

Comprehensive Creek Planning Initiative Boulder County

Sustaining Colorado Watersheds Conference

October 8, 2014



Watershed Recovery



Emergency
Response



Immediate
Threat
Assessment and
Mitigation



Long-Term
Vision

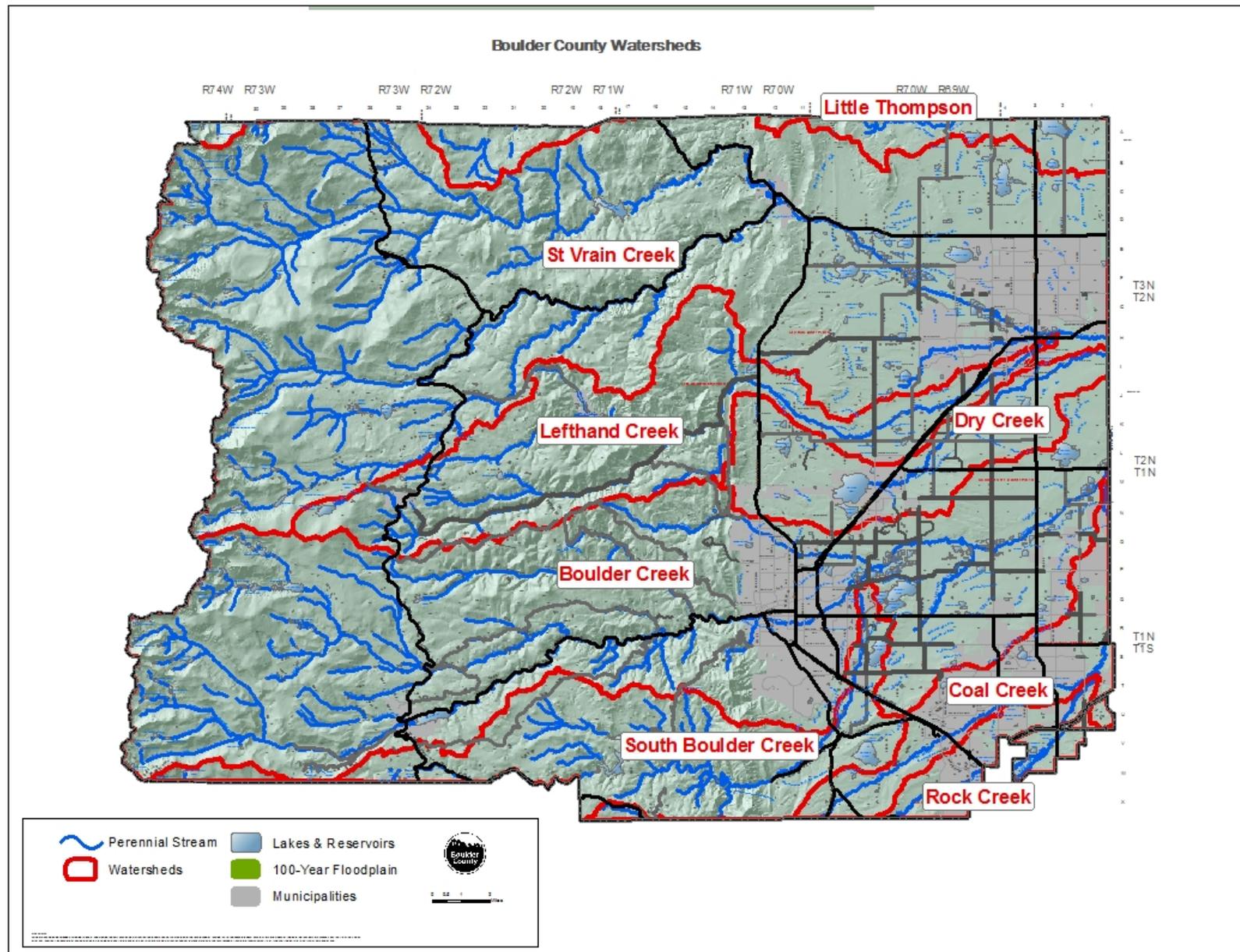
Watershed
Master Plans



Future Creek
Projects

Funding and
Implementation

Boulder County Watersheds





Immediate
Threat and
Damage
Assessment
and
Mitigation

Roads and Bridges

- 10 county bridges were severely damaged or destroyed
- 118 private crossings (bridges or culverts) were damaged or destroyed
- 140 miles of county roads were damaged or destroyed



Total Estimated Cost for Public Road and Bridges:

\$128,179,680



Immediate Threat and Damage Assessment and Mitigation

Waterways

- Alignment of the creeks changed in many locations—sometimes drastically
- Many ponds were breached
- Large amounts of sediment deposited in creeks
- Bank erosion and instability
- Extensive damage in creeks on private lands



Total Estimated Cost for Waterways Projects on Public Lands:

\$29,279,435



Immediate Threat and Damage Assessment and Mitigation

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

Community Engagement

- Over 650 participants



Immediate
Threat and
Damage
Assessment
and
Mitigation



Information Clearinghouse



Immediate
Threat and
Damage
Assessment
and
Mitigation

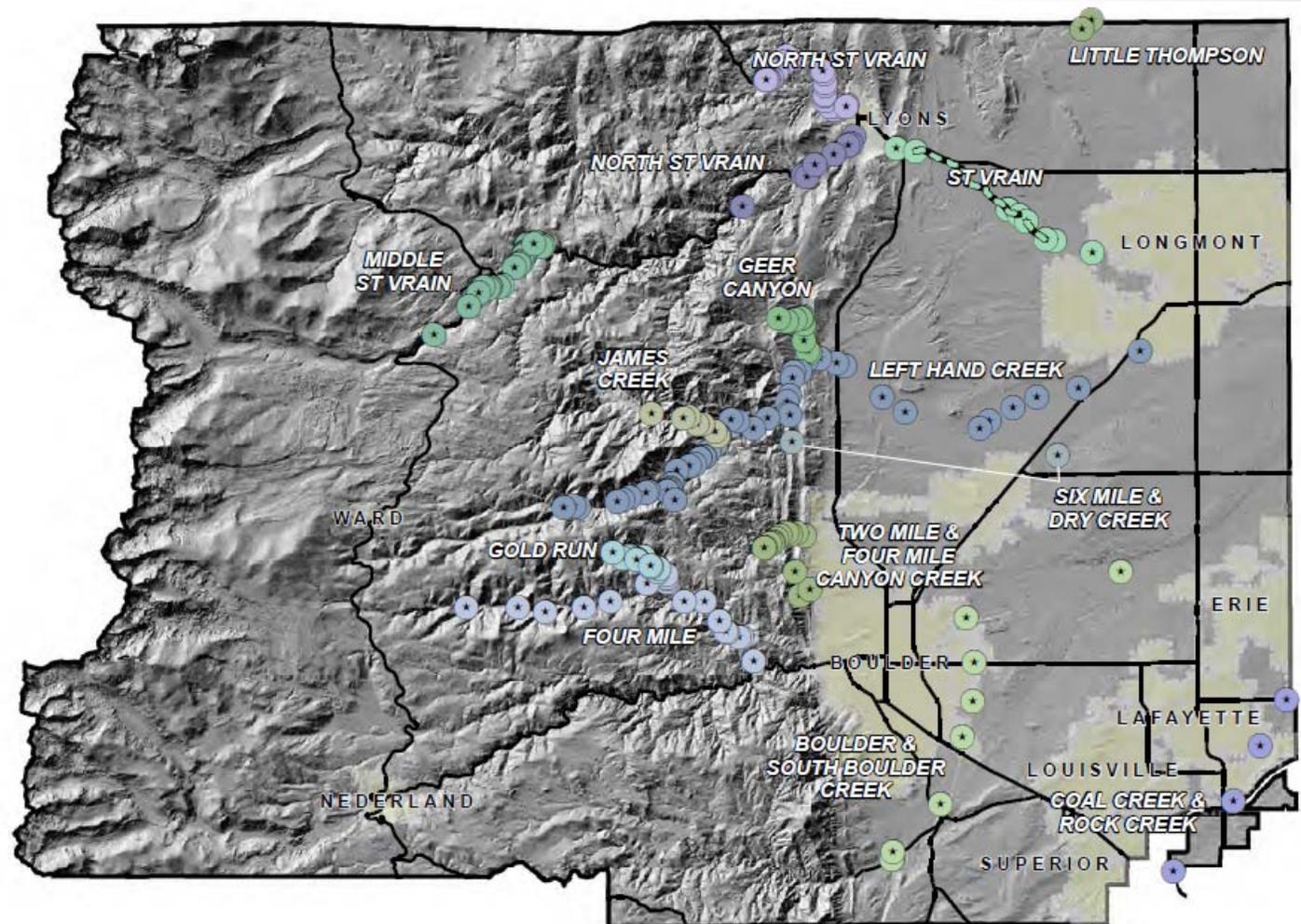
A screenshot of the Boulder County website's 'Creek Planning & Recovery' page. The browser address bar shows 'http://www.bouldercounty.org/flood/property/pages/creeks.aspx'. The page has a navigation menu with categories like 'Families & Adults', 'Open Space & Recreation', 'Property & Land', 'Roads & Transportation', 'Environment', 'Safety & Law', and 'Licenses, Permits & Records'. The main content area is titled 'Creek Planning & Recovery' and includes a video player for 'Comprehensive Creek Planning Initiative Video'. Below the video, there is a list of 'Master Plan Pages' for various creeks: 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, and St. Vrain Creek. There is also an 'Events Calendar' section and a 'News & Presentations' section with several links to documents and presentations.



Immediate Threat and Damage Assessment and Mitigation

County-wide Evaluation

- 208 sites were identified requiring follow-up and recovery measures.



High Hazard Debris Removal



Immediate
Threat and
Damage
Assessment
and
Mitigation



Total Estimated Cost for High Hazard Projects:

\$2,869,201



Long-Term
Vision

Watershed
Master Plans

Boulder County Master Plans

Activity	St. Vrain Creek	Left Hand Creek	Fourmile Creek
Coalition Convened	Complete	Complete	Complete
Community Process Initiated	Complete	Complete	Complete
Ecological Assessment	Complete	Complete	Complete
Geomorphic Assessment	Complete	Complete	Complete
Hydraulic Model	Upcoming	N/A	Complete
Flood Hazard Areas Identified	Upcoming	Upcoming	Upcoming
Draft Alternatives	Complete	Upcoming	Upcoming
Draft Plan	Upcoming	Upcoming	Upcoming
Feedback on Draft Plan	Upcoming	Upcoming	November
Plan Finalized	November	November	December

Complete

N/A

Upcoming

St. Vrain Creek



Long-Term
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Watershed
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St Vrain Creek Watershed



County
Watershed
Study Area



Long-Term
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Master Plans

St. Vrain Creek

Coalition

- 8 agencies
- Meeting twice per month to guide development of plan

Community Engagement

- 2 kick-off meetings in June- 200 participants
- Individual and neighborhood meetings throughout study
- 4 reach-specific community workshops for feedback on alternatives- 140 participants
- Final workshop in November to release plan

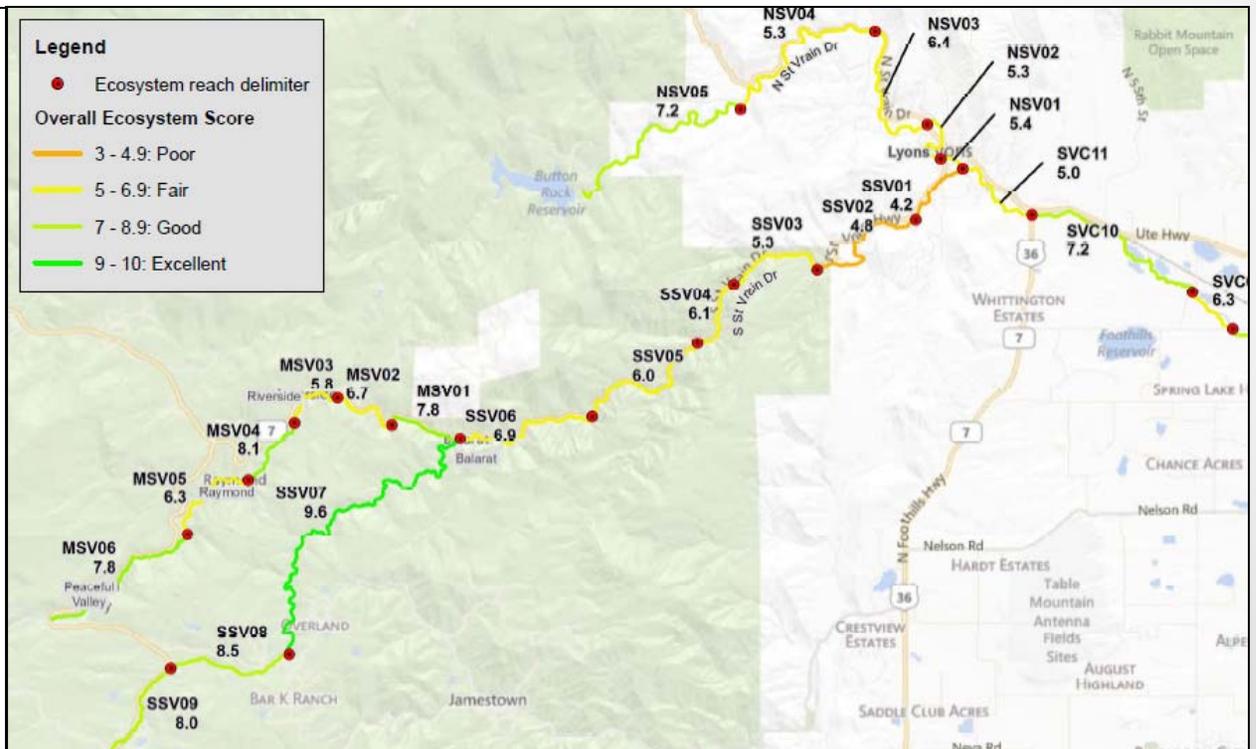
St. Vrain Creek Ecological Assessment

Evaluation of the overall condition of streams, riparian zones, and in-stream habitat

Main stem=
Fair to Good

North St. Vrain=
Fair to Good

South St. Vrain=
Poor to Excellent



St. Vrain Creek Ecological Assessment



Poor

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

No further management recommended

Excellent



St. Vrain Creek Geomorphic Analysis

Rapid Geomorphic Assessment

- Define post-flood geomorphic conditions in the St. Vrain system
- Supplement an overall understanding of the dynamics of the St Vrain Creek
- Assist with focusing on geomorphically appropriate flood risk reduction and restoration strategies

Channel Migration Zone Mapping

- A channel migration zone (CMZ) refers to the area a stream has occupied in recent history
- Shows where a stream may migrate through again

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St. Vrain Creek Geomorphic Assessment



Reference Stream Type	C4
Existing Stream Type	C4
Reference Bed Form	Riffle-pool
Existing Bed form	Plane bed
Departure Type	Bed form change due to straightening.
Channel Evolution Stage	II-III
Channel Processes	Reach has been historically straightened and channel adjustments are limited due to armoring. Significant overbank flow and aggradation occurred during the September 2013 flood but post flood dredging and berming largely returned the channel to its pre-flood location. The bed lacks well-defined riffle-pool features and is predominately a transport reach during most events.
Sediment Regime	Unconfined Source & Transport

St. Vrain Creek

Channel Migration Zone Map

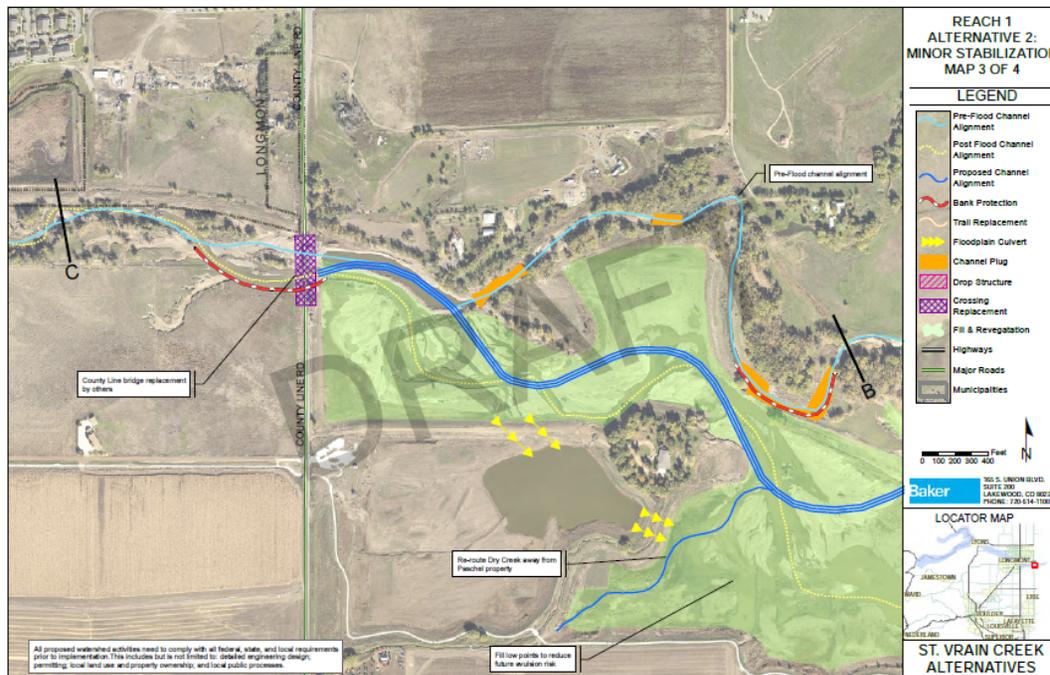
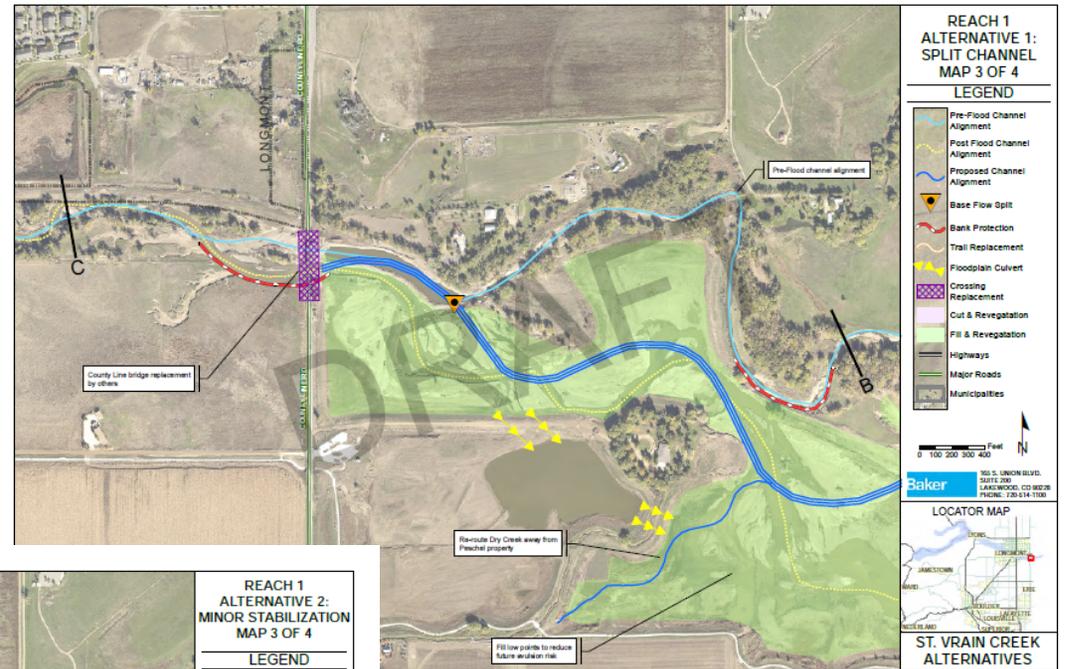


Figure 7
Draft Geomorphic Hazard Zones
 St. Vrain Creek System - St. Vrain
 Boulder County, Colorado

St. Vrain Watershed Alternatives

Alternatives

- Split channel
- Channel realignment
- Minor channel stabilization
- 100-Year flood control channel
- 100-Year flood control channel with low flow channel



Alternatives (cont.)

- Site-specific projects
- Stream restoration
- Infrastructure improvements only

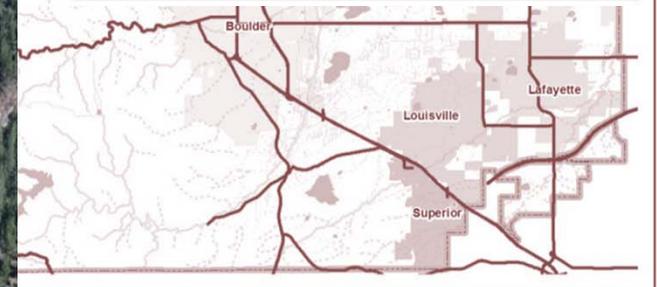
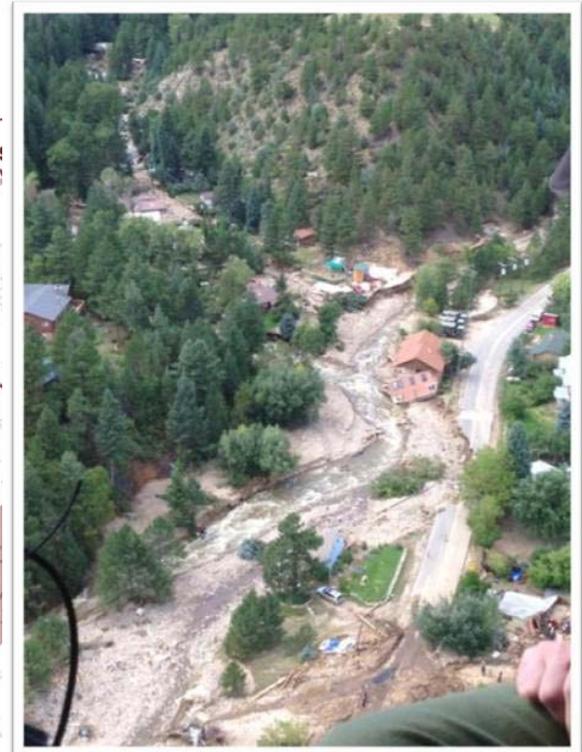
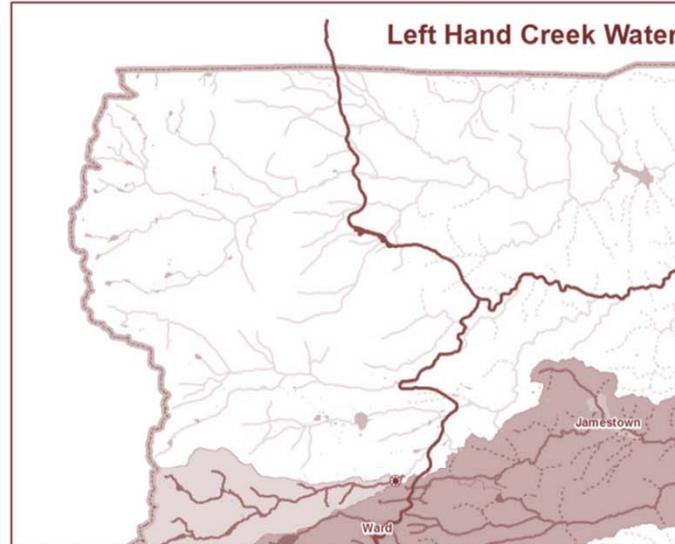
All proposed watershed activities need to comply with all federal, state, and local requirements prior to implementation. This includes but is not limited to: detailed engineering design, permitting, local land use and property ownership, and local public processes.

Left Hand Creek



Long-Term
Vision

Watershed
Master Plans





Long-Term
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Left Hand Creek

Coalition

- Over 20 agencies, community organizations, water interests
- Meeting twice per month to guide development of plan

Community Engagement

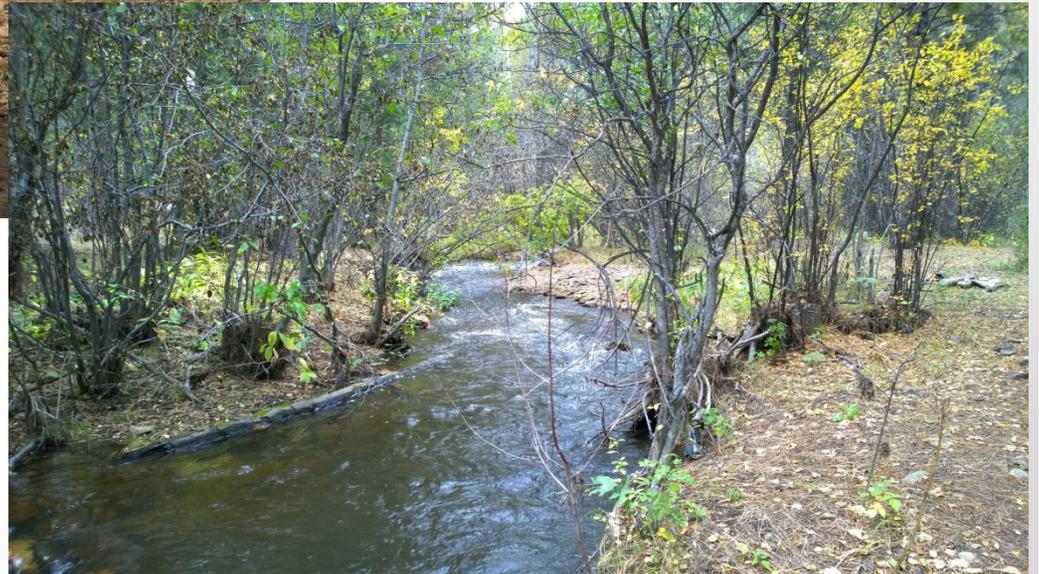
- 2 Kick-off meetings in July/August-
150 Participants
- Meetings with individuals and neighborhoods while in the field
- 2 additional community meetings in October for draft plan feedback

Left Hand Creek Ecological Assessment

Evaluation of the overall condition of streams, riparian zones, and in-stream habitat.

Lower Left Hand=Poor to Fair

Upper Left Hand=Fair to Good



Left Hand Creek

Geomorphic Assessment

Geomorphic hazards in the Left Hand Creek watershed are extensive, but appear quite different in the upper and lower watersheds.

Lower Left Hand Creek

- Geomorphic hazards are the result of:
 - rapid aggradation
 - avulsion
 - expansion
 - floodplain deposition
- Hazards consist of:
 - unstable headcuts
 - bank failure
 - depositional features such as sediment slugs and bars

Upper Left Hand Creek

- Geomorphic hazards are a result of:
 - debris flows, jams
 - channel avulsion and expansion
- Hazards consist of:
 - destroyed banks
 - unstable perched channels
 - boulder berms
 - extensive floodplain deposition

Strategies to address these risks involve bank, channel, and floodplain stabilization. Energy dissipating features are proposed for higher energy reaches, while flow acceleration in lower gradient reaches will be encouraged to promote sediment transport and the establishment of a low-flow channel.

Left Hand Creek

Geomorphic Assessment

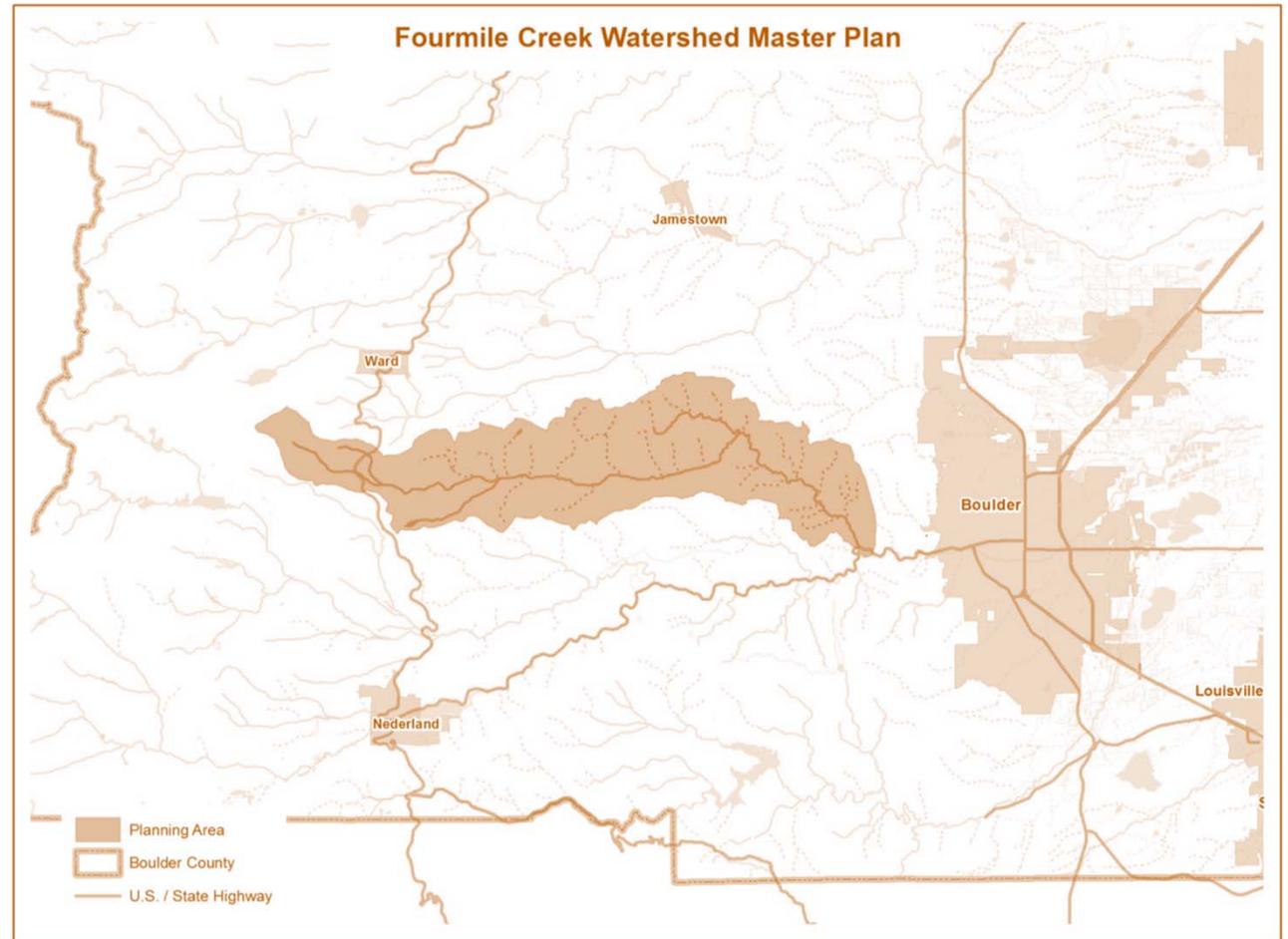


Fourmile Creek



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Long-Term
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Watershed
Master Plans

Fourmile Creek

Coalition

- Coordinated with the Boulder Creek Watershed Coalition with UDFCD and other communities

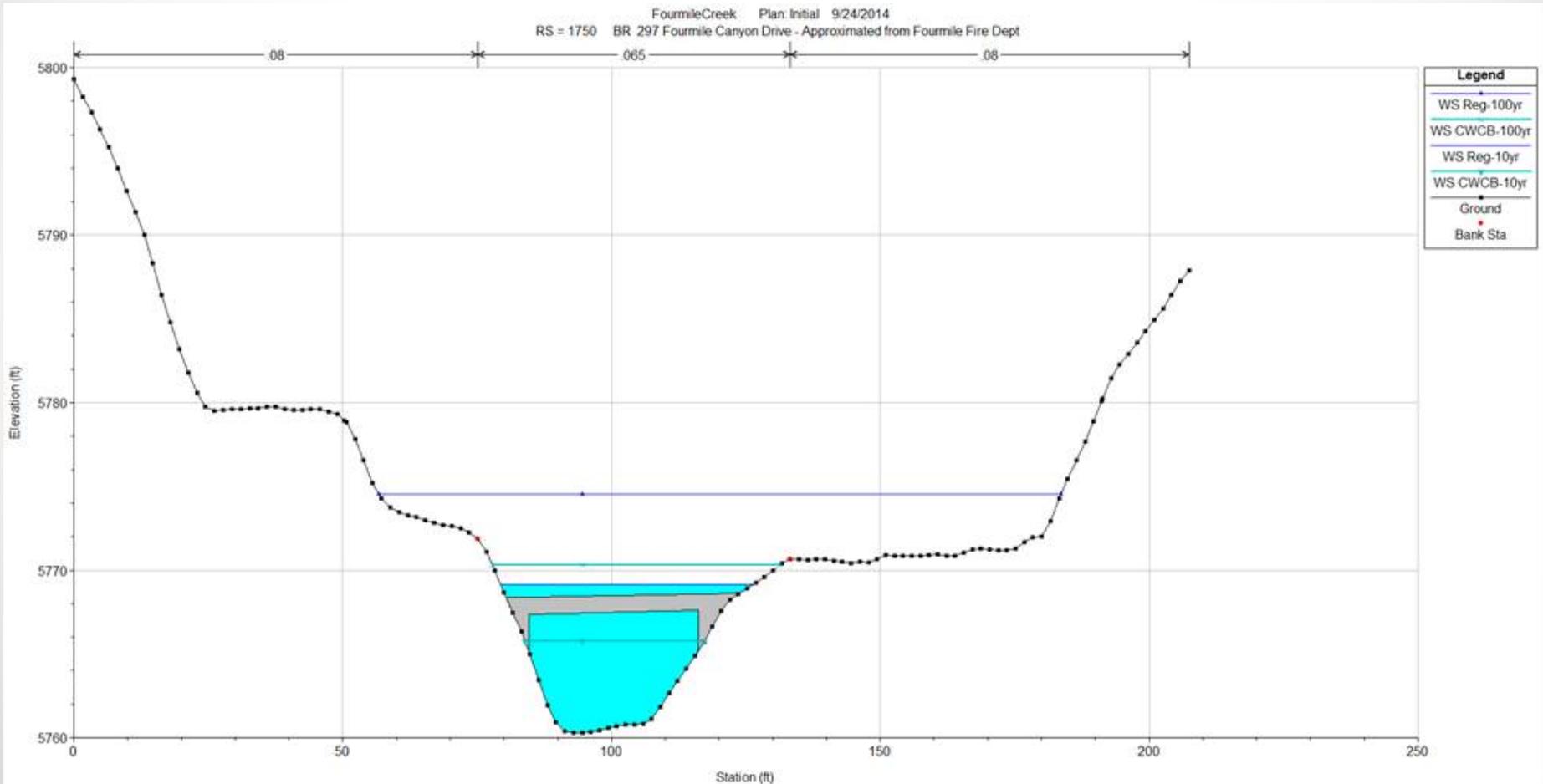
Community Engagement

- Kick-off meeting in September- over 50 Participants
- Meetings with individuals and neighborhoods while in the field
- 2 additional community meetings in November

Fourmile Creek Modeling



Fourmile Creek Modeling



Lower Boulder Creek



Long-Term
Vision

Watershed
Master Plans

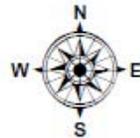
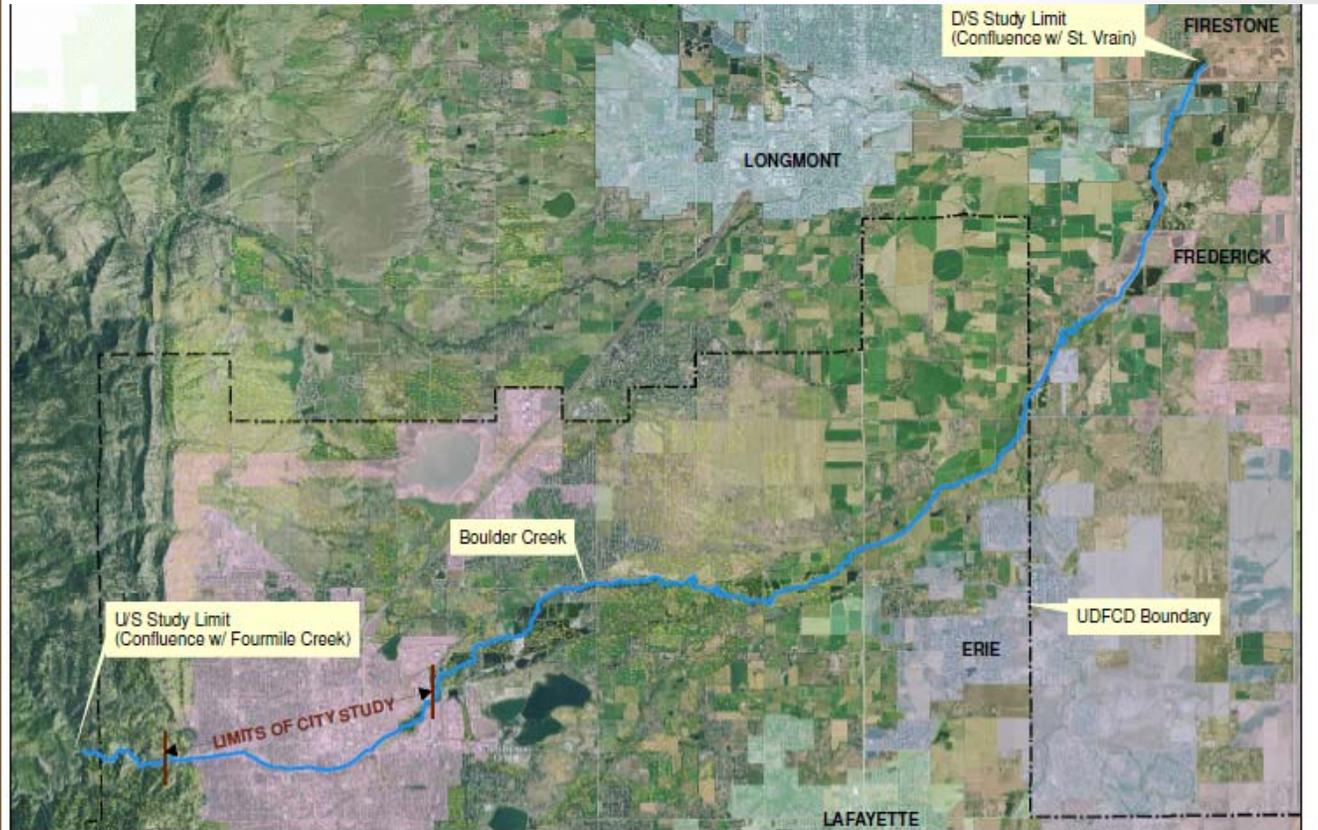
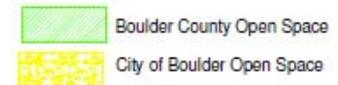


EXHIBIT A
Boulder Creek Mitigation Plan
Approximate Study Limits
March 2014





Long-Term
Vision

Watershed
Master Plans

Lower Boulder Creek

- Funding agreement developed with Urban Drainage and Flood Control District (UDFCD)
- Coalition partners include city of Boulder, city of Longmont, Boulder County
- Request for Proposals (RFP) released
- Consultant selection by end of October
- Coordinated with the Fourmile Creek study, Weld County communities, St. Vrain master plan



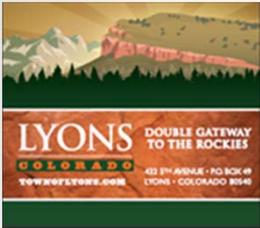
Long-Term
Recovery

Enabling Flood Recovery through Watershed Planning

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

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

Partnerships



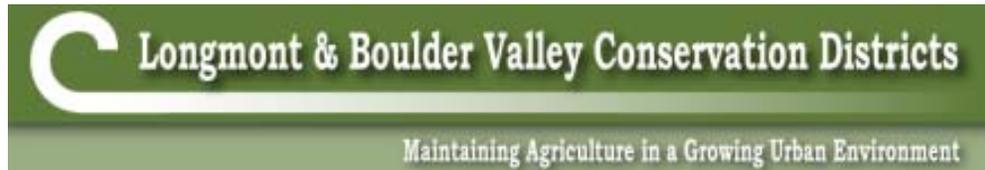
COLORADO
Colorado Water
Conservation Board
Department of Natural Resources



COLORADO
Department of
Transportation



COLORADO
Division of Homeland Security
& Emergency Management
Department of Public Safety



FEMA





Long-Term
Recovery

Post Master Plan Preparations

- Initial conversations with current master plan coalitions about the future
- Meeting with landowners, community members, and stakeholders to discuss project implementation, collect feedback, and continue involvement
- Reviewing other models
- Goal to establish organizational structures by end of year



Long-Term Recovery

Post Master Plan Preparations

Coalition Feedback

- Watershed-level coordination valuable
- Recognize importance of having organizational capacity
- Rely on organizations that are already in place, capacity that exists
- Focus on flood restoration and recovery, public perceives as slow
- Funding needed for project implementation, quickly following plan completion

Landowner and Stakeholder Feedback

- Resident participation in the coalition and project implementation is critical
- Keep a watershed-level view, with sub-committees to address local issues
- Include volunteer organizations

Successful Collaboration



Long-Term
Recovery

Inclusion

Benefits

Interdependence

Clarity

Resources

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