

Montana Department of Transportation Stream Mitigation Monitoring Report
US 2 - SWAMP CREEK EAST MITIGATION SITE

Project Overview

Watershed: Watershed #1 - Kootenai

MDT Project: NH-1(35)49F; Control No. 1027000

Monitoring Year: 2023

Years Monitored: Lower Reach - 5th year of monitoring, Upper Reach 4th year of monitoring

Corps Permit Number: NWO-2012-00146-MTM

Stream Protection Act Authorization: SPA# MDT-R1-04-2018

Monitoring Conducted By: Confluence Consulting Inc.

Monitoring Dates: August 3, 2023

Purpose of the approved project:

As part of the U.S. Highway 2/Swamp Creek East Road Reconstruction Project, the Montana Department of Transportation (MDT) modified two reaches of Swamp Creek to allow for highway widening and roadway improvements. MDT mitigated these impacts on-site by reconstructing 1,069 feet of Swamp Creek adjacent to U.S. Highway 2. The project was broken up into “upper” and “lower” reaches. The lower reach is located east of the U.S. Highway 2 corridor and is approximately 170 linear feet in length. The upper reach is located west of the U.S. Highway 2 corridor and is approximately 899 linear feet in length. Construction was completed on the lower reach prior to the 2019 monitoring event and was assessed for the first time in the summer of 2019. The upper reach was completed in 2020 and assessed for the first time during the summer of 2020.

Site Location:

Upper Reach Upstream Coordinates: 48.1341951, -115.432838

Upper Reach Downstream Coordinates: 48.135767, -115.4337009

Lower Reach Upstream Coordinates: 48.135914, -115.4335097

Lower Reach Downstream Coordinates: 48.137279, -115.4341232

County: Lincoln

Nearest Town: Libby

Map Included: Figure 1 on page #4.

Mitigation Site Construction Started: Summer 2018

Construction Ended: Spring 2020

Dates of any recent corrective or maintenance activities (since previous report):

Activity: None **Date:** NA

Specific recommendations for additional corrective actions: Noxious weed control should be implemented in the upper reach.

Previous Monitoring Reports and Methods Descriptions:

<https://www.mdt.mt.gov/publications/brochures/stream-mitigation.aspx>

Monitoring methods are described in the 2019 monitoring report, and additional details for the upper reach are available in the 2020 monitoring report.

Monitoring Period: Minimum of 3 years from construction completion or until concurrence by US Army Corps of Engineers (USACE).

Requirements (from approved mitigation plan, banking instrument, or DA permit conditions)

Performance Standards:

The monitoring site met the performance standard for vegetation success for the first time in 2022, and again in 2023.

Table 1. Summary of performance standards for the Swamp Creek East Mitigation site.

Parameter	Success Criteria	Status	Site Meeting Success Criteria?
Vegetation Success	Will be achieved when combined areal cover of riparian and streambank vegetation is $\geq 75\%$.	Y	The average areal cover along the four riparian transects was 81.6%.

Summary Data

Riparian Vegetation Inventory

The results of four line-point intersect transects indicate that total areal vegetation cover in riparian areas was 81.6% in 2023 (Table 2). This is an increase in cover from 2022, with upper and lower reaches displaying decreases in bare ground of 2.5 and 8.9 percent respectively. The dominant species recorded at the lower reach were reed canarygrass (*Phalaris arundinacea*), and grass blue wildrye (*Elymus glaucus*). At the upper reach, reed canarygrass and intermediate wheatgrass (*Elymus hispidus*) were the dominant species.

A total of 76 species have been observed site-wide since 2019 with 17 species documented for the first time in 2023. Thirty-one of the seventy-six species identified are considered hydrophytic based on the 2020 National Wetland Plant List (USACE 2020; Appendix C). Fifty-eight percent of the species recorded across the site are native and considered beneficial to the restoration efforts, including willows which were planted within the project reach.

Noxious Weeds

Five Montana state-listed noxious weed species, including Canada thistle (*Cirsium arvense*), ox-eye daisy (*Leucanthemum vulgare*), common tansy (*Tanacetum vulgare*), spotted knapweed (*Centaurea stoebe*), and butter-and-eggs (*Linaria vulgaris*) were observed in within the Swamp Creek stream mitigation site in 2023. Canada thistle and spotted knapweed are the most prevalent noxious weed in the upper reach, although the right bank also has infestations of ox-eye daisy, or butter-and-eggs. Noxious weed cover was estimated at 1% within the lower reach and at approximately 5% for all species combined for the upper reach. In the lower reach, common tansy is the most common noxious weed. Noxious weed infestations encompassing at least 1 percent of the total cover within each reach were mapped (Map 1, Appendix A). Noxious weed infestations identified in trace amounts (<1% of inventory area within each reach) were noted but not mapped.

Table 2. Percent cover along vegetation transects within the Swamp Creek East Mitigation site in 2021-2023.

Reach	Location	Length (ft)	% Cover					
			2021		2022		2023	
			Bare Ground/ Fabric	Vegetation	Bare Ground/ Fabric	Vegetation	Bare Ground/ Fabric	Vegetation
Lower	Transect 1	42	5	95	30	70	10	90
	Transect 2	42	25	75	15	85	30	70
Upper	Transect 3	45	50	50	30	70	30	70
	Transect 4	36	25	75	20	80	0	100
		Weighted Average	26.7	73.3	24.0	76.0	18.4	81.6

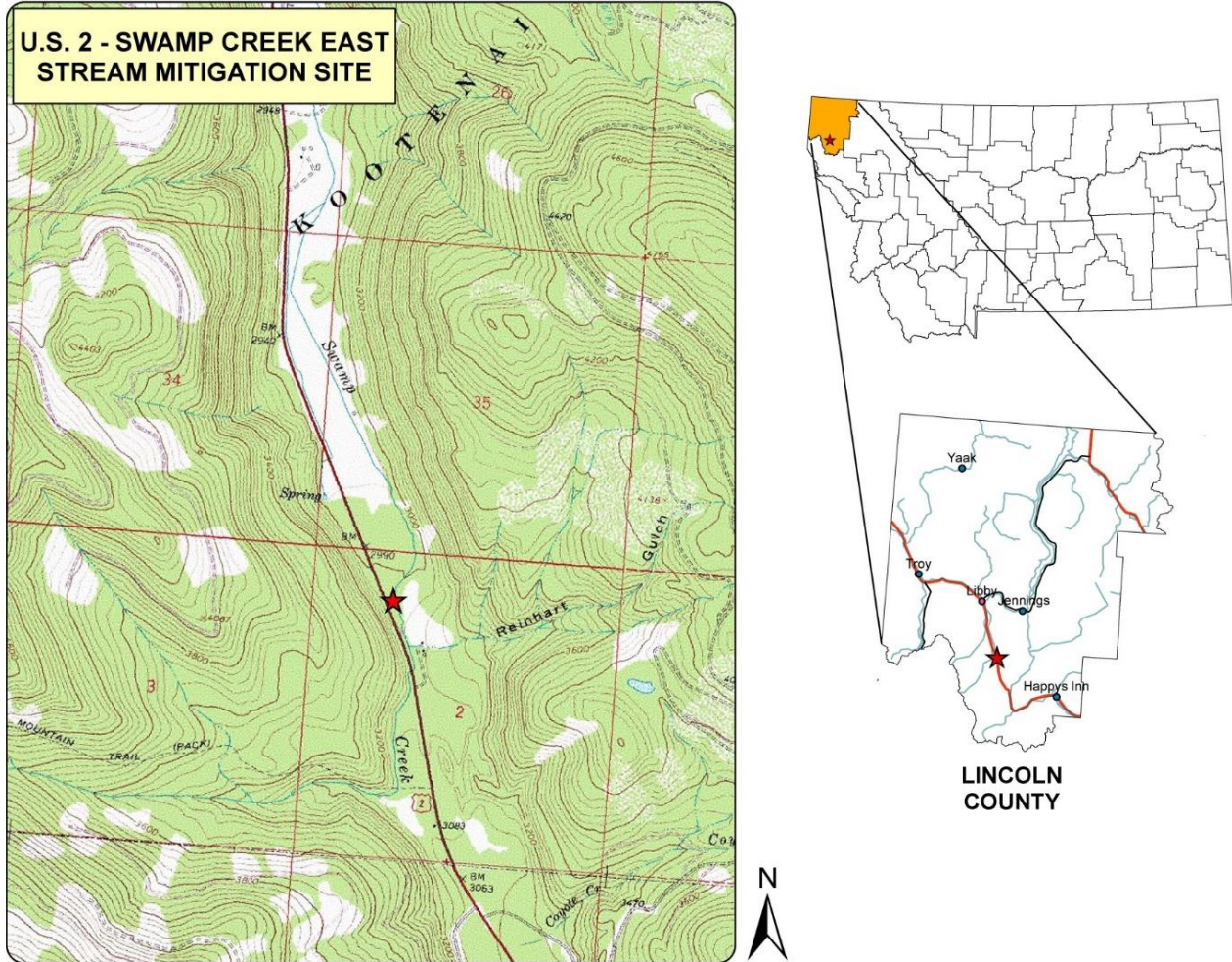
Conclusions

A weighted average across the four vegetation transects indicates that total vegetative cover was 81.6 percent in 2023, which meets the vegetative success criterion. This criterion was also met in 2022, and an upward trend in total cover has been observed over the last few monitoring events (Table 2), indicating that vegetation at the site is stabilizing. In general, vegetation is transitioning from a community dominated by non-native species, including many annual forbs, to one dominated by native and introduced perennial grass species. This transition will provide greater soil stability and increased cover for birds and small mammals. As indicated by the 17 new species observed during the 2023 monitoring event, plant diversity has continued to increase over the monitoring period. Habitat diversity and structure is expected to increase as perennial cover expands, willows mature, and more volunteers establish.

While there are no success criteria for channel form stability or function, the rock weirs and culverts on the site were all in good condition and functioning as designed during the 2023 monitoring visit.

Maps, Plans, Photos:

Figure 1. Site Location Map



Project Area Maps/Figures: See Appendix A

Photos: See Appendix B

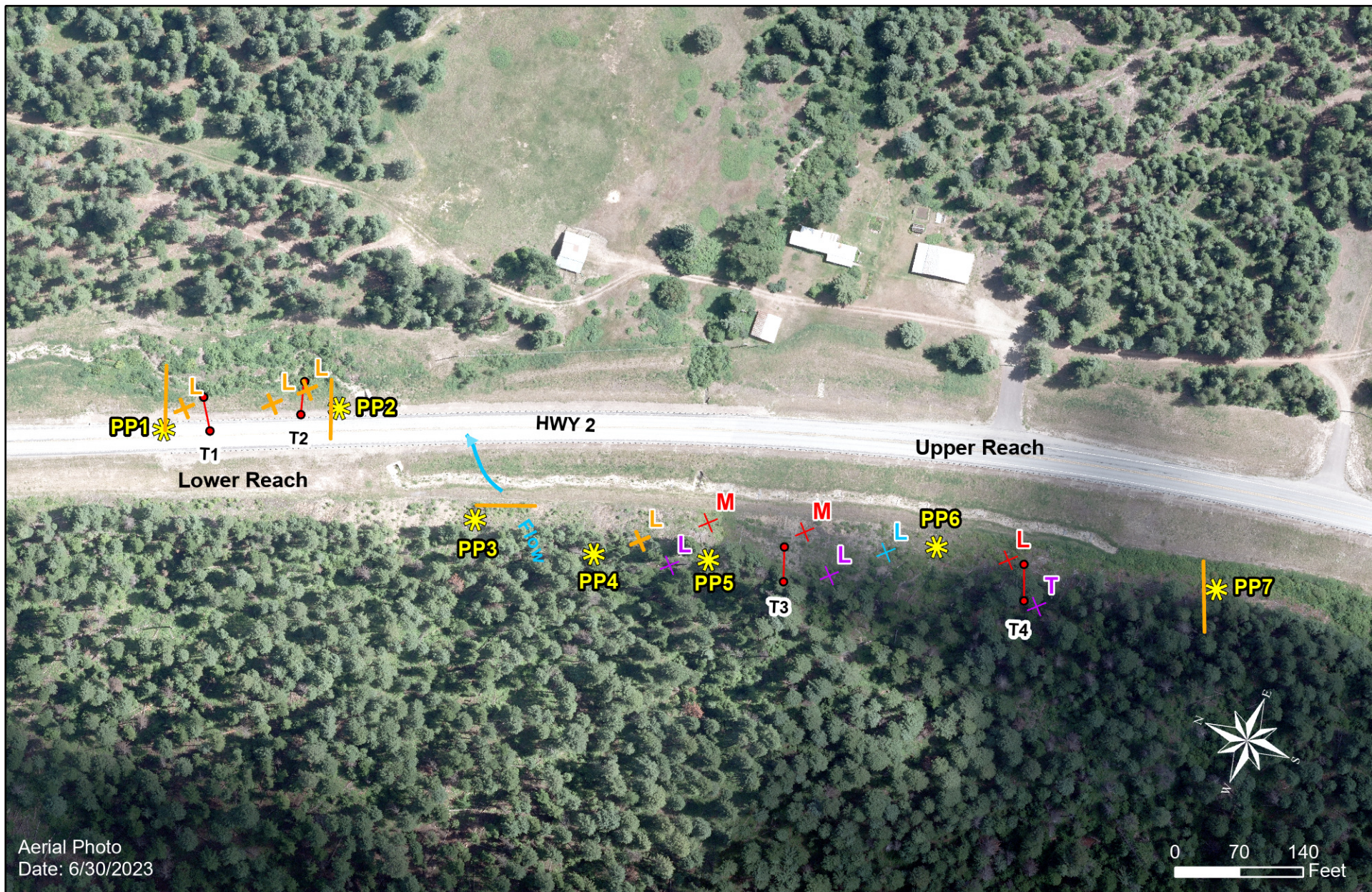
Comprehensive Plant List: See Appendix C









Plans: See Appendix D of 2019 Monitoring Report

<https://www.mdt.mt.gov/publications/brochures/stream-mitigation.aspx>

APPENDIX A
PROJECT AREA MAPS

MDT Stream Mitigation Monitoring
Swamp Creek East
Lincoln County, Montana



 CONFLUENCE CONSULTING	Legend		Noxious Weeds		Swamp Creek East 2023 - Upper and Lower Reaches Monitoring Features
		Approximate Channel Reach Breaks		Centaurea stoebe	Noxious Weed Cover Classes
		Vegetation Transects		Cirsium arvense	T = Trace
		Photo Points		Tanacetum vulgare	L = Low (1-5% cover)
				Leucanthemum vulgare	M = Moderate (6-25% cover)
				H = High (26-100% cover)	Map 1
					Map Date: 10/25/2023
					SwampEast_monitor_2023.mxd

APPENDIX B
PROJECT AREA PHOTOGRAPHS

MDT Stream Mitigation Monitoring
Swamp Creek East
Lincoln County, Montana

MONITORING PHOTO LOG

SITE NAME: Swamp Creek East
MONITORING YEAR: 2023



2019



2023

Photo Point 1: Looking south (upstream) from the bottom of the lower reach.



2019



2023

Photo Point 2: Looking north (downstream) from the top of the lower reach.



2019



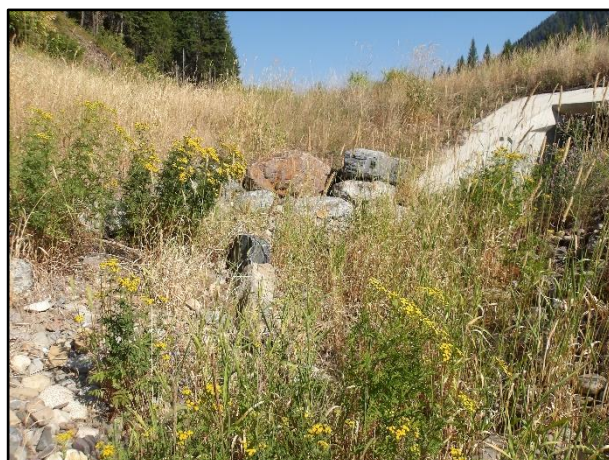
2023

Photo Point 3: Looking south (upstream) from the bottom of upper reach during (2019) and after construction (2023).

SITE NAME: Swamp Creek East
MONITORING YEAR: 2023

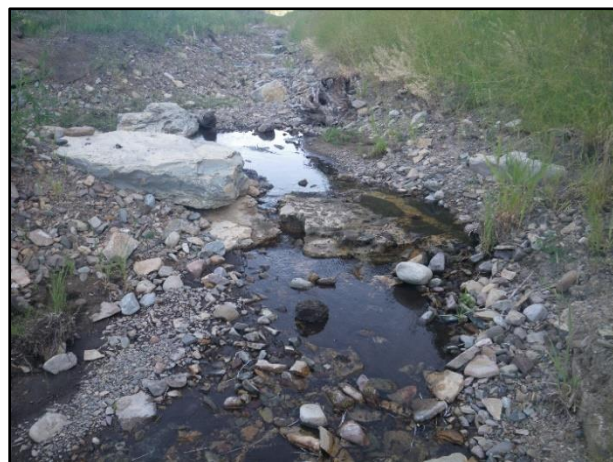


2020



2023

Photo Point 4: Looking north (downstream) at the downstream end of the upper reach.



2020



2023

Photo Point 5.1: Looking south (upstream) from below the culvert located mid-way up the upper reach.



2020



2023

Photo Point 5.2: Looking east at the culvert located mid-way up the upper reach.

SITE NAME: Swamp Creek East
MONITORING YEAR: 2023



2020



2023

Photo Point 5.3: Looking north (downstream) from the culvert located mid-way up the upper reach.



2020



2023

Photo Point 5.4: Looking south (upstream) above the culvert located mid-way up the upper reach.



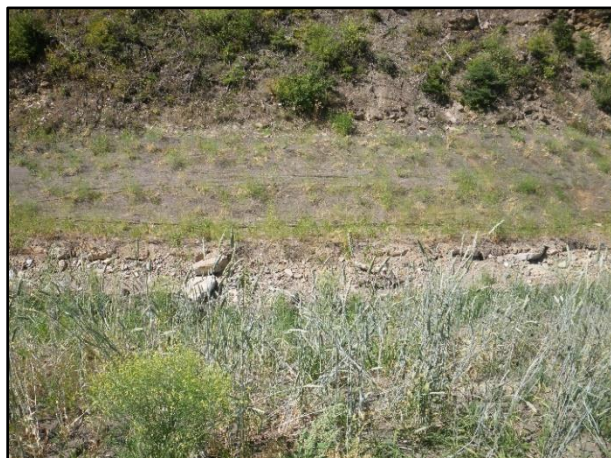
2020



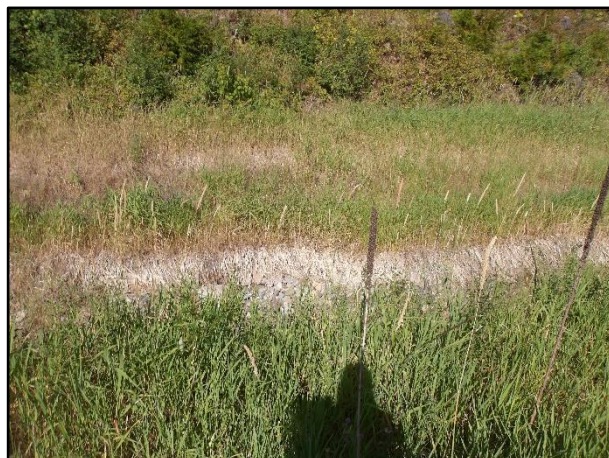
2023

Photo Point 6.1: Looking southwest (upstream) at the upper end of the upper reach.

SITE NAME: Swamp Creek East
MONITORING YEAR: 2023



2020

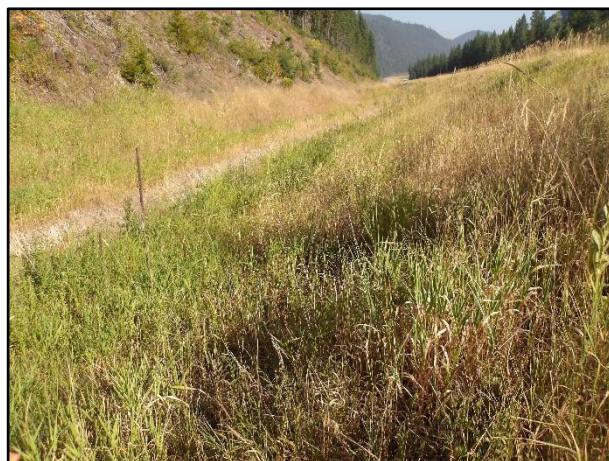


2023

Photo Point 6.2: Looking west from the upper end of the upper reach.



2020



2023

Photo Point 6.3: Looking northwest (downstream) from the upper end of the upper reach.



2020



2023

Photo Point 7: Looking north (downstream) from the top of the upper reach.



2019



2023

Additional Photo 1: View looking west across Vegetation Transect #1.



2019



2023

Additional Photo 2: View looking east across Vegetation Transect #1



2019



2023

Additional Photo 3: View looking west across Vegetation Transect #2.



2019



2023

Additional Photo 4: View looking east across Vegetation Transect #2.



2020



2023

Additional Photo 5: View looking west across Vegetation Transect #3.



2020



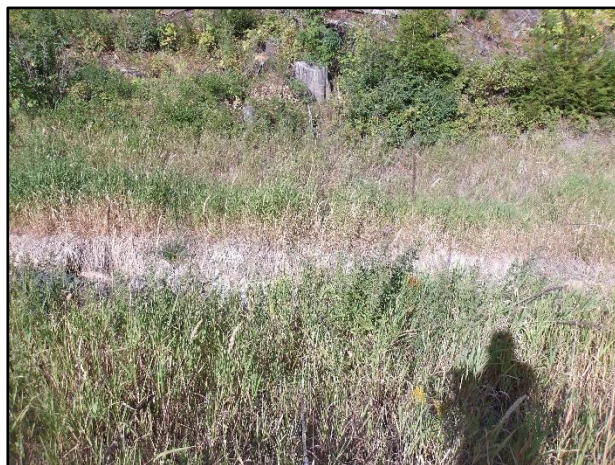
2023

Additional Photo 6: View looking east across Vegetation Transect #3.

SITE NAME: Swamp Creek East
MONITORING YEAR: 2023



2020



2023

Additional Photo 7: View looking west across Vegetation Transect #4.



2020



2023

Additional Photo 8: View looking east across Vegetation Transect #4.

APPENDIX C
2019 – 2023 COMPREHENSIVE PLANT SPECIES LIST

MDT Stream Mitigation Monitoring
Swamp Creek East
Lincoln County, Montana

Table C-1. Comprehensive list of plant species observed at the Swamp Creek East Stream Mitigation Site from 2019 through 2023.

Scientific Name	Common Name	WMVC Indicator Status*
<i>Achillea millefolium</i>	Common Yarrow	FACU
<i>Agrostis stolonifera</i>	Spreading Bent	FAC
<i>Alnus incana</i>	Speckled Alder	FACW
<i>Alopecurus arundinaceus</i>	Creeping Meadow-Foxtail	FAC
<i>Amelanchier alnifolia</i>	Saskatoon Service-Berry	FACU
<i>Anaphalis margaritacea</i>	Pearly-Everlasting	FACU
<i>Beckmannia syzigachne</i>	American Slough Grass	OBL
<i>Berteroa incana</i>	Hoary False-alyssum	UPL
<i>Bromus diandrus</i>	Ripgut Brome	UPL
<i>Bromus inermis</i>	Smooth Brome	UPL
<i>Bromus japonicus</i>	Japanese Brome	UPL
<i>Bromus squarrosus</i>	Corn Brome	UPL
<i>Bromus tectorum</i>	Cheatgrass	UPL
<i>Capsella bursa-pastoris</i>	Shepherd's-Purse	FACU
<i>Carex aurea</i>	Golden-Fruit Sedge	FACW
<i>Carex bebbii</i>	Bebb's Sedge	OBL
<i>Carex interior</i>	Inland Sedge	OBL
<i>Carex pachystachya</i>	Thick-Head Sedge	FAC
<i>Centaurea stoebe</i>	Spotted Knapweed	UPL
<i>Cerastium fontanum</i>	Common Mouse-Ear Chickweed	FACU
<i>Chenopodium album</i>	Lamb's-Quarters	FACU
<i>Chenopodium capitatum</i>	Strawberry Goosefoot	UPL
<i>Cirsium arvense</i>	Canada Thistle	FAC
<i>Cornus alba</i>	Red Osier	FACW
<i>Deschampsia caespitosa</i>	Tufted Hair Grass	FACW
<i>Eleocharis palustris</i>	Common Spike-Rush	OBL
<i>Elymus glaucus</i>	Blue Wildrye	FACU
<i>Elymus lanceolatus</i>	Streamside Wild Rye	FACU
<i>Elymus repens</i>	Creeping Wild Rye	UPL
<i>Elymus trachycaulus</i>	Slender Wild Rye	FAC
<i>Epilobium brachycarpum</i>	Willowherb	FAC
<i>Epilobium ciliatum</i>	Fringed Willowherb	FACW
<i>Fragaria virginiana</i>	Virginia Strawberry	FACU
<i>Heuchera parviflora</i>	Littleleaf Alumroot	UPL

Scientific Name	Common Name	WMVC Indicator Status*
<i>Hieracium umbellatum</i>	Narrowleaf Hawkweed	UPL
<i>Juncus ensifolius</i>	Dagger-Leaf Rush	FACW
<i>Juncus nodosus</i>	Knotted Rush	OBL
<i>Juncus tenuis</i>	Lesser Poverty Rush	FAC
<i>Lactuca serriola</i>	Prickly Lettuce	FACU
<i>Leucanthemum vulgare</i>	Ox-Eye Daisy	FACU
<i>Linaria vulgaris</i>	Butter-and-eggs	UPL
<i>Madia glomerata</i>	Mountain Tarplant	FACU
<i>Maianthemum racemosum</i>	Feathery False Solomon's-Seal	FAC
<i>Medicago lupulina</i>	Black Medic	FACU
<i>Melilotus officinalis</i>	Yellow Sweet-Clover	FACU
<i>Mentha arvensis</i>	American Wild Mind	FACW
<i>Mimulus guttatus</i>	Seep Monkey-Flower	OBL
<i>Phacelia hastata</i>	Silverleaf Phacelia	UPL
<i>Phalaris arundinacea</i>	Reed Canary Grass	FACW
<i>Phleum pratense</i>	Common Timothy	FACU
<i>Plantago major</i>	Great Plantain	FAC
<i>Poa palustris</i>	Fowl Blue Grass	FAC
<i>Populus balsamifera</i>	Balsam Poplar	FAC
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	FAC
<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	UPL
<i>Rorippa</i> sp.	Yellowcress	UPL
<i>Rubus parviflorus</i>	Western Thimble-Berry	FACU
<i>Rumex crispus</i>	Curly Dock	FAC
<i>Rumex salicifolius</i>	Willow Dock	FACW
<i>Salix exigua</i>	Narrow-leaf Willow	FACW
<i>Salix lasiandra</i>	Pacific Willow	FACW
<i>Silene</i> sp.	Catchflies	N/A
<i>Sisymbrium altissimum</i>	Tall Hedge-Mustard	FACU
<i>Solidago canadensis</i>	Canadian Goldenrod	FACU
<i>Sonchus arvensis</i>	Field Sow-Thistle	FACU
<i>Spiraea betulifolia</i>	Shiny-Leaf Meadowsweet	FACU
<i>Symphoricarpos albus</i>	Common Snowberry	FACU
<i>Symphyotrichum campestre</i>	Western Meadow Aster	UPL

Scientific Name	Common Name	WMVC Indicator Status*
<i>Symphyotrichum foliaceum</i>	Alpine Leafy-Head Aster	FACU
<i>Tanacetum vulgare</i>	Common Tansy	FACU
<i>Thlaspi arvense</i>	Field Pennycress	UPL
<i>Trifolium pratense</i>	Red Clover	FACU
<i>Trifolium repens</i>	White Clover	FAC
<i>Verbascum thapsus</i>	Great Mullein	FACU
<i>Veronica americana</i>	American-Brooklime	OBL
<i>xTriticale</i>	Triticale	UPL

*2020 National Wetland Plant List; Western Mountains, Valleys, and Coast Region (USACE 2020)

New species identified in 2023 are **bolded**.