

CEDAR COVE REACH

Big Thompson Watershed

2013 Colorado Flood Recovery



COLORADO
Department of Local Affairs
Community Development Block Grant –
Disaster Recovery



COLORADO
Colorado Water
Conservation Board
Department of Natural Resources



United States Department of Agriculture
Natural Resources Conservation Service



Multiple Benefits

- **Protect life, property, and infrastructure**
- **Mitigate flood risk**
- **Engage local community**
- **Enhance ecosystem structure and function**
- **Increase floodplain capacity**
- **Protect critical infrastructure**



Watershed
Big Thompson



Locale
Larimer County



Local Sponsor
Big Thompson
Watershed Coalition



Property Ownership
40% public
60% private



Project Cost
\$1,628,076



Construction Dates
Aug. 3 - Dec. 1, 2017
(121 days)

The Cedar Cove reach of the Big Thompson River lies in a canyon pocket, where the steep narrow canyon walls upstream open up and the valley flattens before constricting once again. During large flood events, such as in 1976 and more recently in 2013, this reach functions to store sediment and debris scoured from the canyon upstream. As the water slows and sediment deposits, the river becomes unpredictable, choosing multiple channels and often claiming the entire corridor.

The 2013 flood cut off access roads and severely damaged several homes in the Cedar Cove reach. Tragically, two lives were lost. After the flood, the pre-flood channel was re-excavated to restore residential access and protect US Highway 34. While these emergency repairs offered some short-term relief, they provided little long-term security and left the channel and floodplain in a degraded state.

The Big Thompson Watershed Coalition (BTWC) formed after the 2013 flood to lead the Big Thompson's long-term flood recovery vision and effort. BTWC produced a Master Plan in 2015, in which Cedar Cove ranked in the top 5 highest priorities for improvements, and secured funding for a rehabilitation project in 2016.

Upper portion of the Cedar Cove reach immediately after the flood. The channel quickly bypassed the undersized Cedar Cove bridge, accessing historic river channels to the south and undermining the US Highway 34 embankment. Photo courtesy of Bill Spitz.



The purpose of the Cedar Cove project was to provide a robust, resilient, and sustainable river and floodplain design that seeks to reduce the impact of future flooding, stabilizes the channel with consideration of multiple flow events, enhances the protection of life and property, and creates aquatic and riparian habitat.

River Corridor Rehabilitation

Approximately 3,600 linear feet of the Big Thompson River corridor was rehabilitated in the Cedar Cove project reach through a combination of channel grading, in-channel and bank stabilization features, and revegetation.

A multi-stage channel was constructed through the entire Cedar Cove reach. Multi-stage channels function at a wide range of flows, and provide many benefits including habitat improvement during low flows and floodplain relief during storm/runoff events. Construction of a multi-stage channel should be a vast improvement for stream function and health over the very uniform “ditch” that was excavated in the aftermath of the flood.

A riffle-pool complex was installed throughout the project area, allowing for sediment transport through the riffle sections and energy dissipation in the pools. Pools were designed and constructed to be self-maintaining through scour achieved via large boulders and wood structures. In addition to energy dissipation, the pools provide high quality aquatic habitat.

In-channel features, including rock grade control and stabilization structures, boulder toe, woody debris toe protection, and soil lift bank protection, were installed to stabilize the channel bed and banks. These structures reduce potential bank erosion and channel down-cutting that could impact stream function and threaten infrastructure. In addition, these features help maintain the appropriate riffle/pool morphology and improve habitat complexity.

Following construction, the Cedar Cove project area was revegetated with native seed mixes, live stakes and brush-layered willows, container plants, and bare-root trees and shrubs. Successful native vegetation establishment will provide further stabilization for the channel banks and floodplain areas, and improve riparian habitat and water quality through the reach.

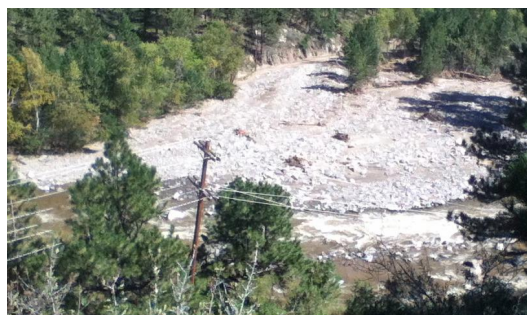


Project Objectives

- Stabilize streambanks to protect against infrastructure damage
- Improve floodplain capacity and connection
- Establish cover on critically eroding land
- Improve water quality through reduction of sediment loading from bank erosion
- Enrich riparian habitat through the addition of topsoil, seeding, and vegetation
- Enhance aquatic habitat through improved vegetation, water quality, and habitat complexity



Top: Energized once again in 2013, the Big Thompson River accessed its native corridor, this time undermining the hillslope upon which the US Highway 34 roadway sits. Photo courtesy of Bill Spitz.



Bottom: Massive sediment deposition in the Cedar Cove reach one week after the flood. Photograph courtesy of Shar and Gary Wamsley.

Before



Uniform and homogeneous channel lacking access to the floodplain on either side. Riprap was placed as an emergency measure shortly after the flood.

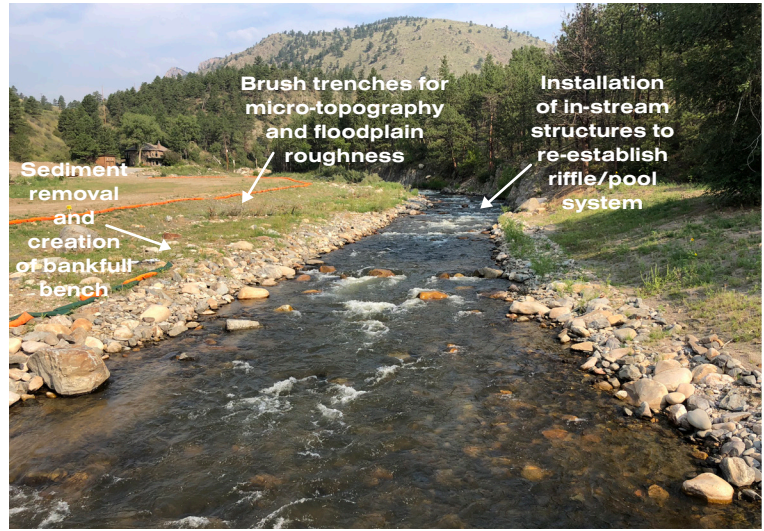
After



The project realigned the channel to create a floodplain bench on the left side of the photo. On the right side, banks were protected using vegetated soil lifts on a wood toe protection structure. The entire project area was seeded and mulched.



Emergency repairs at Cedar Cove homogenized the channel, lined it with rock, and kept it disconnected from the floodplain.



The Cedar Cove project installed in-stream structures to re-create a riffle-pool system and increase complexity, removed sediment to create a bankfull bench and reconnect the river to its floodplain, installed brush trenches for roughness, and revegetated the site with native vegetation.

BY THE NUMBERS

project length:
3,600 linear feet



3,160 willow and
cottonwood live stakes



14 participating
landowners



1,512 container plants



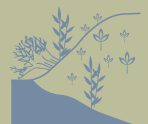
43 in-stream
structures



4.5 acres
seeded



830 linear feet of
bioengineered
streambanks



PROJECT TEAM

The Cedar Cove project was funded by the Natural Resources Conservation Service (NRCS) Emergency Watershed Protection (EWP) Program and the Colorado Water Conservation Board (CWCB). The Department of Local Affairs (DOLA) Community Development Block Grant - Disaster Recovery (CDBG-DR) Watershed Resilience Programs funded design and provided match funding for implementation. CWCB provided technical assistance throughout project planning and execution.

Effective coordination with project stakeholders and cooperators was critical to the successful completion of the Cedar Cove project. Communication and collaboration efforts across parties were led by BTWC.

Since completion of the project, BTWC has been working on long-term stewardship of the project area through volunteer revegetation projects, development of a stewardship guide for landowners, and collaboration with project partners on adaptive management.

Partners

Private landowners

City of Loveland

Larimer County

Colorado Water Conservation Board (CWCB)

Colorado Department of Local Affairs (DOLA)

Colorado Department of Transportation (CDOT)

Colorado Parks and Wildlife (CPW)

Natural Resources Conservation Service (NRCS)

Contractors

Stantec Consulting Services, Inc.

Kiewit Corporation

Resilient Watershed Partners (RWP)

FOR MORE INFORMATION

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www.BigThompson.co www.ColoradoEWP.com

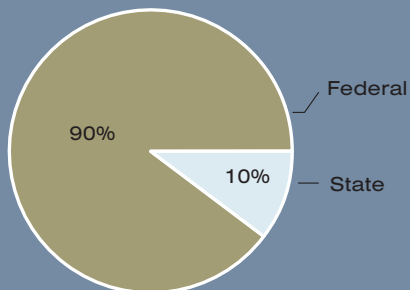
Growth of a willow fascine at Cedar Cove (August 2018). Fascines (or wattles) are live willow cuttings installed in a shallow trench that, upon sprouting, work to slow water velocity, trap sediment, and stabilize streambanks.



BUDGET

TOTAL: \$1,628,076

Project Funding by Source



Project Cost Breakdown

