Colorado

Emergency Watershed Protection (EWP)

COLORADO EWP

Colorado Emergency Watershed Protection (EWP) Program

DNR

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Colorado Water Conservation Board

Department of Natural Resources

Watershed Flood Recovery

- Protect life and property while restoring ecological processes that connect land and water
- Complete recovery work on a watershed scale
- Support early planning to identify root issues, develop holistic solutions, and allow time to secure appropriate funding
- Support watershed coalitions as a model for stakeholder engagement
- Execute projects with multiple objectives
- Incorporate resiliency into every project

Watershed Flood Recovery Timeline

2013 Flood

SEPTEMBER 2013

Emergency Response and Repairs

SEPTEMBER/OCTOBER 2013

Master Planning Begins

January 2014

Project Identification and Scoping

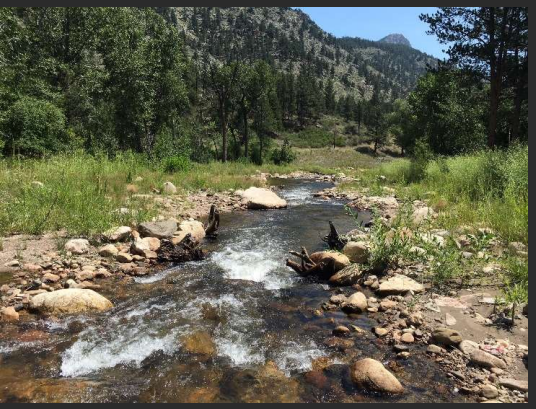
2014-2015

Design and Permitting

2016

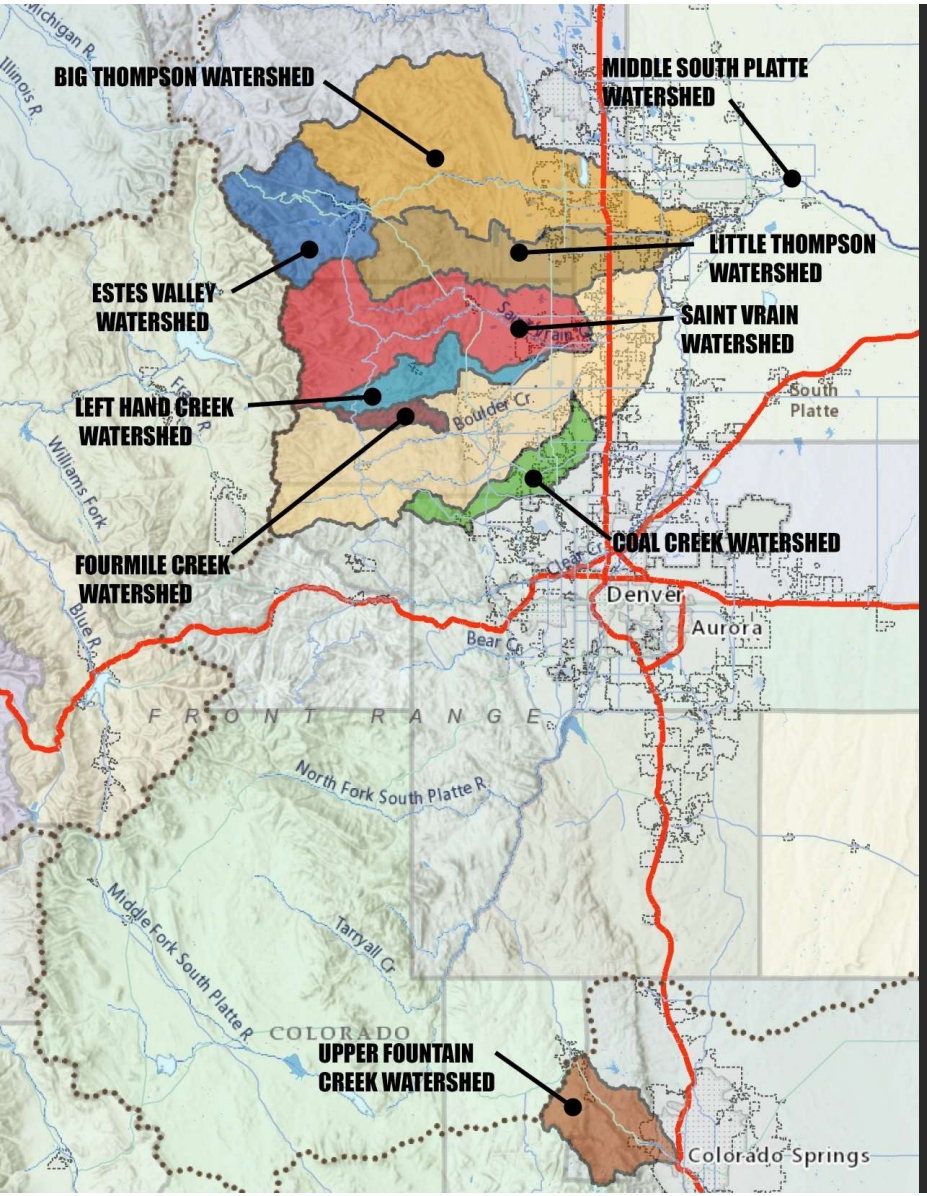
Major Construction Begins

January 2017



Major Construction Completed

May 2018



Watershed Coalition Building

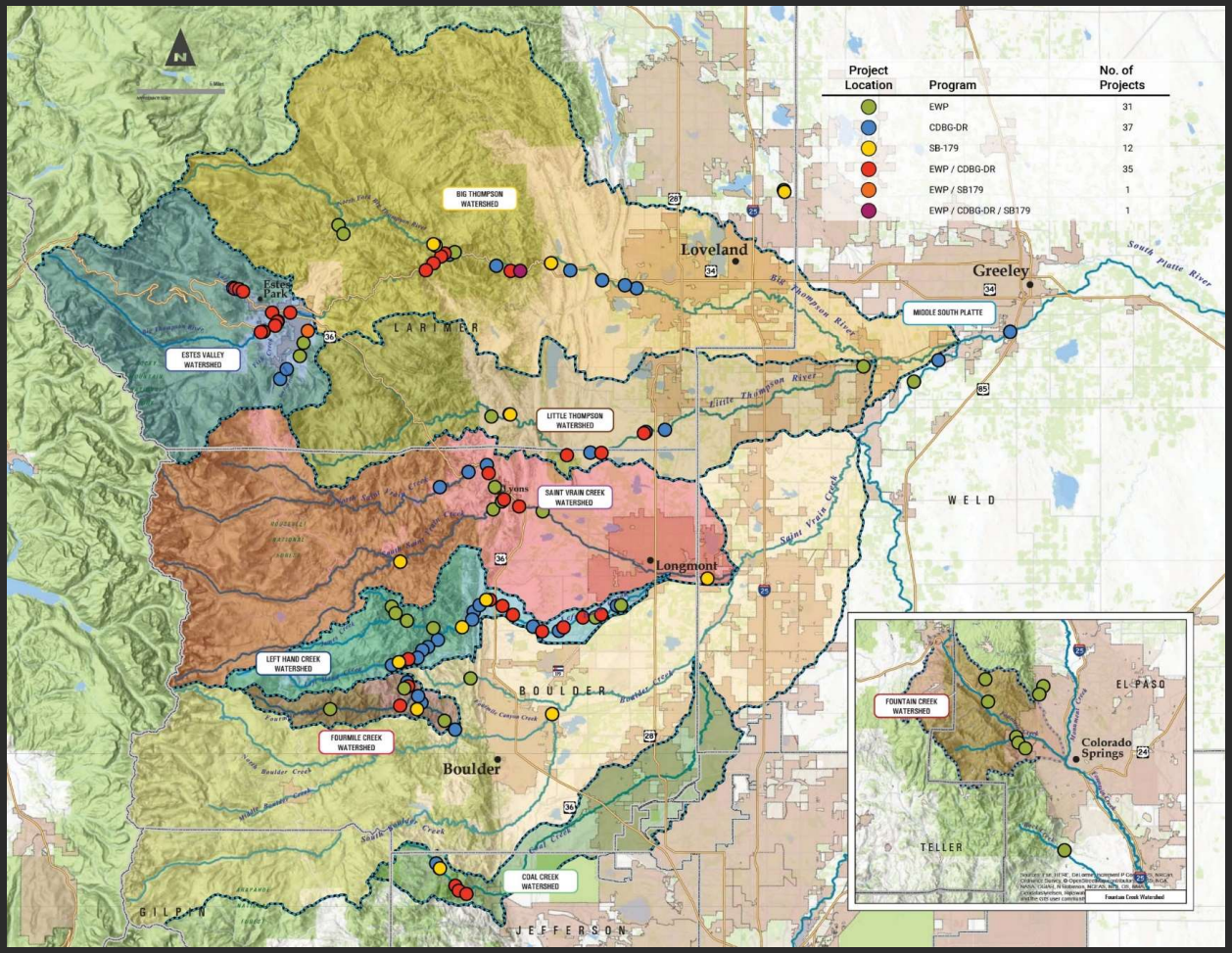
- Organized stakeholders (landowners, local gov't, water districts)
- Managed Federal, State, and local recovery funds
- Shepherded permits and environmental compliance
- Hired designers and contractors to construct projects
- Partnered with State to monitor and maintain projects

Flood Recovery Master Planning

- **Master plans:**
  - **Defined each watershed's vision for recovery**
  - **Enhanced the community's understanding of the river corridor and associated risks.**
  - **Provided conceptual designs and cost estimates**
  - **Prioritized projects**
  - **Fostered consensus-driven and technically sound solutions**

Flood Recovery Funding Programs

- NRCS Emergency Watershed Protection (EWP)
- Watershed Resilience Pilot Program
- Senate Bill 14-179
- Other Programs



By the Numbers

- **117** total flood recovery projects completed (68 EWP)
- Total construction costs of over **$70 million** (~$50 million EWP)
- Over **$270 million** – value of infrastructure and private structures protected
- **65 miles** of river and floodplain improvements implemented (40 miles EWP)
- **12** watershed master plans finalized
- **34** resiliency planning studies completed
- **23** comprehensive recovery planning studies completed
- Over **700** private property owners engaged
- **$4.2 million** across 10 coalitions for capacity building staffing grants. CWCB supplemented this with an additional $400,000.

Watershed Approach

- Physical and ecologic concerns addressed
- Proposed solutions contemplated the need to not transfer problems
- Natural geomorphic processes and river function provided the basis for flood mitigation
- This design approach incorporated:
  - Planned depositional zones,
  - Natural woody materials,
  - Extensive vegetation and biostabilization
  - Provided space for the river to move (when feasible)

Enhancing the Environment

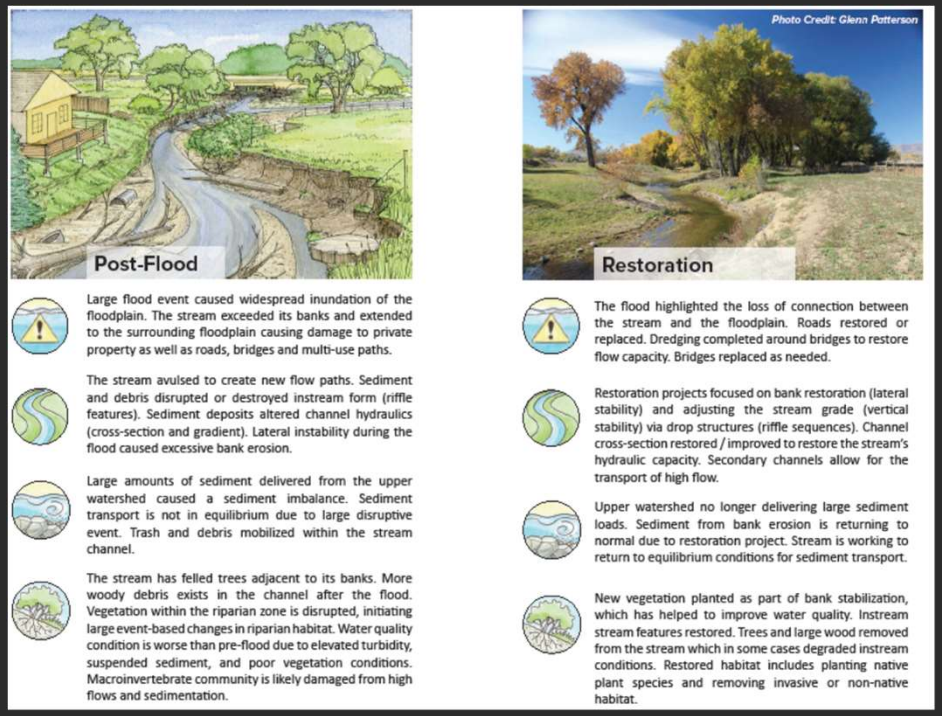
- Incorporation of bioengineering techniques
- Channel sections that considered the hydrology and hydraulics for low flows, annual flows, and flood events
- Aquatic, riparian, and terrestrial habitat enhancement using plants and other native materials
- Revegetation with native plant species in abundance and diversity
- Removal of invasive species, such as crack willow (salix fragilis), that created debris blockages during the flood

A Model for Other Communities

- **Improvements were evaluated beyond political boundaries**
- **Capacity was established for future disaster recovery**
- **Resources will become reference and guidance documents for future efforts**
- **Projects are being monitored for effectiveness**

Flood Recovery Resources

- **Colorado Emergency Watershed Protection (EWP) Program Success Stories**
- **Stream Stewardship and Recovery Handbook**
- **Resilient Crossings Handbook**
- **Adaptive Management Guide**
- **Plant Restoration Matrix**
- **Living Streambanks: A Manual of Bioengineering Treatments for Colorado Streams**
- **Flood Recovery Project Monitoring Methods**
- **Technical Guidance: Revegetation Plans for Stream Restoration Projects**
- **EWP Program 2013 Colorado Flood Recovery Phase 2 Project Engineering Guidance**



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Watershed and Project Summaries

BIG THOMPSON RIVER
WATERSHED FLOOD RECOVERY
2013-2018

LEFT HAND CREEK
WATERSHED FLOOD RECOVERY
2013-2018

SAINT VRAIN CREEK
WATERSHED FLOOD RECOVERY
2013-2018

LITTLE THOMPSON RIVER
WATERSHED FLOOD RECOVERY
2013-2018

FOURMILE CREEK
WATERSHED FLOOD RECOVERY
2013-2018

ESTES VALLEY
WATERSHED FLOOD RECOVERY
2013-2018

COAL CREEK
WATERSHED FLOOD RECOVERY
2013-2018

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Community Development Block Grant – Disaster Recovery

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Preparing for the Next Flood

Colorado Hazard Mapping Program (CHAMP) - Senate Bill 15-245

Flood Hazard Mapping Program

Fluvial Hazard Zone (FHZ) Mapping Pilot Program

Debris Flow Mapping Program

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Colorado Emergency Watershed
Protection (EWP) Program

Project Before and After Photos

North Fork of the Big Thompson

Post Flood

Post Project

1. Sediment removal to provide conveyance and create riparian corridor.
2. Large wood structures provide bank protection, improve complexity and create habitat.
3. Constructed riffles, pools, and boulder cascades provide a complex channel that can better absorb velocity at high flows and provide habitat for fish and wildlife.

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People Before and After

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People Before and After

Project Before and After

Bielins-Hock Open Space

Post Flood

Post Project

1. Sediment removal and floodplain connectivity
2. Backwater pool improves habitat
3. Preserve existing vegetation
4. Grading and soil lift installation to stabilize banks
5. Buried rip-rap setback to protect infrastructure

Thank You for Your Dedication and Support!