MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT

SCHRIEBER LAKE MITIGATION SITE
LINCOLN COUNTY, MONTANA

PROJECT COMPLETED: 2014

MONITORING REPORT #7: DECEMBER 2017



Prepared for:

VISION ZERO
zero deaths · zero serious injuries
MONTANA DEPARTMENT OF TRANSPORTATION

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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 incudes 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.

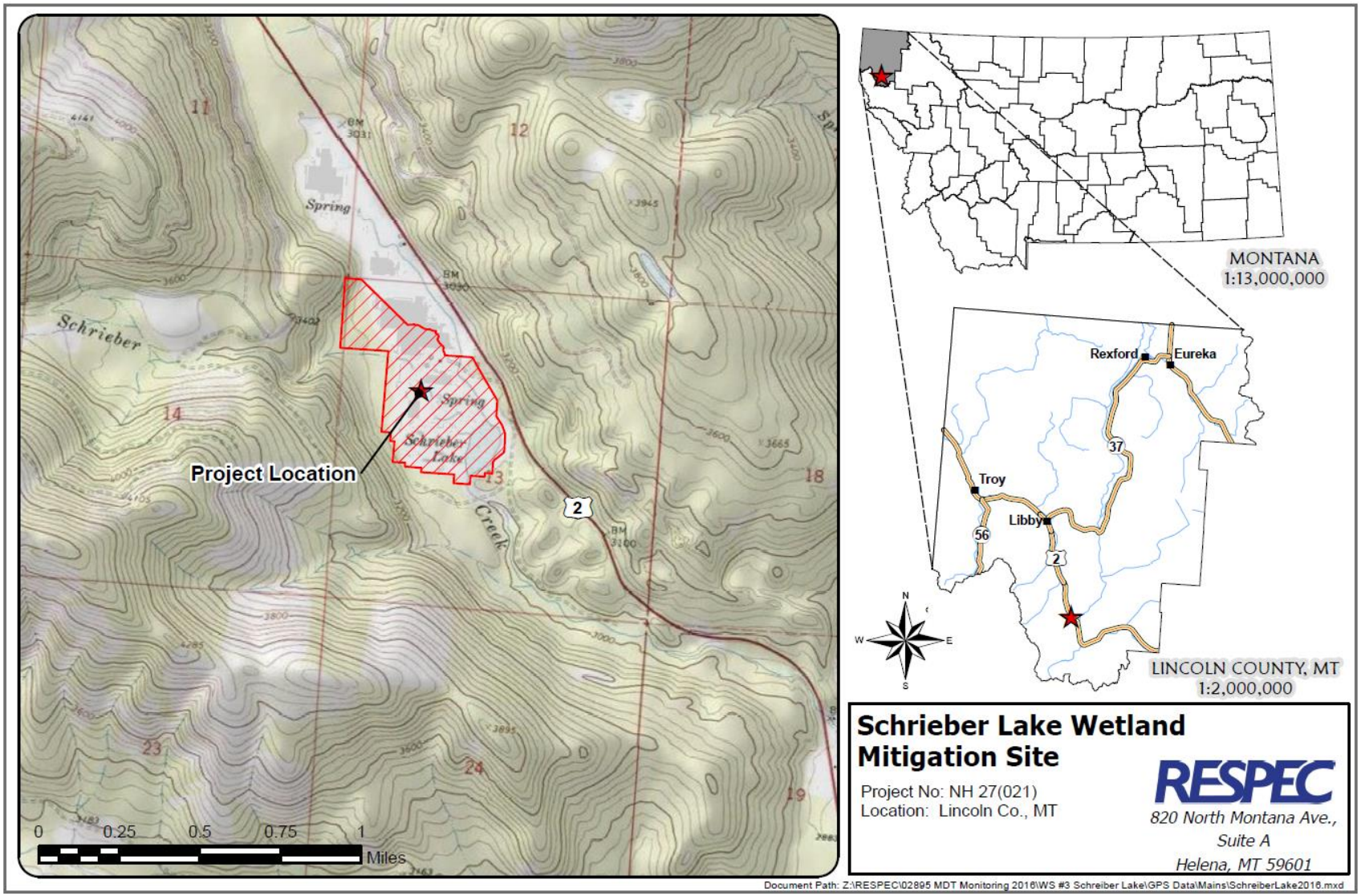


Figure 1-1. Project Location of the Schrieber Lake Site.

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

Wetland Mitigation	Acreage	Ratio[a]	Credit Acres
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)[b]	3.81	5 to 1	0.76
Open Water – Schrieber Lake	8.60	None	0
Temporary Project Impacts[c]	6.34	None	0
Permanent Project Impacts	0.02	None	–0.02
Total Mitigation Credit Acreage	**48.06**		**13.40 acres**

(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 (± 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[a]
Abies grandis	Grand Fir	FACU
Achillea millefolium	Common Yarrow	FACU
Agrostis scabra	Rough Bent	FAC
Agrostis stolonifera	Spreading Bent	FAC
Algae, green	Algae, green	NL
Alnus incana	Speckled Alder	FACW
Alopecurus pratensis	Field Meadow Foxtail	FAC
Amelanchier alnifolia	Saskatoon Service-Berry	FACU
Antennaria sp.	Pussytoes	NL
Apocynum androsaemifolium	Spreading Dogbane	FACU
Aquatic macrophytes	Aquatic macrophytes	NL
Arctostaphylos uva-ursi	Red Bearberry	FACU
Bromus marginatus	Mountain Brome	NL
Betula pumila	Bog Birch	OBL
Bromus inermis	Smooth Brome	UPL
Calamagrostis rubescens	Pinegrass	NL
Campanula rotundifolia	Bluebell-of-Scotland	FACU
Cardaria draba	Whitetop	NI
Carex aquatilis	Leafy Tussock Sedge	OBL
Carex bebbii	Bebb's Sedge	OBL
Carex geyeri	Geyer's Sedge	NL
Carex inops	Long-Stolon Sedge	NL
Carex lasiocarpa	Woolly-Fruit Sedge	OBL
Carex nebrascensis	Nebraska Sedge	OBL
Carex simulata	Analogue Sedge	OBL
Carex sp.	Sedge	NL
Carex utriculata	Northwest Territory Sedge	OBL
Carex vesicaria	Lesser Bladder Sedge	OBL
Centaurea stoebe	Spotted Knapweed	NL
Cirsium arvense	Canada Thistle	FAC
Cirsium vulgare	Bull Thistle	FACU
Comarum palustre	Purple Marshlocks	OBL
Cornus canadensis	Canadian Bunchberry	FAC
Crataegus douglasii	Black Hawthorn	FAC
Cynoglossum officinale	Houndstongue	FACU
Dactylis glomerata	Orchard Grass	FACU
Deschampsia caespitosa	Tufted Hair Grass	FACW
Elymus glaucus	Blue Wild Rye	FACU
Elymus repens	Creeping Wild Rye	FAC
Elymus trachycaulus	Slender Wild Rye	FAC
Epilobium ciliatum	Fringed Willow Herb	FACW
Equisetum arvense	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[a]
Fragaria virginiana	Virginia Strawberry	FACU
Galium triflorum	Fragrant Bedstraw	FACU
Geum macrophyllum	Large-Leaf Avens	FAC
Glyceria grandis	**American Mannagrass**	**OBL**
Glyceria striata	Fowl Mannagrass	OBL
Gnaphalium palustre	Western Marsh Cudweed	FACW
Hypericum perforatum	Common St. John's-Wort	FACU
Juncus nodosus	Knotted Rush	OBL
Juncus tenuis	Lesser Poverty Rush	FAC
Larix occidentalis	Western Larch	FACU
Lemna minor	Common Duckweed	OBL
Leucanthemum vulgare	Ox-Eye Daisy	FACU
Linaria dalmatica	Dalmatian Toadflax	NL
Linaria vulgaris	Butter-and-Eggs	NL
Mahonia aquifolium	Holly-Leaf Oregon-Grape	FACU
Maianthemum stellatum	Starry False Solomon's-Seal	FAC
Moss	Sphagnum/Aulacomnium Moss	NL
Nasella viridula	Green Needlegrass	NL
Pascopyrum smithii	Western Wheatgrass	FACU
Penstemon sp.	Beardtongue	NL
Persicaria amphibia	Water Smartweed	OBL
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FAC
Pinus contorta	Lodgepole Pine	FAC
Pinus monticola	Western White Pine	FACU
Pinus ponderosa	Ponderosa Pine	FACU
Plantago sp.	Plantain	NL
Poa compressa	Flat-Stem Bluegrass	FACU
Poa palustris	Fowl Bluegrass	FAC
Poa pratensis	Kentucky Bluegrass	FAC
Poa sp.	Bluegrass	NL
Potentilla anserina	Silverweed	OBL
Potentilla norvegica	Norwegian Cinquefoil	FAC
Pseudoroegneria spicata	Bluebunch Wheatgrass	NL
Pseudotsuga menziesii	Douglas Fir	FACU
Rhamnus alnifolia	Alder-Leaf Buckthorn	FACW
Rosa woodsii	Woods' Rose	FACU
Rumex acetosella	Common Sheep Sorrel	FACU
Salix bebbiana	Gray Willow	FACW
Salix boothii	Booth's Willow	FACW
Salix candida	Sage Willow	OBL
Salix geyeriana	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[(a)]
Salix sp.	Willow	NL
Scutellaria galericulata	Hooded Skullcap	OBL
Shepherdia canadensis	Russet Buffalo-Berry	UPL
Symphoricarpos albus	Common Snowberry	FACU
Symphyotrichum spathulatum	Mountain American-Aster	FAC
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Pennycress	UPL
Trifolium aureum	Yellow Clover	NL
Typha latifolia	Broad-Leaf Cattail	OBL
Urtica dioica	Stinging Nettle	FAC
Vaccinium sp.	Blueberry	NL
Verbascum thapsus	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 pretense*), 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

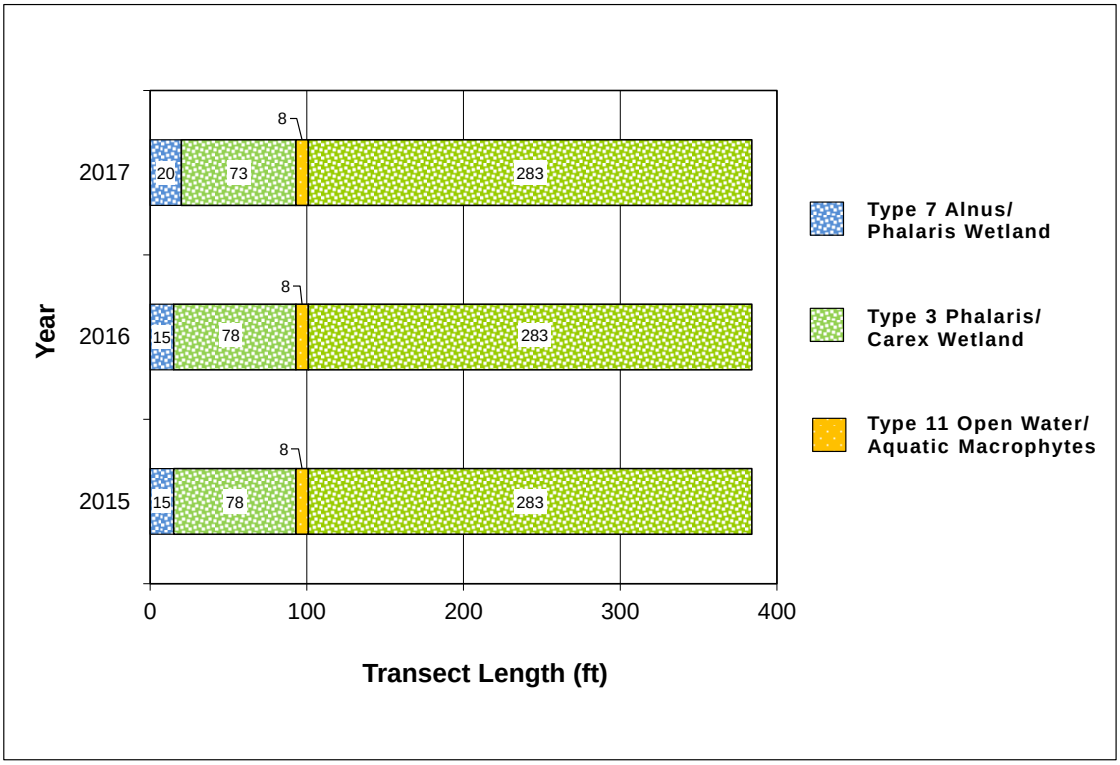


Chart 3-1. Transect Map Showing Community Types on T-1 From 2015 Through 2017 From Start (0 Foot) to Finish (384 Feet).

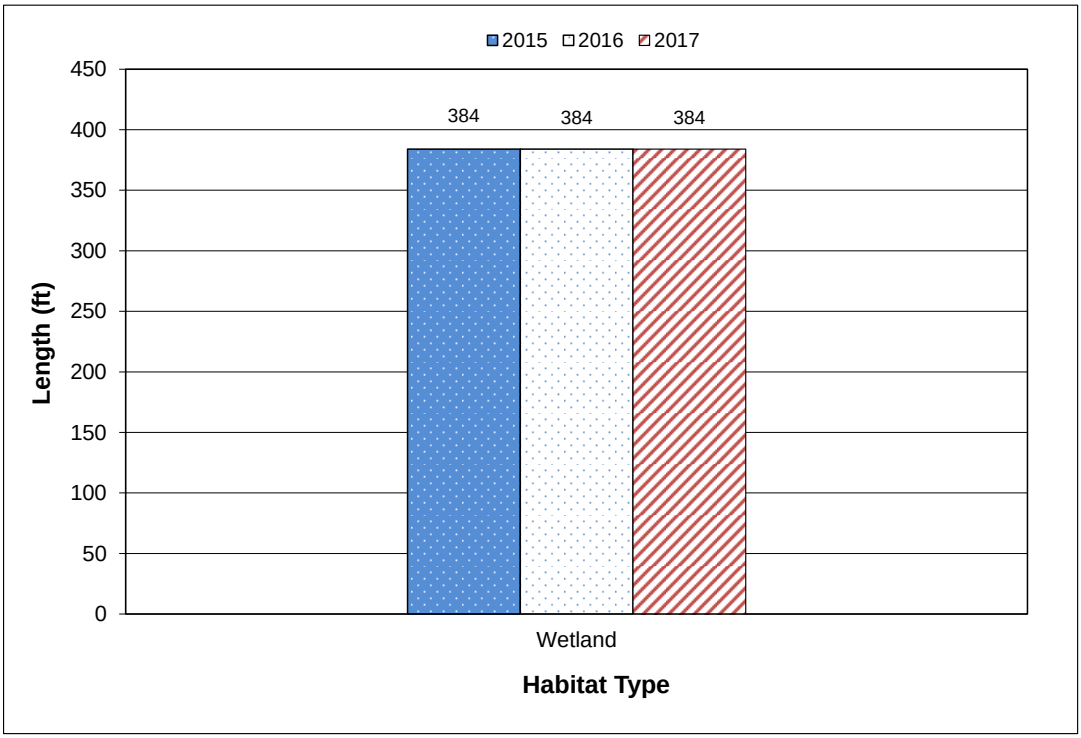


Chart 3-2. Length of Habitat Types Within T-1 From 2015 Through 2017.

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

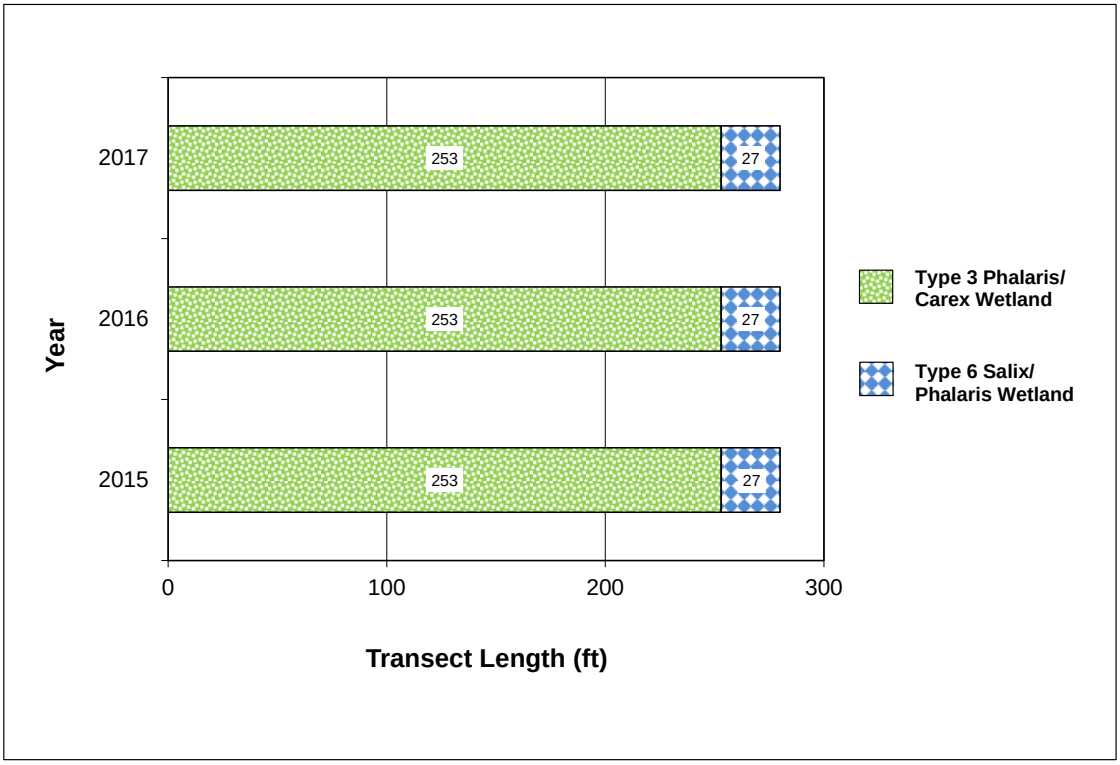


Chart 3-3. Transect Map Showing Community Types on T-2 From 2015 Through 2017 From Start (0 Foot) to Finish (280 Feet).

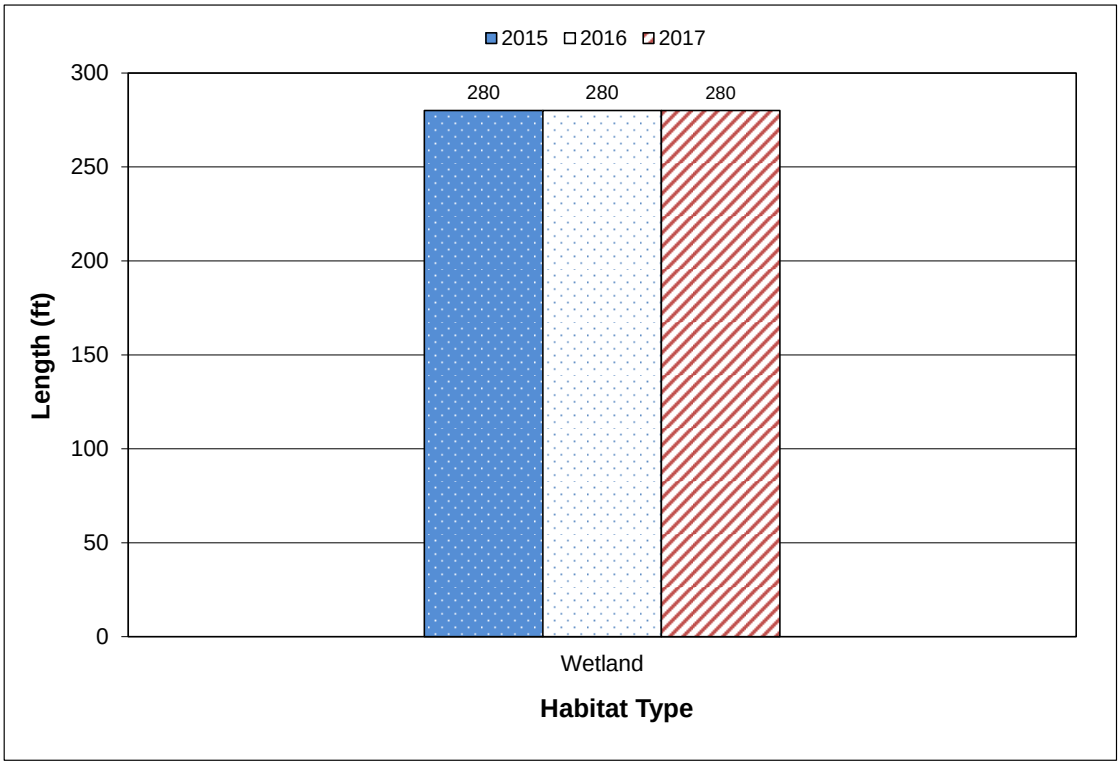


Chart 3-4. Length of Habitat Types Within T-2 From 2015 Through 2017.

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

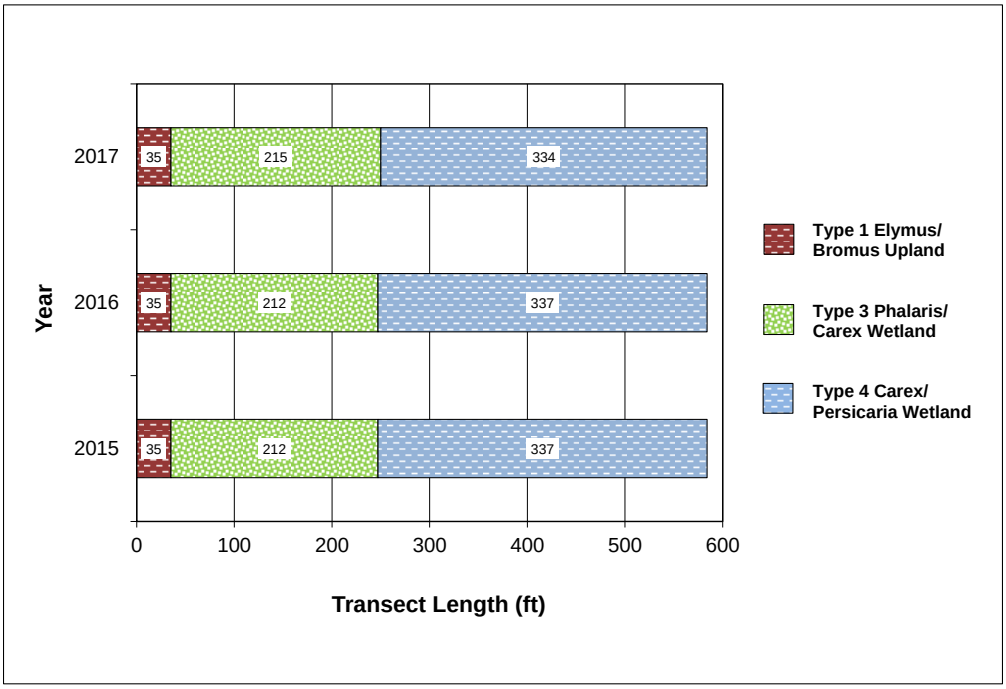


Chart 3-5. Transect Map Showing Community Types on T-3 From 2015 Through 2017 From Start (0 Foot) to Finish (584 Feet).

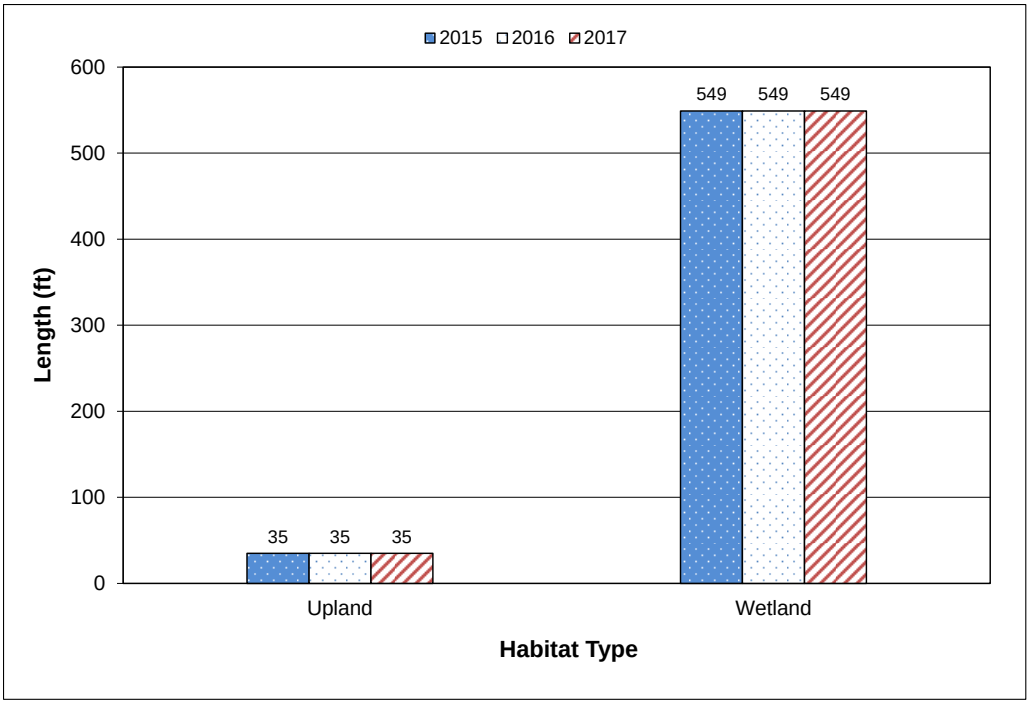


Chart 3-6. Length of Habitat Types Within T-3 From 2015 Through 2017.

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 Udifluvent. 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 Schreiber 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 Schreiber Lake (8.26 acres), the Schreiber 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 Schreiber 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[(a)]	**52.10**	**52.10**	**52.10**
Project Area	**104.70**	**104.70**	**104.70**

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

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

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

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 Schreiber 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

Function and Value Parameters From the 2008 MDT MWAM[(a)]	2015	2016	2017
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)
Actual Points/Possible Points	**9.7/11**	**9.6/11**	**9.6/11**
% of Possible Score Achieved	**88.2**	**87**	**87**
Overall Category	**I**	**I**	**I**
Acreage of Assessed Aquatic Habitats within Easement (acres)	**51.7**	**51.7**	**51.7**
Functional Units (acreage × actual points)	**501.49**	**496.32**	**496.32**

(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^2)				Mean Depth (ft)				W:D Ratio			
	2015	2016	2017	%Δ[(a)]	2015	2016	2017	%Δ[(a)]	2015	2016	2017	%Δ[(a)]	2015	2016	2017	%Δ[(a)]	2015	2016	2017	%Δ[(a)]
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 Shrieber 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
	Subtotal for Schrieber Creek		**82**	**8**	**92**	**11**	**93**	**7**
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
	Subtotal for Coyote Creek		**100**	**2**	**100**	**1**	**100**	**1**

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
	Subtotal for Schrieber Creek	**56**	**56**	**56**	**86**	**86**	**86**	**86**	**85**	**85**
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
	Subtotal for Coyote Creek	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

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
	Subtotal for Schrieber Creek		**92**		**86**	**91**
Coyote Creek	CC1A-1	100	100	50	100	100
	CC1A-2	100	100	50	100	100
	CC1B-1	75	100	50	100	100
	Subtotal for Coyote Creek		**100**		**100**	**100**

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	*Phalaris arundinacea*	9
	SC1-2	*Cirsium arvense*	6
	SC2A-1	*Bromus inermis*	3
	SC2A-2	*Elymus/Phalaris*	9
	SC2B-1	*Elymus/Phalaris*	9
	SC3-1	*Phalaris arundinacea*	9
	SC3-2	*Phalaris arundinacea*	9
	SC7	*Phalaris arundinacea*	9
Coyote Creek	CC1A-1	*Phalaris arundinace/Carex simulata*	9
	CC1A-2	*Phalaris arundinacea/Carex simulata*	9
	CC1B-1	*Phalaris arundinacea*	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 Schreiber 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[a]	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 *Carex* areas	25.60	4:1	6.40	25.66	6.42	25.66	6.42	25.66	6.42
Upland buffer (50 ft)[b]	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
Total Mitigation Acreage	**39.55**		**13.40**	**46.05**	**16.09**	**46.05**	**16.09**	**41.44**	**15.17**

(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[a]	CC[b]	
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[(a)]	CC[(b)]	
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 ii.) 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[a]	CC[b]	
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[(a)]	CC[(b)]	
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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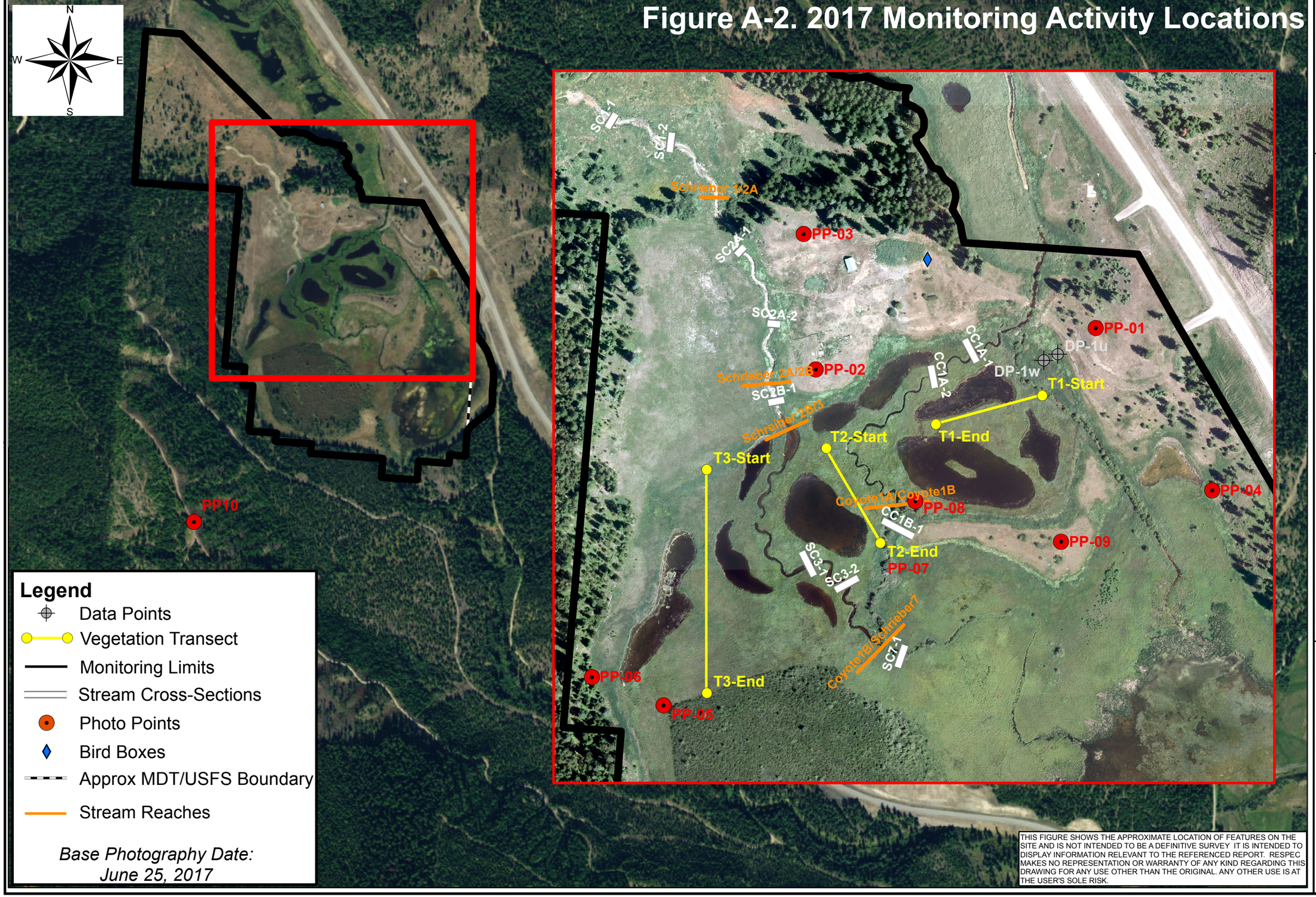
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APPENDIX A
PROJECT AREA MAPS

MDT Wetland Mitigation Monitoring
Schrieber Lake
Lincoln County, Montana

Figure A-2. 2017 Monitoring Activity Locations



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.

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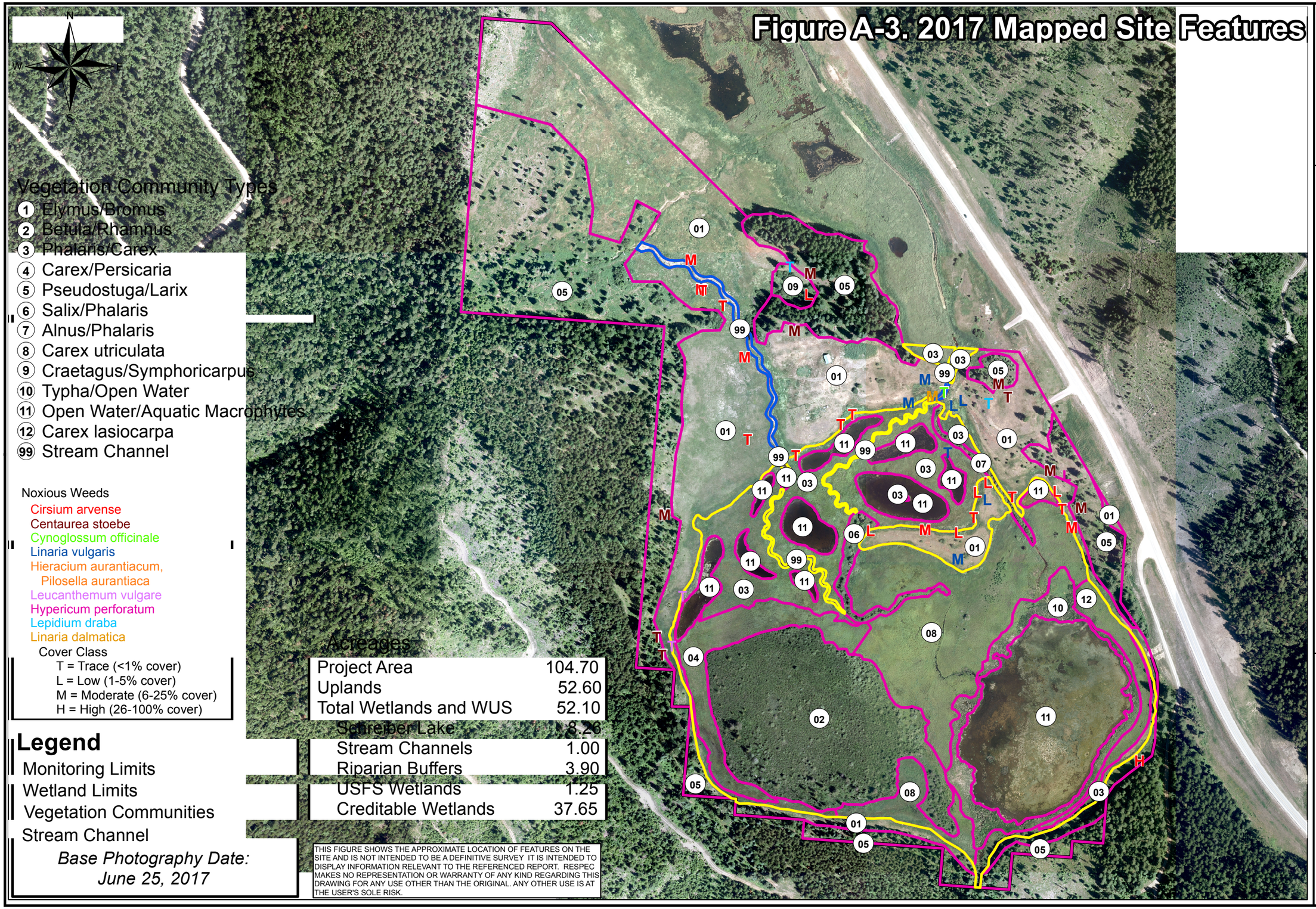
Schrieber Lake Mitigation Site
2017 Monitoring Activity Locations

0 100 200 400 600 800 1,000 Feet

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 Schreiber Lake\GPS Data\Mains\Monitor2017.mxd

Figure A-3. 2017 Mapped Site Features



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

Schrieber Lake Mitigation Site
2017 Mapped Site Features

0 150 300 600 900 1,200 1,500 Feet

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 Schreiber Lake\GPS Data\Mains\Veg2017.mxd

APPENDIX B
MONITORING FORMS

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

Comments / Problems: _____

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

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

Comments / Problems: _____

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

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

Comments / Problems: _____

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

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

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
Various Species	1500		

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: **20 feet (Station 0-20)**	
Vegetation Community Type: Alnus incana / Phalaris arundinacea	
Plant Species	**Cover**
Phalaris arundinacea	5 = > 50%
Total Vegetative Cover:	100%

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

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

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Schrieber Lake** Date: **July 26, 2017** Examiner: **M. Traxler**
Transect Number: **2** Approximate Transect Length: **280 feet** Compass Direction from Start: **152˚** Note: _____

Transect Interval Length: **253 feet (Station 0-253)**	
Vegetation Community Type: Phalaris arundinacea / Carex sp.	
Plant Species	**Cover**
Phalaris arundinacea	4 = 21-50%
Carex simulata	4 = 21-50%
Carex utriculata	4 = 21-50%
Persicaria amphibia	3 = 11-20%
Carex vesicaria	1 = 1-5%
Total Vegetative Cover:	100%

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

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

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
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: **35 feet (Station 0-35)**	
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: **215 feet (Station 35-250)**	
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: **334 feet (Station 250-584)**	
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		Indicator Class	Source
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

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	☐	☐	☐	
Ground squirrel sp.	3	☐	☐	☐	
Columbia spotted frog		☐	☐	☐	
Pumpkinseed		☐	☐	☐	
Brook trout		☐	☐	☐	
Shiner sp.		☐	☐	☐	
Painted turtle		☐	☐	☐	
Common garter snake		☐	☐	☐	
White-tailed deer	1	☐	☐	☐	
Raccoon		☒	☐	☐	
Muskrat		☒	☐	☐	
Meadow vole		☐	☐	☐	
Bushy-tailed woodrat		☐	☐	☐	
Western jumping mouse		☐	☐	☐	
Yellow-bellied marmot		☐	☐	☐	
Elk		☒	☐	☐	
Moose		☒	☐	☐	
Western toad		☐	☐	☐	

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 adfluvents, 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 ○ No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present? Yes ○ No ◉	
Wetland Hydrology Present? Yes ○ No ◉	

Remarks:
Upland sample point.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size: 5 Foot Radius)			
1. Elymus repens	70	☑ 77.8%	FACU
2. Bromus inermis	10	☐ 11.1%	UPL
3. Alopecurus pratensis	5	☐ 5.6%	FACW
4. Phleum pratense	5	☐ 5.6%	FACU
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	90	= Total Cover	
Woody Vine Stratum (Plot size: 30 Foot Radius)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 1

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	10	x 5 =	50
Column Totals:	90 (A)		360 (B)

Prevalence Index = B/A = 4.000

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:
Dominance of upland vegetation.

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

Soil

Sampling Point: DP-1U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					Silt Loam	Rocks at 10", dry

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicator present.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (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:

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 adfluvents, 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 ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks:

Wetland sample point. Wetland area dominated by emergent vegetation type.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size: 5 Foot Radius)			
1. Phalaris arundinacea	80	☑ 79.2%	FACW
2. Alopecurus pratensis	20	☐ 19.8%	FACW
3. Bromus inermis	1	☐ 1.0%	UPL
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	101	**= Total Cover**	
Woody Vine Stratum (Plot size: 30 Foot Radius)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 1

Dominance Test worksheet:

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	101 (A)		205 (B)

Prevalence Index = B/A = 2.030

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

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 Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR	2/1	100						Loam	
9-18	10YR	2/1	95	10YR	5/8	5	D	M	Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydric soil indicators present with smell of hydrogen sulfide.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (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):	10

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 realtively 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 cuthoat 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
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	.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 Natioal Forest personel 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)	☒ **High**								☐ **Moderate**								☐ **Low**			
Class Cover Distribution (all vegetated classes)	☐ **Even**				☒ **Uneven**				☐ **Even**				☐ **Uneven**				☐ **Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
☒ **Low Disturbance** at AA (see #12i)	---	---	---	---	E	---	---	---	---	---	---	---	E	---	---	---	---	---	---	---
☐ **Moderate Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** 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)**			
	☒ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **Low**
☒ **Substantial**	1E	---	---	---
☐ **Moderate**	---	---	---	---
☐ **Minimal**	---	---	---	---

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	☒ **Permanent / Perennial**						☐ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☒ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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 queary). 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 ☒ **N0**

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 **iia** 0.1 = __ or ☒ **N0**

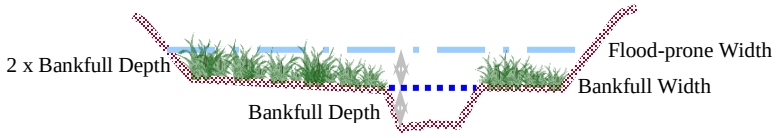
iii. Final Score and Rating: .5M **Comments:** Salmonids observed in creek during monitoring. Assumed to be brook trout, but is unverified.

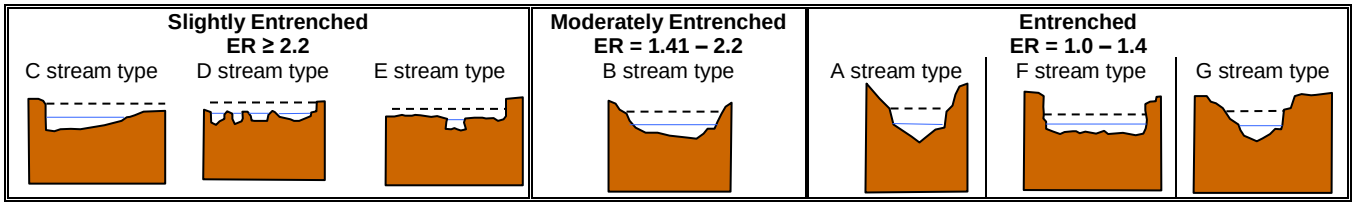
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

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.

25 / 10 = 2.5
flood prone width / bankfull width = entrenchment ratio





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)	☒ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☐ 25-75%	☒ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	---	.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	**☒ >5 acre feet**			**☐ 1.1 to 5 acre feet**			**☐ ≤1 acre foot**		
Duration of Surface Water at Wetlands within the AA	**☒ P/P**	**☐ S/I**	**☐ T/E**	**☐ P/P**	**☐ S/I**	**☐ T/E**	**☐ P/P**	**☐ S/I**	**☐ T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	---	---	---	---	---	---	---	---
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	**☒ ≥ 70%**		**☐ < 70%**		**☐ ≥ 70%**		**☐ < 70%**	
Evidence of Flooding / Ponding in AA	**☒ Yes**	**☐ No**	**☐ Yes**	**☐ No**	**☐ Yes**	**☐ No**	**☐ Yes**	**☐ No**
AA contains **no or restricted outlet**	1H	---	---	---	---	---	---	---
AA contains **unrestricted 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**		
	☒ Permanent / Perennial	**☐ Seasonal / Intermittent**	**☐ Temporary / Ephemeral**
☒ ≥ 65%	1H	---	---
☐ 35-64%	---	---	---
☐ < 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)**		
	☒ E/H	**☐ M**	**☐ L**
☐ E/H	---	---	---
☒ M	H	---	---
☐ L	---	---	---
☐ 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	**☒ Vegetated Component >5 acres**						**☐ Vegetated Component 1-5 acres**						**☐ Vegetated Component <1 acre**					
B	**☒ High**		**☐ Moderate**		**☐ Low**		**☐ High**		**☐ Moderate**		**☐ Low**		**☐ High**		**☐ Moderate**		**☐ Low**	
C	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
P/P	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 ≥ 30% plant cover, ≤ 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 ≥ 50-foot wide vegetated upland buffer around ≥ 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 *FROM GROUNDWATER DISCHARGE* or *WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*** ☒ **P/P**	☐ **S/I**	☐ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	1H	---	---	---
☐ **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**		
Estimated Relative Abundance (#11)	☐ Rare	☒ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	.9H	---	---	---	---	---	---	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** 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): Schrieber 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	
Total Points	**9.6**	**11**	**496.32 Total Functional Units**	
Percent of Possible Score 87% (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**

APPENDIX C
PROJECT AREA PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Schrieber Lake
Lincoln County, Montana

Schrieber Lake: Photo Point Photographs



Photo Point: 1 – Photo 1 Location: Northwest Boundary
Bearing: 242 degrees Year: 2015



Photo Point: 1 – Photo 1 Location: Northwest Boundary
Bearing: 242 degrees Year: 2016



Photo Point: 1 – Photo 1 Location: Northwest Boundary
Bearing: 242 degrees Year: 2017



Photo Point: 1 – Photo 2 Location: Northwest Boundary
Bearing: 197 degrees Year: 2015



Photo Point: 1 – Photo 2 Location: Northwest Boundary
Bearing: 197 degrees Year: 2016



Photo Point: 1 – Photo 2 Location: Northwest Boundary
Bearing: 197 degrees Year: 2017

Schrieber Lake: Photo Point Photographs



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



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



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



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



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



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

Schrieber Lake: Photo Point Photographs



Photo Point: 2 – Photo 2 Location: Near Corral
Bearing: 205 degrees Year: 2015



Photo Point: 2 – Photo 2 Location: Near Corral
Bearing: 205 degrees Year: 2016



Photo Point: 2 – Photo 2 Location: Near Corral
Bearing: 205 degrees Year: 2017



Photo Point: 2 – Photo 3 Location: Near Corral
Bearing: 162 degrees Year: 2015



Photo Point: 2 – Photo 3 Location: Near Corral
Bearing: 162 degrees Year: 2016



Photo Point: 2 – Photo 3 Location: Near Corral
Bearing: 162 degrees Year: 2017

Schrieber Lake: Photo Point Photographs



Photo Point: 2 – Photo 4 Location: Near Corral
Bearing: 104 degrees Year: 2015



Photo Point: 2 – Photo 4 Location: Near Corral
Bearing: 104 degrees Year: 2016



Photo Point: 2 – Photo 4 Location: Near Corral
Bearing: 104 degrees Year: 2017



Photo Point: 2 – Photo 5 Location: Near Corral
Bearing: 69 degrees Year: 2015



Photo Point: 2 – Photo 5 Location: Near Corral
Bearing: 69 degrees Year: 2016



Photo Point: 2 – Photo 5 Location: Near Corral
Bearing: 69 degrees Year: 2017

Schrieber Lake: Photo Point Photographs



Photo Point: 3 Location: West of Corrals
Bearing: 183 degrees Year: 2015



Photo Point: 3 Location: West of Corrals
Bearing: 183 degrees Year: 2016



Photo Point: 3 Location: West of Corrals
Bearing: 183 degrees Year: 2017



Photo Point: 4 Location: East corner of Cell 10
Bearing: 287 degrees Year: 2015



Photo Point: 4 Location: East corner of Cell 10
Bearing: 287 degrees Year: 2016



Photo Point: 4 Location: East corner of Cell 10
Bearing: 287 degrees Year: 2017

Schrieber Lake: Photo Point Photographs



Photo Point: 5 – Photo 1 Location: Corner of carr
Bearing: 143 degrees Year: 2015



Photo Point: 5 – Photo 1 Location: Corner of carr
Bearing: 143 degrees Year: 2016



Photo Point: 5 – Photo 1 Location: Corner of carr
Bearing: 143 degrees Year: 2017

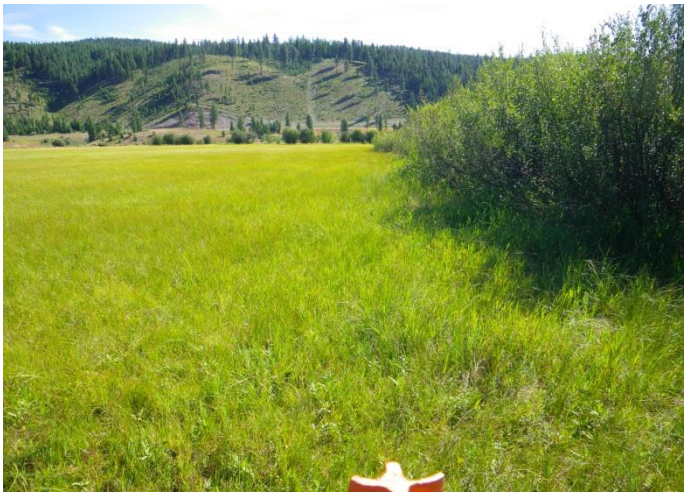


Photo Point: 5 – Photo 2 Location: Corner of carr
Bearing: 35 degrees Year: 2015

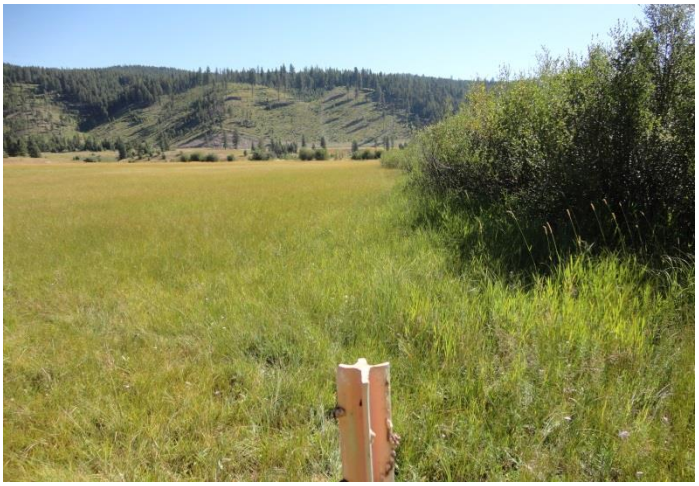


Photo Point: 5 – Photo 2 Location: Corner of carr
Bearing: 35 degrees Year: 2016



Photo Point: 5 – Photo 2 Location: Corner of carr
Bearing: 35 degrees Year: 2017

Schrieber Lake: Photo Point Photographs



Photo Point: 5 – Photo 3 Location: Corner of carr
Bearing: 359 degrees Year: 2015



Photo Point: 5 – Photo 3 Location: Corner of carr
Bearing: 359 degrees Year: 2016



Photo Point: 5 – Photo 3 Location: Corner of carr
Bearing: 359 degrees Year: 2017



Photo Point: 6 – Photo 1 Location: South end of Cell 1
Bearing: 150 degrees Year: 2015



Photo Point: 6 – Photo 1 Location: South end of Cell 1
Bearing: 150 degrees Year: 2016



Photo Point: 6 – Photo 1 Location: South end of Cell 1
Bearing: 150 degrees Year: 2017

Schrieber Lake: Photo Point Photographs



Photo Point: 6 – Photo 2 Location: South end of Cell 1
Bearing: 103 degrees Year: 2015



Photo Point: 6 – Photo 2 Location: South end of Cell 1
Bearing: 103 degrees Year: 2016



Photo Point: 6 – Photo 2 Location: South end of Cell 1
Bearing: 103 degrees Year: 2017



Photo Point: 6 – Photo 3 Location: South end of Cell 1
Bearing: 52 degrees Year: 2015



Photo Point: 6 – Photo 3 Location: South end of Cell 1
Bearing: 52 degrees Year: 2016



Photo Point: 6 – Photo 3 Location: South end of Cell 1
Bearing: 52 degrees 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 Location: Interior of site
Bearing: 49 degrees Year: 2015



Photo Point: 8 – Photo 2 Location: Interior of site
Bearing: 49 degrees Year: 2016



Photo Point: 8 – Photo 2 Location: Interior of site
Bearing: 49 degrees Year: 2017



Photo Point: 8 – Photo 3 Location: Interior of site
Bearing: 79 degrees Year: 2015



Photo Point: 8 – Photo 3 Location: Interior of site
Bearing: 79 degrees Year: 2016



Photo Point: 8 – Photo 3 Location: Interior of site
Bearing: 79 degrees 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 Location: Overlook
Bearing: 17 degrees Year: 2015



Photo Point: 10 – Photo 1 Location: Overlook
Bearing: 17 degrees Year: 2016



Photo Point: 10 – Photo 1 Location: Overlook
Bearing: 17 degrees Year: 2017



Photo Point: 10 – Photo 2 Location: Overlook
Bearing: 39 degrees Year: 2015



Photo Point: 10 – Photo 2 Location: Overlook
Bearing: 39 degrees Year: 2016



Photo Point: 10 – Photo 2 Location: Overlook
Bearing: 39 degrees Year: 2017

Schrieber Lake: Photo Point Photographs



Photo Point: 10 – Photo 3 Location: Overlook
Bearing: 57 degrees Year: 2015



Photo Point: 10 – Photo 3 Location: Overlook
Bearing: 57 degrees Year: 2016



Photo Point: 10 – Photo 3 Location: Overlook
Bearing: 57 degrees Year: 2017

Schrieber Lake: Vegetation Transect Photographs



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



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



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



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



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



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

Schrieber Lake: Vegetation Transect Photographs



Transect 2: Start Location: T-2
Bearing: 152 degrees Year: 2015



Transect 2: Start Location: T-2
Bearing: 152 degrees Year: 2016



Transect 2: Start Location: T-2
Bearing: 152 degrees Year: 2017



Transect 2: End Location: T-2
Bearing: 332 degrees Year: 2015



Transect 2: End Location: T-2
Bearing: 332 degrees Year: 2016



Transect 2: End Location: T-2
Bearing: 332 degrees Year: 2017

Schrieber Lake: Vegetation Transect Photographs



Transect 3: Start Location: T-3
Bearing: 175 degrees Year: 2015



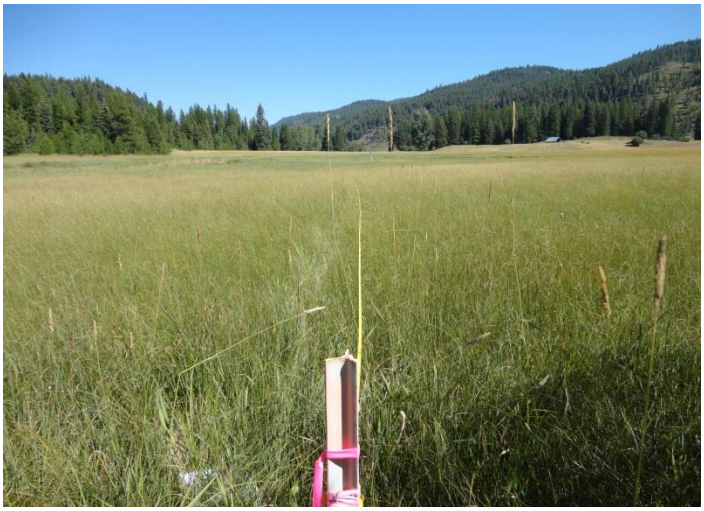
Transect 3: Start Location: T-3
Bearing: 175 degrees Year: 2016



Transect 3: Start Location: T-3
Bearing: 175 degrees Year: 2017



Transect 3: End Location: T-3
Bearing: 355 degrees Year: 2015



Transect 3: End Location: T-3
Bearing: 355 degrees Year: 2016



Transect 3: End Location: T-3
Bearing: 355 degrees Year: 2017

Schrieber Lake: Data Point Photographs

	
Data Point: DP-1W Location: Veg Com 3 Year: 2017	Data Point: DP-1U Location: Veg Com 1 Year: 2017

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 Location: Schrieber Creek
Bearing: 10° – Left Bank Year: 2016



Cross-Section: SC1-2 Location: Schrieber Creek
Bearing: 10° – Left Bank Year: 2017



Cross-Section: SC2A-1 Location: Schrieber Creek
Bearing: 315° – downstream Year: 2016



Cross-Section: SC2A-1 Location: Schrieber Creek
Bearing: 315° – downstream Year: 2017



Cross-Section: SC2A-1 Location: Schrieber Creek
Bearing: 45° – Left Bank Year: 2016



Cross-Section: SC2A-1 Location: Schrieber Creek
Bearing: 45° – Left Bank Year: 2017

Schrieber Lake: Cross-Section Photographs



Cross-Section: SC2A-2 Location: Schrieber Creek
Bearing: 185° – downstream Year: 2016



Cross-Section: SC2A-2 Location: Schrieber Creek
Bearing: 185° – downstream Year: 2017



Cross-Section: SC2A-2 Location: Schrieber Creek
Bearing: 275° – Right Bank Year: 2016



Cross-Section: SC2A-2 Location: Schrieber Creek
Bearing: 275° – Right Bank Year: 2017



Cross-Section: SC2B-1 Location: Schrieber Creek
Bearing: 175° – downstream Year: 2016



Cross-Section: SC2B-1 Location: Schrieber Creek
Bearing: 175° – downstream Year: 2017

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



Cross-Section: SC7-1
Bearing: 20° – Left Bank
Location: Schrieber Creek
Year: 2016



Cross-Section: SC7-1
Bearing: 20° – Left Bank
Location: Schrieber Creek
Year: 2017



Cross-Section: CC1A-1
Bearing: 50° – Upstream
Location: Coyote Creek
Year: 2016



Cross-Section: CC1A-1
Bearing: 50° – Upstream
Location: Coyote Creek
Year: 2017



Cross-Section: CC1A-1
Bearing: 140° – Left Bank
Location: Coyote Creek
Year: 2016



Cross-Section: CC1A-1
Bearing: 320° – Right Bank
Location: Coyote Creek
Year: 2017

Schrieber Lake: Cross-Section Photographs



Cross-Section: CC1A-2 Location: Coyote Creek
Bearing: 85° – Upstream Year: 2016



Cross-Section: CC1A-2 Location: Coyote Creek
Bearing: 85° – Upstream Year: 2017



Cross-Section: CC1A-2 Location: Coyote Creek
Bearing: 175° – Left Bank Year: 2016



Cross-Section: CC1A-2 Location: Coyote Creek
Bearing: 355° – Right Bank Year: 2017



Cross-Section: CC1B-1 Location: Coyote Creek
Bearing: 200° – Downstream Year: 2016



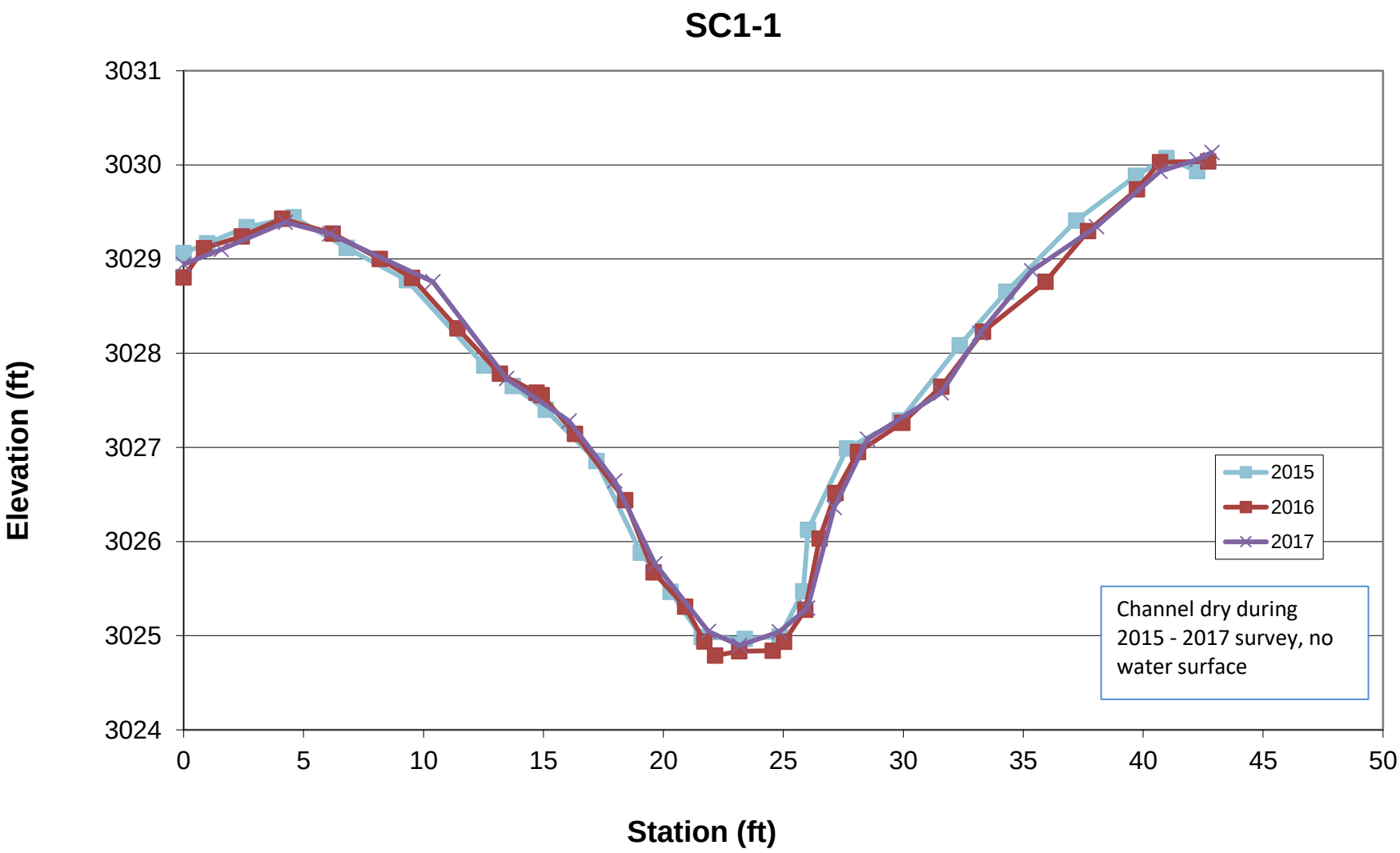
Cross-Section: CC1B-1 Location: Coyote Creek
Bearing: 200° – Downstream Year: 2017

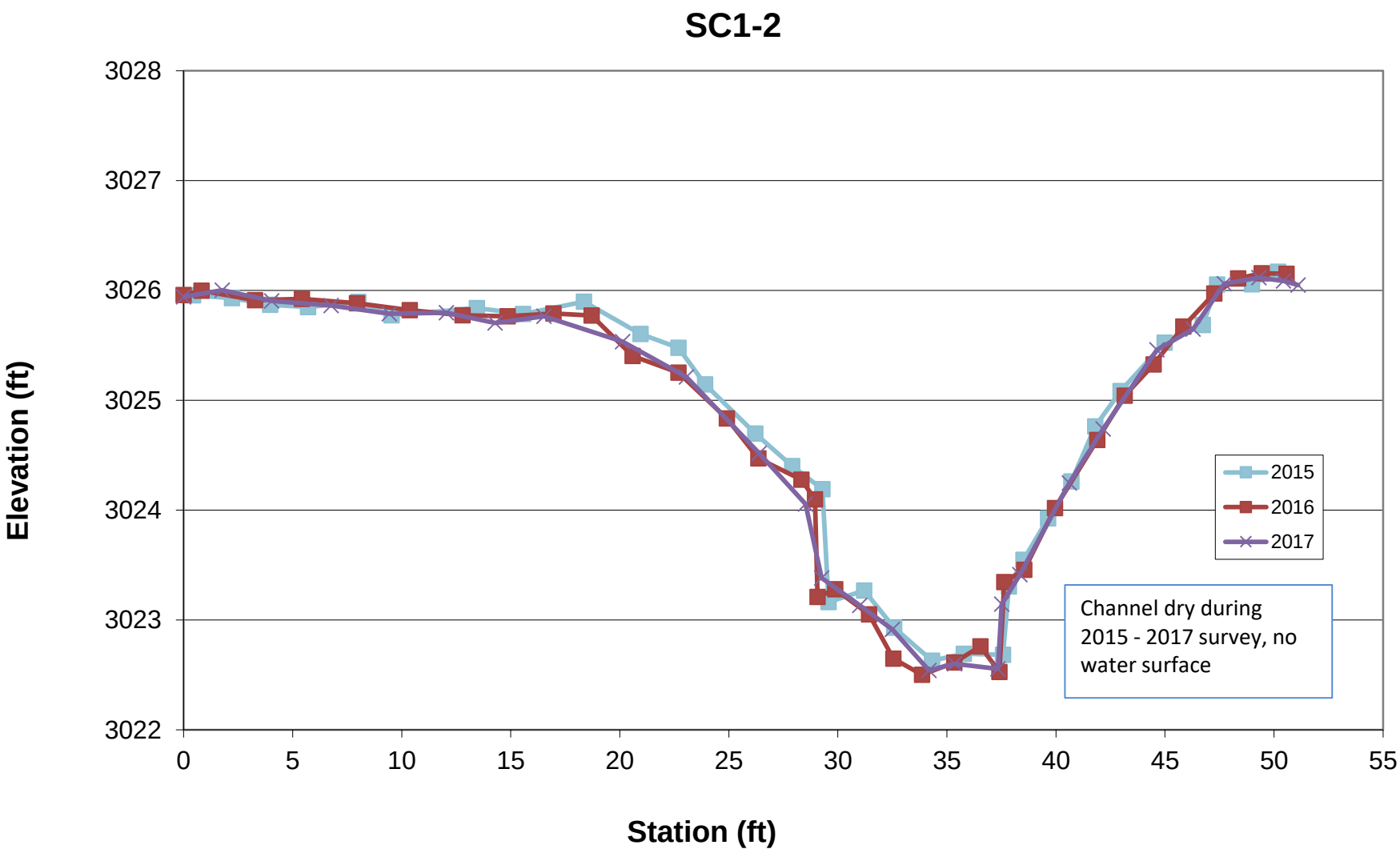
Schrieber Lake: Cross-Section Photographs

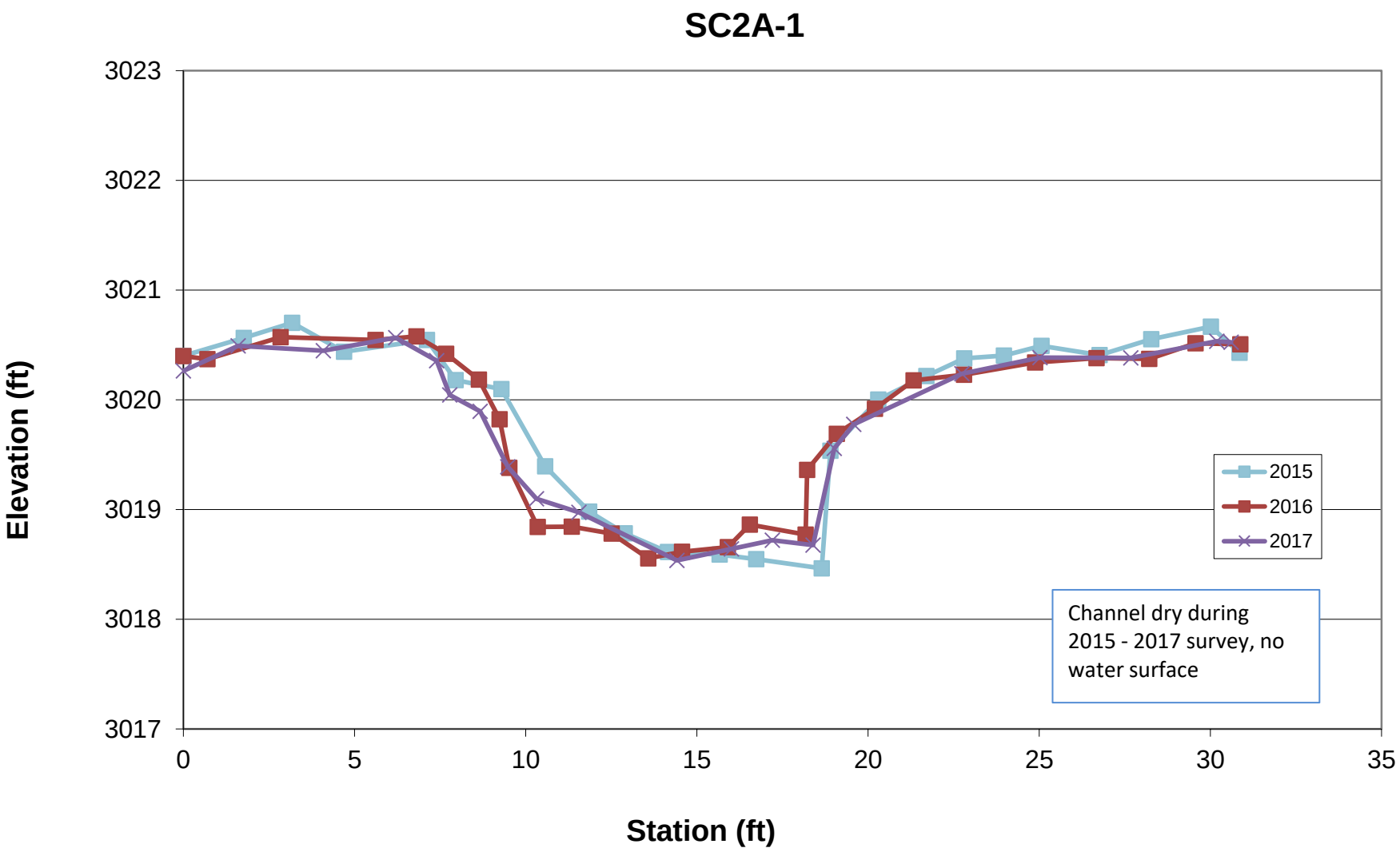
	
Cross-Section: CC1B-1 Location: Coyote Creek Bearing: 110° – Left Bank Year: 2016	Cross-Section: CC1B-1 Location: Coyote Creek Bearing: 290° – Right Bank Year: 2017

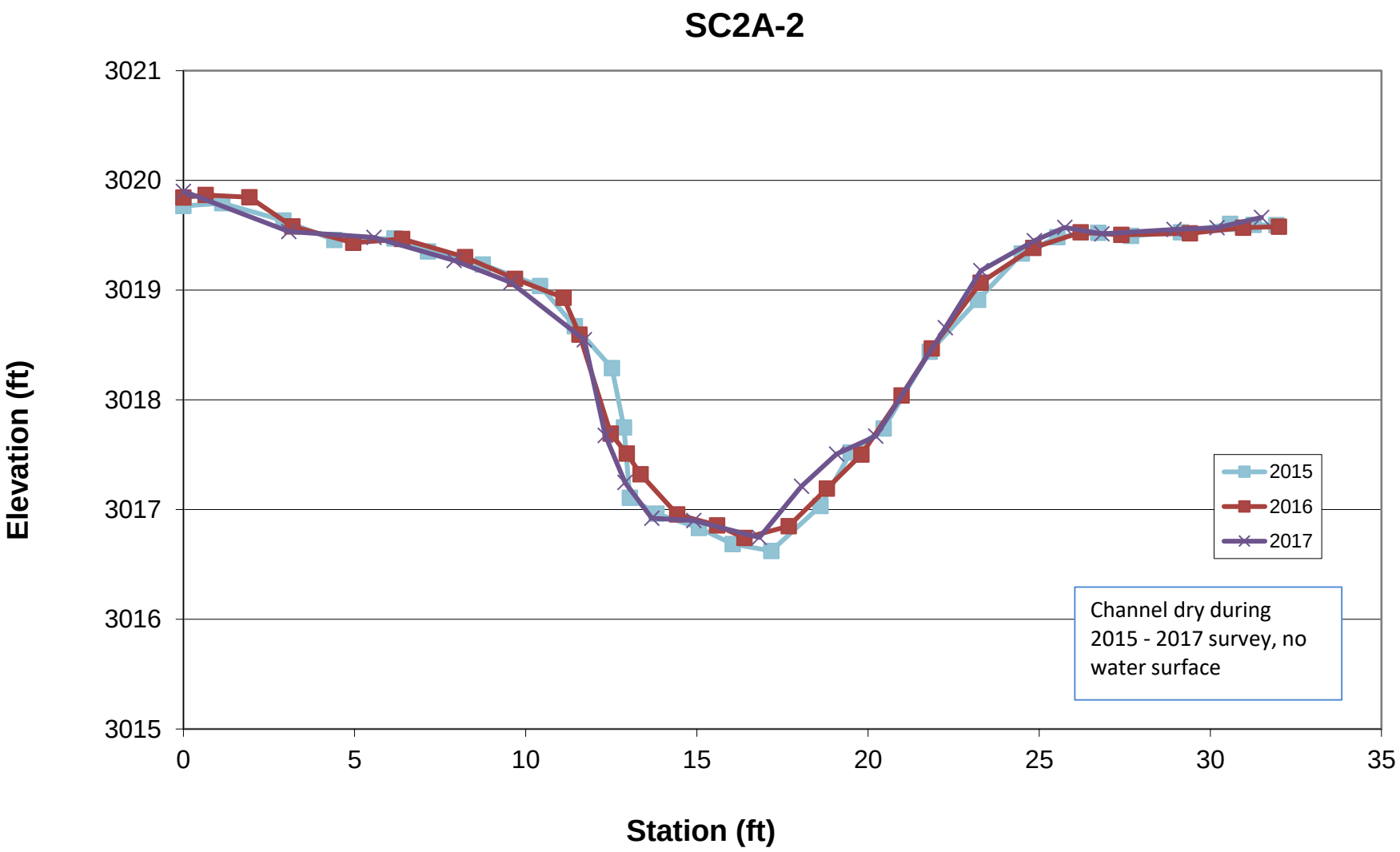
APPENDIX D
SURVEYED STREAM CROSS SECTIONS

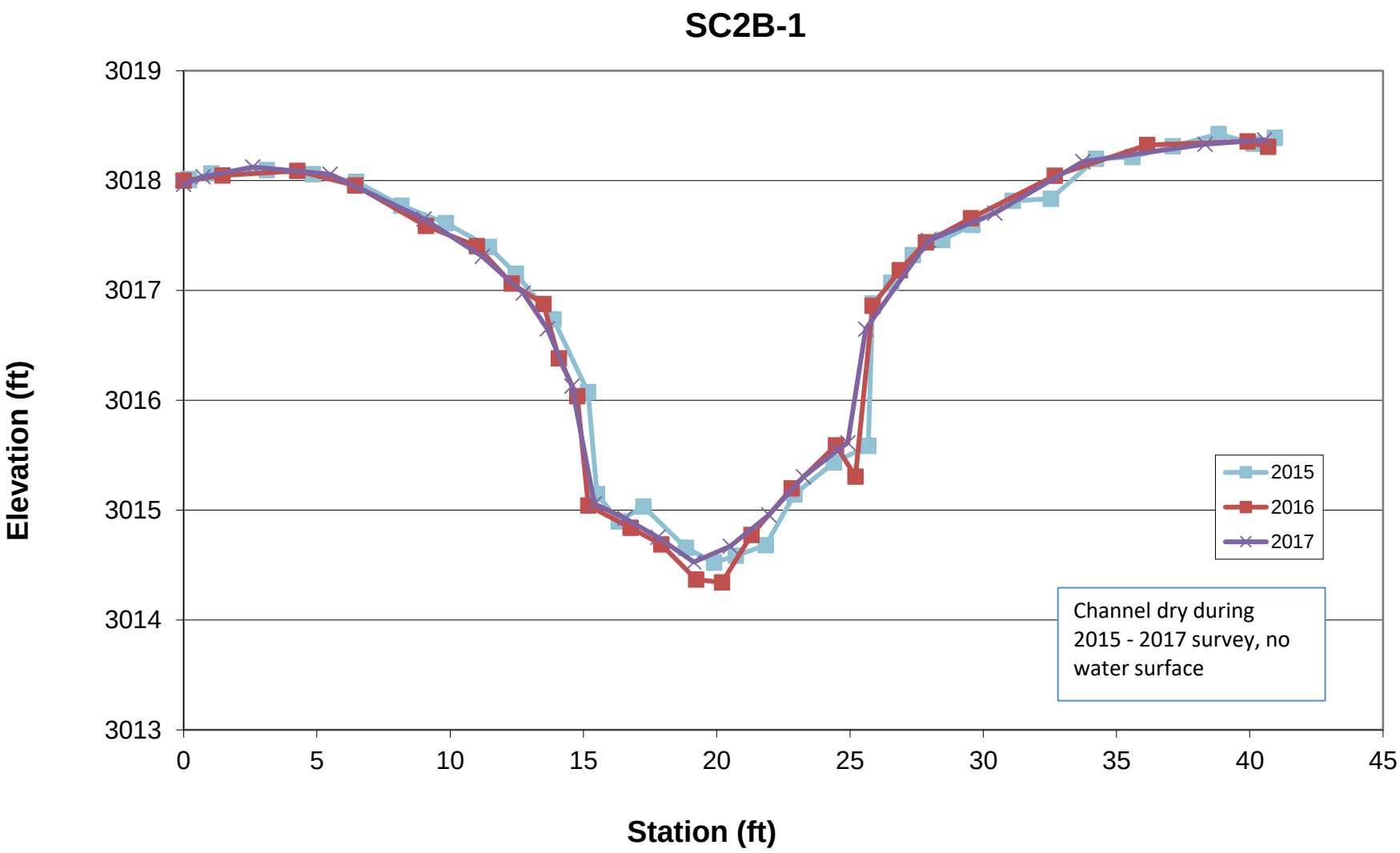
MDT Wetland Mitigation Monitoring
Schrieber Lake
Lincoln County, Montana

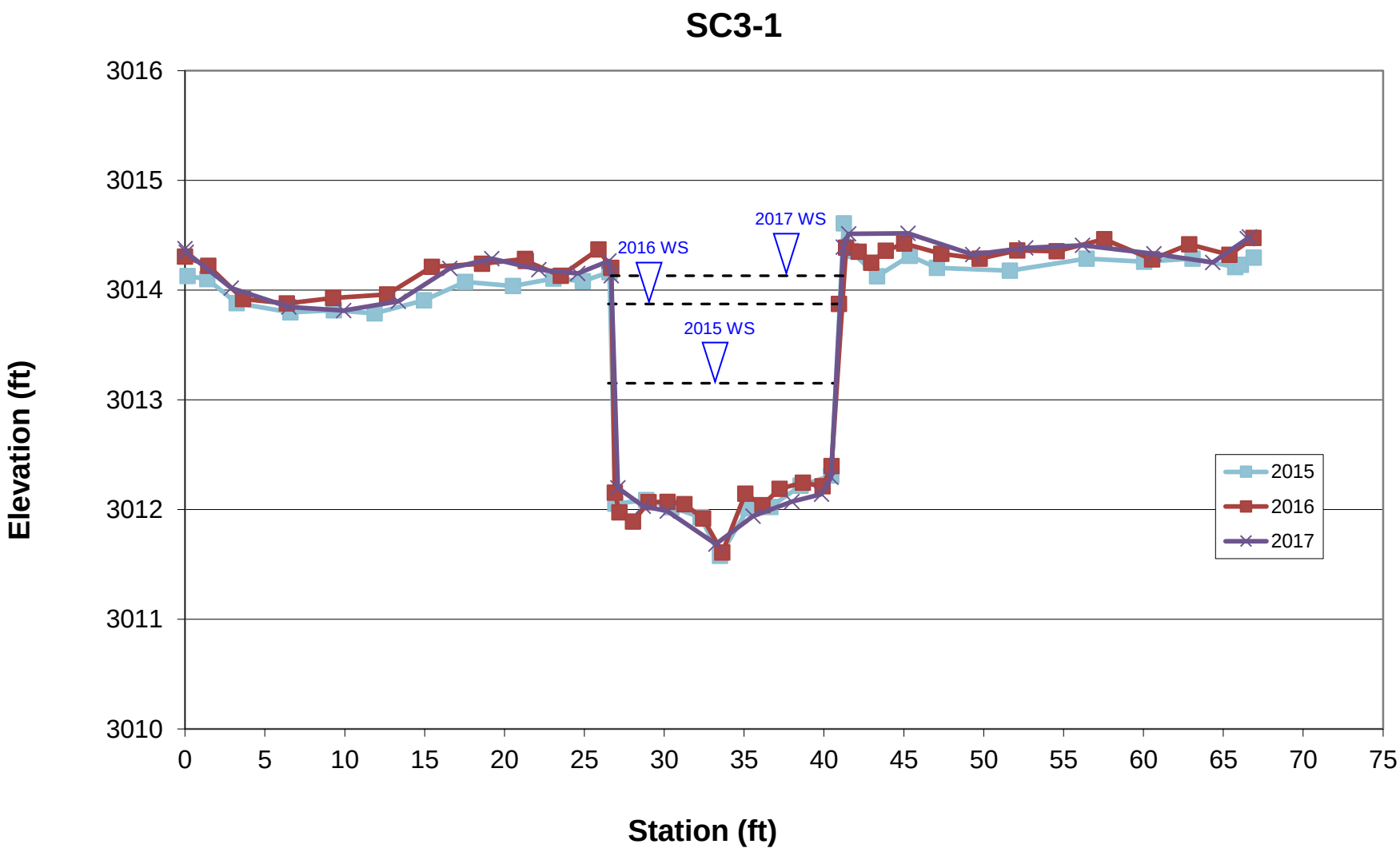

SC1-1
Elevation (ft)
3031
3030
3029
3028
3027
3026
3025
3024
0
5
10
15
20
25
30
35
40
45
50
Station (ft)
2015
2016
2017
Channel dry during 2015 - 2017 survey, no water surface

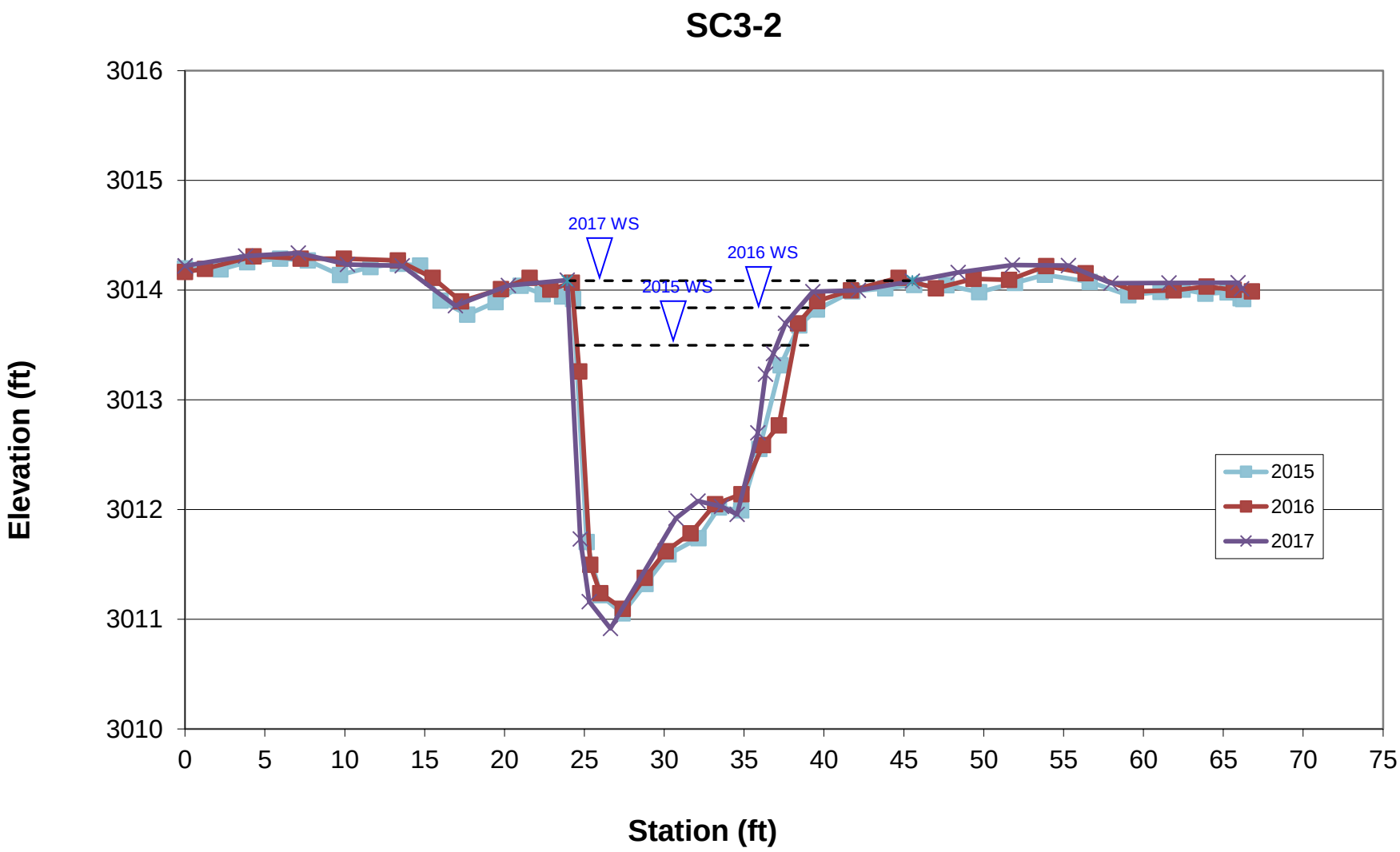

SC1-2
Elevation (ft)
3028
3027
3026
3025
3024
3023
3022
0
5
10
15
20
25
30
35
40
45
50
55
Station (ft)
2015
2016
2017
Channel dry during 2015 - 2017 survey, no water surface

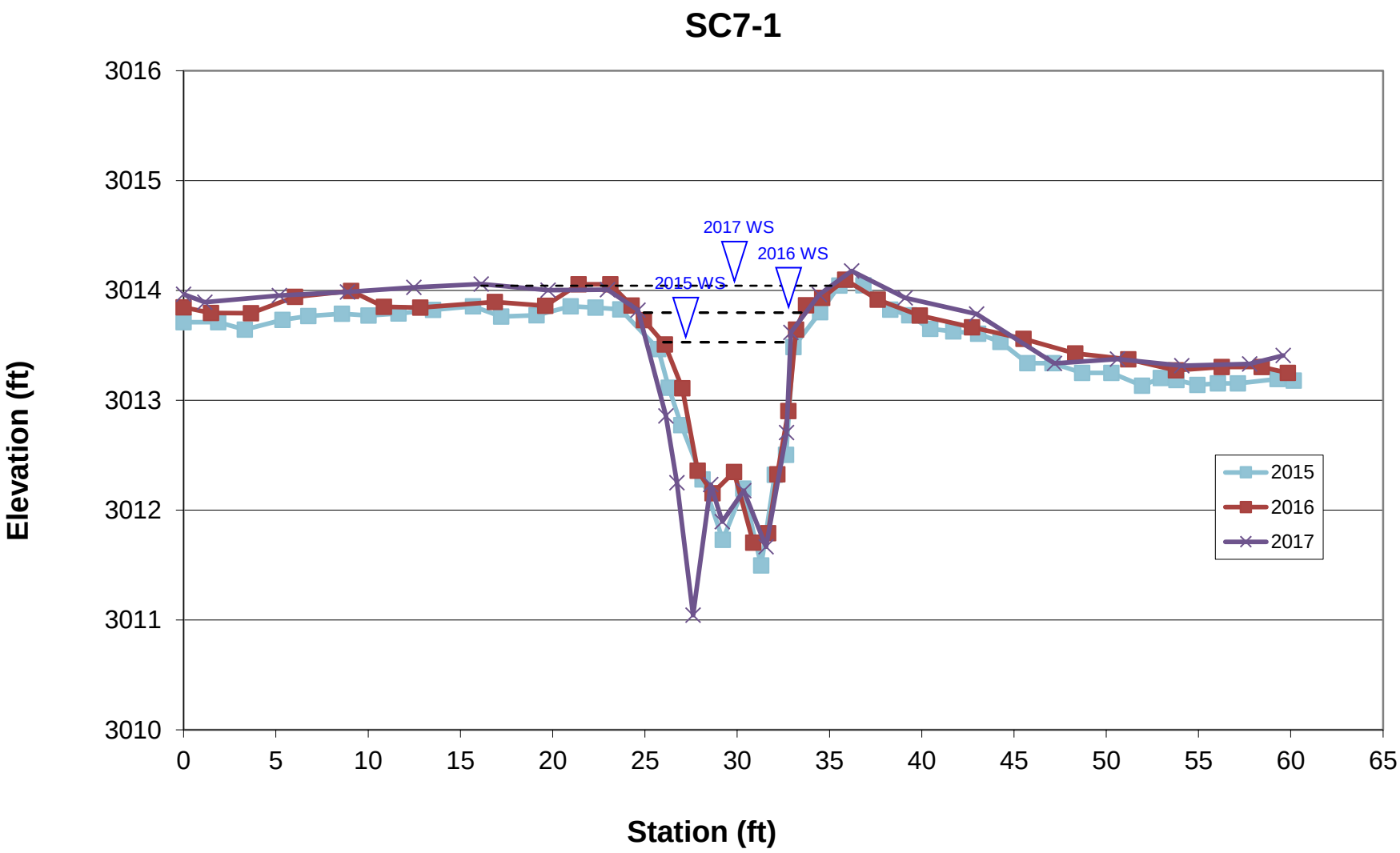

SC2A-1
Elevation (ft)
3023
3022
3021
3020
3019
3018
3017
0
5
10
15
20
25
30
35
Station (ft)
2015
2016
2017
Channel dry during 2015 - 2017 survey, no water surface

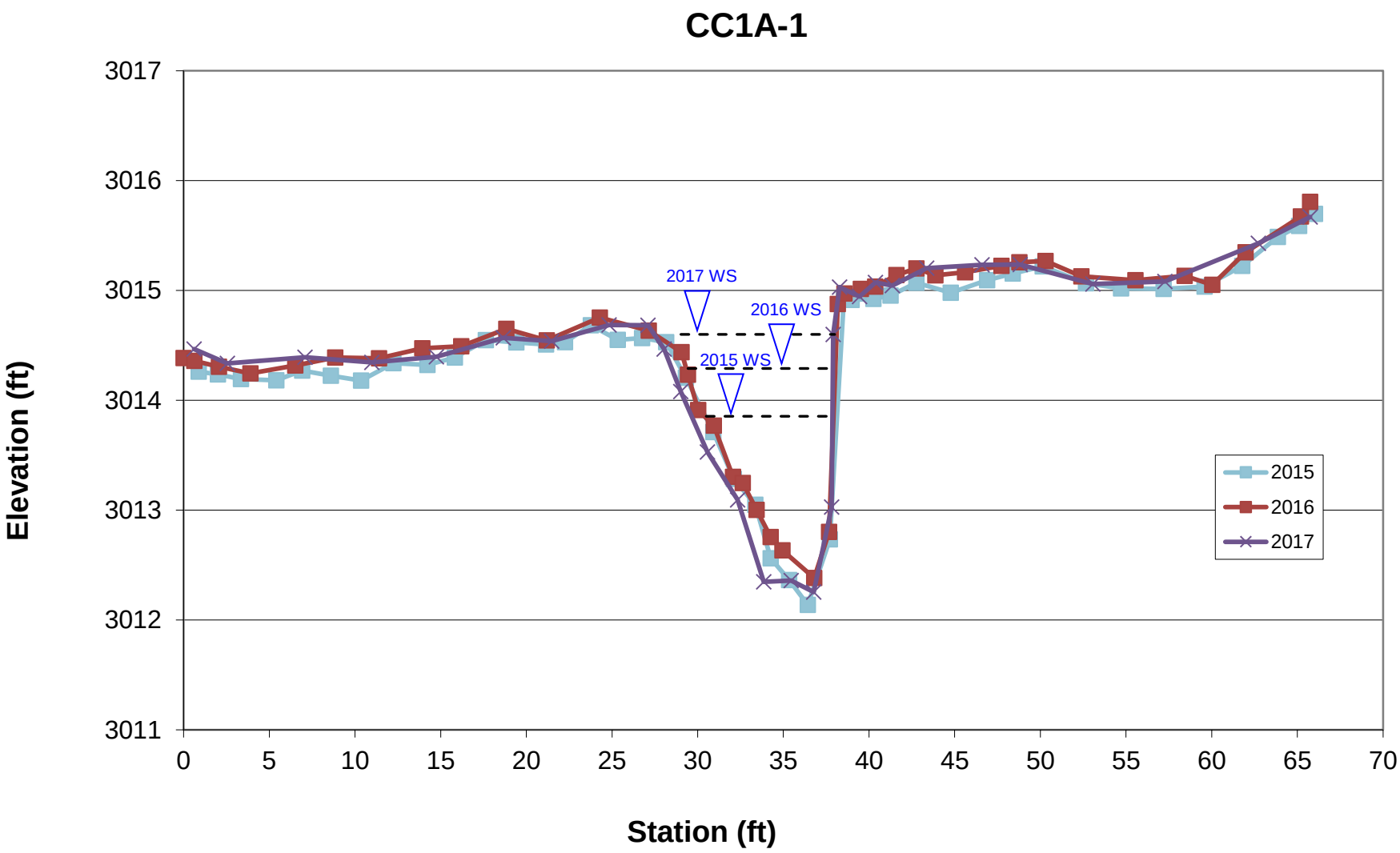

SC2A-2
Elevation (ft)
3021
3020
3019
3018
3017
3016
3015
0
5
10
15
20
25
30
35
Station (ft)
2015
2016
2017
Channel dry during 2015 - 2017 survey, no water surface

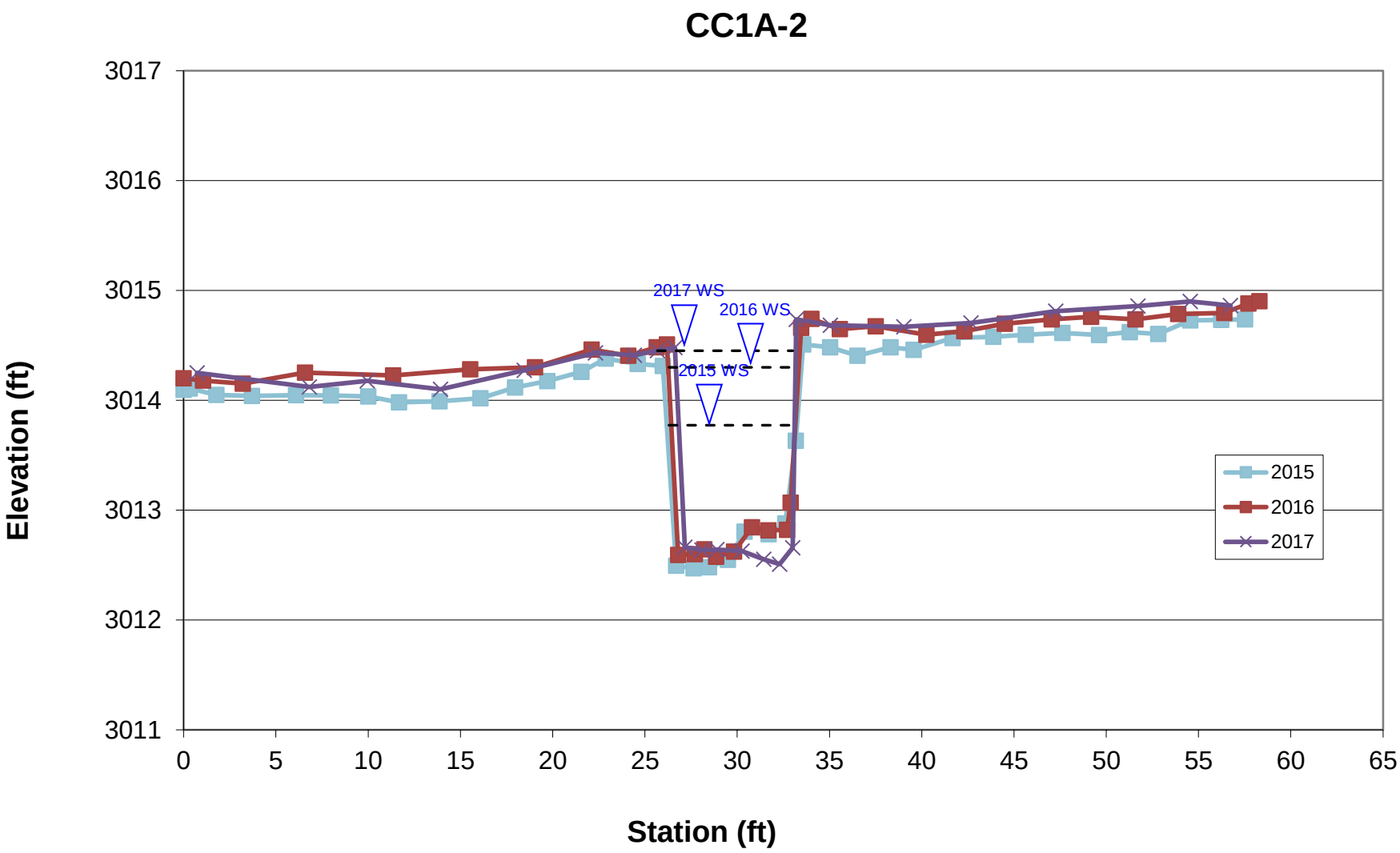

SC2B-1
Elevation (ft)
3019
3018
3017
3016
3015
3014
3013
0
5
10
15
20
25
30
35
40
45
Station (ft)
2015
2016
2017
Channel dry during 2015 - 2017 survey, no water surface

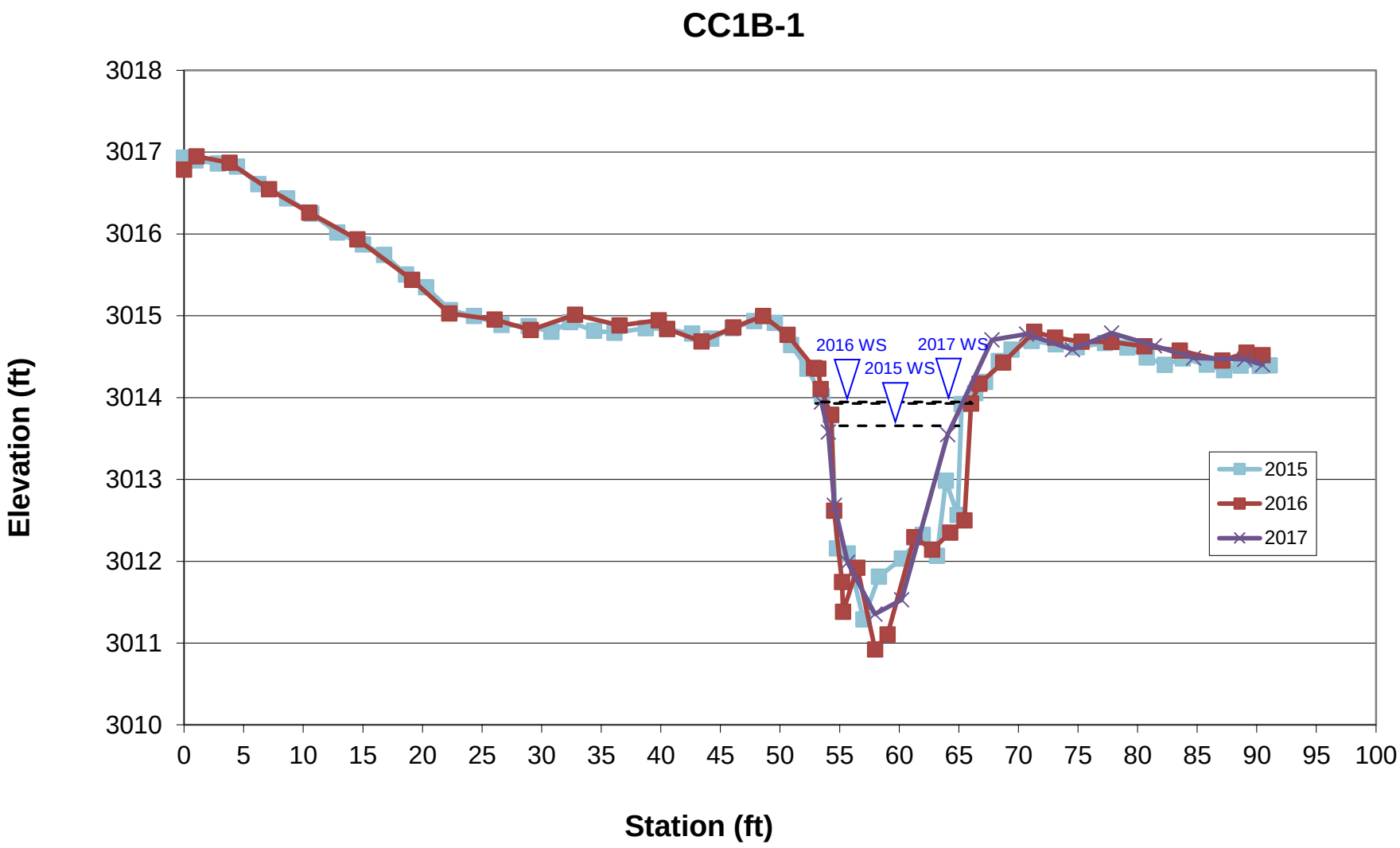

SC3-1
Elevation (ft)
Station (ft)
3016
3015
3014
3013
3012
3011
3010
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
2016 WS
2017 WS
2015 WS
2015
2016
2017


SC3-2
Elevation (ft)
Station (ft)
2017 WS
2016 WS
2015 WS
2015
2016
2017
3016
3015
3014
3013
3012
3011
3010
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75


SC7-1
3016
3015
3014
3013
3012
3011
3010
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Elevation (ft)
Station (ft)
2017 WS
2016 WS
2015 WS
2015
2016
2017


CC1A-1
Elevation (ft)
3017
3016
3015
3014
3013
3012
3011
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Station (ft)
2017 WS
2016 WS
2015 WS
2015
2016
2017


CC1A-2
Elevation (ft)
Station (ft)
3017
3016
3015
3014
3013
3012
3011
0
5
10
15
20
25
30
35
40
45
50
55
60
65
2017 WS
2016 WS
2015 WS
2015
2016
2017


CC1B-1
Elevation (ft)
Station (ft)
3018
3017
3016
3015
3014
3013
3012
3011
3010
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
2016 WS
2015 WS
2017 WS
2015
2016
2017

APPENDIX E
PROJECT PLAN SHEETS

MDT Wetland Mitigation Monitoring
Schrieber Lake
Lincoln County, Montana

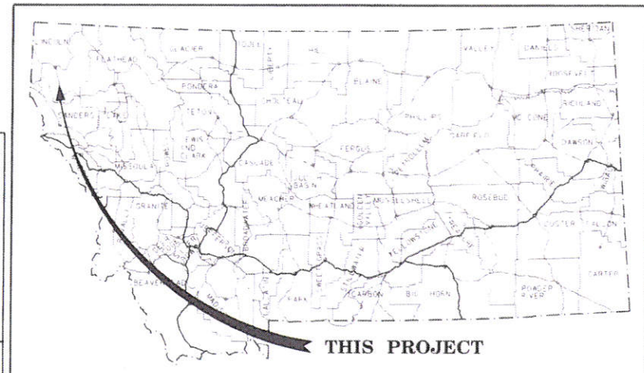
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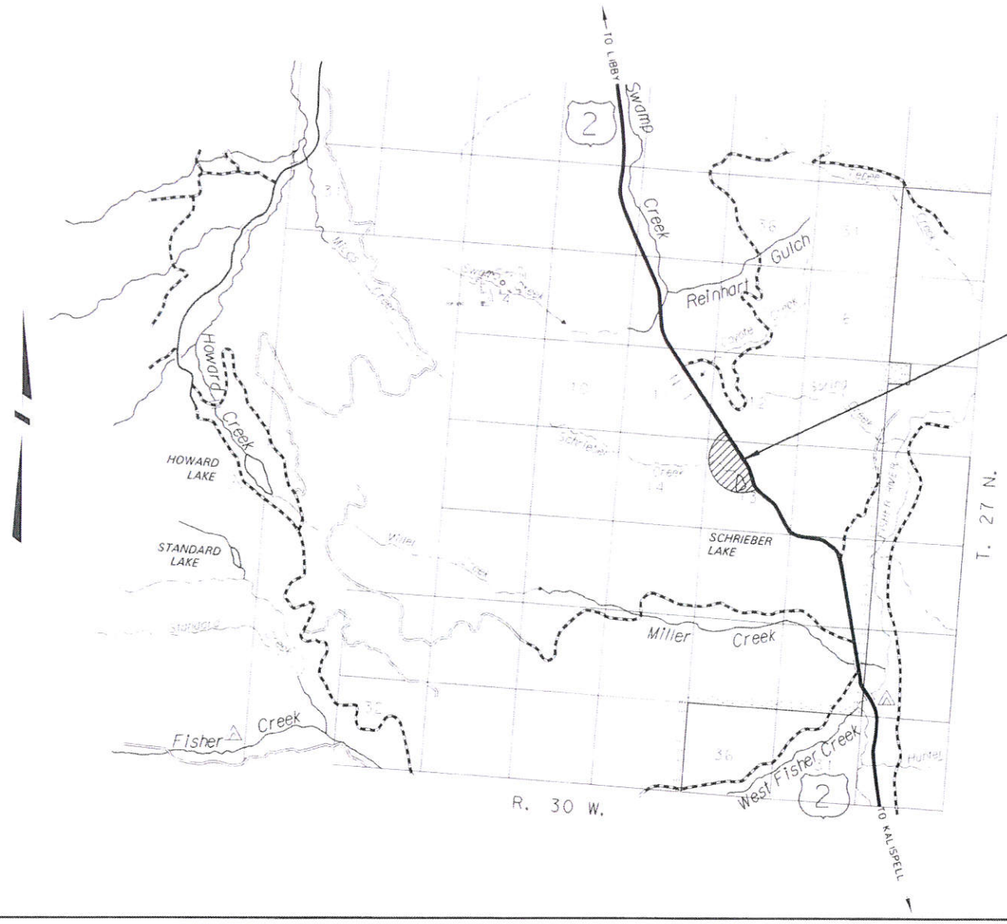
MONTANA DEPARTMENT OF TRANSPORTATION

CSF • 0.9994 3246

FEDERAL AID PROJECT NO. NH 27(39)
AQUATIC RESOURCES MITIGATION
SCHRIEBER LAKE MITIGATION
LINCOLN COUNTY

LENGTH N/A kilometers





MONTANA DEPARTMENT OF TRANSPORTATION

APPROVED : _____ 20 ____

MIKE TOOLEY
DIRECTOR OF TRANSPORTATION

BY _____
ENVIRONMENTAL SERVICES BUREAU CHIEF

MONTANA REGISTERED PROFESSIONAL ENGINEER
THOMAS S. MARTIN 11228PE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED : _____ _____
DIVISION ADMINISTRATOR DATE

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R W & I.C.	NH 1-1(34)45 F NH 1-1(52)45 F
P.E.	NH 27(29)

3			
2			
1			

E-2

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Highways & Engineering
Division

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

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

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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

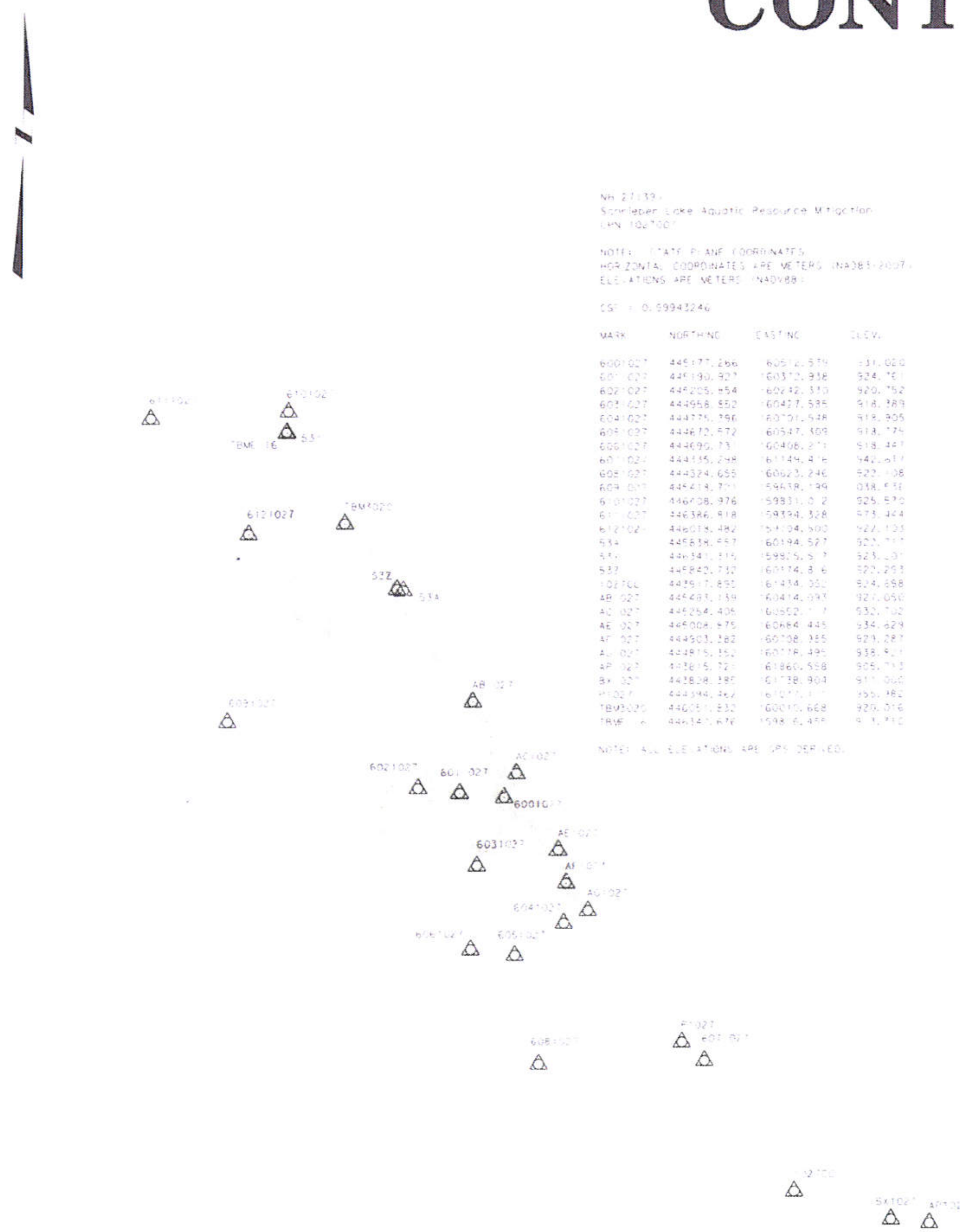
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	3

CONTROL DIAGRAM

MDT MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD



NH 27(39)
Schreiber Lake Aquatic Resource Mitigation
UPN 1027007

NOTE: STATE PLANE COORDINATES
HORIZONTAL COORDINATES ARE METERS (NAD83-2007)
ELEVATIONS ARE METERS (NAVD88)

CSF = 0.99943246

MARK	NORTHING	EASTING	ELEV.
6001027	445177.266	160512.579	931.020
6011027	445190.927	160372.938	924.761
6021027	445205.654	160242.330	920.752
6031027	444958.552	160427.535	918.389
6041027	444775.396	160701.548	918.905
6051027	444672.572	160547.309	918.175
6061027	444690.731	160406.271	918.447
6071027	444135.298	161149.416	942.617
6081027	444324.655	160623.246	922.108
6091027	445418.721	159638.199	938.538
6101027	446408.976	159831.012	925.570
6111027	446386.918	159394.328	973.444
6121027	446018.482	159104.500	927.103
53A	445638.657	160194.527	[illegible]
53Y	446341.315	159925.517	923.201
53Z	445842.732	160174.816	922.293
102TCC	443917.895	161434.330	924.698
AB1027	445403.139	160414.093	927.050
AC1027	445254.405	160552.117	932.702
AE1027	445008.675	160684.445	934.629
AF1027	444903.282	160708.365	929.287
AG1027	444815.352	160728.495	[illegible]
AP1027	443815.72[illegible]	161860.558	905.713
BX1027	443828.385	161738.904	911.000
P1027	444394.467	[illegible]	955.482
TBM3020	446051.832	160010.668	920.016
TBM 16	446341.676	159816.455	[illegible]

NOTE: ALL ELEVATIONS ARE GPS DERIVED.

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 280 FEET THEN WALK NORTH 185 FEET
AND THE MARK IS AT THE TOP OF A RIDGE. FROM PP# 3470 MARK IS WEST 55 FEET.
SET WITNESS POST 4 FEET NORTH.
HAND HELD GPS N 48-06-25.4 W 115-24-34.[illegible]

6011027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6011027 2011
ON US HIGHWAY 2 AT MILEPOST 54.00 TURN LEFT AND HEAD WEST FOLLOW ROAD [illegible] FEET TO AN
ABANDONED HOUSE. MARK IS 60 FEET SOUTH OF AN ABANDONED HOUSE. MARK IS 30 FEET SOUTH-EAST OF
AN OLD PUMPHOUSE. SET WITNESS POST 5 FEET NORTH.
HAND HELD GPS N 48-06-25.4 W 115-24-41.4

6021027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6021027 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 115-24-4[illegible]

6031027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6031027 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 [illegible] FEET NORTH OF SCHREIBER CREEK.
SET WITNESS POST 5 FEET NORTH.

6041027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6041027 2011
AT MILEPOST 54.[illegible] TURN LEFT AND HEAD WEST 550 FEET. MARK IS 55 FEET WEST OF THE ROAD.
MARK IS 80 FEET FROM THE TREELINE AT THE SOUTH EDGE OF MEADOW.
SET WITNESS POST 5 FEET NORTH.
HAND HELD GPS N 48-06-12.9 W 115-24-24.0

6051027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6041027 2011
AT MILEPOST 54.1 TURN LEFT AND HEAD WEST 1350 FEET AND TAKE THE RIGHT FORK OF THE
ROAD CONTINUE TO THE END OF THE ROAD. A GAUGING STATION WILL BE DIRECTLY IN FRONT OF
YOU. MARK IS 220 FEET EAST OF THE GAUGING STATION AT THE SOUTHWEST EDGE OF SCHREIBER LAKE.
APPROXIMATELY 10 FEET SOUTH OF THE SOUTHERN EDGE OF SCHREIBER LAKE.
SET WITNESS POST 5 FEET NORTH.
HAND HELD GPS N 48-06-04.[illegible] W [illegible]-24-[illegible]

6061027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6061027 2011
ON US HIGHWAY 2 AT MILEPOST 54.[illegible] 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 TREELINE. SET WITNESS POST 5 FEET NORTH.
HAND HELD GPS N 48-06-33.4 W 115-24-3[illegible].6

6071027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6071027 2011
MARK IS AT U.S. HWY 2 MILEPOST 54.66 25 FEET RIGHT OF CENTERLINE.
SET WITNESS POST 5 FEET NORTH.
HAND HELD GPS N 48-06-00 W 115-24-01

6081027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6081027 2011
FROM U.S. HWY 2 MILEPOST 54.[illegible] TURN LEFT AND HEAD WEST ON UNMARKED ROAD
GO 0.26 MILES, LEFT TURN GO 0.04 MILES, RIGHT TURN GO 0.08 MILES, RIGHT TURN CONTINUE
AND STOP AT [illegible].16 MILES FROM HWY 2. MARK IS 15 FEET EAST OF DIRT ROAD.
SET WITNESS POST 5 FEET NORTH.
HAND HELD GPS N 48-05-58 W 115-24-26

6091027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6091027 2011
AT MILEPOST 52.58 ON U.S. HWY 2 TURN LEFT AND HEAD WEST [illegible] MILES ON SCHREIBER CREEK ROAD
MARK IS 12 FEET SOUTH OF CENTERLINE AT A BEND IN THE ROAD.
SET WITNESS POST 5 FEET WEST.
HAND HELD GPS N 48-06-29 W 115-25-1[illegible]

6101027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6101027 2011
U.S. HWY 2 MILEPOST 53.076 60 FEET LEFT. MARK IS LOCATED ON SOUTHERLY EDGE OF TURNOUT AT
WEATHER STATION. SET WITNESS POST 4 FEET WEST.

6111027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6111027 2011
TURN LEFT AND HEAD WEST ON SCHREIBER CREEK ROAD AT MILEPOST 52.58. FOLLOW THE ROAD
0.456 MILES TO THE MARK LOCATED ON THE EAST SHOULDER.
SET WITNESS POST 4 FEET SOUTH.

6121027
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED 6121027 2011
MARK IS LOCATED ON WESTERLY EDGE OF MEADOW 150+/- 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.

53Z
FOUND 2" ALUMINUM CAP STAMPED 53Z 1987 [illegible] FEET RIGHT OF HIGHWAY [illegible] CENTERLINE ON THE
NORTH EDGE OF A PULLOUT AT MILEPOST 53.36. WITNESS POST SET 3 FEET WEST.

53A
FOUND 2" ALUMINUM CAP STAMPED 53A [illegible] FEET LEFT OF HIGHWAY 2 CENTERLINE AT MILEPOST 53.50.
WITNESS POST SET 2 FEET EAST.

53Y
FOUND 2" ALUMINUM CAP STAMPED 53Y 75 FEET RIGHT OF HIGHWAY 2 CENTERLINE AT MILEPOST 53.10.
TWO WITNESS POSTS THE FIRST IS ONE FOOT NORTH AND THE OTHER IS ONE FOOT SOUTH.

102TCC
FOUND 2" MDT ALUMINUM CAP STAMPED [illegible] 2006. HAND HELD GPS N48-05-47 W 115-23-45

AB1027
FOUND 2" MDT ALUMINUM CAP STAMPED AB1027 2006. HAND HELD GPS N48-06-[illegible] W 115-24-45

AC1027
FOUND 2" MDT ALUMINUM CAP STAMPED AC1027 2006. HAND HELD GPS N48 06 28 W 115 24 33

AE1027
FOUND 2" MDT ALUMINUM CAP STAMPED AE1027 2006. HAND HELD GPS N48-06-20 W 115-24-26

AF1027
FOUND 2" MDT ALUMINUM CAP STAMPED AF1027 2006. HAND HELD GPS N48-06-17 W 115-24-24

AG1027
FOUND 2" MDT ALUMINUM CAP STAMPED AG1027 2006. HAND HELD GPS N48-06-14 W 115-24-2[illegible]

AP1027
FOUND 2" MDT ALUMINUM CAP STAMPED AP1027 2006. HAND HELD GPS N48-05-44 W 115-23-25

BX1027
FOUND 2" MDT ALUMINUM CAP STAMPED BX1027 2006. HAND HELD GPS N48-05-4[illegible] W 115-23-[illegible]

TBM 16
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED TBM 16 2012
[illegible].65M SOUTHWEST OF 53Y [illegible] FOUND PER NGS DATASHEET.

TBM3020
SET 5/8" X 30" REBAR WITH 2" MDT ALUM HORIZ CONTROL CAP STAMPED TBM3020 2012
3020 FOUND PER NGS DATASHEET.

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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	4

SUMMARY

FENCING

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

REMOVE STRUCTURE

STATION FROM	STATION TO	lump sum	cubic meters UNCL. EXC.	REMARKS
		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 FROM	STATION TO	square meters COIR EROSION CONTROL NETTING	square meters COCONUT BLANKET	lin. meters FASCINE	cubic meters # STREAM-BED MATERIAL	cubic meters # RIFFLE MATERIAL	cubic meters UNCL. CHANNEL EXC.	each * GRADE CONTROL STRUCTURE	REMARKS
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)
0+10.00	3+07.10						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 FROM	STATION TO	LUMP SUM	REMARKS
		1	PROJECT SITE
TOTAL		1	

* SEE SPECIAL PROVISIONS

REVEGETATION

FOR	cubic meters TOPSOIL SALVAGING & PLACING	hectares WETLAND SEEDING - UPLAND	hectares WETLAND SEEDING-WETLAND	lump sum TREE & SHRUB PLANTING #	square meters WETLAND SOD	REMARKS
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 UNCL. EXC.	UNCL. BORROW	EMB.+	REMARKS
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 FROM	STATION TO		LOG & ROOT WAD (each)	BANK HABITAT LOG (each)	REMARKS
			30	45	SCHRIEBER LAKE PROJECT SITE
			75	100	SCHRIEBER MEADOWS PROJECT SITE
TOTAL			105	145	

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

CLEARING & GRUBBING

STATION FROM	STATION TO	hectares CLEARING AND GRUBBING	REMARKS
		0.23	SCHRIEBER CREEK SEG. 1 AND 2
TOTAL		0.23	

CULVERT SUMMARY RECAP

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

FOR INFORMATION ONLY, INCLUDED IN THE COST OF REMOVE STRUCTURE

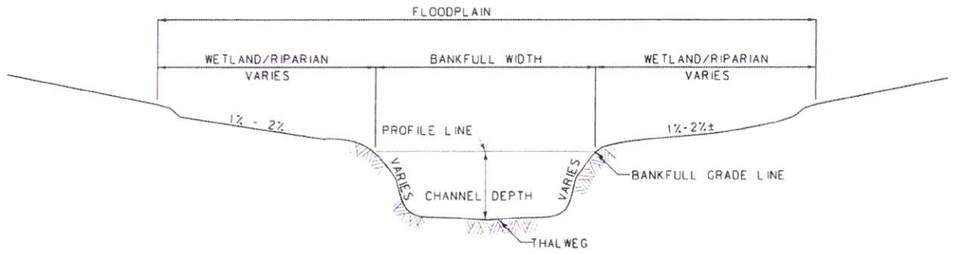
DIVERSION STRUCTURE

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

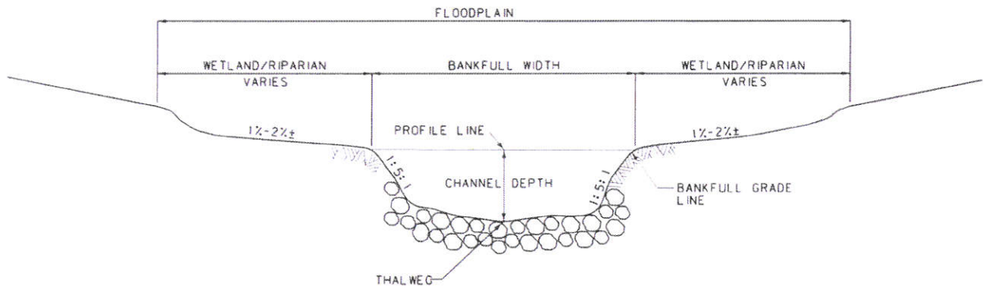
FOR INFORMATION ONLY, INCLUDED IN COST OF GRADING

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	5

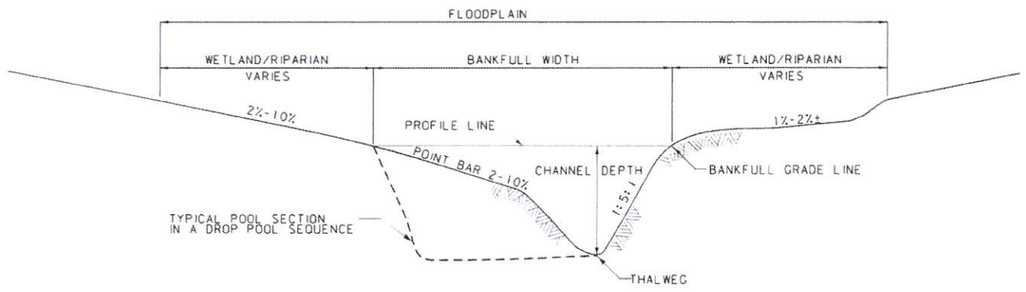
DETAIL



TYPICAL SECTION
RUN



TYPICAL SECTION
RIFFLE/DROP



TYPICAL SECTION
POOL

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

* 3.1 TO 9.0 m TRANSITION POOL STA.3+89.82 TO 4+20.67 (SEE PLANS)

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

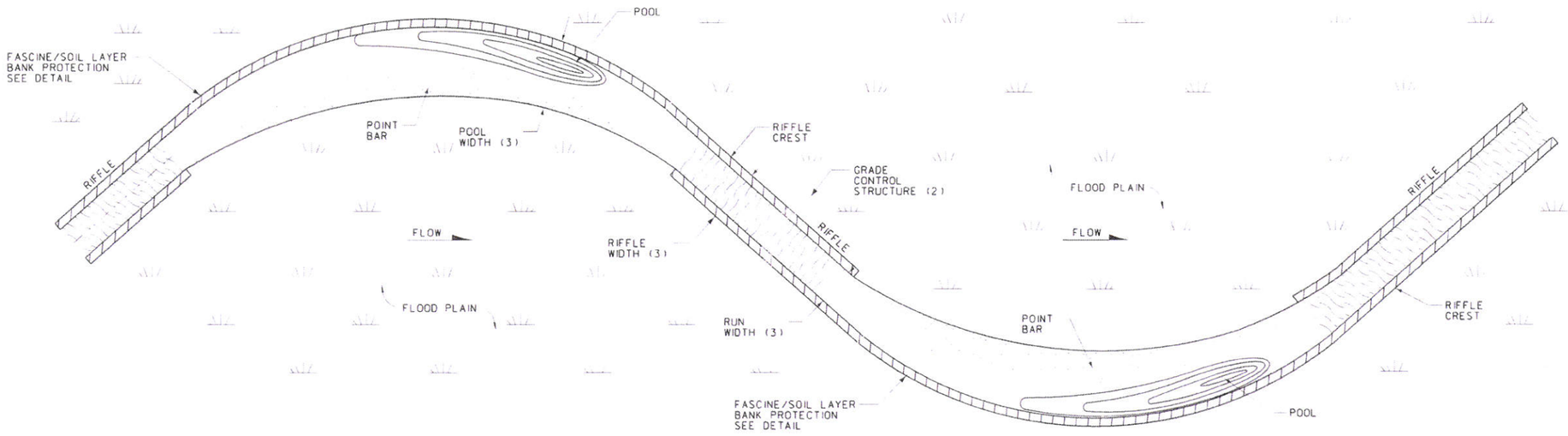
TYPICAL CHANNEL
SECTION DIMENSIONS
(NOT TO SCALE)

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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	6

CHANNEL DETAILS



SCHEMATIC - CHANNEL BANK PROTECTION PLAN
SEGMENTS 1 AND 2A

NOTES

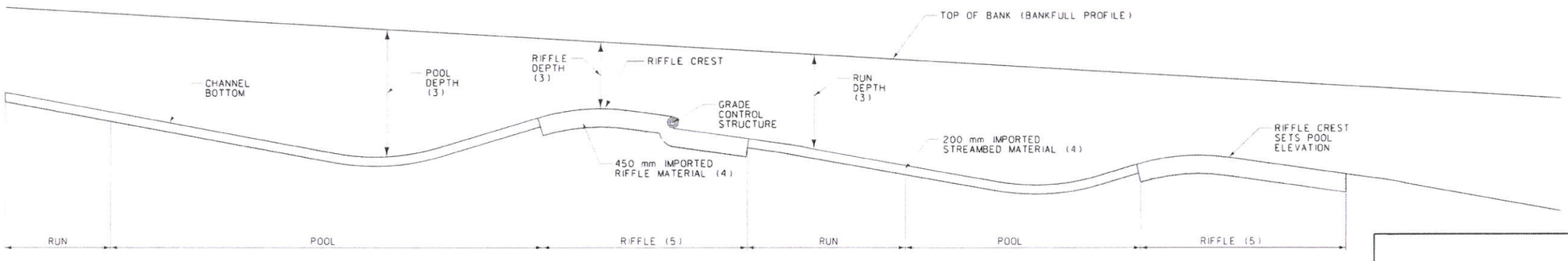
(1) THIS DETAIL SHOWS TYPICAL BANK PROTECTION INSTALLATION. SEE PLANS, SPECIALS, AND SUMMARIES FOR MORE INFORMATION.

(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.



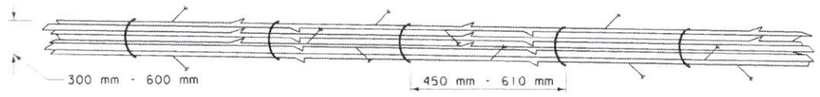
SCHEMATIC - CHANNEL PROFILE - SEGMENTS 1 AND 2A
NOT TO SCALE

BANK PROTECTION PLAN
(NOT TO SCALE)

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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	7

DETAIL



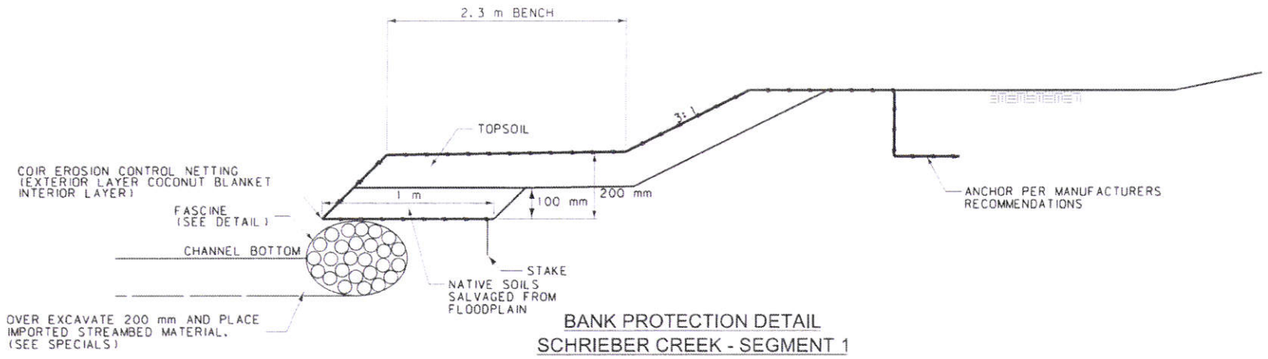
FASCINE

NOTE: OBTAIN LIVE CONIFER BRANCHES 13 mm TO 50 mm DIAMETER, 1.5 m TO 3.0 m LONG.

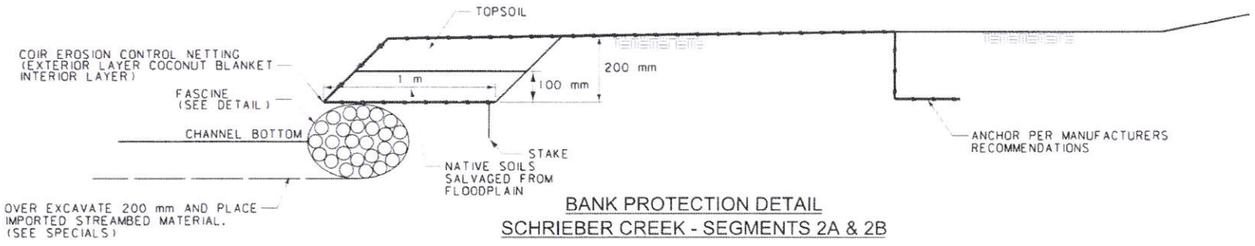
SIDE BRANCHES CAN BE LEFT INTACT.

STAGGER CUTTINGS IN A UNIFORM BUNDLE, 1.5 m TO 6.0 m LONG DEPENDING ON SITE CONDITIONS AND HANDLING CAPABILITIES. VARY ORIENTATION OF CUTTINGS.

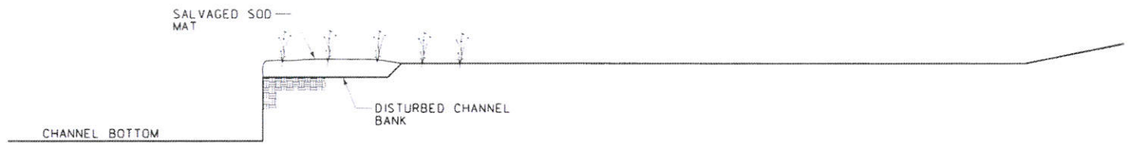
TIE BUNDLE WITH 100% BIODEGRADABLE BINDING MATERIAL



BANK PROTECTION DETAIL
SCHRIEBER CREEK - SEGMENT 1



BANK PROTECTION DETAIL
SCHRIEBER CREEK - SEGMENTS 2A & 2B

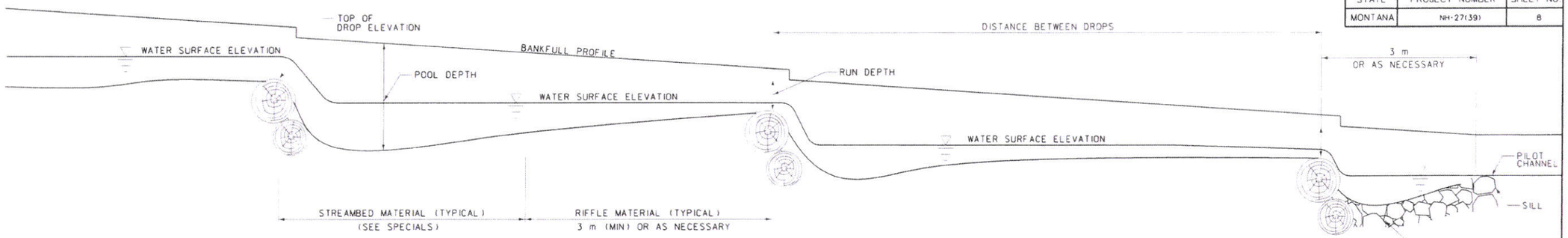


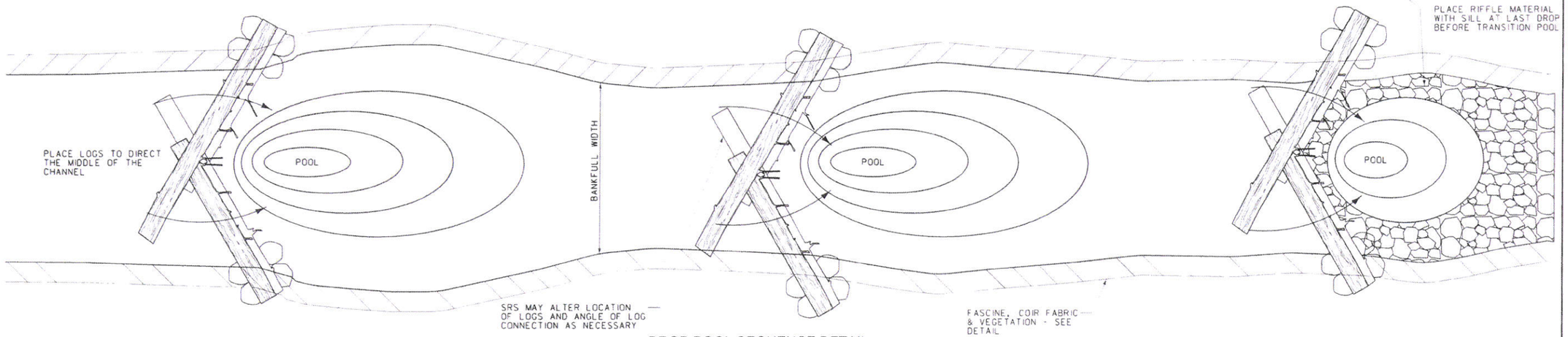
BANK PROTECTION DETAIL
SCHRIEBER CREEK - SEGMENT 3
COYOTE CREEK

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

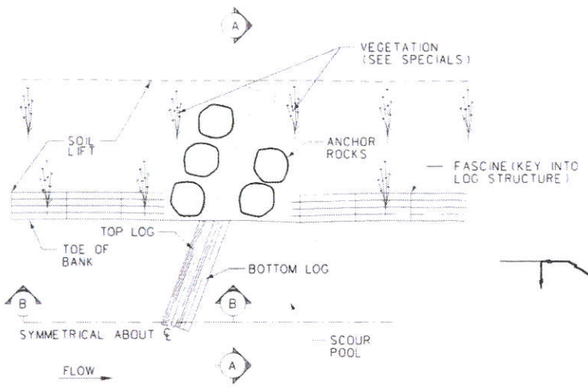
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	8

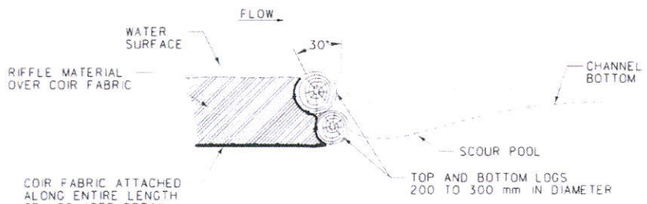




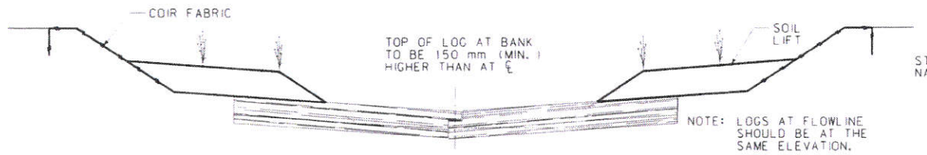
DROP POOL SEQUENCE DETAIL
SEGMENT 2B



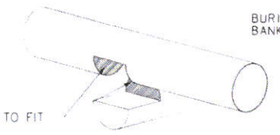
PLAN VIEW



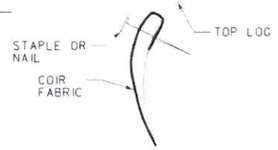
SECTION B-B



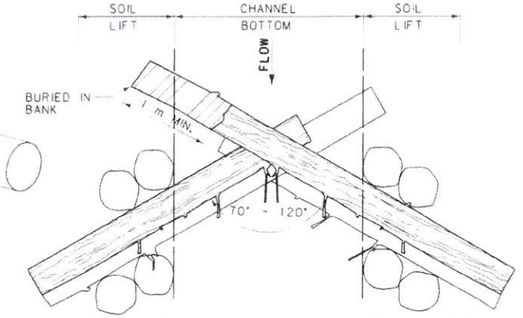
SECTION A-A



DETAIL



ATTACHMENT DETAIL



PLAN VIEW - GRADE CONTROL STRUCTURE

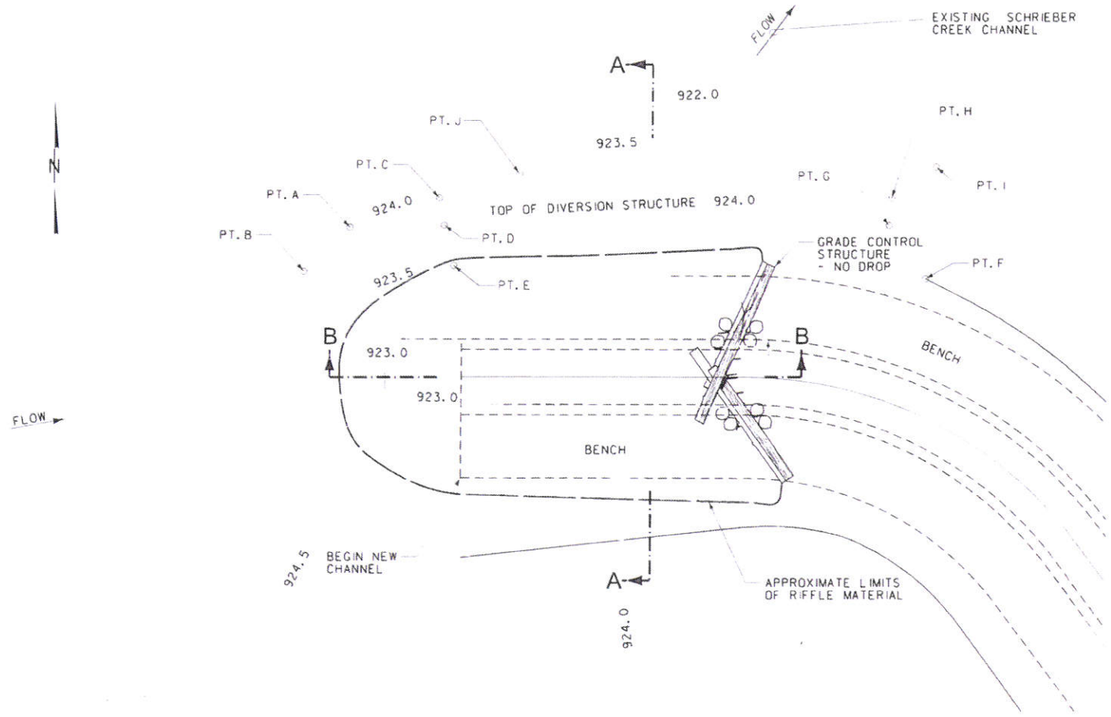
GRADE CONTROL STRUCTURE DETAIL - SEGMENTS 1 & 2B

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

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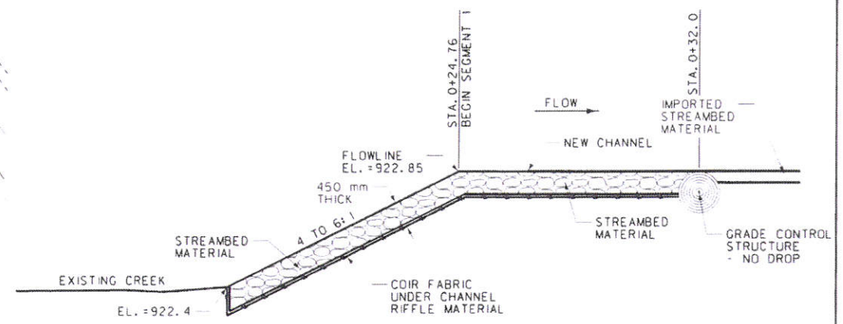
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	9

DIVERSION STRUCTURE DETAILS

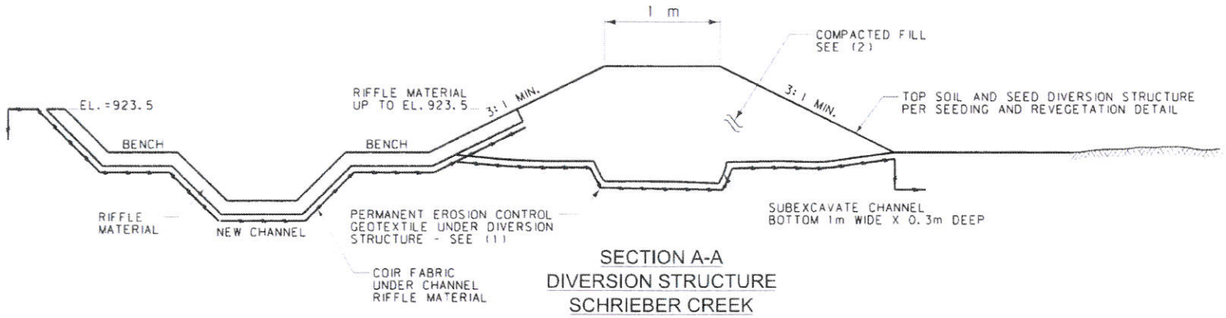


DIVERSION STRUCTURE - SCHRIEBER CREEK

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



SECTION A-A
DIVERSION STRUCTURE
SCHRIEBER CREEK

(1) BURY AND ANCHOR PERMANENT EROSION CONTROL GEOTEXTILE SO THAT NO PORTION OF THE FABRIC IS EXPOSED.

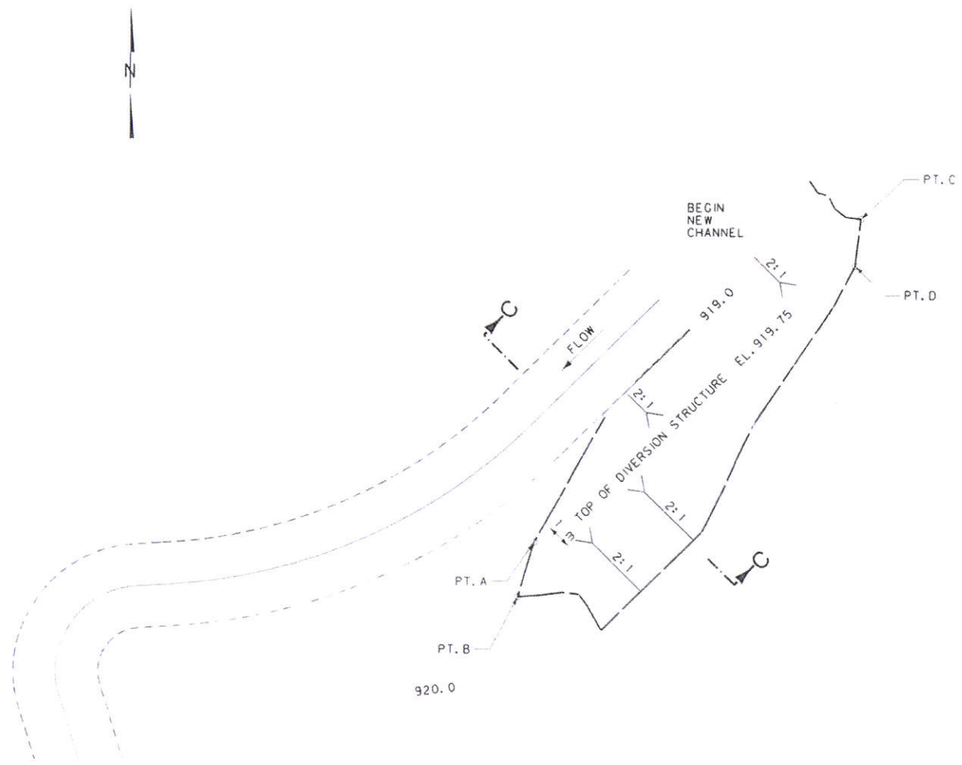
(2) PLACE AND COMPACT SUITABLE MATERIALS PER SECTION 203, EARTH EMBANKMENT.

SCHRIEBER CREEK
DIVERSION STRUCTURE DETAIL
(NOT TO SCALE)

DIVERSION STRUCTURE DETAILS

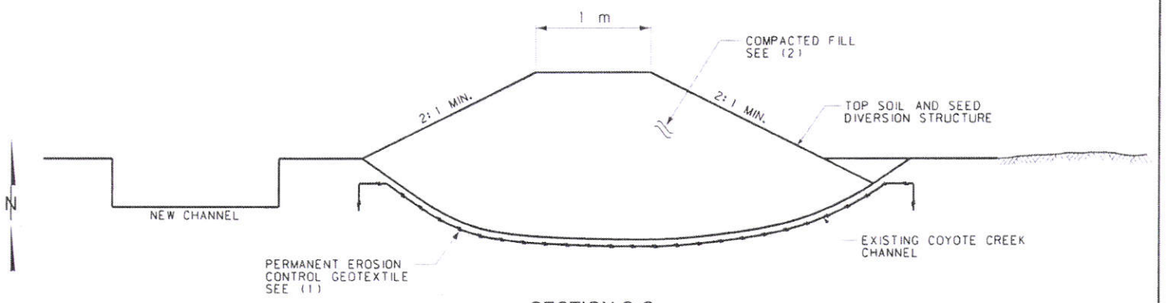
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	10

MONTANA DEPARTMENT OF TRANSPORTATION
MDT
MONTANA CADD



DIVERSION STRUCTURE - COYOTE CREEK

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



SECTION C-C
DIVERSION STRUCTURE
COYOTE CREEK

(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)

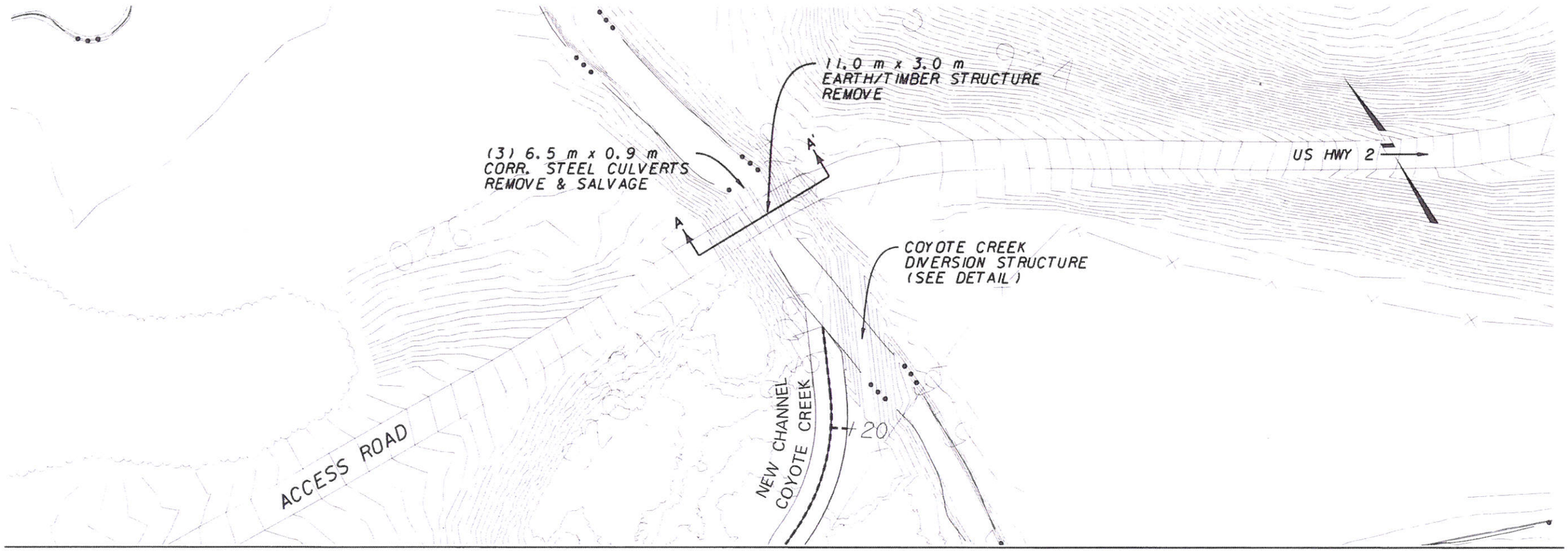
FOR MDT INTERNAL DISTRIBUTION ONLY

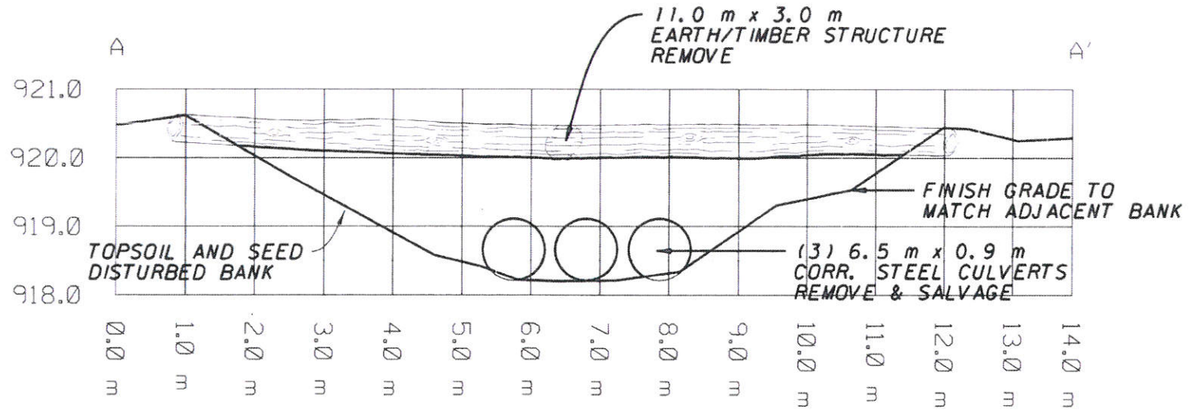
04/08/2014
Highways & Engineering
Division

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

CSF = 0.99943246

MONTANA DEPARTMENT OF TRANSPORTATION
MDT
MONTANA CADD





BRIDGE REMOVAL DETAIL

(NO SCALE)

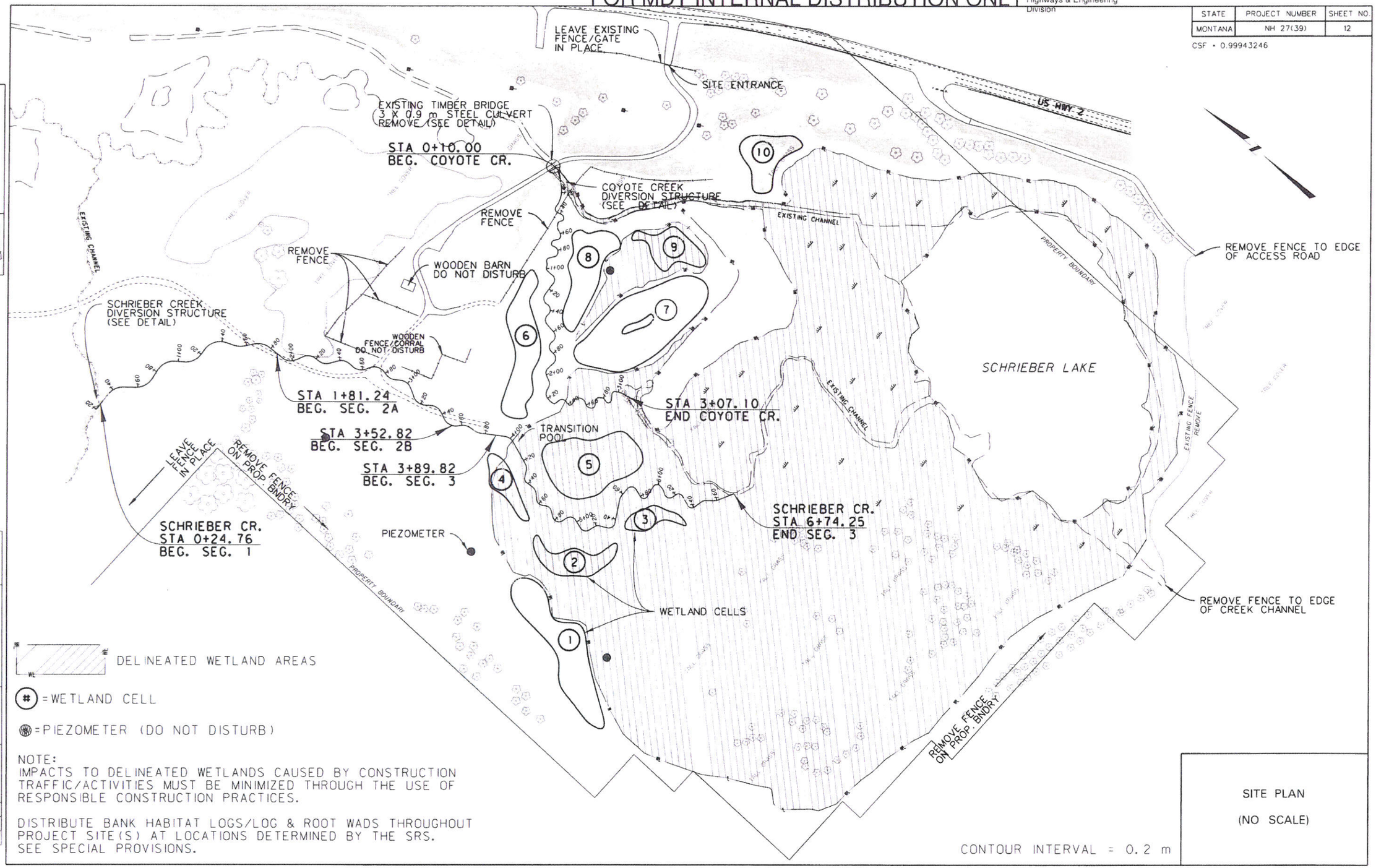
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	12

CSF = 0.99943246

MDT MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD



NOTE:
IMPACTS TO DELINEATED WETLANDS CAUSED BY CONSTRUCTION TRAFFIC/ACTIVITIES MUST BE MINIMIZED THROUGH THE USE OF RESPONSIBLE CONSTRUCTION PRACTICES.

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

CONTOUR INTERVAL = 0.2 m

SITE PLAN

(NO SCALE)

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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

MONTANA DEPARTMENT OF TRANSPORTATION
MDT
MONTANA CADD

DATE	REVISED BY	CHECKED BY
4/8/2014 11:13:19 AM	DS	1/1/13

3
2
1

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
0+10.00	POT	445,186.943	160,456.487	BEGIN COYOTE CREEK
0+16.56	PC	445,182.331	160,451.831	
0+24.11	PT	445,177.016	160,446.471	
0+30.99	PT	445,176.562	160,438.937	
0+32.41	PC	445,176.490	160,437.621	
0+42.79	PT	445,176.401	160,427.139	
0+46.07	PT	445,176.170	160,423.910	
0+52.18	PT	445,175.071	160,417.845	
0+56.60	PT	445,173.847	160,413.454	
0+57.83	PT	445,173.533	160,412.260	
0+61.66	PC	445,169.826	160,435.612	
0+62.30	PT	445,168.258	160,436.142	
0+63.66	PT	445,167.079	160,435.327	
0+64.92	PT	445,166.396	160,434.322	
0+66.41	PT	445,164.925	160,433.284	
0+71.55	PT	445,166.082	160,431.185	
0+91.24	PT	445,167.939	160,430.443	
0+93.53	PT	445,167.937	160,428.377	
0+94.20	PT	445,167.244	160,426.208	
0+94.45	PT	445,166.914	160,426.033	
0+95.60	PT	445,165.620	160,424.202	
0+95.91	PT	445,165.225	160,424.203	
0+97.80	PT	445,166.240	160,424.628	
0+98.78	PT	445,161.883	160,424.459	
0+99.77	PT	445,161.082	160,427.459	
1+00.93	PT	445,160.107	160,427.772	
1+04.17	PT	445,157.442	160,429.906	
1+05.87	PT	445,156.556	160,418.405	
1+08.73	PT	445,161.377	160,416.154	
1+11.1	PT	445,162.866	160,411.316	
1+12.56	PT	445,161.156	160,412.740	
1+13.09	PT	445,160.774	160,412.241	
1+14.06	PT	445,160.067	160,411.717	
1+14.81	PT	445,159.171	160,412.090	
1+16.45	PT	445,158.575	160,410.338	
1+18.67	PT	445,157.766	160,414.641	
1+19.18	PT	445,162.483	160,409.287	
1+19.31	PT	445,162.452	160,409.162	
1+19.82	PT	445,162.082	160,407.723	
1+21.10	PT	445,159.038	160,406.235	
1+20.58	PT	445,158.857	160,403.557	
1+22.07	PT	445,157.427	160,401.126	
1+24.50	PT	445,155.200	160,399.347	
1+26.08	PT	445,154.276	160,398.344	
1+26.72	PT	445,153.733	160,397.620	
1+27.31	PT	445,153.543	160,397.449	
1+28.86	PT	445,152.968	160,396.129	
1+30.75	PT	445,152.328	160,394.379	
1+31.31	PT	445,151.844	160,394.126	
1+32.07	PT	445,151.329	160,393.778	
1+34.23	PT	445,149.372	160,394.261	
1+34.9	PT	445,148.776	160,394.565	
1+11.56	PT	445,141.669	160,389.677	
1+13.82	PT	445,142.933	160,390.065	
1+11.12	POT	445,140.907	160,389.669	
1+25.42	PT	445,140.482	160,376.443	
1+26.35	PT	445,140.294	160,375.549	
1+26.60	PT	445,139.936	160,375.636	
1+24.83	PT	445,139.768	160,375.606	
1+41.23	PT	445,127.381	160,377.780	
1+41.90	PT	445,127.306	160,367.321	
1+44.0	PT	445,128.838	160,367.411	
1+49.13	PT	445,129.973	160,362.450	
1+51.36	PT	445,124.991	160,361.403	
1+56.42	PT	445,116.760	160,353.671	
1+56.77	PT	445,111.506	160,356.566	
1+58.6	PT	445,112.982	160,353.423	
1+59.62	PT	445,113.178	160,352.971	
1+75.04	PT	445,114.732	160,347.335	
1+77.79	PT	445,103.811	160,346.627	
1+80.47	PT	445,106.143	160,346.348	
1+82.78	PT	445,104.369	160,345.309	
1+83.55	PT	445,101.723	160,330.567	
1+84.46	PT	445,102.277	160,324.402	
1+88.13	PT	445,103.266	160,321.139	
2+02.78	PT	445,100.228	160,323.231	
2+05.46	PT	445,082.822	160,321.419	
2+10.82	PT	445,083.166	160,316.339	
2+09.91	PT	445,084.207	160,324.62	
2+13.48	PT	445,080.462	160,320.517	
2+11.67	PT	445,081.584	160,316.418	
2+20.81	PT	445,087.228	160,315.831	
2+22.55	PC	445,085.661	160,315.582	
2+23.65	PT	445,084.602	160,315.431	
2+24.78	PT	445,083.538	160,315.512	
2+26.38	PT	445,082.274	160,315.606	
2+27.07	PT	445,081.183	160,315.686	
2+27.85	PT	445,080.231	160,315.747	
2+31.46	PT	445,080.140	160,280.004	
2+35.42	PT	445,079.148	160,274.054	
2+37.70	PT	445,079.4	160,324.835	
2+40.07	PT	445,078.842	160,326.378	
2+41.02	PT	445,078.119	160,327.182	
2+43.97	PT	445,078.281	160,324.315	
2+48.13	PT	445,078.650	160,328.161	

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
2+50.10	P	445,070.825	160,330.424	
2+51.62	PT	445,069.357	160,331.361	
2+52.50	PC	445,068.319	160,331.784	
2+55.13	PI	445,066.015	160,333.034	
2+57.33	PT	445,063.676	160,332.851	
2+60.51	PT	445,060.821	160,330.406	
2+61.15	PT	445,060.265	160,330.125	
2+61.73	PT	445,059.648	160,330.209	
2+63.49	PC	445,057.920	160,330.442	
2+68.69	PT	445,052.752	160,331.210	
2+69.19	PT	445,052.646	160,330.724.76	
2+73.56	PC	445,057.614	160,333.671	
2+75.26	PT	445,058.380	160,340.196	
2+76.35	PT	445,057.303	160,341.190	
2+78.7	PC	445,055.334	160,342.243	
2+82.29	PT	445,053.838	160,343.483	
2+83.07	PT	445,051.944	160,342.765	
2+83.54	PC	445,050.468	160,342.265	
2+86.20	PT	445,048.998	160,341.705	
2+86.61	PT	445,048.056	160,341.198	
2+86.61	PC	445,047.305	160,341.393	
2+88.64	PT	445,047.088	160,343.271	
2+89.44	PT	445,046.203	160,346.091	
2+89.64	PC	445,050.288	160,343.507	
+96.20	PT	445,040.018	160,351.904	
2+98.36	PT	445,043.438	160,353.191	
2+00.59	PC	445,047.072	160,354.353	
3+02.50	PT	445,040.[illegible]	160,[illegible]	
3+73.29	PT	445,044.215	160,[illegible]	
3+82.10	POT	445,040.245	160,[illegible]	END COYOTE CREEK

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
0+24.76	POT	445,360.438	160,096.114	BEGIN SCHRIEBER CR-SEC 1
0+26.03	PC	445,360.418	160,126.386	
0+42.58	PT	445,360.404	160,113.232	
0+43.01	PT	445,354.337	160,119.418	
0+53.12	PC	445,344.971	160,123.261	
0+66.87	PT	445,331.677	160,122.037	
0+73.94	PT	445,340.939	160,137.685	
0+81.16	PT	445,341.547	160,144.550	
0+92.34	PT	445,342.070	160,154.574	
0+31.64	PT	445,335.293	160,153.277	
+04.87	PT	445,324.289	160,161.095	
+13.52	PT	445,322.[illegible]	160,[illegible]	
+26.56	PT	445,316.664	160,166.549	
+24.27	PT	445,322.904	160,180.202	
+25.91	PT	445,323.669	160,[illegible]	
+41.06	PT	445,341.547	160,197.156	
1+49.7	PT	445,307.201	160,197.188	
1+54.06	PT	445,302.538	160,[illegible]	
1+58.62	PT	445,300.452	160,201.509	
1+59.06	PT	445,295.416	160,207.642	
1+72.86	PT	445,290.032	160,213.197	
1+79.09	PT	445,283.[illegible]	160,[illegible]	
1+81.24	POT	445,281.679	160,213.961	END SCHRIEBER CR-SEC 1

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
1+81.24	POT	445,281.679	160,213.961	BEG SCHRIEBER CR-SEC 2A
1+92.06	PC	445,270.761	160,212.203	
1+98.23	PT	445,264.936	160,212.214	
2+33.11	PT	445,261.347	160,218.282	
2+35.71	PC	445,259.158	160,223.25	
2+15.18	PT	445,256.193	160,228.988	
2+16.20	PT	445,245.71	160,[illegible]	
2+27.94	PC	445,247.953	160,228.513	
2+27.34	PT	445,242.275	160,[illegible]	
2+31.84	PT	445,230.361	160,[illegible]	
2+38.33	PT	445,235.493	160,237.748	
2+43.68	PT	445,232.208	160,242.238	
2+48.15	PT	445,226.972	160,241.776	
2+51.91	PT	445,227.215	160,241.591	
2+58.31	PT	445,216.826	160,241.277	
2+63.29	PT	445,213.862	160,246.916	
2+65.14	PC	445,213.007	160,248.583	
2+72.23	PT	445,209.258	160,255.753	
2+79.74	PT	445,201.463	160,255.382	
2+81.33	PC	445,198.973	160,252.869	
2+65.87	PT	445,194.597	160,251.671	
2+89.86	PT	445,190.602	160,254.164	
2+92.55	PC	445,187.712	160,256.191	
2+93.28	PT	445,182.347	160,259.717	
3+04.96	PT	445,176.908	160,266.382	
3+11.01	PC	445,171.790	160,253.083	

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
3+[illegible]	PT	445,[illegible]	160,[illegible]	
3+24.64	PT	445,[illegible]	160,262.928	
3+27.82	PC	445,[illegible]	160,265.352	
3+32.75	PT	445,[illegible]	160,265.782	
3+32.55	PT	445,[illegible]	160,266.184	
3+44.09	PC	445,[illegible]	160,262.749	
3+45.47	PT	445,[illegible]	160,[illegible]	
3+47.82	POT	445,[illegible]	160,[illegible]	END SCH. DA/BEG SEC. 2B
3+58.9	PT	445,[illegible]	160,[illegible]	
3+58.90	PT	445,[illegible]	160,[illegible]	
3+66.38	PT	445,[illegible]	160,[illegible]	
3+67.05	PT	445,[illegible]	160,[illegible]	
3+71.38	PC	445,[illegible]	160,[illegible]	
3+73.88	PT	445,[illegible]	160,[illegible]	
3+76.28	PT	445,[illegible]	160,[illegible]	
3+89.82	PT	445,[illegible]	160,[illegible]	END SCHREIBER CR-SEC 2B

STREAM ALIGNMENT COORDINATE TABLE

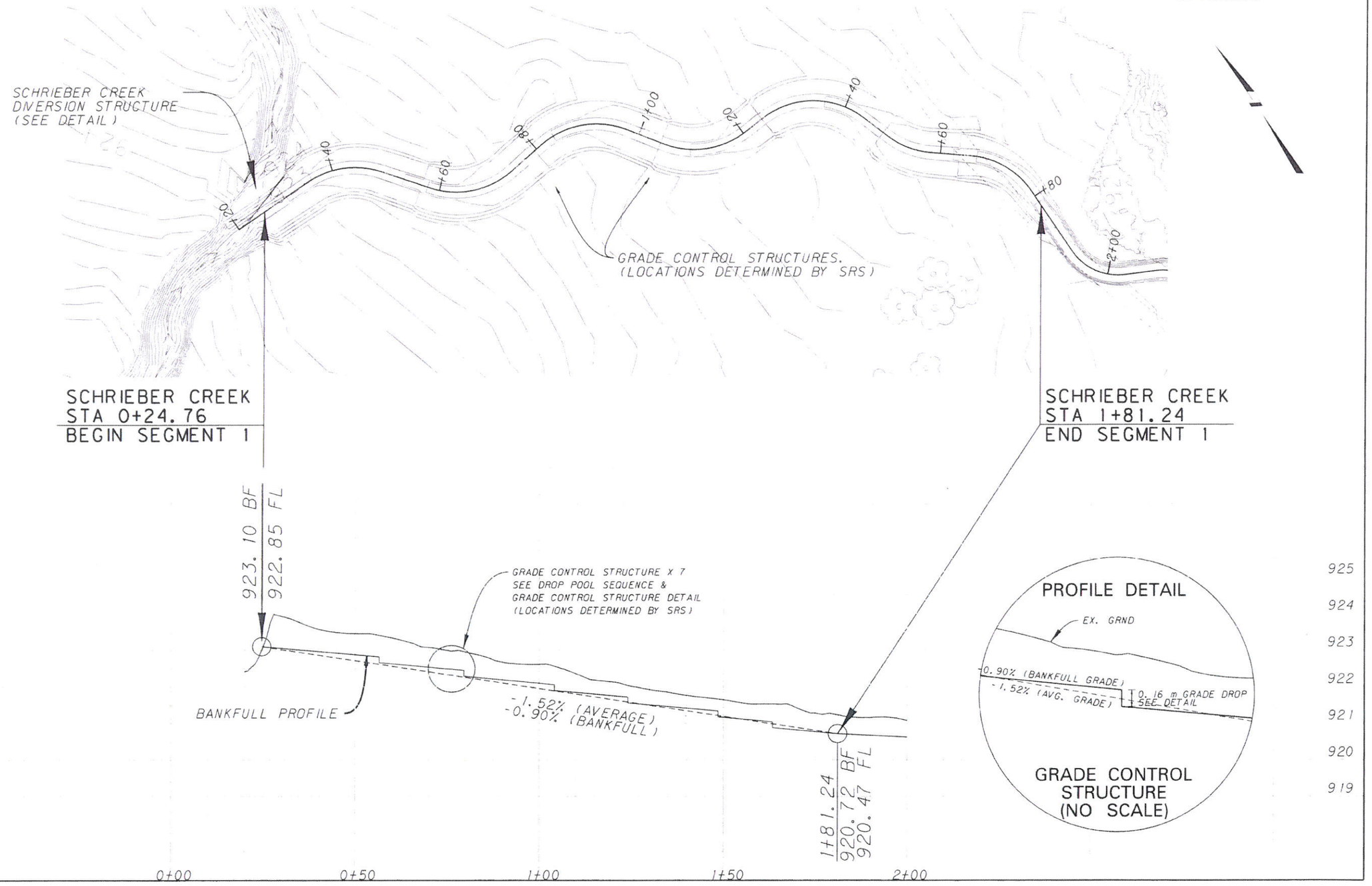
STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
3+85.82	POT	445,[illegible]	160,[illegible]	BEGIN SCHRIEBER CR-SEC 3
3+93.99	PC	446,[illegible]	160,[illegible]	
3+94.64	PT	446,[illegible]	160,[illegible]	
4+02.90	PT	445,[illegible]	160,[illegible]	
4+22.56	PC	445,[illegible]	160,[illegible]	
4+26.75	PT	445,[illegible]	160,[illegible]	
4+28.65	PT	445,[illegible]	160,[illegible]	
4+34.24	PC	445,[illegible]	160,[illegible]	
4+36.60	PT	445,[illegible]	160,[illegible]	
4+38.60	PT	445,[illegible]	160,[illegible]	
4+43.07	PC	445,[illegible]	160,[illegible]	
4+47.61	PT	445,[illegible]	160,[illegible]	
4+51.73	PT	445,[illegible]	160,[illegible]	
4+55.00	PC	445,[illegible]	160,[illegible]	
4+56.03	PT	445,[illegible]	160,[illegible]	
4+61.77	PT	445,[illegible]	160,[illegible]	
4+67.07	PT	445,[illegible]	160,[illegible]	
4+68.41	PT	445,[illegible]	160,[illegible]	
4+70.58	PT	445,[illegible]	160,[illegible]	
4+76.00	PC	445,[illegible]	160,[illegible]	
4+93.06	PT	445,[illegible]	160,[illegible]	
4+85.63	PC	446,[illegible]	160,[illegible]	
4+94.72	PT	446,[illegible]	160,[illegible]	
4+96.64	PT	446,[illegible]	160,[illegible]	
5+04.54	PC	446,[illegible]	160,[illegible]	
5+07.73	PT	446,[illegible]	160,[illegible]	
5+27.88	PT	446,[illegible]	160,[illegible]	
5+27.82	PT	446,[illegible]	160,[illegible]	
5+36.13	POT	446,[illegible]	160,[illegible]	
5+54.89	PC	446,[illegible]	160,[illegible]	
5+56.77	PT	446,[illegible]	160,[illegible]	
5+58.50	PT	446,[illegible]	160,[illegible]	
6+05.77	PC	446,[illegible]	160,[illegible]	
6+07.77	PT	446,[illegible]	160,[illegible]	
6+73.24	PT	446,[illegible]	160,[illegible]	
6+80.38	PC	446,[illegible]	160,[illegible]	
6+85.21	PT	446,[illegible]	160,[illegible]	
6+56.47	PT	446,[illegible]	160,[illegible]	
6+59.67	PC	446,[illegible]	160,[illegible]	
6+60.87	PT	446,[illegible]	160,[illegible]	
6+02.52	PT	446,[illegible]	160,[illegible]	
6+04.50	PC	446,[illegible]	160,[illegible]	
6+06.20	PT	446,[illegible]	160,[illegible]	
6+07.57	PT	446,[illegible]	160,[illegible]	
6+09.63	PC	446,[illegible]	160,[illegible]	
6+15.03	PT	446,[illegible]	160,[illegible]	
6+17.10	PT	446,[illegible]	160,[illegible]	
6+20.61	PC	446,[illegible]	160,[illegible]	
6+22.38	PT	446,[illegible]	160,[illegible]	
6+26.37	PT	446,[illegible]	160,[illegible]	
6+35.01	PT	446,[illegible]	160,[illegible]	
6+38.99	PT	446,[illegible]	160,[illegible]	
6+40.96	PT	446,[illegible]	160,[illegible]	
6+47.57	PC	446,[illegible]	160,[illegible]	
6+49.31	PT	446,[illegible]	160,[illegible]	
6+50.93	PT	446,[illegible]	160,[illegible]	
6+58.29	PC	446,[illegible]	160,[illegible]	
6+63.30	PT	446,[illegible]	160,[illegible]	
6+60.29	PT	446,[illegible]	160,[illegible]	
6+74.25	POT	446,[illegible]	160,[illegible]	END SCHRIEBER CR SEC 3

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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)	14

CSF = 0.99943246

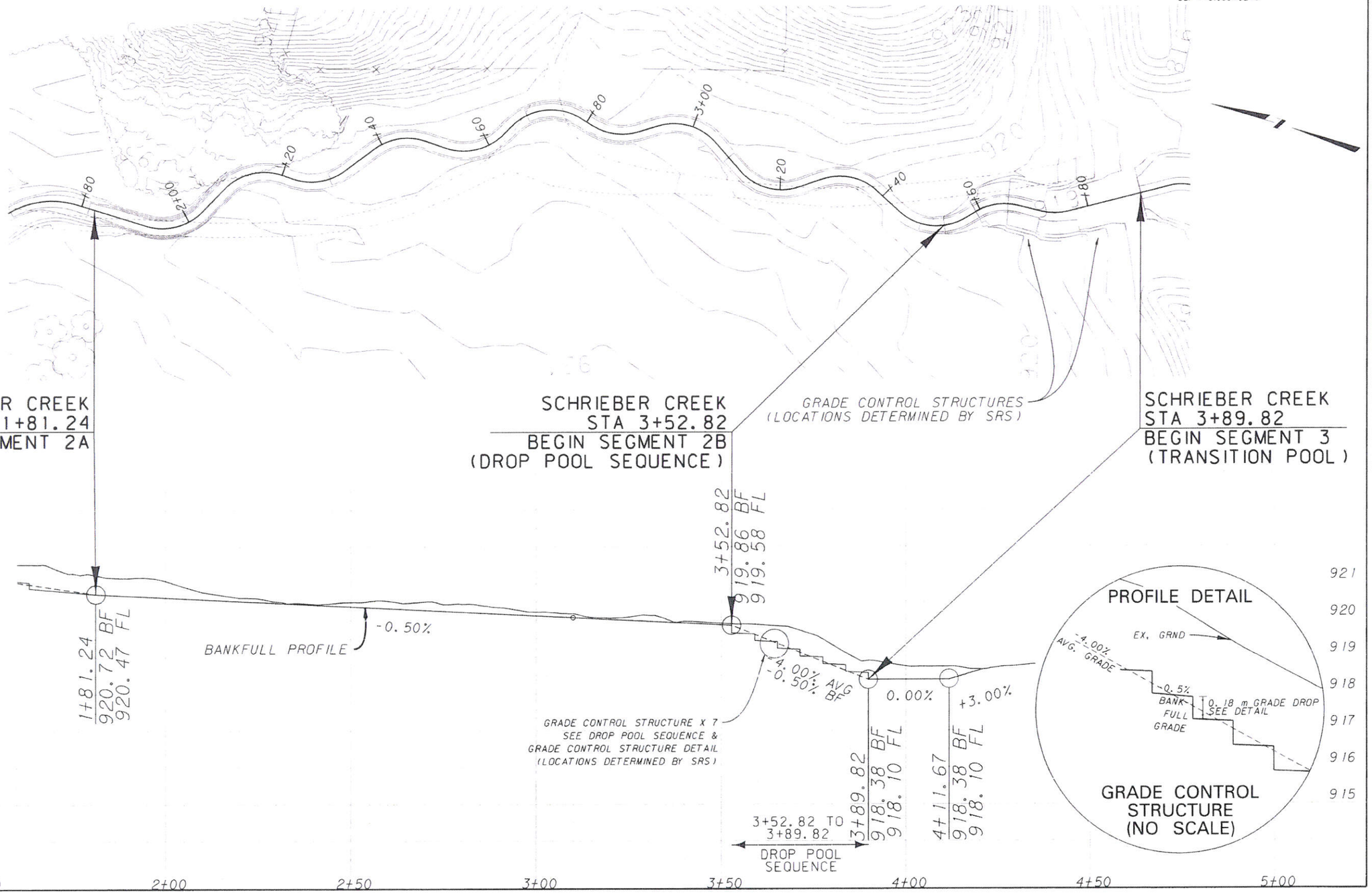


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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	15

CSF = 0.99943246

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



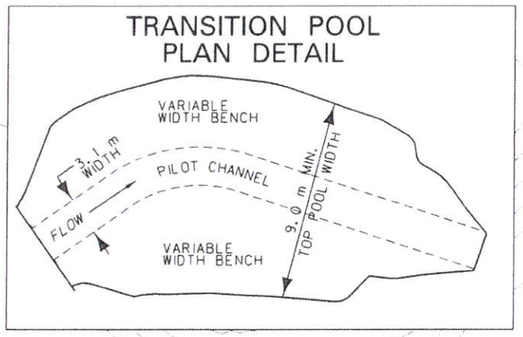
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	16

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

CSF = 0.99943246

TRANSITION POOL PLAN DETAIL



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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)	17

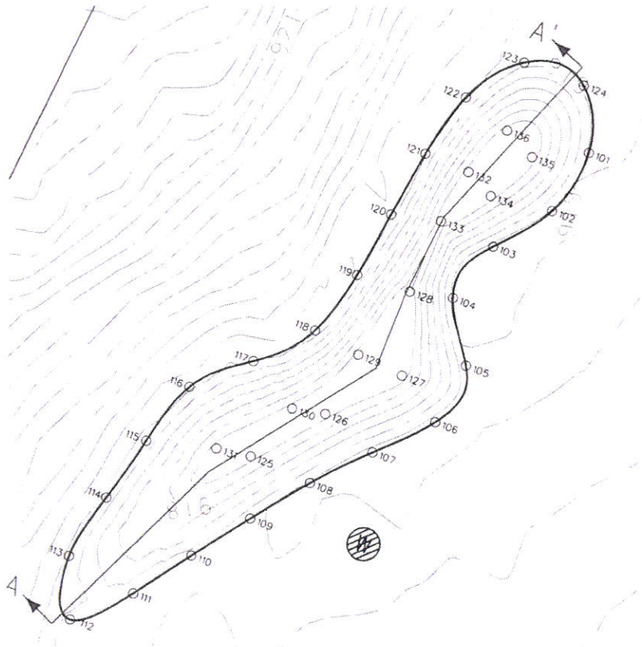
MDT MONTANA DEPARTMENT OF TRANSPORTATION

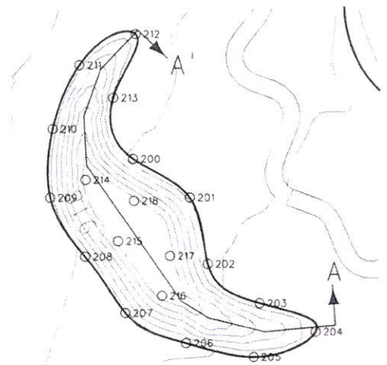
MONTANA CADD

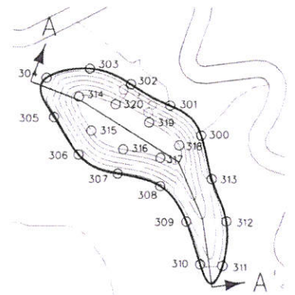


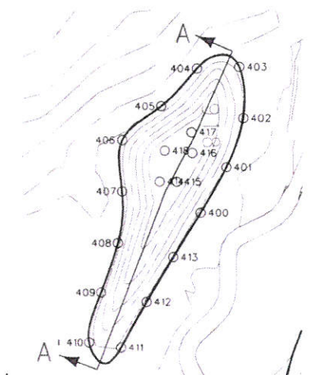
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	18

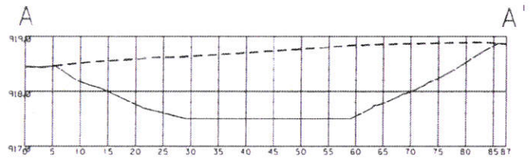
CSF = 0.99943246

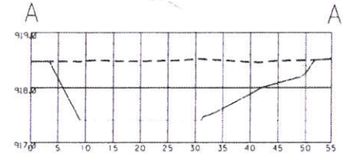


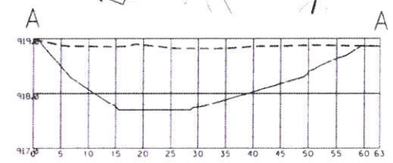


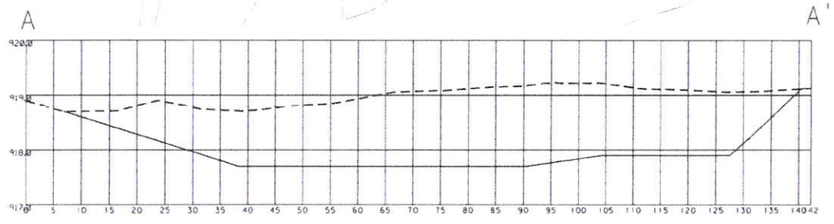












CELL 1 COORDINATES

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION
101	445055.911	1501942.025	918.035
102	445045.731	1501942.734	918.035
103	445033.860	1501942.734	918.035
104	445022.540	1501942.734	918.035
105	445011.220	1501942.734	918.035
106	444999.900	1501942.734	918.035
107	444988.580	1501942.734	918.035
108	444977.260	1501942.734	918.035
109	444965.940	1501942.734	918.035
110	444954.620	1501942.734	918.035
111	444943.300	1501942.734	918.035
112	444931.980	1501942.734	918.035
113	444920.660	1501942.734	918.035
114	444909.340	1501942.734	918.035
115	444898.020	1501942.734	918.035
116	444886.700	1501942.734	918.035
117	444875.380	1501942.734	918.035
118	444864.060	1501942.734	918.035
119	444852.740	1501942.734	918.035
120	444841.420	1501942.734	918.035
121	444830.100	1501942.734	918.035
122	444818.780	1501942.734	918.035
123	444807.460	1501942.734	918.035
124	444796.140	1501942.734	918.035
125	444784.820	1501942.734	918.035
126	444773.500	1501942.734	918.035
127	444762.180	1501942.734	918.035
128	444750.860	1501942.734	918.035
129	444739.540	1501942.734	918.035
130	444728.220	1501942.734	918.035
131	444716.900	1501942.734	918.035
132	444705.580	1501942.734	918.035
133	444694.260	1501942.734	918.035
134	444682.940	1501942.734	918.035
135	444671.620	1501942.734	918.035
156	444660.300	1501942.734	918.035

CELL 1 COORDINATES

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION
128	444730.314	1501975.834	917.700
129	444726.814	1501975.834	917.700
130	444723.46	1501975.834	917.700
131	444721.132	1501975.834	917.700
132	444714.82	1501975.834	917.700
133	444694.76	1501975.834	917.900
134	444692.21	1501975.834	917.900
135	444690.53	1501975.834	917.900
156	444684.428	1501975.834	917.900

CELL 2 COORDINATES

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION
200	444[illegible]	1[illegible]	[illegible]
201	444[illegible]	1[illegible]	[illegible]
202	444[illegible]	1[illegible]	[illegible]
203	444[illegible]	1[illegible]	[illegible]
204	444[illegible]	1[illegible]	[illegible]
205	444[illegible]	1[illegible]	[illegible]
206	444[illegible]	1[illegible]	[illegible]
207	444[illegible]	1[illegible]	[illegible]
208	444[illegible]	1[illegible]	[illegible]
209	444[illegible]	1[illegible]	[illegible]
210	444[illegible]	1[illegible]	[illegible]
211	444[illegible]	1[illegible]	[illegible]
212	444[illegible]	1[illegible]	[illegible]
213	444[illegible]	1[illegible]	[illegible]
214	444[illegible]	1[illegible]	[illegible]
215	444[illegible]	1[illegible]	[illegible]
216	444[illegible]	1[illegible]	[illegible]
217	444[illegible]	1[illegible]	[illegible]
218	444[illegible]	1[illegible]	[illegible]

CELL 3 COORDINATES

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION
300	444[illegible]	1[illegible]	[illegible]
301	444[illegible]	1[illegible]	[illegible]
302	444[illegible]	1[illegible]	[illegible]
303	444[illegible]	1[illegible]	[illegible]
304	444[illegible]	1[illegible]	[illegible]
305	444[illegible]	1[illegible]	[illegible]
306	444[illegible]	1[illegible]	[illegible]
307	444[illegible]	1[illegible]	[illegible]
308	444[illegible]	1[illegible]	[illegible]
309	444[illegible]	1[illegible]	[illegible]
310	444[illegible]	1[illegible]	[illegible]
311	444[illegible]	1[illegible]	[illegible]
312	444[illegible]	1[illegible]	[illegible]
313	444[illegible]	1[illegible]	[illegible]
314	444[illegible]	1[illegible]	[illegible]
315	444[illegible]	1[illegible]	[illegible]
316	444[illegible]	1[illegible]	[illegible]
317	444[illegible]	1[illegible]	[illegible]
318	444[illegible]	1[illegible]	[illegible]
319	444[illegible]	1[illegible]	[illegible]
320	444[illegible]	1[illegible]	[illegible]

CELL 4 COORDINATES

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION
400	445[illegible]	1[illegible]	[illegible]
401	445[illegible]	1[illegible]	[illegible]
402	445[illegible]	1[illegible]	[illegible]
403	445[illegible]	1[illegible]	[illegible]
404	445[illegible]	1[illegible]	[illegible]
405	445[illegible]	1[illegible]	[illegible]
406	445[illegible]	1[illegible]	[illegible]
407	445[illegible]	1[illegible]	[illegible]
408	445[illegible]	1[illegible]	[illegible]
409	445[illegible]	1[illegible]	[illegible]
410	445[illegible]	1[illegible]	[illegible]
411	445[illegible]	1[illegible]	[illegible]
412	445[illegible]	1[illegible]	[illegible]
413	445[illegible]	1[illegible]	[illegible]
414	445[illegible]	1[illegible]	[illegible]
415	445[illegible]	1[illegible]	[illegible]
416	445[illegible]	1[illegible]	[illegible]
417	445[illegible]	1[illegible]	[illegible]
418	445[illegible]	1[illegible]	[illegible]

NOTE:

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

WETLAND PROFILE & COORDINATES

(NO SCALE)

FOR MDT INTERNAL DISTRIBUTION ONLY 02/19/2014 Highways & Engineering Division

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

CSF = 0.99943246

MONTANA DEPARTMENT OF TRANSPORTATION MDT

MONTANA CADD

LEAVE EXISTING FENCE/GATE IN PLACE

SITE ENTRANCE

US HWY 2

EXISTING TIMBER BRIDGE 3' x 0.9 m STEEL CULVERT REMOVE (SEE DETAIL)

STA 0+10.00 BEG. COYOTE CR.

COYOTE CREEK DIVERSION STRUCTURE (SEE DETAIL)

REMOVE FENCE

EXISTING CHANNEL

REMOVE FENCE

WOODEN BARN DO NOT DISTURB

PROPERTY BOUNDARY

DO NOT DISTURB USFS FENCE

NO IMPACT AREA

SCHRIEBER CREEK DIVERSION STRUCTURE (SEE DETAIL)

WOODEN FENCE/CORRAL DO NOT DISTURB

SCHRIEBER LAKE

STA 1+81.24 BEG. SEG. 2A

STA 3+52.82 BEG. SEG. 2B

STA 3+89.82 BEG. SEG. 3

TRANSITION POOL

STA 3+07.10 END COYOTE CR.

EXISTING CHANNEL

NO IMPACT AREA

REMOVE FENCE TO PROP. LINE

LEAVE FENCE IN PLACE

REMOVE FENCE ON PROP BNDRY

SCHRIEBER CR. STA 0+24.76 BEG. SEG. 1

PIEZOMETER

SCHRIEBER CR. STA 6+74.25 END SEG. 3

PROPERTY BOUNDARY

WETLAND CELLS

NO IMPACT AREA

REMOVE FENCE ON PROP BNDRY

DELINEATED WETLAND AREAS

= WETLAND CELL

= PIEZOMETER (DO NOT DISTURB)

NOTE:
IMPACTS TO DELINEATED WETLANDS CAUSED BY CONSTRUCTION TRAFFIC/ACTIVITIES MUST BE MINIMIZED THROUGH THE USE OF RESPONSIBLE CONSTRUCTION PRACTICES.

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

CONTOUR INTERVAL = 0.2 m

SITE PLAN
SCHRIEBER LAKE
MITIGATION

(NO SCALE)

DESIGN ICE/TOL	DESIGNED	REVIEWED	CHECKED	DRAWN
2/19/2014	RW	RW		
11:07:17				

NO	DATE	BY	REVISION
3			
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