

Coal Creek Bank Stabilization and Sediment Reduction

State(s): Wyoming

Managing Agency/Organization: Wyoming Game and Fish Department

Type of Organization: State governmental agency

Project Status: Underway

Project type: WNTI Project

Project action(s): Riparian or Instream Habitat Restoration

Trout species benefitted: Bonneville Cutthroat Trout

Population: Coal Creek, Thomas Fork of the Bear River

Project summary: Funding will be used to complete work to reduce sediment inputs into Coal Creek, an important Bonneville Cutthroat Trout (BCT) stream in western Wyoming. Aquatic habitats and stream function in Coal Creek and downstream in the Thomas Fork River, have been degraded by high sediment levels from various sources. In particular, the Coal Creek Road has been identified as a major contributor because portions of the road were constructed within the active floodplain. Over time the creek has moved toward the road at numerous sites due to instability from excessive livestock grazing. These conditions created erosion along the toe slopes of the road and cause high loads of sediment to flow directly into the stream. Realignment of the road and/or creek, runoff drainage remedies, bank stabilization, and re-vegetation and fencing is needed to resolve these problems. This project will: 1) Reduce sediment loading, 2) Improve riparian and aquatic habitat condition and function, 3) Improve habitat for BCT and other native fishes, 4) Maintain and enhance stream habitat connectivity, and 5) Improve road function while reducing sediment contribution from the road along two miles of Coal Creek. This will be accomplished by restoring riparian and upland vegetation, constructing bankfull benches and/or toe wood along meander bends, completing necessary borrow ditch and road drainage upgrades, and reducing bank angles at ten remaining sites identified along a 2-mile section of Coal Creek Road (BLM Road #4216).

Problem the Project Addresses: Coal Creek is a primary perennial tributary in the Thomas Fork River drainage, which contains a conservation population of migratory BCT, a designated NSS3 species in Wyoming's State Wildlife Action Plan. BCT complete extensive inter-state migrations between the Bear River, the Thomas Fork, and small tributaries for spawning and rearing. Eliminating barriers and allowing expression of migratory life history tactics is important to the conservation of BCT in the Bear River system. For some time, the Coal Creek Road has been recognized as a substantial sediment contributor in Coal Creek (Thomas Fork Habitat Management Plan [TFHMP] 1979, BLM National Riparian Service Team 1998). The creek also contained several undersized and perched culverts that impeded fish passage depending on flow conditions. This project has the potential to greatly enhance habitats for migratory metapopulations of BCT by improving connectivity between habitats and reducing sediment loading into Coal Creek. Phase I of this project replaced two culverts at road crossings on Coal Creek and one of its tributaries, Little Muddy Creek to improve connectivity and stream function.

Completing phase II of this effort addresses WNTI restoration project priorities. In particular, this project focuses on restoration actions for BCT, identified as a priority species for 2017-2019. The project will aid multiple populations (Priority #1) by reconnecting habitats and improving tributary habitats for migratory individuals. The project will also provide immediate benefits to enhance the viability of priority populations (Priority #2) by decreasing sediment contributions from multiple sources and enhancing connectivity between the Thomas Fork, Coal Creek, and smaller tributaries. Lastly, the project will support conservation of unique functioning habitat and life histories (Priority #3). Low elevation stream systems are highly altered in the Great Basin, but improvements in grazing practices and protection of in-stream flows in Coal Creek over the last 30 years has greatly improved habitat quality. This project will aid the expression of migratory life histories by both re-connecting these networks, and enhancing habitat within these tributary networks.

Extensive willow removal by aerial spraying in the early 1900s (Binns 1981) severely impacted stream channels throughout the Thomas Fork basin. In combination with historic over grazing by both domestic livestock and wildlife, the loss of willows left streams without shade and the stabilizing rhizomatous roots systems to hold banks intact. Following this removal, streams over widened with eroding banks.

Objectives: The project addresses key habitat and connectivity threats to BCT by reducing sediment inputs from a road, reducing eroding banks, improving instream habitat, increasing instream woody structure, and enhance connectivity by replacing small culverts with larger bottomless culverts.

The Wyoming State Wildlife Action Plan (SWAP; 2017) identifies BCT as one of three species of greatest conservation need in the Bear River Basin, along with Northern Leatherside Chub and Bluehead Sucker. This

document suggests several actions to achieve conservation goals for these species, including conducting habitat enhancements in Coal Creek. The WGFD Strategic Habitat Plan outlines actions for habitat protection and enhancement to prioritize conservation decisions. This document identifies the Thomas Fork watershed as a priority "Enhancement Area" where active management is necessary to ameliorate deteriorated habitat conditions and fully realize aquatic wildlife potential. Our project will directly address these two WGFD documents by actively completing enhancements to improve degraded habitat conditions and stream connectivity. In particular, this project will address four strategies from the Strategic Habitat Plan: II - developing partnership to complete projects, V - promoting sound riparian communities, VI - promoting functioning stream channels that maintain natural processes, and X - promoting strategies that enhance willow communities.

This project will be implemented in two phases. At these sites, bankfull benches will replace high, vertical stream banks, steep bank angles will be reduced, and bare areas will be planted with native vegetation. At some sites, large wood (toe wood and/or tree revetments) will be used to both enhance channel stability and provide in-stream cover for fish. At all sites, road surfaces will be graded and ditched to address overland flow of sediments and further reduce sedimentation.

Phase I, completed in 2015) replaced two aged and undersized culverts on Coal Creek and one of its tributaries, Little Muddy Creek.

Phase II -To be completed in 2018. Involves rehabilitation at ten remaining sites:

- Sites 2-1, 2-2, 2-3 - Raw, eroding banks immediately adjacent to Coal Creek Road will have bankfull benches installed and re-sloped bank toes. Additional road grading and small culvert placement will help drainage at the sites.
- Site 3 - road realignment, borrow ditch placement and slope revegetation on raw bank.
- Site 4 - Channel realignment with installed bankfull bench. Re-grading of road surface and culvert/ditch work to facilitate proper drainage.
- Site 5 - Channel realignment with installed bankfull bench and toe wood. Re-grading of road surface and culvert/ditch work to facilitate proper drainage.
- Site 6 - Channel realignment with installed bankfull bench. Re-grading of road surface and culvert/ditch work to facilitate proper drainage.
- Site 7 - Borrow ditch and culvert placement along road grade to stop drainage from directly entering stream.
- Site 9 - Complete realignment of stream channel along 200'+ of road with vertical raw bank. Includes installation of bankfull bench along either bank and re-grade road surface to ameliorate road hazard.
- Site 10 - Borrow ditch, road grading to prevent overland flow from road surface to stream.
- Site 11b - Road realignment away from steep (10'+) eroding bank and installation of bankfull bench with re-sloped bank toe.

Partners:

- Wyoming Game and Fish Department
- Bureau of Land Management
- Wyoming Landscape Conservation Initiative
- Wyoming Wildlife and Natural Resource Trust
- Wyoming Office of State Lands and Investments
- Private landowner

Project Monitoring: Wyoming Game and Fish Department monitors fish and wildlife populations and habitat conditions and trends throughout this area at regular intervals, and populations will be evaluated in Coal Creek within 5 years of project completion. WGFD will also use the Bank Assessment for Non-point source Consequence of Sediment (BANCS; Rosgen 2006) model for pre- and post-project monitoring to evaluate sediment contributions from each of the project sites. This project will reduce estimated sediment loading at the remaining sites from -119 tons/year to less than -15 tons/year.

Fixed monitoring locations (cross sections) for channel stability will be established. Monitoring at cross sections will be done in at least two different years following bankfull or higher flows to document stability and performance of constructed features, the stream channel and the road. Lateral and vertical measurements will be collected to document post-construction erosion rates. Photo points have also been established to document pre-project conditions and photos will be taken again in successive years.

BLM currently monitors riparian trends at established trend monitoring sites following Greenline and/or MIM protocols, and these sites will be monitored following completion of this project. Annual use monitoring and water temperature monitoring have been (and will continue to be) sampled since 2013 according to an Allotment Management Plan and Settlement Agreement for the grazing allotment that Coal Creek is located in.

Funding Source(s): National Fish Habitat Action Plan

Project cost: \$30,000

Start Date: 09/01/2018 **Completion Date:** 12/31/2019

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