

MIDDLE/UPPER FISH CREEK

Estes Valley Watershed

2013 Colorado Flood Recovery



Multiple Benefits

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

The September 2013 flood caused significant changes to the Fish Creek corridor through Estes Park. Fish Creek residences, many of which are located within the active river corridor, sustained extensive damage. During the storm, debris obstructed numerous undersized private culvert crossings and resulted in increased damages to the roadway and private property. Utilities that had been located in vulnerable areas were also heavily impacted, including sewer, electric, and water lines.

The primary objective of the Middle/Upper Fish Creek project was to protect life and property. This was accomplished by removing sediment and debris to expand floodplain capacity, installing engineered structures to deflect future floods away from critical infrastructure, stabilizing sediments, and promoting improved sediment and debris transport through the reach.

Following the flood, neighbors rallied together to form the Fish Creek Coalition (later formalizing as the Estes Valley Watershed Coalition), which worked with the Town of Estes Park to create the Fish Creek Master Plan. The Middle/Upper Fish Creek project area identified in the Master Plan was designated by the Natural Resources Conservation Service (NRCS) as a high priority project, along with several other sections of Fish Creek. This project stemmed from the initial Damage Survey Report developed by the NRCS and Colorado Water Conservation Board (CWCB), which deemed nearly the entirety of Fish Creek in critical need. The Middle/Upper Fish Creek project encompasses four project reaches (Reaches 1, 2, 4, and 5) on Fish Creek.



Watershed
Fish Creek



Locale
Larimer County



Local Sponsor
Estes Valley Watershed Coalition



Property Ownership
100% private



Project Cost
\$1,112,518

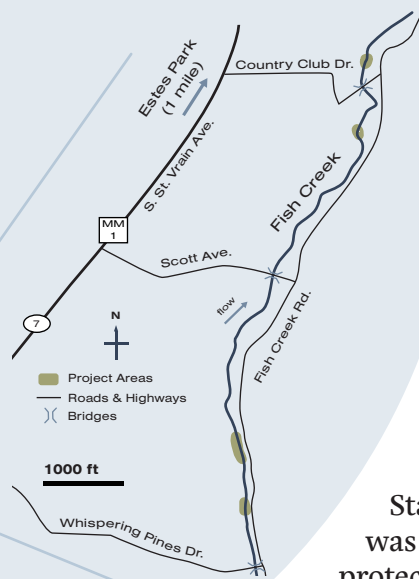


Construction Dates
July 31- Nov. 9, 2017
(102 days)

Destruction of Fish Creek Road as a result of the flood. Photo: Bill Spitz



Fish Creek Middle & Upper Fish Creek



River Corridor Rehabilitation

The main components of the Middle/Upper Fish Creek project involved establishing and excavating floodplains, shaping the channel for efficient water and sediment conveyance, and removing flood-deposited sediments. The channel now better accommodates for low, bankfull, and flood stages.

Stabilization of the bank, channel, and floodplain was achieved through bank and roadway embankment protection, bed stabilization, and installation of in-stream structures. Offset protection (buried riprap) was placed near structures in need of protection, and the river was allowed to move and erode its banks in other locations. Floodplain wood, boulder clusters, sills, brush layers, and floodplain roughness elements were installed to slow rapidly moving waters and provide habitat for riparian and aquatic organisms.

Naturalized structures designed to mimic the form and function of beaver dams, also referred to as beaver dam analogs (BDAs), were installed in Reach 4. Beaver dams existed in this reach prior to the flood, and the BDAs were installed to reconnect the channel to the floodplain, raise the groundwater level to support a robust riparian corridor, and benefit aquatic habitat.

Debris, trash, and other flood-deposited materials were removed, and woody material was salvaged and reused where possible. All bare and disturbed areas were seeded and mulched with a native seed mix. Trees, shrubs, and live stakes were planted down to the water's edge. Biodegradable erosion control fabric was used on select slopes to provide erosion control until vegetation is established.

"The Estes Park High School places high value on incorporating community service into our curriculum. Our collaboration with the Estes Valley Watershed Coalition toward the Fish Creek restoration is especially beneficial in this regard. Since the area where the students work is so near the school grounds, our students are frequently reminded of the results of their efforts, and have adopted a sense of ownership for this project."
– Chuck Scott, Estes Park High School Principal

Project Objectives

- Increase floodplain connection by creating floodplain benches and removing floodplain sediment deposits blocking connection
- Stabilize eroding banks
- Improve stream health through installation of habitat features such as riffle-pool structures, in-stream wood, and beaver dam analogs
- Remove flood debris and trash from the riparian corridor
- Re-establish cover on critically eroding land using native riparian vegetation
- Provide bed and bank stability through use of beaver dam analogs and bioengineering techniques

BY THE NUMBERS



**project length:
2,282 linear feet**



**15 participating
landowners**



**4 beaver
dam analogs**



**1,175 linear
feet of
bioengineered
streambanks**



**9,323 cubic
yards of
sediment
removed**

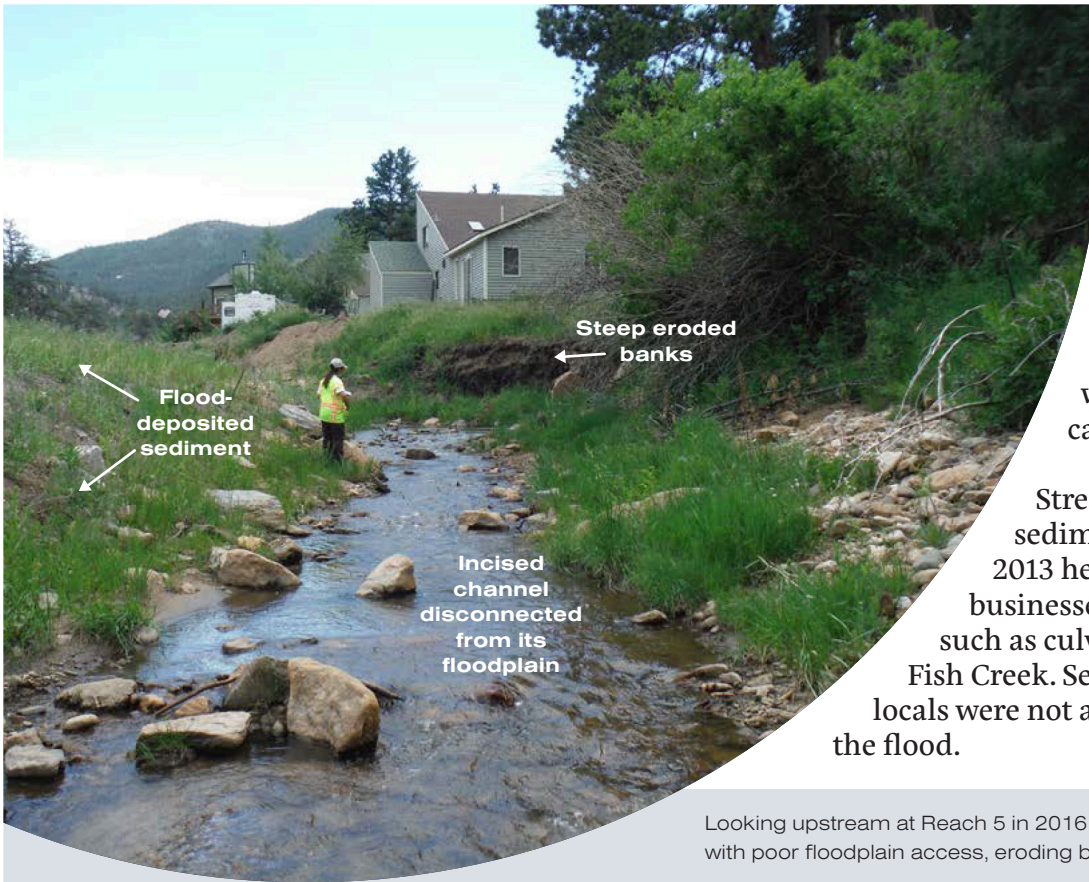


**2,185
volunteer
hours**

Before

Prior to the 2013 flood, thick willow stands, aspens, beaver meadow complexes, and pine trees were found along Fish Creek. Willows provided excellent habitat for deer, elk, and bears, and were commonly used as elk-calving areas.

Streambank erosion and sedimentation from the flood of 2013 heavily impacted residences, businesses, and critical infrastructure, such as culverts and sewer pipes, along Fish Creek. Sewer services for some area locals were not available for nine months after the flood.



Looking upstream at Reach 5 in 2016 on Fish Creek. Note incised channel with poor floodplain access, eroding banks, and homogenous habitat.

After

This project increased overall watershed health and resiliency through sediment removal, floodplain reconnection, grade control via beaver dam analogs, improved in-channel habitat, and revegetation efforts. Fish Creek now has more space to meander and drop sediment prior to entering residential neighborhoods.

The community rallied behind the project, producing results above and beyond the outlined project goals. Local citizens contributed to the project through participation in multiple volunteer events, and are eager to continue stream improvements on this and other area reaches.

REVEGETATION



1,416 container plants



1,853 willow & cottonwood live stakes



5 acres seeded



Reach 5 looking upstream just after construction, featuring a compound channel with improved floodplain access, meanders, in-channel complexity, and soil stabilization through coir logs and erosion control fabric.

PROJECT TEAM

During the post-flood river resiliency master planning process for Fish Creek and Fall River, two river advisory committees were formed to give citizen input to the process. As the master planning process wound down, these two groups joined with parties representing the Upper Big Thompson River and the Black Canyon Creek, forming the Estes Valley Watershed Coalition (EVWC) to implement the Master Plans and secure funding for projects necessary to maintain all four river corridors in a healthy and safe condition for people and wildlife into the future.

By involving a broad representation of stakeholders, EVWC represents diverse interests that work to build participation and acceptance. The EVWC worked to target resources, focusing on manpower and funding, to address important projects identified by the community, such as the Middle/Upper Fish Creek project.

FOR MORE INFORMATION

Lindsay McFarland, *Watershed Coordinator*
Estes Valley Watershed Coalition
EVwatershed@evwatershed.org

www.evwatershed.org
www.ColoradoEWP.com

Partners

Private landowners
Estes Park High School
Cross Roads Ministry
Estes Park True Value
Home Depot
Volunteers for Outdoor Colorado
Colorado Water Conservation Board (CWCB)
Natural Resources Conservation Service (NRCS)

Contractors

CH2M HILL Engineers, Inc.
Otak
Tezak Heavy Equipment
Resilient Watershed Partners (RWP)

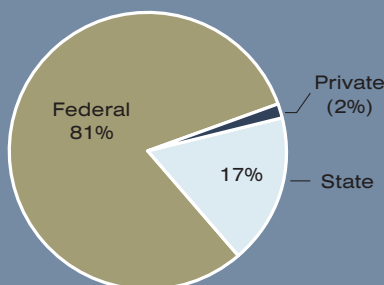
Looking downstream at a newly constructed beaver dam analog structure on Reach 4.



BUDGET

TOTAL: \$1,112,518

Project Funding by Source



Project Cost Breakdown

