Comprehensive Creek Planning Initiative

January 12, 2015

Watershed Recovery

Emergency Response

Immediate Threat Assessment and Mitigation

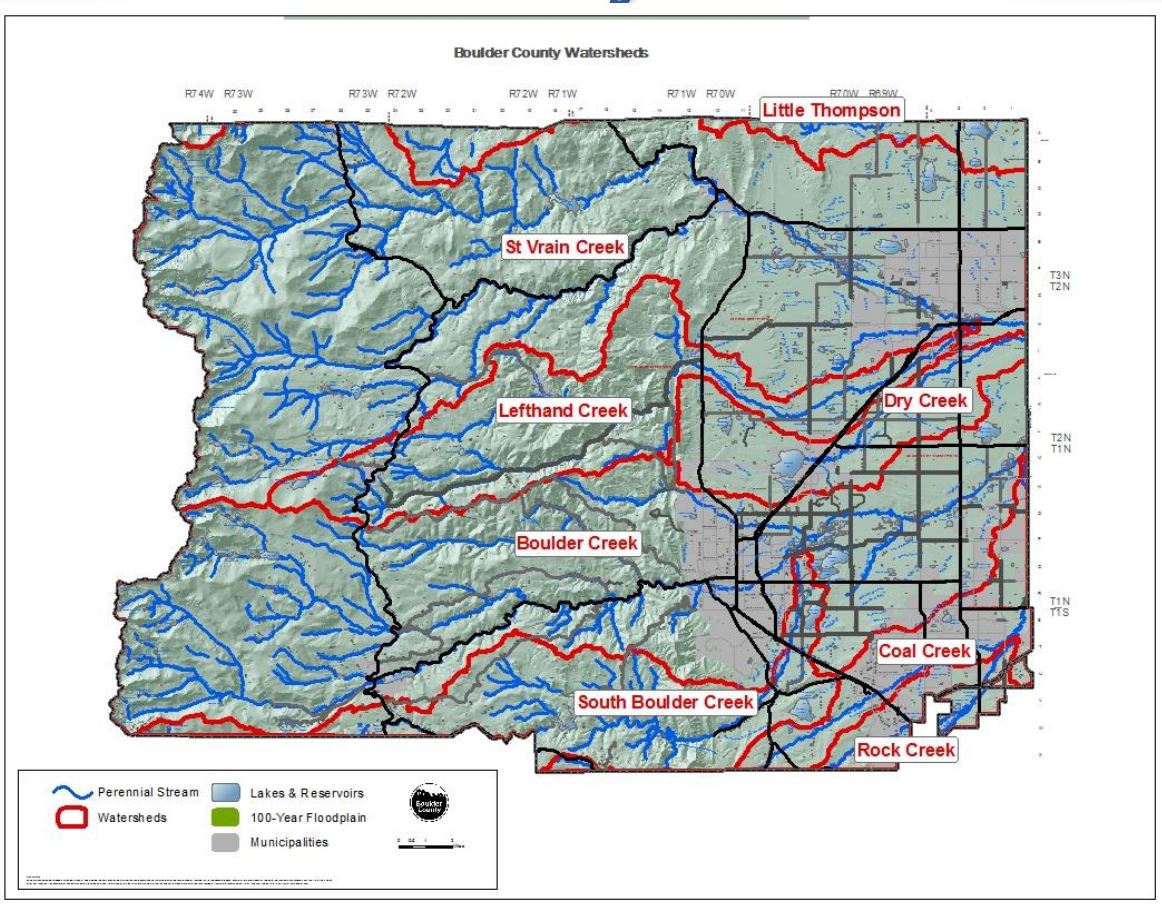
Long-Term Vision

Watershed Master Plans

Future Creek Projects

Funding and Implementation

Boulder County Watersheds



Comprehensive Creek Planning Initiative

- Initiated to ensure county-wide view of creek recovery and restoration
- Began with community meetings to identify needs
- Moved to high-hazard debris removal and mitigation projects
- Prepared for and transitioned to watershed-level master planning process
- Master plans complete in December 2014

Long-Term Vision

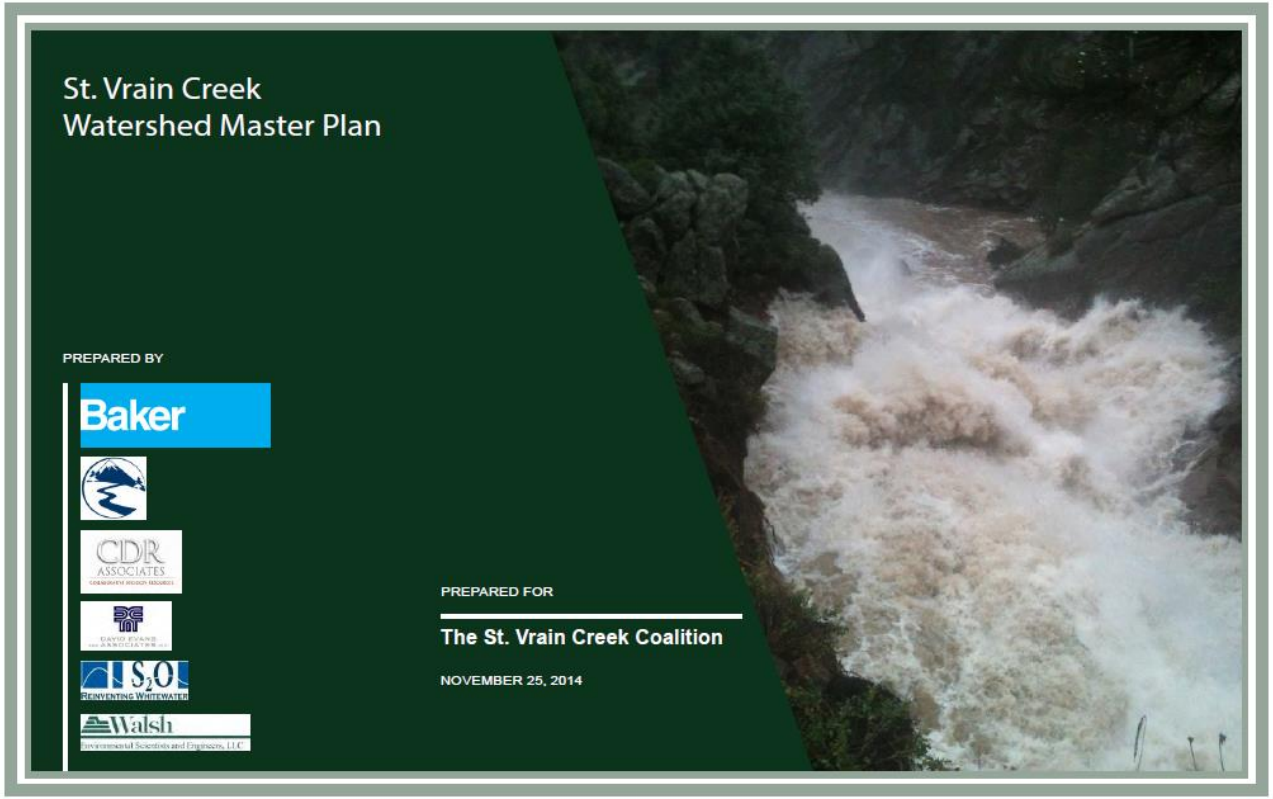
Watershed Master Plans

Little Thompson River

Long-Term Vision

Watershed Master Plans

St. Vrain Creek



Long-Term Vision

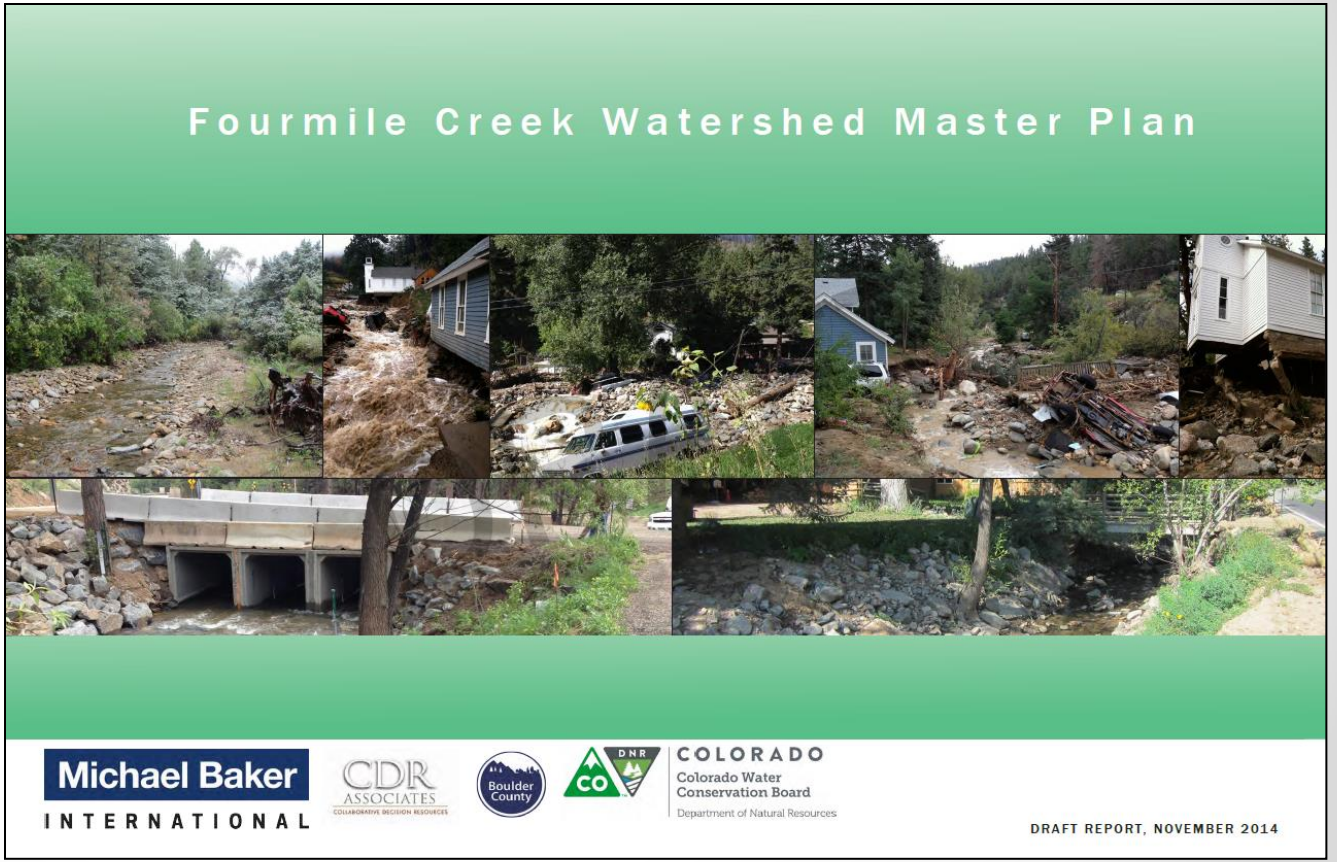
Watershed Master Plans

Left Hand Creek

Long-Term Vision

Watershed Master Plans

Fourmile Creek



Long-Term Vision

Watershed Master Plans

Coal Creek (Upper Reaches)

Upper Coal Creek Watershed Restoration Master Plan

November 2014

Jefferson and Boulder Counties

TEG The Environmental Group

ICON ENGINEERING, INC.

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Centennial, CO 80112
303-221-0802
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Ecological Resource Consultants, Inc.

DHM DESIGN

Long-Term Vision

Watershed Master Plans

Enabling Flood Recovery through Watershed Planning

- **Partnerships**
  - Coalition partners
  - Community members & landowners
  - Stakeholder interests
- **Resources**
  - County: Staffing and funding, $300K
  - State: Guidance and funding
    - CWCB Master Plan Grant, $700K
    - CDBG-DR Planning Grant, $80K
    - CWCB Stream Restoration Grants*

**Funding needed for project implementation, including local match*

Partnerships

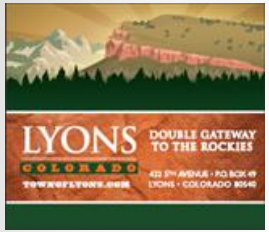
Boulder County

City of Longmont Colorado

City of Boulder

United States Environmental Protection Agency

St. Vrain & Left Hand Water Conservancy District



KEEP IT CLEAN PARTNERSHIP

Arapaho and Roosevelt National Forests
Pawnee National Grassland

FEMA

Colorado Division of Reclamation Mining & Safety

NRCS
Natural Resources Conservation Service

CDOT Colorado Department of Transportation

Jamestown Colorado

Left Hand Water District

DNR Colorado Colorado Water Conservation Board
Department of Natural Resources

CDPS Colorado Division of Homeland Security & Emergency Management
Department of Public Safety

Longmont & Boulder Valley Conservation Districts
Maintaining Agriculture in a Growing Urban Environment

amec

Baker

David Evans and Associates Inc.

S2O Reinventing Whitewater

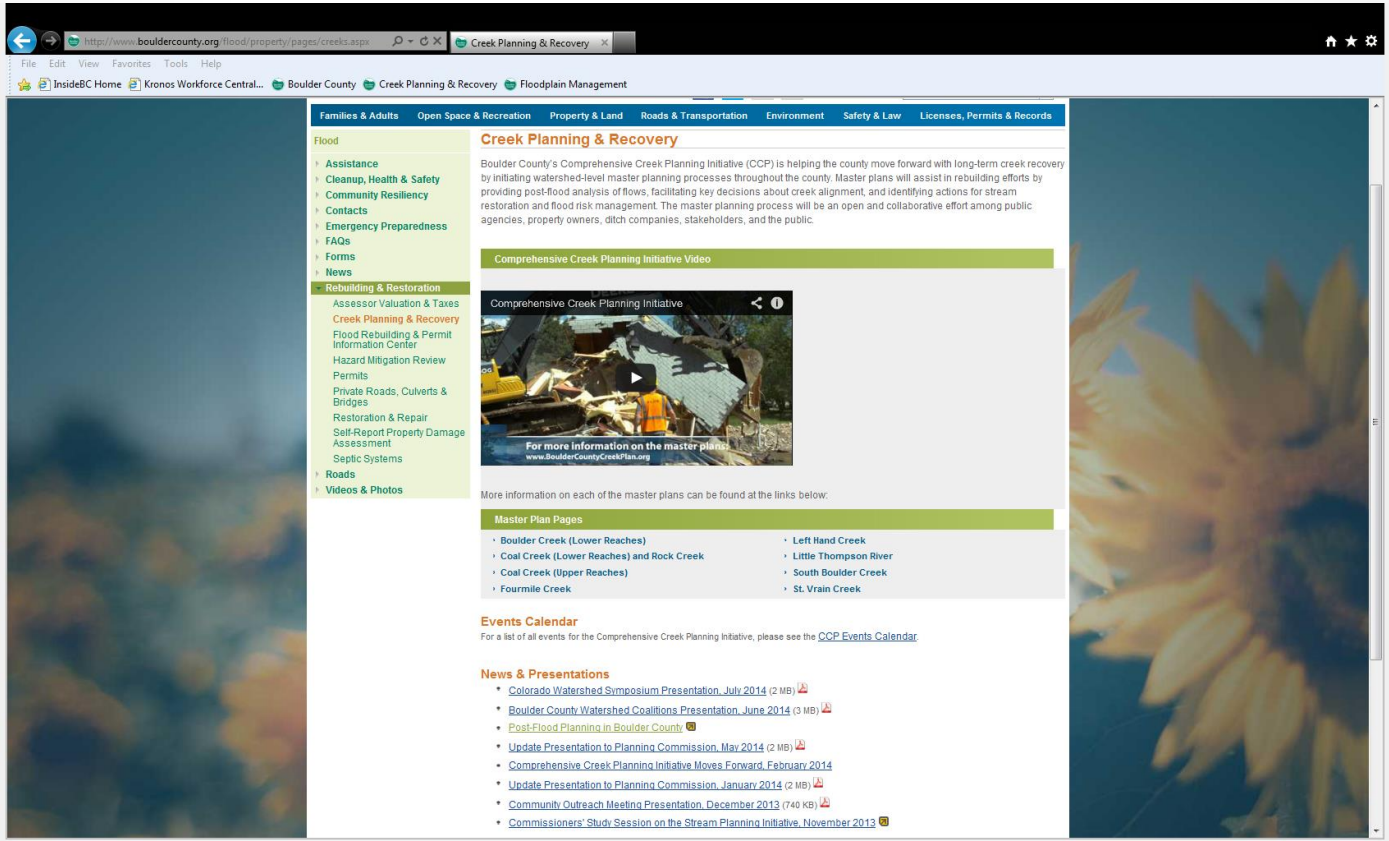
Walsh Environmental Scientists and Engineers, LLC

CDR Associates
Collaborative Decision Resources

Community Engagement

- **1** project video produced
- **15** community meetings with over **575** total participants
- **3,593** postcards sent announcing the master plan process and kick-off community meetings
- **10** presentations at meetings, conferences, and workshops
- **13** press releases sent
- **16** external emails with updates and announcements on master plans

Information Clearinghouse



Long-Term Vision

Watershed Master Plans

Plan Outcomes

Multidisciplinary technical assessment of current watershed conditions, including:

- Ecological Assessment
- Geomorphic Assessment
- Flood Risk Assessment
- Channel Migration Zone Analysis

Ecological Assessment

St. Vrain Creek

Poor

Recommendations:
Consider opportunities for improved meanders, habitat, vegetation, etc.; need to create more complexity within the channel

No further management recommended

Excellent

Geomorphic Assessment

Left Hand Creek

Good

In tact section of lower Left Hand Creek (on BoCo Open Space). This reach largely in tact due to functioning, connected floodplain.

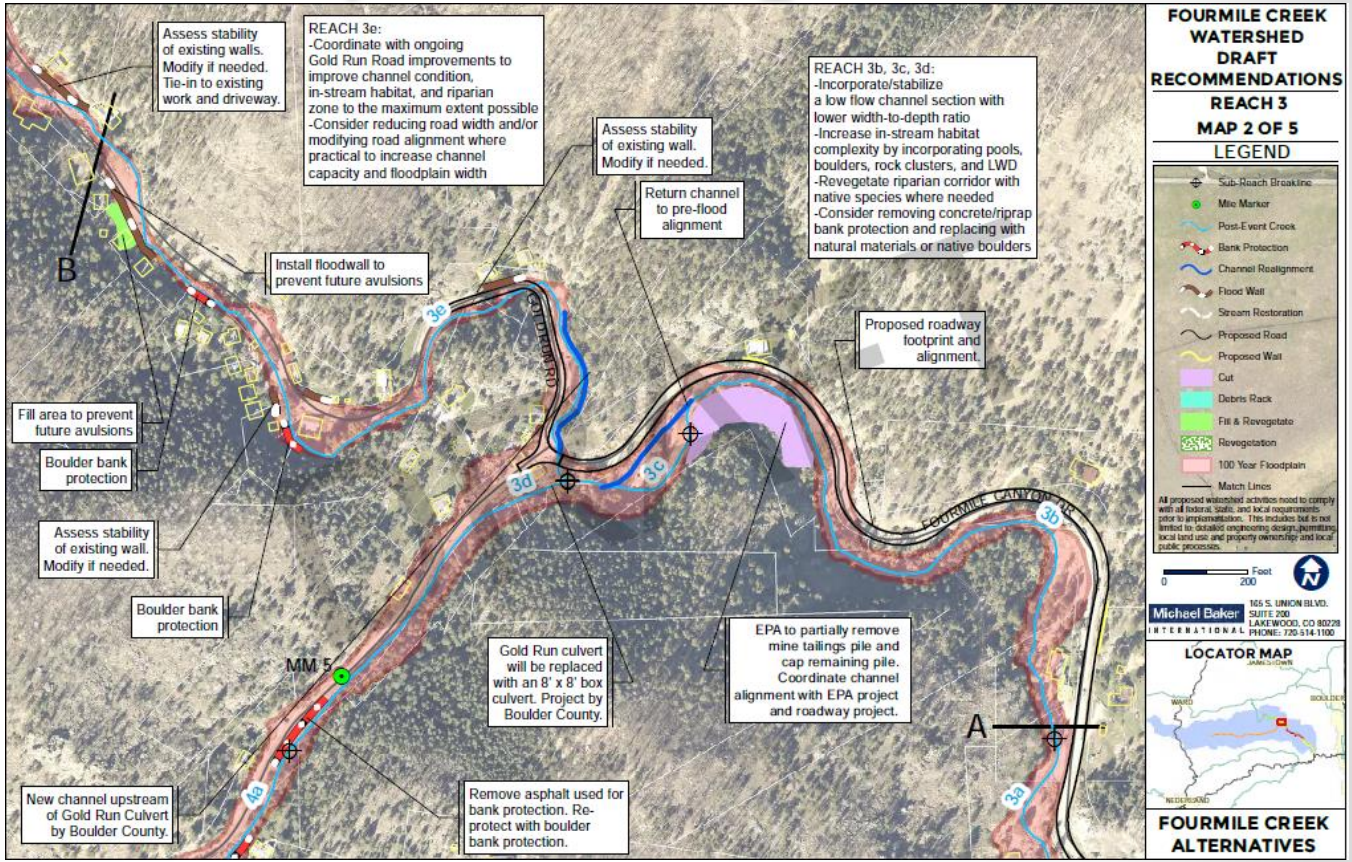
Tight bedrock pinch led to stripping of alluvium in James Canyon, ultimately destroying the roadway and the pre-flood channel.

Poor

Long-Term Vision

Watershed Master Plans

Project Maps



Project Descriptions

NEIGHBORHOOD: Boulder County
SHEET: 41
STATION: 1299+00 to 1333+00
RESTORATION RECOMMENDATIONS: 1308+00 to 1326+00

Aerial photos of pre-flood conditions and anecdotal information indicate this reach had a moderately dense vegetated riparian corridor, ranging from 150 feet directly along the river corridor to more than 550 feet wide in areas with expanded floodplain surfaces. The vegetation is comprised primarily of cottonwoods, some willows, and other riparian species, many of which were torn out during the flood. Flood flows caused considerable scour of the floodplain and overbank surfaces in some areas, including significant lateral channel migration in the large bend near Sta 1325+00 and Sta 1302+00. Due to the significant scour upstream, including significant sediment and debris transported through the upstream canyon, large sediment deposits, including coarse material, also exist in this area.

The 2013 Flood caused many of the significant channel bends to erode laterally into overbank surfaces that have primarily been used as cropland. Sinuosity of the channel was also generally reduced as flood flows scoured a more direct flow path along the floodplain.

Although significant geomorphic changes have occurred in this reach as a result of the 2013 Flood, much of the current channel and floodplain is relatively stable, and expected to recover without significant restoration activities. However, there are some overbank areas that require some fill and reclamation along with some bank stabilization. Seeding or planting of the reworked channel banks would help accelerate vegetation recruitment.

The Boulder Larimer (Ish) Irrigation Ditch diversion structure has been reconstructed, and significant channel reconstruction both upstream and downstream of the diversion dam has occurred.

RESTORATION RECOMMENDATIONS

1. Stabilize right bank between Sta 1298+00 and Sta 1309+00 to protect irrigation ditch.
2. Stabilize left bank near Sta 1302+00.
3. Create and/or refine low-flow channel near Sta 1320+00 to improve conveyance and sediment transport in this area. Effects of low-flow channel will be limited at downstream end due to Boulder Larimer (Ish) Irrigation Ditch diversion dam.
4. Stabilize banks near Sta 1324+00.
5. Develop low-flow channel below diversion dam and grade adjacent floodplain surface (much of this work has already occurred).

OPINION OF PROBABLE COST

Item Description	Unit	Unit Price	Sta 1308+00 to Sta 1326+00 Sheet 40 and 41	
			Quantity	Cost
Mob/Demob	LS	$ 32,400	1	$ 32,400
Dewatering	LF	$ 14	2400	$ 33,600
Create/refine Low Flow Channel	LF	$ 27	1400	$ 37,800
Excavate, Grade Low Flow Channel (capacity)	LF	$ 48		$ -
Grade Control	EA	$ -		$ -
Grading	AC	$ 8,000	0	$ -
Floodplain Stabilization	AC	$ 8,100	2	$ 16,200
Lowering and Grading	AC	$ 32,300		$ -
Point Bar Creation	LF	$ 5	1400	$ 7,000
Bank Stabilization, Level 1	LF	$ 110		$ -
Bank Stabilization, Level 2	LF	$ 75	1000	$ 75,000
Bank Stabilization, Level 3	LF	$ 45	0	$ -
Land Reclamation Fill	AC	$ 20,200		$ -
Upper Bank Stablization, Level 1	LF	$ 25		$ -
Upper Bank Stablization, Level 2	LF	$ 15		$ -
Upper Bank Stablization, Level 3	LF	$ 5		$ -
Seeding	AC	$ 5,000	10	$ 50,000
Temporary irrigation and weed management	LS	$ 22,800	1	$ 22,800
Site Specific	LS	$ -		$ -
SUBTOTAL				$ 274,800
Contingency, 15% of subtotal				$ 41,200
Permitting , 2.5% of subtotal				$ 6,900
Design, plans, specification, contract administration, 15%				$ 41,200
Supervision & Administration, 10%				$ 27,500
TOTAL				$ 392,000

Conceptual Designs

Figure 28. Graphical example of existing crossing constructed with low-flow channel that facilitates aquatic organism passage and sediment transport.

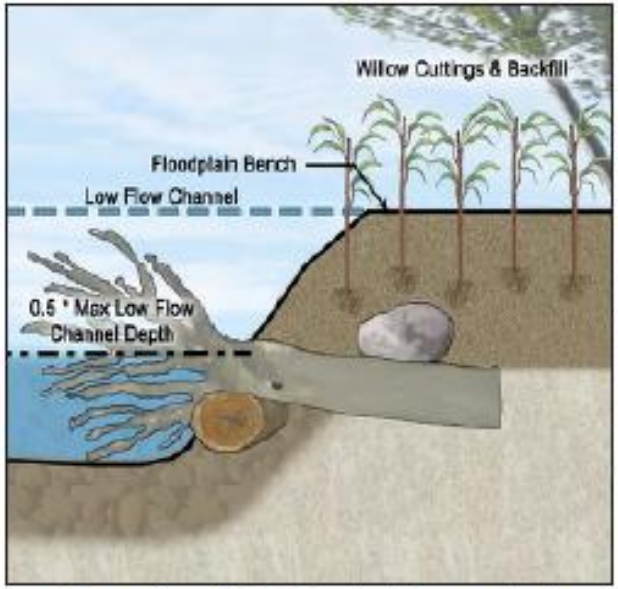


Figure 7.4 Large Woody Debris Bank Protection Detail*

Figure 7.3 Boulder Bank Protection Detail*

Long-Term Vision

Watershed Master Plans

Project Prioritization

Fourmile Creek Master Plan

Tier 1 - Projects reducing flood risk due to post-flood conditions

Reach 1 – Removal of Sediment aggradation from the channel near Mile Marker 1.1

Reach 1 – Fourmile Creek restoration project (CWCB Grant)

Reach 3 – Assessing the stability of existing walls and modifying if necessary

Reach 3 – Filling and revegetating avulsion areas

Reach 3 – Installing debris racks and stabilizing the banks of Ingram Gulch

Reach 4 – Removal of sediment aggradation from the channel and floodplain near Mile Markers 5.1, 5.8, and 6.3

Reach 4 – Removing a debris jam in a high avulsion risk area near Mile Marker 7.7

Tier 2 - Projects that improve stream stability and promote ecological recovery

All Reaches – Low flow channel restoration

All Reaches – Increasing in-stream habitat

All Reaches – Revegetation

Reaches 1, 3, and 4 – Bank Protection

Reach 3 – Relocating Fourmile Creek in the vicinity of Salina Junction

Reach 4 – Removing a temporary berm near Mile Marker 7.2 and bank protection

Tier 3 - Projects that affect areas with low risk to infrastructure

Reach 2 – Filling the pre-flood channel to reduce avulsion risk

Long-Term Vision

Watershed Master Plans

Cost Estimates

- Top priority projects
  - St. Vrain $68 million*
  - Left Hand $20 million**
  - Fourmile $2.6 million*
- Floodplain management recommendations and cost estimates
  - Studies and remapping $1.6 million

*Cost estimates for all Tier 1 projects with unmet needs

**Cost estimates for all of the top 5 projects with unmet needs

Long-Term Vision

Watershed Master Plans

Plan Adoption

Feedback on Plans

- Planning Commission — January 21
- POSAC — January 22

Adoption

- BOCC — early February

Long-Term Recovery

Plan Use

- Conceptual
  - Framework and guidance for recovery actions
  - Informed by scientific data
  - Next steps of further planning, design
- Funding tool
- Communication and organizing tool

Long-Term Recovery

Project Implementation

- Projects could be completed by:
  - Individual property owners
  - Groups of neighbors
  - Watershed Coalitions
  - Government agencies
  - Non-governmental agencies
  - Cooperative efforts
- Private property owners will need to participate/give approval for any projects on their property

Long-Term Recovery

Project Implementation

- County Land Use review and permitting
  - County encourages projects that align with master plan recommendations for stream alignment and channel configuration
  - Floodplain development permit still necessary to assess impacts of project in regulated floodplain
  - Cooperative efforts could streamline permitting processes by developing “one project” involving multiple properties

Long-Term Recovery

Post-Master Plan Coalitions

St. Vrain

- Continuing discussions about mission and governance structure of post-master plan Coalition

Left Hand

- Left Hand Watershed Oversight Group (LWOG) to serve as watershed coalition
- LWOG Board expanding representation

Fourmile

- Fire District pursuing proposal to house and develop coalition

Long-Term Recovery

Project Funding: CDBG-DR Round 2

Two Programs for Creek Recovery (DOLA/CWCB)

- Watershed Resiliency
- Planning Resiliency

January

Planning program: Projects (up to 30% design)

Planning program: Staff

Watershed program: Watershed Coordinators

March

Watershed program: Small scale or pilot projects

November

Watershed program: Large projects

Long-Term Recovery

Project Funding: CDBG-DR Round 2

- County Applications- January
  - Floodplain program staff
  - Floodplain studies and map updates
  - Creek recovery staff
  - Project design, to prepare for November applications
    - South St. Vrain Creek (Hall Meadows)
    - St. Vrain breaches 1 and 2
    - St. Vrain breaches 5-9
    - Left Hand Creek and Fourmile Creek stream restoration (roadway design integration)
- Applications coordinated through city-town-county Collaborative
- Coalition participation to seek support for applications
- No County application for Watershed Coordinators

Long-Term Recovery

Project Funding: Other Potential Sources

- CDBG-DR Round 3
- HUD Resiliency competition
- Waterway/infrastructure coordination-resiliency funds
- NRCS Emergency Watershed Protection Program
- EPA, Trout Unlimited, and other grant opportunities to be identified

Long-Term Recovery

Next Steps: Creek Recovery and Restoration Program Activities (Winter-Spring)

- Complete county adoption of master plans
- Continue participation in Coalitions
- Complete January and March CDBG-DR Round 2 funding applications
- Initiate project designs (30%) by department staff, when funding secured
  - Parks & Open Space
  - Transportation
- Pursue additional funding for project implementation
  - Projects considered on a case-by-case basis
  - Dependent on resource availability
- Complete CWCB Watershed Planning grant activities
  - Lower Boulder Creek Master Plan (UDFCD)
- Continue communication and outreach activities

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