



WYOMING GAME AND FISH DEPARTMENT

South Flat Creek Channel Restoration



Report

November 7, 2025

Project Title: Flat Creek

Report Type: Final Report

WNTI Grant #: F22AC0372

Location: S6, T 400N, R160W

Lat/Long: 45.455150,-110.798260

Project Coordinator Name: Holden Reinert

Organization: Wyoming Game and Fish

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Reporting Period: 7/1/2023 through 12/31/2025

Is this project complete in its entirety? Yes

If no, what is the estimated completion date?

Introduction

The Wyoming Game and Fish Department (WGFD) worked with partners and the Lockhart Cattle Company to restore form and function to 1.2 miles of Flat Creek, an important Snake River Fine-Spotted Cutthroat Trout spawning stream. Flat Creek is a Snake River tributary that flows from its headwaters in the Gros Ventre Mountains of western Wyoming, through the National Elk Refuge and town of Jackson Hole, across open ranch lands and subdivisions along its way to confluence with the main stem Snake River. The Snake River Fine-Spotted Cutthroat Trout Fishery is a native, wild fishery heavily utilized by anglers. Reversing the effects of flood control, land management and development on spring creek spawning habitats throughout the Snake River valley is critical to maintaining this healthy population for future generations.

Restoration of Flat Creek downstream of the Town of Jackson began in 2015 with stakeholder development and conceptual design. A contract for survey and conceptual design was awarded in 2016 and in 2017, conceptual designs, quantities and cost estimates were delivered. The design was finalized in 2019. Design criteria follow the tenants of Natural Channel Design. Surveys of a downstream reference reach with intact riparian and channel morphology informed the design. Alder Engineering and Nelson Engineering (both of Jackson, WY) provided assistance on final design and construction oversight.

Clearwater Restoration (Jackson, WY) was hired in 2021 to complete the first half of construction. In-stream construction on the lower reach of Flat Creek (southern property boundary upstream to the bridge on Lockhart Cattle Co.) occurred from October 21 through March 14, 2022. Five outside meander bends were finished with soil lifts and plantings, and three bends were finished with toewood, soil lifts and plantings totaling 0.6 miles of stream restoration and floodplain grading. Riparian fencing, a combination of 5-strand barbed wire fence (13 pods; 8,305') and steel jack fence (2,885'), was installed in late April. Riparian vegetation was planted in early May with the help of WGFD staff and volunteers from Trout Unlimited, Teton Conservation District, and Silverstar Communications.

During summer 2022 we assembled materials, finalized in-stream work plans and fencing plans and developed a timeline with the landowner for completing the project in early 2023. Clearwater Restoration was again hired for Middle Flat Creek, due to their experience and skillful work on Phase 1. They began acquiring materials and mobilizing machinery in June 2022. In September, Nelson Engineering (Alder Environmental sub-contractor)

was onsite surveying elevations, sewer lines, and man-hole covers. In-stream work on Middle Flat Creek began in October 2022. By December 2022, 2,000 additional feet of stream was restored including six augmented riffles, one toe wood bank, three soil lift banks, and seven rock vanes. In-stream work was paused for the winter due to excessive sheet ice. Work resumed in late February until the spawning closure on March 15, 2023 and work outside of the stream continued until early April. An additional 1,100 feet upstream, including five augmented riffles, two toewood banks, and one soil lift bank were restored. A fence the length of the stream was installed early April 2023 to protect riparian plantings and stream work from cattle grazing.

From the completion of construction in spring 2023 until July 2024 we have watched the new channel adjust from two bankfull events. Outside bends stabilized with toewood have held well during high flow events. Sod mats remain intact and woody riparian vegetation is showing promising signs of recruitment, and grasses adjacent to the project area ranging from 4 to 6 feet in height. Spawning gravels were excavated from pools and deposited in glides at multiple locations throughout the Middle Flat Creek reach. Additional riparian fencing was installed May 2025. Additional cottonwoods (40) were planted to increase vegetation with deep binding root mass. Post-implementation repairs were evaluated post-runoff 2025. Structural integrity of toewood, bankfull benches, and rock vanes was very high throughout the project reach. Structures will continue to be monitored on a bi-annual basis.

Lockhart Ranch's partnership has been instrumental in this enhancement effort. Additional partners in addition to WNTI are numerous and include: Wyoming Wildlife Natural Resource Trust (WWNRT), Wyoming Department of Environmental Quality (DEQ), Wyoming Governor's Big Game License Coalition, Natural Resource and Conservation Service (NRCS), Teton Conservation District, U.S. Fish and Wildlife Service, Wyoming Water Development Commission (WWDC), Jackson Hole One Fly, Western Native Trout Initiative, Water for Wildlife Foundation, and Trout Unlimited.

Project Accomplishments

- Increased stream channel sinuosity by 5%
- Decreased channel widths by up to 70%
- Increased riffle depths by up to 65%
- Increased the number of pools (decrease pool spacing by 20%)
- Increased pool depths by 30%
- Restored entrenchment ratios (measurement of floodplain connectivity) of ≥ 2.2
- Reconnected and develop floodplain wetlands
- 3,300 linear feet of stream channel reconstructed
- 515 linear feet of augmented riffles
- 13 rock vanes installed
- 802 linear feet of soil lifts constructed

Monitoring

Baseline data collected during conceptual and final project design phases includes topographical surveys, geomorphic assessment, hydraulic and hydrologic analyses, riparian monitoring, bank erosion assessment and cutthroat trout redd counts. Survey data collected include longitudinal profile and cross sectional geometry throughout the project reach. These data are used to summarize baseline conditions (slope, sinuosity, floodplain connectivity, pool and riffle spacing, estimated bankfull discharge and channel capacity) and relate existing conditions to departure from a reference state. Riparian vegetation surveys to inventory baseline conditions of the herbaceous and woody riparian community were conducted according to Wyoming Stream Quantification Tool Manual guidelines (USACE 2018). The Bank Assessment for Non-point source Consequences of

Sediment (BANCS; Rosgen 2006) model was applied to the project reach to estimate baseline erosion conditions in tons of sediment per foot of stream bank per year. Particle size distribution and sediment transport were assessed following protocols established by Dave Rosgen (Rosgen 2006). Finally, redd counts were conducted in June and July of 2015 and 2016 to document baseline spawning activity throughout the project reach.

Post-construction monitoring was conducted the second year following construction, and then bi or tri annually as needed and permitting landowner access. Post project completion or “as-built” surveys were completed to document layout and concurrence with design plans. Physical habitat surveys include photo points and cross sections and structural integrity assessments. Fisheries sampling consists of redd counts.

Project Expenditures

Funding Administered by the Department

Funding Partner	Amount
TCD Small Water Grant 1	\$35,000.00
TCD	\$15,000.00
TCD Small Water Grant 2	\$35,000.00
USFWS	\$15,000.00
WNTI	\$32,071.89
WGFD Fish Passage	\$3,581.03
WBGGLC	\$10,000.00
WGFD – M&O	\$10,000.00
Jackson Hole One Fly	\$60,000.00
NRCS EQIP	\$194,333.00
Habitat Trust Fund	\$25,000.00
WWNRT	\$160,000.00
Total	\$582,767.46

Funding NOT Administered by the Department

Funding Partner	Amount
Jackson Hole Trout Unlimited	\$30,000.00
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Total	\$ 0.00

In-Kind Contributions

Contributing Agency/Partner	Description of Contribution	Estimated Value	Contact Person	Phone or Email
WGFD In-Kind	In-kind time	\$42,300	Holden Reinert	Holden .Reinert@wyo.gov
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Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
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Total		\$42,300.00		

Project Map and Photos



Figure 1. Middle Flat Creek Stream Restoration location and restored creek planform. Flat Creek upstream from the ranch bridge bisecting the project area is the location for in-stream work October 2022 – May 2023.



Photo1. Middle Flat Creek pre-construction. This reach was shallow and over-widened through the majority of the reach.



Photo 2. Post construction banks on Middle Flat Creek. A toewood bank with a soil lift on top.



Photo 3. An outside bend with a rock toe below a point of diversion.



Photo 4. A soil lift shows a healthy vegetation response.



Photo 5. A satisfied landowner takes in the wonders of modern stream restoration on his property.