



## **Blacktail Creek Non Point Nutrient Management Project**

*“Evaluating Nutrient Levels, Loading, Sources and Developing Best Management Practices (BMP’s) to Control Nutrient Inflow and exploring point to non-point source nutrient trading potential for Blacktail Creek in Butte.”*

Mile High Conservation District

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## Project Summary

Silver Bow Creek has been identified as an impaired creek specifically from a nutrient point of view by the Department of Environmental Quality (DEQ) "Upper Clark Fork Phase 2 Sediment and Nutrients TMDLs and Framework Water Quality Improvement Plan". Blacktail Creek (BTC) has been identified in the Nutrient TMDL Framework Plan as one of the main contributors to this condition. The proposed project will allow for the development of a phased approach to identifying and addressing nonpoint nutrient contributors to Blacktail & Silver Bow Creeks.

Nutrient levels in a water body are a critical parameter for healthy aquatic life and fish population to thrive. Blacktail Creek is a tributary to Silver Bow Creek which in turn flows into Clark Fork River. The nutrient levels in Blacktail Creek is reported to be high enough by the Montana Department of Environmental Quality (DEQ), to be of concern not only for the health of the stream but also it might influence the nutrient loading by point sources in the downstream locations including the municipal waste water treatment plant. Blacktail Creek exceeds Montana's policy for nutrient loading under Total Maximum Daily Load (TMDL) standards. Point sources are under pressure to control nutrient loading while the non-point sources might contribute significantly to the nutrient loading. This project will identify nutrient sources to BTC, and develop Best Management Practices (BMPs) which may be incorporated into The Natural Resource Damage Program (NRDP) restoration efforts in the BTC while also exploring the potential for point source to non-point source nutrient trading and federal and state grants.

Nutrient loading and levels will be characterized along the creek to identify nutrient non-point and point sources. Based on the field results the Best Management Practices (BMPs) will be identified which will reduce the nutrient loading to the BTC thus exploring the potential to trade with one or more point sources that may require otherwise very expensive control systems to reduce nutrients. It is expected for example; that even after BSB implements a very expensive municipal waste water system upgrade the ability to meet the required TMDL goals will not be reached. While, it is likely that inexpensive control measures by way of BMPs may reduce the non-point source of nutrient loading, thus benefitting the point sources as well to maintain a healthy watershed. Under this project the major objectives are; evaluating nutrient levels, loading, and sources of BTC and developing best management practices and, exploring the point source to non-point source nutrient trading potential.

One goal of the project is to implement the new Montana Policy for Nutrient Trading Circular DEQ-13 which has never been implemented in Montana. The results of the project will be used to obtain DEQ approval of nutrient trades in the Montana Pollutant Discharge Elimination System (MPDEAS) in the Upper Clark Fork River Basin. This policy "provides a pre-application process to work with any point source interested in trading to assist in determining the appropriate information needed to incorporate the trade in an MPDES permit and inform the permitted facility of any new permit conditions that will be required to implement the trade". This project will provide the Mile High CD the data needed to complete the DEQ application process as well as apply for other federal and state funds potentially available through DEQ or EPA.

The project will be coordinated with existing stream restoration projects under way on Blacktail Creek by NRDP and overseen by the Watershed Restoration Coalition (WRC) and the Mile High Conservation District (MHCD) from Lexington Street to the headwaters of Blacktail Creek in the Roosevelt Drive and the Lime Kiln area.

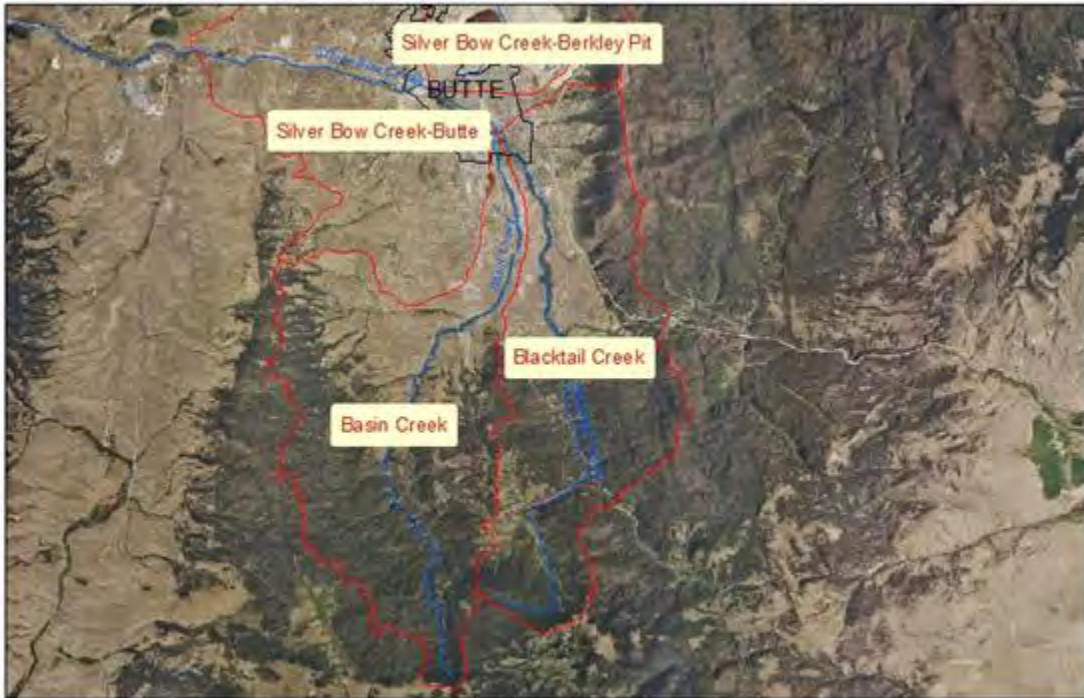


Figure 1. Blacktail Creek, Silver Bow County, Montana.

## **Project Goals and Objectives**

The project has the following goals & objectives:

**Goal 1.** Identification of Non Point & Point sources into Blacktail Creek to facilitate development of Best Management Practices

**Objective 1:** Evaluating nutrient levels and loading in Blacktail Creek (BTC) during high and low flows as well as normal flow conditions

**Objective 2:** Identify the sources of nutrient loading and develop Best Management Practices to minimize the impact of nutrient on BTC and thereby to Silver Bow Creek.

**Goal 2.** Implement the Montana policy for nutrient trades Circular 13, on Blacktail Creek

**Objective 1.** Explore nutrient trading potential of non-point sources with point sources

## Project Benefits

Excess nitrogen in the form of dissolved ammonia (which is typically associated with wastewater) can be toxic to fish and other aquatic life. Excess nitrogen in the form of nitrate in drinking water can inhibit normal hemoglobin function in infants. In addition, excess nitrogen and phosphorus from human sources can cause excess algal growth, which in turn depletes the supply of dissolved oxygen, killing fish and other aquatic life. Excess nutrient concentrations in surface water create blue-green algae blooms (Priscu, 1987), which can produce toxins lethal to aquatic life, wildlife, livestock, and humans. Aside from the toxicity effects, nuisance algae can shift the structure of macroinvertebrate communities, which may also negatively affect the fish that feed on macroinvertebrates (U.S. Environmental Protection Agency, 2010). Additionally, changes in water clarity, fish communities, and aesthetics can harm recreational uses, such as fishing, swimming, and boating (Suplee et al., 2009).

*“Where instream nutrient concentrations are grossly elevated over naturally occurring concentrations, net primary production may lead to anoxic conditions in the water column. Under redox conditions, some sediment-bound metals may be released into the water column further impairing water quality. This mechanism may be plausible under certain loading scenarios in the Silver Bow Creek watershed.” (Upper Clark Fork Phase 2 Sediment and Nutrients TMDLs and Framework Water Quality Improvement Plan)*

The proposed project is expected to have several outcomes as listed below:

- a) Provides the base concentrations of Total Nitrates and Total Phosphorus in BTC
- b) Provides the source locations if any of the nutrient inflow into the BTC
- c) Provides information to develop Best Management Practices to eliminate or minimize the nutrient inflow
- d) Provides information to develop nutrient trading potential with point sources along the same watershed
- e) Provides information to restore and sustain healthy aquatic systems for long term benefit to the community and the citizens of Montana.

Historically, the sampling in the Summit Valley watershed has been for metal contaminants. However, nutrient loading plays a major role in the health of the water body. Therefore, it is critical to understand the nutrient loading and their sources in order to develop strategies that will cost effectively reduce the impact and help to meet the goals set forth by the Voluntary Nutrient Reduction Program (VNRP) for Clark Fork River.

These outcomes will benefit the Public and citizens by having a stream that is healthy and sustains fish population to provide outdoor enjoyment for Butte Citizens. A healthier stream that sustains flora and fauna has a natural appeal and aesthetic appreciation that is expected no less in Montana. A healthier tributary to Silver Bow Creek may allow economic growth and stimulate local development

## Project implementation

The previously developed Mile High Conservation District “Blacktail Creek Preliminary Nutrient Study/Sampling Analysis Plan (SAP)” completed in December 2014, by Seth Reedy, Sarah Hamblock, PI-Kumar Ganesan, Montana Tech., ( Attachment # 1) will be implemented to measure Total Nitrogen (TN) and Total Phosphorus (TP) in the BTC.

The MHCD will contract with the WRC to oversee coordination and implementation of the project in coordination with ongoing WRC/MHCD and NRDP restoration initiatives on Blacktail and Basin Creek. A Technical Advisory Committee (TAC) consisting of NRDP, BNRDC local, federal and state agency representatives will be convened to provide technical assistance and guidance to the project. The MHCD will contract with an organization or firm capable of implementing the Blacktail SAP and securing or carry out the required sampling analysis as well as providing technical assistance for all tasks in Objectives 1 & 2 of Goal 1. The MHCD will follow all State of Montana procurement requirements in securing the necessary contract.

All tasks in Goal 2 objective 1 will be carried out through technical assistance provided by the project TAC.

**Goal 1.** Identification of Non Point & Point sources into Blacktail Creek to facilitate development of Best management practices

**Objective 1:** Evaluating Nutrient Levels and Loading in Blacktail Creek (BTC) During High and Low Flows as well as Normal Flow Conditions

Task 1. Determining sampling sites for nutrient levels of total nitrate and total phosphorous along Blacktail Creek.

Task 2. Field sampling every 0.5 miles along the Black Tail Creek for approx 10 miles and sample analysis

Task 3. Data interpretation and first attempt to identify nutrient sources

Task 4. Developing second intensive sampling campaign along nutrient sources to pin point the sources of elevated nutrient levels identified in task 2.

Task 5. Calculation of nutrient loading based on flow measurements and nutrient levels

**Objective 2:** Identify the Sources of Nutrient Loading and Develop Best Management Practices to Minimize the Impact of Nutrient on BTC and thereby to Silver Bow Creek.

Task 1. Analyze the nutrient sources based on non-point sources, point sources and their locations and number of such sources

Task 2 Developing BMP's specific to the nutrient sources

Task 3. Developing a ranking system based on BMPs effectiveness, cost, practical applicability and long term benefits

**Goal 2.** Implement the Montana Policy for Nutrient trades Circular 13, on Blacktail Creek

**Objective 1.** Explore Nutrient Trading Potential of Non-Point sources with Point Sources

Task 1. Calculating nutrient loading by point sources to the Silver Bow Creek

Task 2. Calculating non-point source contributions to the BTC

Task 3. Exploring the potential for nutrient trading based on 1:1 to 1:5 of point source to non-point source

Task 4. Preliminary economic analysis and cost savings based

## Project Timeline

The project will be accomplished in two Phases. Objective 1 will be completed in Phase 1 (Table I). Objectives 2 & Goal 2 Objective 1 (Table II) will be completed in Phase 2. The specific time lines are given in the following section.

The project will start at the beginning of March 2017 and continue until June 2019. The main focus in the first year will be to collect nutrient samples to identify the nutrient sources and to develop specific best management practices. During the second year selected BMPs will be identified. In addition, in the second year an attempt will be made to calculate the nutrient loading of point and non point sources to evaluate the nutrient trading potential. It is expected that implementing cost-effective BMPs on non-point nutrient sources will reduce the nutrient loading to the creek. This in essence may allow the point sources to discharge small quantities of nutrient otherwise too expensive to control at the point sources.

## Project Schedule

**Table I First Year Task Timeline**

Phase I Task Timeline Chart (Months)					
From March 2017 to May 2018					
Goal 1					
Objective 1 Task 1	2				
Objective 1 Task 2		6			
Objective 1 Task 3			2		
Objective 1 Task 4				3	
Objective 1 Task 5					2

**Table II Second Year Task Timeline**

Second Year Phase II Task Timeline Chart (Months)							
From June 2018 to May 2019							
Goal 1							
Objective 2 Task 1	2						
Objective 2 Task 2		2					
Objective 2 Task 3			2				
Goal 2							
Objective 1 Task 1				1.5			
Objective 1 Task 2					1.5		
Objective 1 Task 3						1.5	
Objective 1 Task 4							1.5

## Monitoring Activities

Project staff will meet with BNRDC staff at the conclusion of each objective in phases one and two. A report will be prepared and submitted quarterly to the BNRDC to provide a status of the project and next steps.

## Project Budget

The project will be administered by the Mile High Conservation District with project coordination (reporting TAC coordination and contractor oversight) provided by the Watershed Restoration Coalition. A contractor will be secured to carry out Goals 1, Objectives 1 & 2

Implementation of Goal 2, objective 1 will be carried out through the assistance of TAC members after necessary data is obtained from contractor.

<b>Project Administration and /Project Coordination</b>	<b>GRANT</b>	<b>Match</b>
Kris Huglet MHCD Administrator \$25.65 /hr. \$22.50 base, \$4.75 Employer Costs /Fringe \$27.25(108 hrs.)	\$ 2,943.00	
WRC Executive Director \$50/hr. (400 hrs)	\$20,000.00	
<b>Sub Total</b>	<b>\$22,943.00</b>	

## Goal 1 Objectives 1 &2

Assuming:

- 10 miles of creek, Confluence with Silver Bow Creek to the 9 Mile
- one sample location every ½ mile, plus 10% field blank and duplicate samples per DEQ SOPs.
- three sampling events per year (high flow, growing season, base flow)
- analysis for total N, N species, total P, common ions
- field parameters for pH, water temp, etc
- synoptic flow measurement for loading calculations.

• Field Work	\$22,000.00
• Lab analysis	\$15,000.00
• Reporting (data summary report, QAQC check, maps, longitudinal graphs, comparison to standards, etc),	\$10,000.00
• Advanced Reporting (nutrient source ID and attribution, developing)	\$19,000.00
• Targeted SAP, conceptual plan and ranking of potential BMPs, cost benefit analysis)	\$7,000.00

<b>Subtotal</b>	<b>\$73,000.00</b>
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**Goal 2 objective 1**

• Calculating nutrient loading by point sources to Silver Bow Creek		
• Calculating non-point source contributions to the BTC		
• Exploring the potential for nutrient trading based on 1:1 to 1:5 of point source to non-point source		
• Preliminary economic analysis and cost savings based		\$15,000.00
<b>Total</b>	<b>\$95,943.00</b>	<b>\$15,000.00</b>