



Comprehensive Creek Planning Initiative

January 21, 2015

Watershed Recovery



Emergency
Response



Immediate
Threat
Assessment and
Mitigation



Long-Term
Vision

Watershed
Master Plans



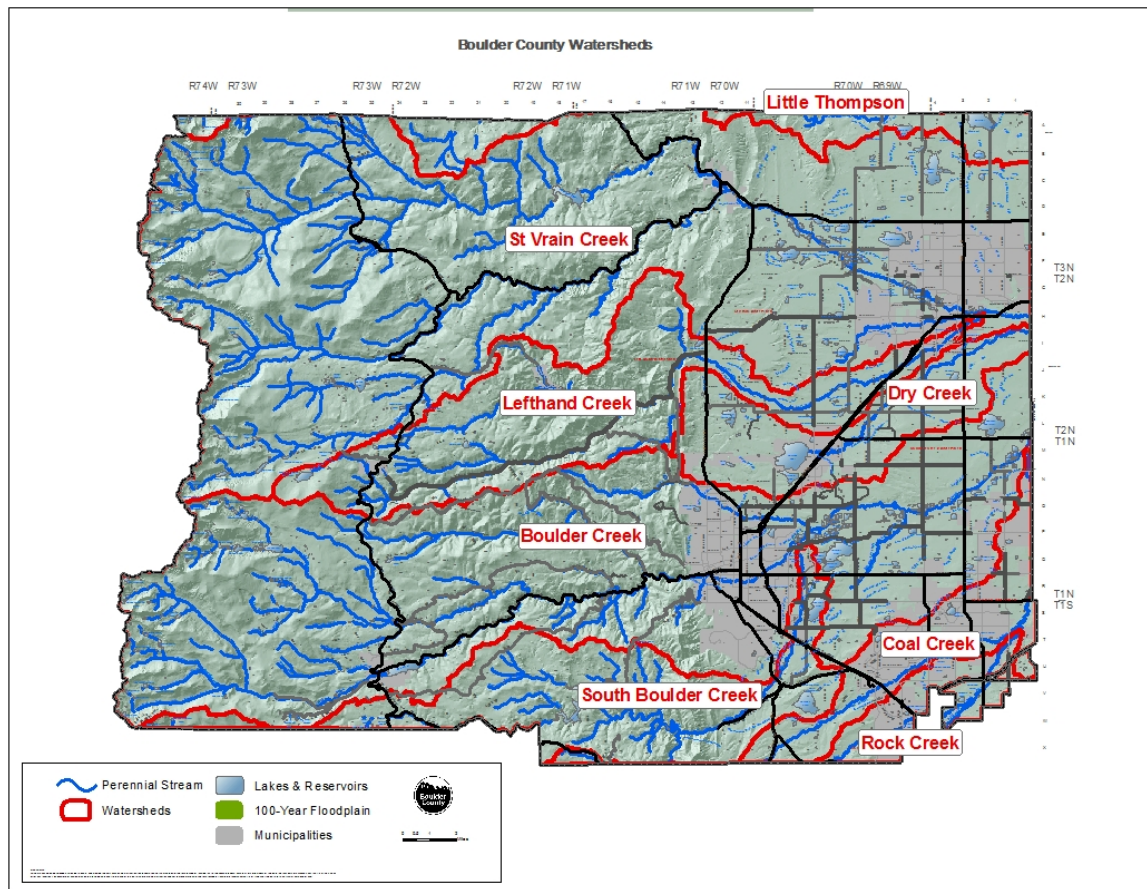
Future Creek
Projects

Funding and
Implementation

Agenda

- Overview: Comprehensive Creek Planning Initiative
 - Plan development
 - Outcomes
- Next steps for Watershed Recovery
 - Plan use
 - Project implementation
- Public Comment
- Planning Commission Feedback

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

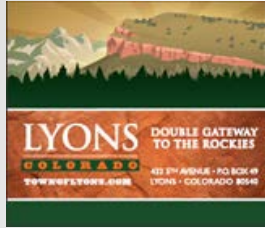
Enabling Flood Recovery through Watershed Planning

- **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*

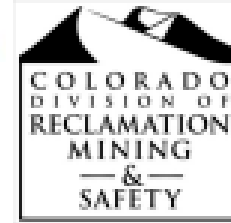
**Funding for project implementation, local match needed*



Partnerships



FEMA



COLORADO

Colorado Water Conservation Board

Department of Natural Resources



COLORADO

Division of Homeland Security & Emergency Management

Department of Public Safety

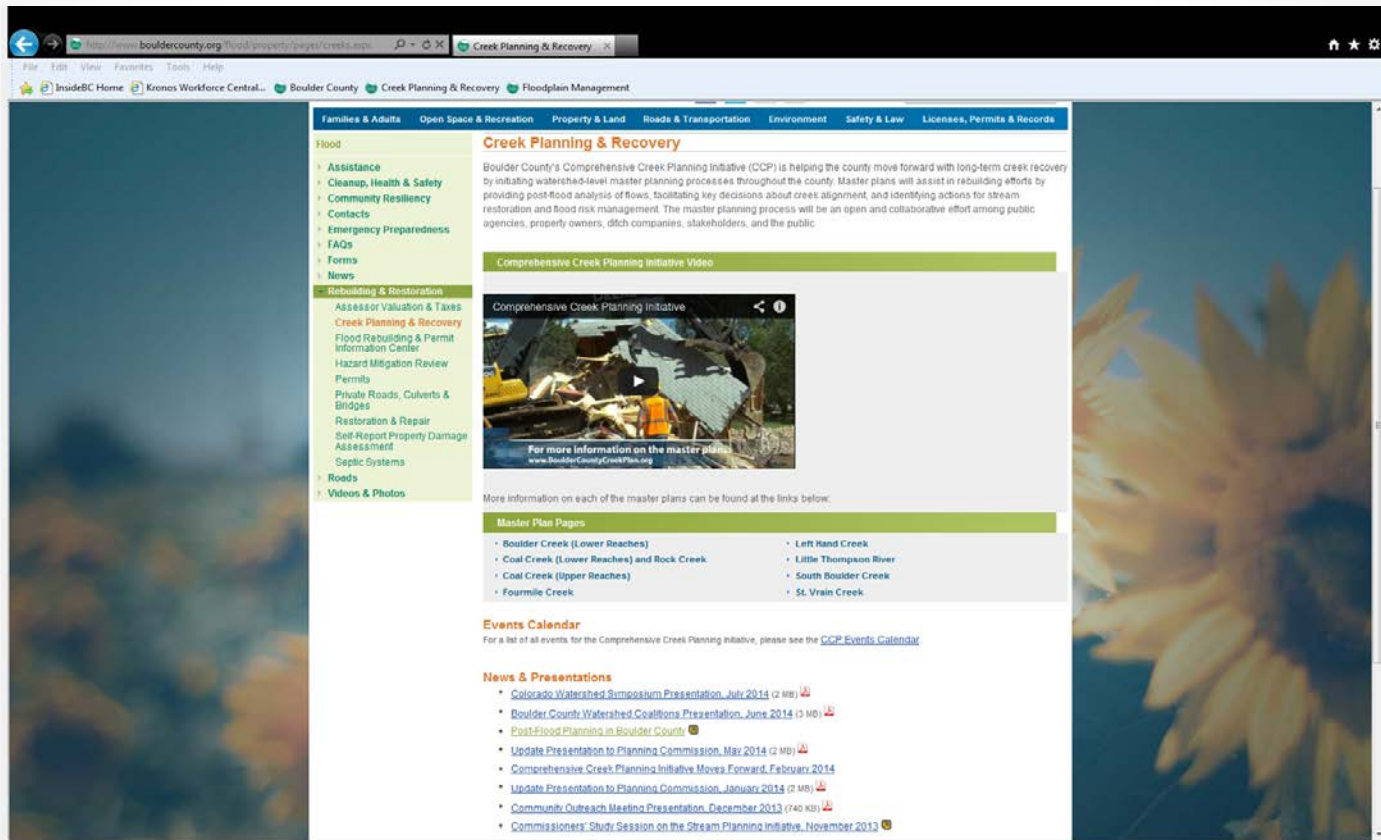


Community Engagement

- 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

Emergency
Res



<http://www.bouldercounty.org/flood-property/pages/creeks.aspx> Creek Planning & Recovery

File Edit View Favorites Tools Help

InsideBC Home Kronos Workforce Central... Boulder County Creek Planning & Recovery Floodplain Management

Families & Adults Open Space & Recreation Property & Land Roads & Transportation Environment Safety & Law Licenses, Permits & Records

Flood

- Assistance
- Cleanup, Health & Safety
- Community Resiliency
- Contacts
- Emergency Preparedness
- FAQs
- Forms
- News

Retooling & Restoration

- Assessor Valuation & Taxes
- Creek Planning & Recovery
- Flood Rebuilding & Permit Information Center
- Hazard Mitigation Review
- Permits
- Private Roads, Culverts & Bridges
- Restoration & Repair
- Self-Report Property Damage Assessment
- Septic Systems

Roads

Videos & Photos

Creek Planning & Recovery

Boulder County's Comprehensive Creek Planning Initiative (CCPI) is helping the county move forward with long-term creek recovery by initiating watershed-level master planning processes throughout the county. Master plans will assist in rebuilding efforts by providing post-flood analyses of flows, facilitating key decisions about creek alignment, and identifying actions for stream restoration and flood risk management. The master planning process will be an open and collaborative effort among public agencies, property owners, ditch companies, stakeholders, and the public.

Comprehensive Creek Planning Initiative Video

Comprehensive Creek Planning Initiative

For more information on the master plans
www.bouldercounty.org/ccpi

More information on each of the master plans can be found at the links below.

Master Plan Pages

- Boulder Creek (Lower Reaches)
- Coal Creek (Lower Reaches) and Rock Creek
- Coal Creek (Upper Reaches)
- Fourmile Creek
- Left Hand Creek
- Little Thompson River
- South Boulder Creek
- St. Vrain Creek

Events Calendar

For a list of all events for the Comprehensive Creek Planning Initiative, please see the [CCPI Events Calendar](#).

News & Presentations

- Colorado Watershed Symposium Presentation, July 2014 (2 MB)
- Boulder County Watershed Coalitions Presentation, June 2014 (3 MB)
- Post-Flood Planning in Boulder County
- Update Presentation to Planning Commission, May 2014 (2 MB)
- Comprehensive Creek Planning Initiative Moves Forward, February 2014
- Update Presentation to Planning Commission, January 2014 (2 MB)
- Community Outreach Meeting Presentation, December 2013 (740 KB)
- Commissioners' Study Session on the Stream Planning Initiative, November 2013



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Little Thompson River



TETRA TECH

FINAL REPORT

Little Thompson Watershed Restoration Master Plan



Little
Thompson
Watershed
Restoration
Coalition



COLORADO
Colorado Water
Conservation Board

Department of Natural Resources



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St. Vrain Creek

St. Vrain Creek Watershed Master Plan

PREPARED BY

Baker



**CDR
ASSOCIATES**
CONSTRUCTION DESIGN-BUILD



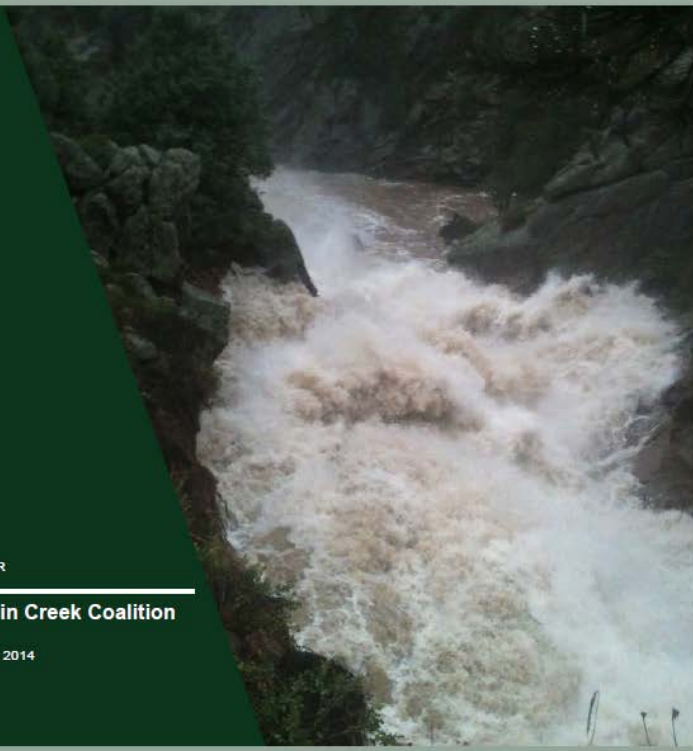
ISO
REGULATING WATERWAYS

Walsh
Environmental Scientists and Engineers, LLC

PREPARED FOR

The St. Vrain Creek Coalition

NOVEMBER 25, 2014





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Left Hand Creek

LEFT HAND CREEK WATERSHED MASTER PLAN



November 14, 2014

amec

CDR
ASSOCIATES
COLLABORATIVE DECISION RESOURCES

Walsh



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Fourmile Creek

Fourmile Creek Watershed Master Plan



Michael Baker
INTERNATIONAL

CDR
ASSOCIATES
COLLABORATIVE DECISION RESOURCES



COLORADO
Colorado Water
Conservation Board
Department of Natural Resources

DRAFT REPORT, NOVEMBER 2014



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Coal Creek (Upper Reaches)



Upper Coal Creek Watershed Restoration Master Plan

November 2014

Jefferson and Boulder Counties



ICON
ENGINEERING, INC.

8100 S Akron Street, Suite 300
Centennial, CO 80112
303-221-0802
www.iconeng.com



Ecological Resource Consultants, Inc.



Plan Outcomes



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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

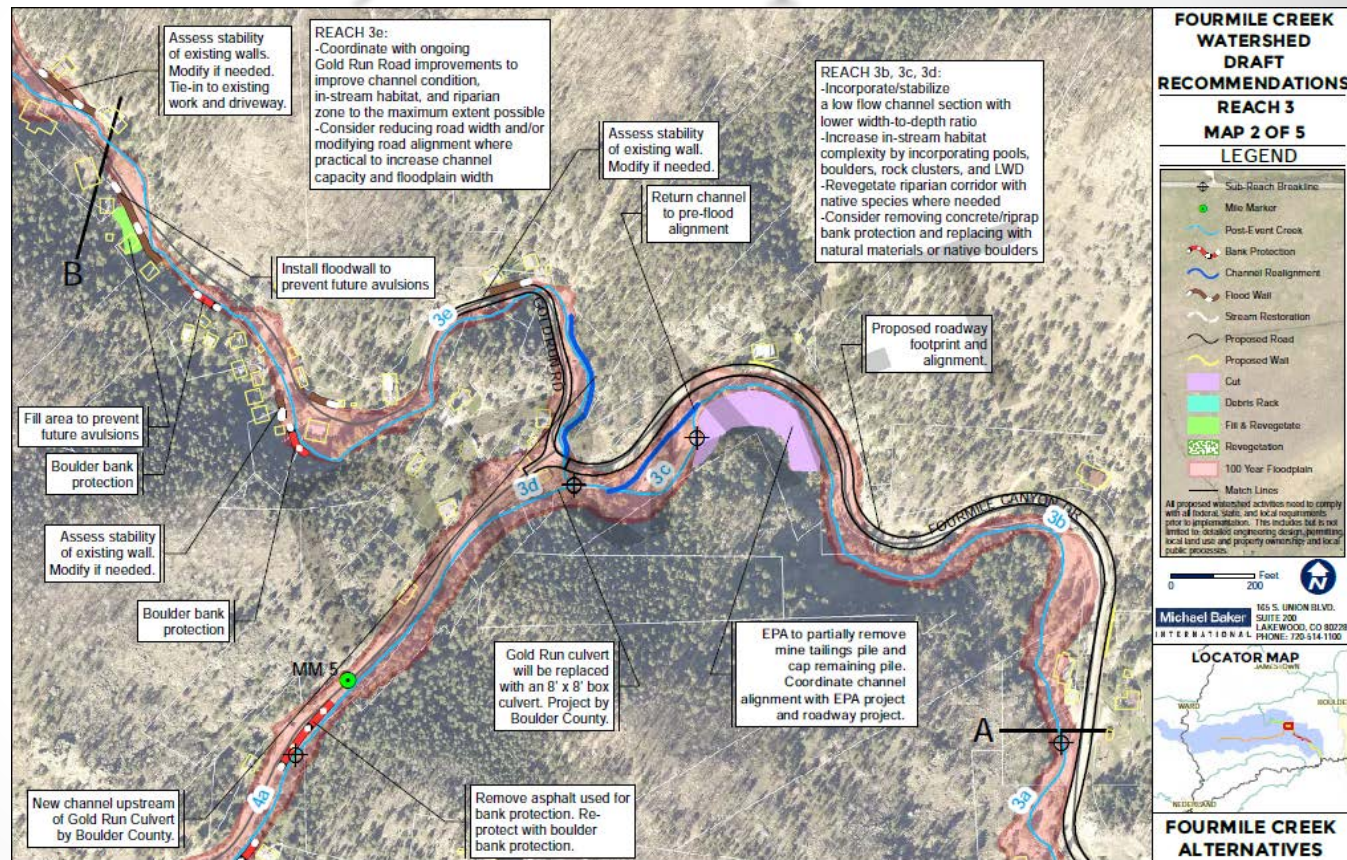




Long-Term
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Project Maps



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 Stabilization, Level 1	LF	\$ 25		\$ -
Upper Bank Stabilization, Level 2	LF	\$ 15		\$ -
Upper Bank Stabilization, 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.

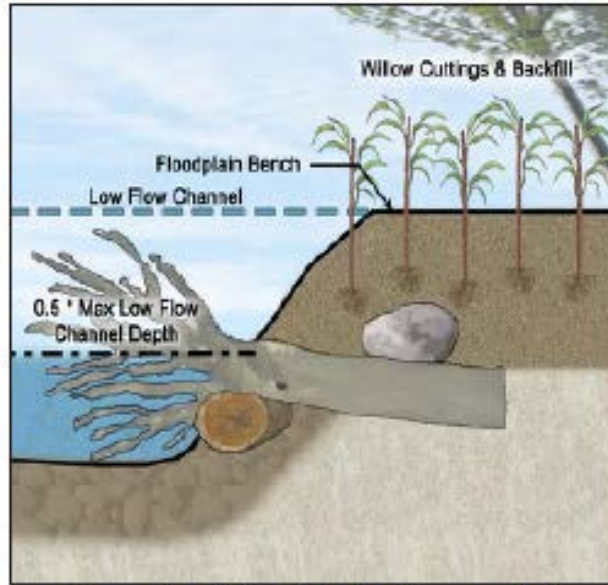


Figure 7.4 Large Woody Debris Bank Protection Detail*



Figure 7.3 Boulder Bank Protection Detail*



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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

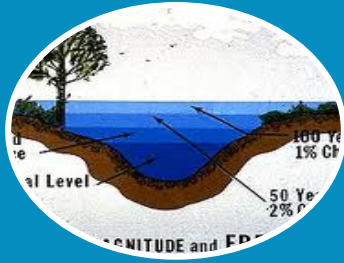
Reaches 1, 3, and 4 – Bank Protection

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



Boulder County Floodplain Management Program

Floodplain Mapping

Master plans identify:

- Areas where updated floodplain studies and FEMA flood insurance rate maps are needed
- Priority areas
- Costs

Floodplain Mapping- St. Vrain Creek

Table 4.3 St. Vrain Creek Watershed -- Flood Hazard Data Unmet Needs

Flooding Source	Extents (downstream to upstream)	Update Needed?	Priority	Reason	Estimated Hydraulics Cost	Estimated FEMA Map Update Cost
St. Vrain Creek	Confluence with Boulder Creek to E. Countyline Road	Yes	Low	Accurate data does not exist as the effective is an approximate analysis and no model is available; however, Longmont has initiated a project that includes updated hydraulic modeling.	Funded via Longmont project	\$29,000
St. Vrain Creek	E. Countyline Road to US36	Partial	Medium	100-year existing conditions exists post-flood from Longmont and SVMF efforts; however, additional frequencies (10-, 25-, 50-, 500-year flows), floodway, etc. would be necessary for FEMA compliance.	\$103,000	\$104,000
St. Vrain Creek	US 36 to N. and S. St. Vrain Confluence	Yes	High	Accurate data does not exist due to post-flood work in the channel and sediment aggradation/degradation; however, Lyons has a FEMA Project Worksheet that includes updated hydraulic modeling for this area.	Funded via FEMA Project Worksheet	\$22,000
North St. Vrain Creek	Confluence to Longmont Dam Road	Yes	High	Accurate data does not exist due to channel migration and sediment aggradation/degradation; necessary to assess accurate flood risk in Apple Valley area and inform future design of projects.	\$83,000	\$24,000
North St. Vrain Creek	Logmont Dam Road to Limit of Residential Area	Partial	Medium	Accurate data does not exist due to channel migration and sediment aggradation/degradation; however, Boulder County Transportation is preparing a model in conjunction with permanent road repairs.	Funded via Boulder County road project	\$15,000
South St. Vrain Creek	Confluence to Andesite Mine	Yes	High	Accurate data does not exist due to channel migration and sediment aggradation/degradation; necessary to assess accurate flood risk in South St. Vrain area and inform future design of projects.	\$43,000	\$24,000
South St. Vrain Creek	Andesite Mine to Upstream Limit	Yes	Medium	Accurate data does not exist due to channel migration and sediment aggradation/degradation; work to be coordinated with CDOT HWY7 permanent repairs in 2015.	\$96,000	\$44,000
Middle St. Vrain Creek	Confluence to Upstream of Riverside/Raymond	Yes	High	Accurate data does not exist due to channel migration and sediment aggradation/degradation; updated flood hazard analysis needed to design private access crossings.	\$156,000	\$24,000
Subtotal:					\$481,000	\$286,000
Grand Total:					\$767,000	



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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 Recovery

Plan Use

- Framework and guidance for recovery actions
 - Informed by scientific data
 - Watershed-level analysis
 - Multijurisdictional and community support
- Funding tool
- Communication and organizing tool
- Staff direction and work plans



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

- Next steps of further planning, project design
- Jurisdictional approvals (land use review, permitting, etc.)
- Funding



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

County Land Use review and permitting

- County encourages projects that align with master plan recommendations for stream alignment, channel section design, and bank stabilization
- Land Use Code already updated for use
 - Plans as guidance, one source of information
 - No changes in land use review criteria
 - Code language gives ability to consider best available information in reviews, including creek plans



Long-Term
Recovery

County Land Use review and permitting

- Land Use Code
 - Special Review and Limited Impact Special Review, Article 4-601.A.12
 - Site Plan Review, Article 4-806.A.3. & A.6
 - Hazard Mitigation Review, Article 19-300.C.7.a



Long-Term Recovery

Sample language: Article 19, 19-300, C.7.a

"The proposal shall not pose or create a significant potential safety hazard when evaluated against evidence of actual damage caused by the 2013 Extreme Rain and Flood Event (including by the Event's related hazardous forces such as flooding, debris flows, rockfalls, mudslides, topographic changes or instability, drainage channel shifts, area drainage system impairments or failures, and soil saturation) and best available information (including but not limited to hydrologic evaluations to determine peak flows, floodplain mapping studies, Colorado Geologic Survey landslide or earth/debris flow data, updated topographic data, and **creek planning studies**)."



Long-Term
Recovery

County Land Use review and permitting

- 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

Creek Recovery and Restoration Program Activities

- 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
- 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)
 - Fourmile Canyon Creek
- Continue communication and outreach activities



Long-Term
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Watershed
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Plan Adoption

Feedback on Plans

- Planning Commission
- POSAC

January 21

January 22

Adoption

- BOCC

February 26

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