

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: 2022

Years Monitored: 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 10, 2022

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 for 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. The upper reach is located west of the U.S. Highway 2 corridor and is approximately 899 linear feet. Construction was completed on the lower reach prior to the 2019 monitoring event and was assessed for the first time in 2019. The upper reach was completed in 2020 and assessed for the first time in 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 of 2020

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

Activity: None **Date:** NA

Specific recommendations for additional corrective actions: Weed control should be undertaken in areas where perennial grass has established. In areas where perennial grass has not established and the vegetation is dominated by annual forbs, weed control could be counter productive to the stability of the site.

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 were provided 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.

Table 1. Summary of performance standards

Performance Standard	Success Criteria	Criteria Achieved?	Discussion
Vegetation Success	Areal cover of riparian and streambank vegetation is $\geq 75\%$	Yes	The project reach exhibits an average of 76.3% areal vegetation cover.

Summary Data

Riparian Vegetation Inventory

In 2022, the total areal vegetation cover was 76.3% (Table 2). Vegetative cover decreased by 7.5% in the lower reach, and increased by 11.4% in the upper reach. The vegetation transects in the lower reach were dominated by two non-native species – intermediate wheatgrass (*Elymus hispidus*) and reed canary grass (*Phalaris arundinacea*). The upper reach was dominated by reed canary grass and the noxious weed Canada thistle (*Cirsium arvense*) and had a slightly higher amount of bare ground than the lower reach.

Fifty-six plant species were observed site-wide, 22 of which are considered hydrophytic based on the 2020 National Wetland Plant List (USACE 2020; Appendix C). The number of plant species observed increased by eight since 2021. Half of the plant species observed were native and considered beneficial to the restoration efforts within the project area.

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 2022. Canada thistle and common tansy were the most prevalent, with oxeye daisy, spotted knapweed, and butter-and-eggs only occurring in trace amounts. Noxious weed infestations encompassing at least 1% of the area within each reach were mapped and are displayed on 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 2020-2022 (averages are weighted).

Reach	Location	Length (ft)	% Cover					
			2020		2021		2022	
			Bare Ground/ Fabric	Vegetation	Bare Ground/ Fabric	Vegetation	Bare Ground/ Fabric	Vegetation
Lower	Transect 1	42	18	82	5	95	30	70
	Transect 2	42	27	73	25	75	15	85
Upper	Transect 3	45	59	41	50	50	30	70
	Transect 4	36	46	55	25	75	20	80
	Average		37.6	62.2	26.7	73.3	24.0	76.3

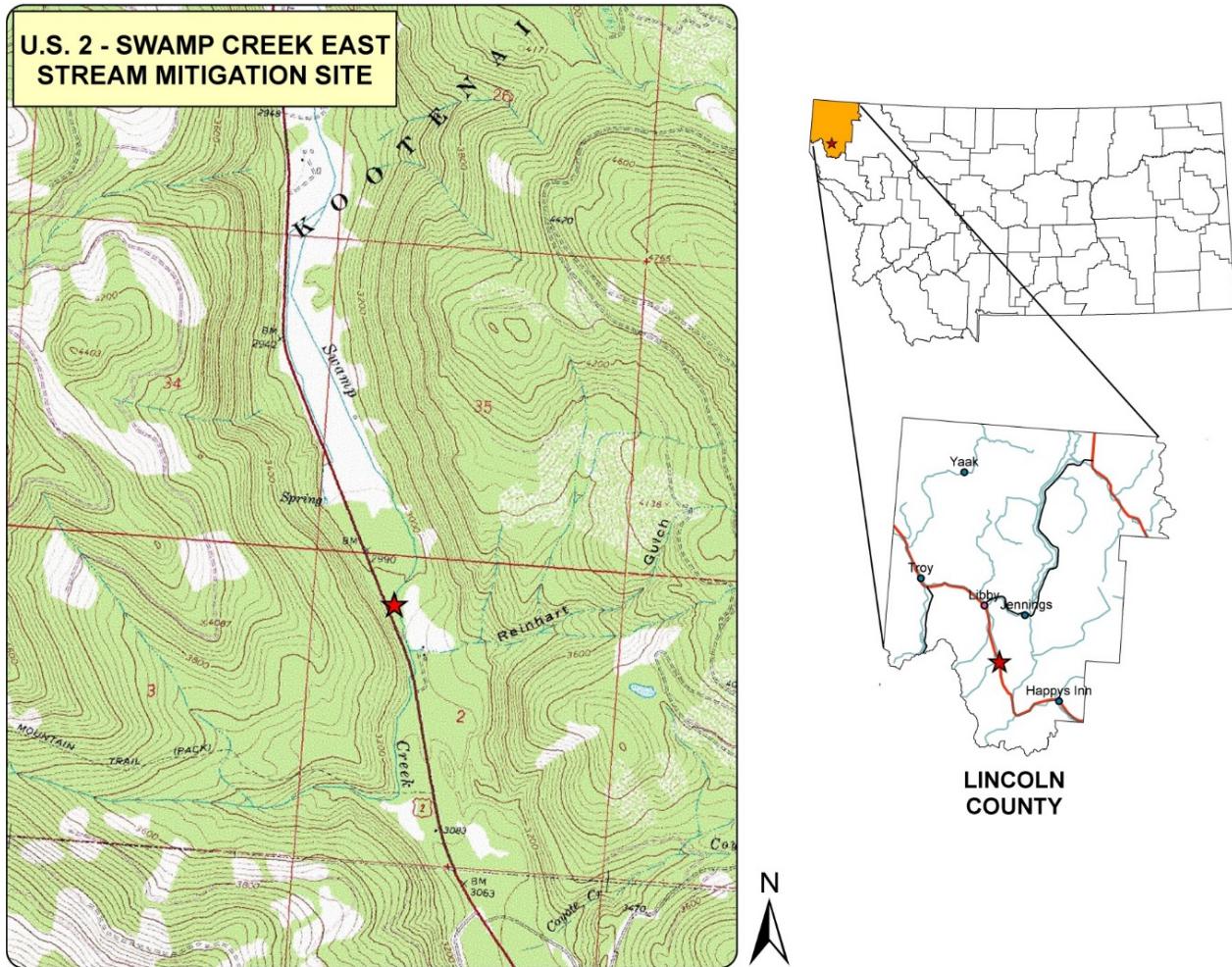
Conclusions

On average, the vegetation cover was 76.3 percent across all four monitoring transects and the vegetative success criterion was met in 2022 (Table 2). Vegetative cover increased again in the upper reach in 2022 but decreased in the lower reach for unknown reasons. The vegetation observed in both reaches was dominated by early-successional, non-native, annual and perennial species which generally provide stability over bare ground and cover for small animals. Plant species diversity has continued to increase over the monitoring period and habitat diversity and structure is expected to increase as coverage of perennial species expands.

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 2022 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 <ul style="list-style-type: none"> — Approximate Channel Reach Breaks ● Vegetation Transects ★ Photo Points 	Noxious Weed Cover Classes T = Trace L = Low (1-5% cover) M = Moderate (6-25% cover) H = High (26-100% cover)	Swamp Creek East 2022 - Upper and Lower Reaches Monitoring Features
			Map 1 Map Date: 2/10/2023 SwampEast_monitor2022.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: 2022



2019



2022

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



2019



2022

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



2019



2022

Photo Point 3: Looking south (upstream) from the bottom of upper reach during (2019) and after construction (2022).

SITE NAME: Swamp Creek East

MONITORING YEAR: 2022



2020



2022

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



2020

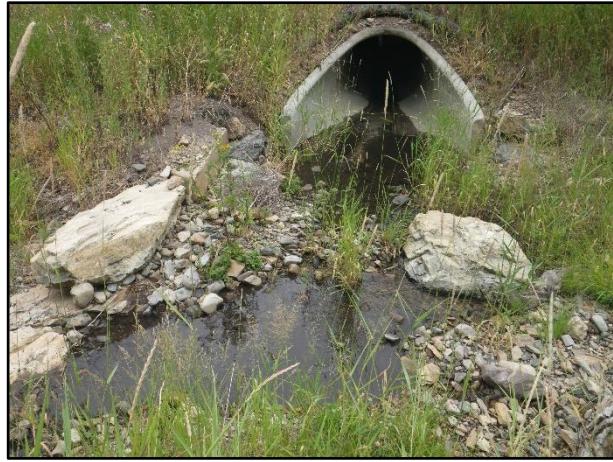


2022

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



2020



2022

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

SITE NAME: Swamp Creek East

MONITORING YEAR: 2022



2020



2022

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



2020



2022

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



2020



2022

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

SITE NAME: Swamp Creek East

MONITORING YEAR: 2022



2020

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



2022



2020

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



2022



2020

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



2022

SITE NAME: Swamp Creek East

MONITORING YEAR: 2022



2019



2022

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



2019



2022

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



2019



2022

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

SITE NAME: Swamp Creek East

MONITORING YEAR: 2022



2019



2022

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



2020



2022

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



2020



2022

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

SITE NAME: Swamp Creek East

MONITORING YEAR: 2022



2020



2022

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



2020



2022

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

APPENDIX C

2019 – 2022 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 2022.

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>Beckmannia syzigachne</i>	American Slough Grass	OBL
<i>Berteroa incana</i>	Hoary False-alyssum	UPL
<i>Bromus diandrus</i>	Ripgut Brome	UPL
<i>Bromus inermus</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 bebbii</i>	Bebb's Sedge	OBL
<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>Elymus lanceolatus</i>	Streamsider 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
<i>Hieracium umbellatum</i>	Narrowleaf Hawkweed	UPL
<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 canadense</i>	Feathery False Solomon's-Seal	FAC
<i>Medicago lupulina</i>	Black Medic	FACU
<i>Melilotus officinalis</i>	Yellow Sweet-Clover	FACU

Scientific Name	Common Name	WMVC Indicator Status*
<i>Mentha arvensis</i>	American Wild Mint	FACW
<i>Mimulus guttatus</i>	Seep Monkey-Flower	OBL
<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>Rorippa</i> sp.	Yellowcress	NL
<i>Rubus parviflorus</i>	Western Thimble-Berry	FACU
<i>Rumex crispus</i>	Curly Dock	FAC
<i>Rumex salicifolius</i>	Willow Dock	UPL
<i>Salix exigua</i>	Narrow-leaf Willow	FACW
<i>Salix lasiandra</i>	Pacific Willow	FACW
<i>Sisymbrium altissimum</i>	Tall Hedge-Mustard	FACU
<i>Sonchus arvensis</i>	Field Sow-Thistle	FACU
<i>Spiraea betulifolia</i>	Shiny-Leaf Meadowsweet	FACU
<i>Symporicarpos albus</i>	Common Snowberry	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>xTriticale</i>	Triticale	UPL

*2020 National Wetland Plant List; Western Mountains, Valleys, and Coast Region (USACE 2020)
New species identified in 2022 are **bolded**