

GLEN HAVEN

Big Thompson Watershed

2013 Colorado Flood Recovery



COLORADO
Colorado Water
Conservation Board
Department of Natural Resources



United States Department of Agriculture
Natural Resources Conservation Service



BIG THOMPSON
WATERSHED COALITION



LARIMER
COUNTY
COMMITTED TO EXCELLENCE

Multiple Benefits

- **Protect life, property, and infrastructure**
- **Engage local community in land use and planning**
- **Enhance ecosystem structure and function**
- **Increase floodplain capacity**
- **Protect critical infrastructure**

Three streams converge near Glen Haven, Colorado: Fox Creek, West Creek, and the North Fork of the Big Thompson River. The 2013 flood caused damage along all three stream corridors as floodwaters overflowed banks, swept trees and debris downstream, and destroyed many structures, bridges, culverts, and roads. Glen Haven's streams were dramatically altered by this natural event, and numerous properties that had been located in the native stream corridor, including critical public service buildings, were damaged or destroyed completely.

The long-term goal of the Glen Haven project was to re-establish a functional stream corridor utilizing natural channel design to repair the damage caused by the flood and ensuing emergency efforts. The project attempted to protect infrastructure by removing sediment and debris, stabilize failing streambanks, re-establish and stabilize floodplains, and redirect the river away from critical assets.



Watershed
Big Thompson



Locale
Larimer County



Local Sponsor
Larimer County



Property Ownership
98% private
2% public



Project Cost
\$2,140,149



Construction Dates
Oct. 6, 2016 - Jun. 10,
2017 (248 days)

The Big Thompson Watershed Coalition (BTWC) formed in the aftermath of the flood to facilitate long-term recovery. BTWC managed the 2015 Big Thompson River Restoration Master Plan, which identified projects in Glen Haven on West Creek and Fox Creek as high priorities based on the infrastructure exposed to flood risk, stream instability and erosion, and the potential for aquatic habitat and riparian ecological improvement.

Larimer County sponsored the Glen Haven projects, partnering with BTWC, the Natural Resources Conservation Service (NRCS), and the Colorado Water Conservation Board (CWCB). These groups worked together with local landowners on implementation of this flood recovery project to reduce risk and improve long-term stream resiliency.

Destruction and debris at the Glen Haven Town Hall and General Store shortly after the flood.



West Creek and Fox Creek Glen Haven



River Corridor Rehabilitation

The main features of the Glen Haven project were designed to stabilize areas with excessive erosion close to structures, and remove sediment and debris in the floodplain to restore some of the channel and floodplain capacity that existed on West Creek and Fox Creek before the 2013 flood.

The majority of the stream restoration work consisted of the removal of large sediment deposits and the construction of floodplain benches to reestablish and reconnect the stream channel with the floodplain. In this scenario, a connected floodplain can help to lower water elevations near vulnerable structures, improve channel stability, and provide a place for future floods to deposit sediment and debris. The project treated excessively eroding streambanks through revegetation, bioengineering, and toe stabilization, as well as some rock riprap in high flood hazard locations.

In reshaping floodplains and channels, the project design also capitalized on opportunities to improve aquatic and riparian habitat. In-stream structures and woody material were added to create channel complexity and enhance fish habitat. Disturbed areas were planted with native willows, trees, and shrubs and/or seeded and mulched.

A major success of the Glen Haven project was the participation of 90 property owners. As the design phase of the project ramped up in May 2016, BTWC hosted a kickoff meeting for landowners. Project designers presented photos and examples to help landowners understand the opportunities for reducing flood risk and improving river health through restoration treatments. BTWC followed the kickoff meeting with a week-long open house in June to encourage landowners to stop by and learn more. The coalition also coordinated many one-on-one meetings and site walks with landowners. In the end, landowners representing more than 90% of the 100+ private properties participated in the recovery project.

BY THE NUMBERS



Project Objectives

- Stabilize streambanks to protect against additional damage to existing infrastructure
- Establish cover on critically eroding land
- Reduce threats to life or property
- Restore the discharge capacity of the stream to pre-flood levels when feasible and possible

Before



After



Fox Creek

A channel avulsion, where the main creek channel jumped across the floodplain to a different location, created the “Grand Canyon of Fox Creek.” Note the paucity of in-channel habitat and lack of floodplain to relieve flood energy.

Banks were graded back and planted, reconnecting the channel with the floodplain and increasing the system’s overall discharge capacity. Habitat features and meanders were incorporated into the channel.



West Creek

Severe bank erosion resulting from the flood undermined the house in this photo. Large volumes of sediment deposited by the flood were removed from the foreground of this photo following the flood, but debris and trash remain.

Sediment and debris were removed, establishing a floodplain to provide additional flow capacity. In-stream J-hooks (channel training structures) were added, the toe of the streambank was reinforced, and the site was planted with native vegetation. Active weed control is occurring while native plants establish.

“Thanks to all those working to bring back West Creek, Fox Creek, and the North Fork from the 2013 disaster. I no longer wonder where Glen Haven would be without Big Thompson Watershed Coalition and its partner government agencies, contractors, non-profits, volunteers, contributors etc. Now my focus is all forward as I marvel at what has been accomplished and the bright future before us.”

- Jack Vaughan, Glen Haven Property Owner

PROJECT TEAM

Multiple agencies, organizations, and property owners collaborated to successfully implement the Glen Haven flood recovery project. BTWC supported the project through coordination with over 90 landowners as well as other stakeholders. The Glen Haven Association helped as a liaison to landowners. Two property owners – Cheley Colorado Camps and Youth United – allowed the use of their land to store materials and stage construction activities.

Larimer County acted as the project sponsor and construction contract administrator and contributed more than 1,800 cubic yards of rock to meet the required non-federal match. The County contracted the project's construction to contractors already working in the area, saving time and money by avoiding the re-mobilization of equipment.

The NRCS provided funding through the Emergency Watershed Protection Program and dedicated engineering personnel for project design and construction oversight. The CWCB provided funding and technical assistance.

Partners

- Private landowners
- Glen Haven Association
- Cheley Colorado Camps
- Youth United
- Big Thompson Watershed Coalition
- Colorado Water Conservation Board (CWCB)
- Colorado State Forest Service
- Natural Resources Conservation Service (NRCS)

Contractors

- American Civil Constructors
- Dietzler Construction
- Resilient Watershed Partners (RWP)

FOR MORE INFORMATION

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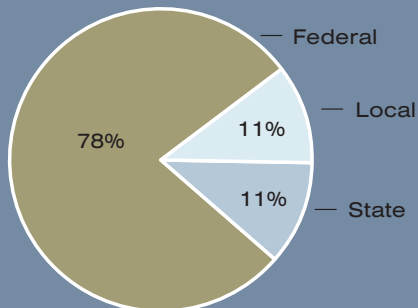
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BUDGET

TOTAL: \$2,140,149

Project Funding by Source



Project Cost Breakdown

