

Fish Creek

# CHELEY CAMP

Estes Valley Watershed

## 2013 Colorado Flood Recovery



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



### Multiple Benefits

- **Protect property and infrastructure**
- **Mitigate flood risk**
- **Educate and engage the community**
- **Enhance ecosystem structure & function**
- **Enrich recreational and tourism opportunities**

The Estes Valley Watershed Coalition (EVWC) was formed in response to the destructive 2013 flood. After working with local landowners and developing the Fish Creek Master Plan, the Cheley Camp project became one of EVWC's highest priority projects. Objectives included protecting existing infrastructure, modifying or removing fish passage barriers, enhancing ecological integrity on the property, and reconnecting the active channel to the floodplain. Primary components of the project were: design and construction of bank stabilization and head-cut treatments, construction of beaver dam analogues (BDAs), incorporation of onsite woody material for aquatic habitat, and revegetation to protect a public road from continued erosion. Project goals were met by re-establishing beaver ponds and riparian wetlands, improving channel structure, and stabilizing banks to curtail damage downstream from sediment input.

This project was implemented to protect and restore the riparian area at the Cheley Camp property in upper Fish Creek. Bank stabilization, revegetation, wetland reconnection, and the installation of beaver dam analogues have increased the resiliency of upper Fish Creek. These activities have also reduced potential damage from sedimentation for downstream reaches.



**Watershed**  
Fish Creek



**Locale**  
Larimer County



**Local Sponsor**  
Estes Valley  
Watershed Coalition



**Property Ownership**  
100% private



**Project Cost**  
\$246,898

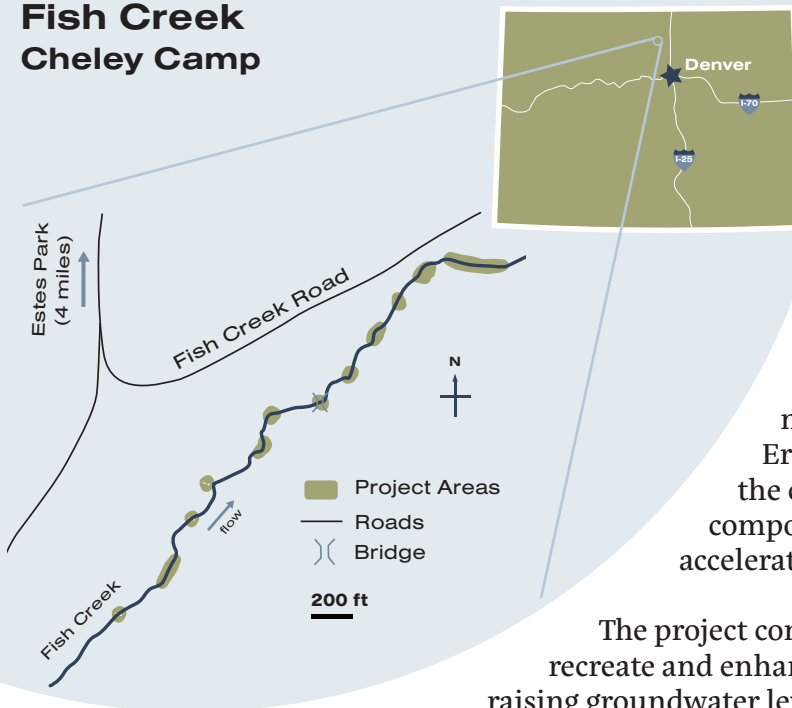


**Construction Dates**  
July 25 - Aug. 30, 2017  
(37 days)

Beavers moved in and raised the pond elevation by approximately two feet at this beaver dam analogue (BDA).



## Fish Creek Cheley Camp



# River Corridor Rehabilitation

The Cheley Camp restoration project harvested large boulders from on-site and buried them in the creek bed and banks to arrest active head-cutting and bank erosion. A riffle-pool sequence to match the natural morphology of the creek was constructed with native creek bed gravel and excavated pools.

Eroded vertical banks were pulled back to reconnect the channel to its floodplain, and a meandering compound channel was constructed to replicate and accelerate the natural progression of stream processes.

The project constructed six beaver dam analogues to recreate and enhance the pre-flood natural environment while raising groundwater levels and reducing bank erosion. Shortly after construction, local beavers inhabited these small ponds and expanded the dams.

Subsequently, the beavers increased the water surface elevation of the ponds by one to two feet. Brook trout were observed in several of the ponds and beavers have begun to construct a few new dams on their own.

A number of large root wads and several smaller woody debris treatments were installed into the project to enhance aquatic habitat and further stabilize the banks. In one location, the post-flood erosion began to threaten to undermine Fish Creek Road. The project moved the creek away from the road and stabilized the near bank with a large root wad anchored by several large boulders. All woody debris was obtained on-site.

Clockwise from top: A boulder base, vertical posts, and river gravel outlet forms the foundation for BDAs; A large root wad serves as habitat and stabilization at the toe of Fish Creek Road; Willow cuttings beginning to sprout.



## Project Objectives

- Develop beaver ponds through installation of BDAs
- Increase floodplain connection through grading and benching
- Connect historical channel as overflow channel to help with flood relief
- Install grade control features to limit headcuts moving upstream
- Reestablish riparian vegetation and protect new vegetation from wildlife
- Use vegetation to create a natural barrier to protect the creek
- Protect infrastructure along Fish Creek Road and access road
- Provide watering hole for horses



# Before

The Cheley Camp project area is a private working ranch at the headwaters of the Fish Creek Watershed. Historically and prior to the 2013 flood, a functioning beaver population maintained a successful system of beaver ponds, meadows, and wildlife habitat in the reach.

This ranch was severely damaged in the flood of 2013 as the water backed up behind a culvert and released with high energy, scouring and incising the once small creek. The damage seen at Cheley Camp was magnified, and translated downstream damaging infrastructure, homes, riparian, and upland habitat.

Eroded, vertical banks and a straight, narrow channel characterized this reach before construction.

# After

Great care was taken to protect the existing vegetation and to utilize and transplant sod mats and live willow clumps back into the excavated areas. The ability of the watershed to attenuate flood flows was improved to reduce erosion for the protection and benefit of those downstream. Water quality and aquatic habitat are now enhanced, and the re-establishment of beaver ponds increases wetlands for the slow release of water during times of drought. Long-term monitoring of the project area is being conducted independently by the Colorado Water Conservation Board (CWCB) and Colorado State University (CSU) in coordination with EVWC.

## BY THE NUMBERS



**project length:**  
4,350 linear feet



**6 beaver dam analogues**



**2,010 live willow stakes**



**2 acres seeded**



Looking downstream at restored floodplain connection, sloped banks, transplanted vegetation, a root wad (for fish habitat and bank protection), and a BDA.



The Cheley Camp project was funded by the Colorado Department of Local Affairs (DOLA). EVWC and Cheley Camp worked as partners to identify landowner needs and property uses as well as to prioritize efforts. Cheley Camp is a highly acclaimed leadership camp, teaching leadership skills through outdoor and environmental stewardship education to young people from around the nation. The EVWC/Cheley Camp team released requests for proposals and selected the project team based on defined criteria.

2Dot Consultants (Denver, CO) served as the project manager, partnering with Urbani Fisheries (Bozeman, Montana) and EST Inc. (Denver, CO) to design and construct a natural stream channel that supports and enhances resiliency and sediment retention. Urbani Fisheries was the lead for design and construction of this project, including the wetland and riparian habitat, planting design, and channel work. EST Inc. provided the professional engineering and geomorphology services associated with this project.

## Partners

Cheley Colorado Camp  
Colorado Department of Local Affairs (DOLA)

## Contractors

2Dot Consultants  
Urbani Fisheries  
EST Inc.

**FOR MORE INFORMATION**  
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Installation of a beaver dam analogue.

# BUDGET

**TOTAL: \$246,898**

### Project Funding by Source

100%  
Federal

### Project Cost Breakdown

Management & Admin by Sponsor	\$12,611
Planning, Design & Permitting	\$94,287
Construction Oversight	\$10,000
Mobilization, Grading & Earthwork	\$120,000
Revegetation & Biostabilization	\$10,000

\$ -      \$40,000      \$80,000      \$120,000