

BIELINS-HOCK OPEN SPACE

Left Hand Creek Watershed

2013 Colorado Flood Recovery



COLORADO
Colorado Water Conservation Board
Department of Natural Resources



United States Department of Agriculture
Natural Resources Conservation Service



Parks & Open Space

Multiple Benefits

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

The September 2013 flood transported massive volumes of water, sediment, and debris down from Left Hand Creek's steep upper canyons, spilling it out onto the plains. At Boulder County Parks & Open Space's (BCPOS) Bielins-Hock property near the City of Longmont, flood debris plugged the existing channel, causing the creek to create a new pathway. As the swift floodwaters carved out a new channel in what had been a sandy pasture, they removed 8-15 vertical feet of earth. The post-flood channel became a small canyon with steep eroding banks and a floodplain too high and disconnected to provide future flood relief and support a riparian ecosystem. Left untreated, the unstable condition of the new channel would be problematic to downstream and nearby infrastructure for years to come.

The main goals of the Bielins-Hock project were to stabilize streambanks, create a floodplain, and protect adjacent and downstream critical infrastructure. Goals were met through grading and stabilization of channel banks and uplands; realignment and reshaping of the stream bed and low-flow channel; and recovery of the benefits of a natural riparian ecosystem through native revegetation.

The Left Hand Creek Watershed Master Plan identified the Bielins-Hock reach as an area requiring treatment to mitigate its high instability. With funding from the Natural Resources Conservation Service's (NRCS) Emergency Watershed Protection (EWP) Program and Colorado Water Conservation Board (CWCB), BCPOS implemented a project to stabilize the channel and banks, reconnect the floodplain, and revegetate the site.



Watershed
Left Hand Creek



Locale
Boulder County



Local Sponsor
Boulder County



Property Ownership
100% public



Project Cost
\$514,788

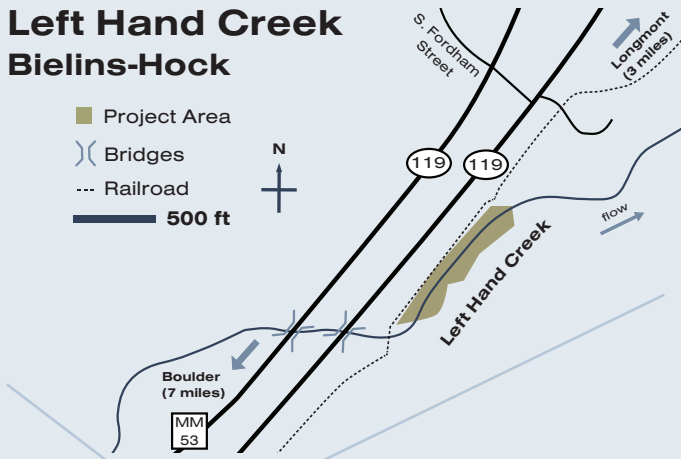
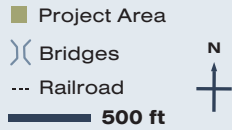


Construction Dates
Aug. 15 - Oct. 26, 2017
(73 days)

The 2013 flood carved a new channel through a pasture, leaving behind 10-foot tall steep eroding banks.



Left Hand Creek Bielins-Hock



River Corridor Rehabilitation

The Bielins-Hock project stabilized the post-flood channel banks, re-established an inset floodplain, enhanced in-stream habitat, improved riparian and upland vegetation and wildlife habitat, and provided measures of infrastructure protection from future flooding. The project incorporated several resilient and innovative techniques into the rehabilitation of Left Hand Creek.

The design included graded banks and floodplain, bench-style planting locations, and toe protection using vegetated soil-wrapped lifts, or “soil lifts,” to protect locations where the low-flow channel approaches the toe of the newly graded and planted banks. Soil lifts are an innovative bioengineering bank stabilization technique where soil, native seed, and willow cuttings are placed in between layers of biodegradable fabric, using root mass cohesion strength to stabilize a bank. In this project, toe rock was placed beneath the soil lifts to provide additional protection against scour, long-term degradation, and future flood erosion.

The project also installed a buried riprap revetment set back approximately 50 feet from the channel to protect the railroad, Boulder-Longmont regional trail, and Diagonal Highway should Left Hand Creek attempt to migrate toward that infrastructure during a future flood. The buried riprap consists of large angular rock extending 10 feet down from the ground surface. Burying the rock and placing it as close as possible to the infrastructure in need of protection allows for the channel to be able to naturally adjust within a corridor, but sets an outer limit at which infrastructure is protected. Burying the rock with native soils both maintains a natural aesthetic and allows for revegetation and reestablishment of the riparian ecosystem.

Revegetation at the Bielins-Hock project site included a high density of native vegetation for floodplain erosion protection. The effort consisted of upland and wetland bank seeding, compost application, and mulching, as well as planting of grass plugs, willows, cottonwoods, and other native shrubs.



Left and Bottom:
Construction of soil-wrapped lifts, including live willow installation.



Project Objectives

- Provide floodplain connectivity for a healthy stream and riparian habitat
- Incorporate heavy bioengineering practices and floodplain restoration
- Support overall reduction of sediment supply to downstream communities by stabilizing eroded streambanks
- Ensure that no imported material (such as rock) is visible upon project completion
- Protect structures at risk from future channel migration, including BCPOS trail and bridge, railroad embankments, and private properties downstream of the project



Post-Flood

Left Hand Creek carved a new path across a pasture composed of sandy soils and upland vegetation after the 2013 flood. In some locations, the creek removed more than 10 vertical feet of earth in its path. The row of large cottonwood trees in the background denotes the location of the pre-flood channel.



Construction Phase 1

Excavation of a new channel and placement of buried rock revetment.



Construction Phase 2

Bielins-Hock site after earthwork and soil lift construction and before revegetation.



Post-Project

Revegetated Bielins-Hock project site. Sediment was removed and the site was re-graded to reconnect the creek with its floodplain, slopes were laid back and banks were stabilized using vegetated soil lifts, and buried riprap was installed to protect the nearby railroad and other infrastructure.

BY THE NUMBERS

project length: 850 linear feet



850 linear feet of bioengineered streambanks



5 in-stream structures



3,880 riparian plants



5 acres seeded



PROJECT TEAM

Boulder County Parks & Open Space (BCPOS) manages the entire Bielins-Hock project area. As the project sponsor, BCPOS plant ecology restoration staff, wildlife biology staff, and resource planning staff collaborated with the EWP Program’s Resilient Watershed Partners (RWP) team to design and implement the Bielins-Hock project. The RWP team was instrumental in field-fitting the 30-percent design into the existing site conditions, while coordinating construction based on changing creek flows, limited space for staging, and a tight project schedule.

With support from their construction contractor, BCPOS has agreed to maintain plantings through watering, weed control, and replanting as necessary. They will also monitor constructed features and revegetation efforts to ensure project effectiveness and success over the long term.

Partners

Private landowners and neighbors
 Colorado Water Conservation Board (CWCB)
 Natural Resources Conservation Service (NRCS)

Contractors

Engenuity Engineering Solutions
 Western States Reclamation
 Resilient Watershed Partners (RWP)

FOR MORE INFORMATION

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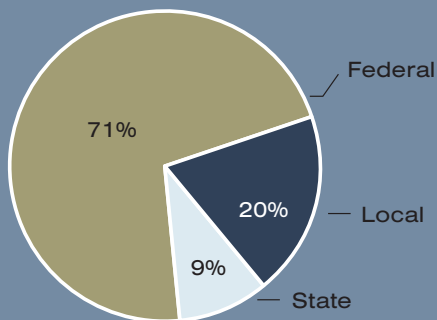


State monitoring team collecting baseline data for long-term project effectiveness monitoring.

BUDGET

TOTAL: \$514,788

Project Funding by Source



Project Cost Breakdown

