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
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
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

Creek Planning & Recovery

Boulder County’s Comprehensive Creek Planning Initiative (CCPi) is helping the county move toward with its creek recovery by initiating a watershed-based master planning process throughout the county. Master plans will assist in outlining efforts by providing point flood analysis of creeks, outlining key discussions about creek alignment and developing policies for stream restoration and flood risk management. This master planning process will be an open and collaborative effort among public agencies, private sectors, ditch companies, stakeholders, and the public.

Master Plan Pages
- Boulder Creek (Lower Headwaters)
- East Creek (Lower Headwaters) and North Creek
- Cold Creek (Upper Headwaters)
- Favorite Creek

Events Calendar
For a list of all events for the Comprehensive Creek Planning Initiative, please see the CCPi Events Calendar.

News & Presentations
- Colorado Watersheds Symposium Presentation, July 2014
- Boulder County Wellness Center Presentation, June 2014
- Flood and Climate at Boulder County
- Update Presentation to Planning Commission, April 2014
- Comprehensive Creek Planning Initiative Rally March Forward, February 2014
- Update Presentations to Planning Commission, January 2014
- Community/Council/Staff/Preservation, December 2013
- Comprehensive Study Session on the Stream Planner Initiative, November 2013
Left Hand Creek

Long-Term Vision

Watershed Master Plans

November 14, 2014

Left Hand Creek Watershed Master Plan
Coal Creek (Upper Reaches)

Long-Term Vision

Watershed Master Plans

Upper Coal Creek Watershed Restoration Master Plan

November 2014
Jefferson and Boulder Counties

The Environmental Group

DHM Design

Ecological Resource Consultants, Inc.
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

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

No further management recommended

Poor

Excellent
Geomorphologic Assessment

Left Hand Creek

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

Poor

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

Good
Project Maps

Long-Term Vision

Watershed Master Plans
Project Descriptions

NEIGHBORHOOD: Boulder County
SHEET: 41
STATION: 1299+00 to 1333+400
RESTORATION RECOMMENDATIONS: 1308+00 to 1326+400

Aerial photos of pre-flood conditions and anecdotal information indicate this reach has 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 realignment 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 1299+00 and Sta 1309+00 to protect irrigation ditch.
2. Stabilize left bank near Sta 1302+400.
3. Create and/or refine low-flow channel near Sta 1330+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).

LITTLE THOMPSON WATERSHED RESTORATION MASTER PLAN

OPINION OF PROBABLE COST

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Sta 1308+00 to Sta 1326+400</th>
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<tr>
<td>Moderate Demolition</td>
<td>LS</td>
<td>$32,400</td>
<td>$32,400</td>
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<tr>
<td>Seeding</td>
<td>LF</td>
<td>$15</td>
<td>$240</td>
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<tr>
<td>Create/Refine Low Flow Channel</td>
<td>LF</td>
<td>$27</td>
<td>$1400</td>
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<td>Excavate, Grade Low Flow Channel (capacity)</td>
<td>LF</td>
<td>$48</td>
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<tr>
<td>Gravel Control</td>
<td>EA</td>
<td>$1,000</td>
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<tr>
<td>Grading</td>
<td>AC</td>
<td>$8,000</td>
<td>$8,000</td>
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<tr>
<td>Floodplain Stabilization</td>
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<td>$8,500</td>
<td>$16,200</td>
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<td>Channel and Grading</td>
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<tr>
<td>Point Bar Creation</td>
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<td>$5,140</td>
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<td>Bank Stabilization, Level 3</td>
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<td>Land Reclamation Fill</td>
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<td>$20,200</td>
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<td>LF</td>
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<td>$5</td>
<td>$5</td>
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<td>Upper Bank Stabilization, Level 3</td>
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<tr>
<td>Seeding</td>
<td>AC</td>
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<td>Temporary irrigation and weed management</td>
<td>LS</td>
<td>$22,750</td>
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<td>Sta Specific</td>
<td>LS</td>
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<td>Contingency, 15% of subtotal</td>
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<td>Permitting, 3% of subtotal</td>
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<td>Design, plans, specifications, contract administration, 15%</td>
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<td>Supervision &amp; Administration, 10%</td>
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<td>$392,000</td>
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Long-Term Vision
Watershed Master Plans

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
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
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>
<thead>
<tr>
<th>Flooding Source</th>
<th>Extents (downstream to upstream)</th>
<th>Update Needed?</th>
<th>Priority</th>
<th>Reason</th>
<th>Estimated Hydraulic Cost</th>
<th>Estimated FEMA Map Update Cost</th>
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<tr>
<td>St. Vrain Creek</td>
<td>Confluence with Boulder Creek to E. Countyline Road</td>
<td>Yes</td>
<td>Low</td>
<td>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.</td>
<td>Funded via Longmont project</td>
<td>$29,000</td>
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<tr>
<td>St. Vrain Creek</td>
<td>E. Countyline Road to US36</td>
<td>Partial</td>
<td>Medium</td>
<td>100-year existing conditions exist post-flood from Longmont and SWMP efforts; however, additional frequencies (10-, 25-, 50-, 500-year floods, floodway, etc. would be necessary for FEMA compliance.</td>
<td>$103,000</td>
<td>$104,000</td>
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<td>St. Vrain Creek</td>
<td>US 36 to N. and S. St. Vrain Confluence</td>
<td>Yes</td>
<td>High</td>
<td>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.</td>
<td>Funded via FEMA Project Worksheet</td>
<td>$22,000</td>
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<td>North St. Vrain Creek</td>
<td>Confluence to Longmont Dam Road</td>
<td>Yes</td>
<td>High</td>
<td>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.</td>
<td>$83,000</td>
<td>$24,000</td>
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<tr>
<td>North St. Vrain Creek</td>
<td>Longmont Dam Road to Limit of Residential Area</td>
<td>Partial</td>
<td>Medium</td>
<td>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.</td>
<td>Funded via Boulder County road project</td>
<td>$15,000</td>
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<td>South St. Vrain Creek</td>
<td>Confluence to Andesite Mine</td>
<td>Yes</td>
<td>High</td>
<td>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.</td>
<td>$43,000</td>
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<td>South St. Vrain Creek</td>
<td>Andesite Mine to Upstream Limit</td>
<td>Yes</td>
<td>Medium</td>
<td>Accurate data does not exist due to channel migration and sediment aggradation/degradation; work to be coordinated with CDOT HWY7 permanent repairs in 2015.</td>
<td>$56,000</td>
<td>$44,000</td>
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<td>Middle St. Vrain Creek</td>
<td>Confluence to Upstream of Riverside/Reynold</td>
<td>Yes</td>
<td>High</td>
<td>Accurate data does not exist due to channel migration and sediment aggradation/degradation; updated flood hazard analysis needed to design private access crossings.</td>
<td>$156,000</td>
<td>$24,000</td>
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**Subtotal:** $481,000 $286,000

**Grand Total:** $767,000
Cost Estimates

• Top priority projects
  o St. Vrain $68 million*
  o Left Hand $20 million**
  o Fourmile $2.6 million*

• Floodplain management recommendations and cost estimates
  o 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
Plan Use

• Framework and guidance for recovery actions
  o Informed by scientific data
  o Watershed-level analysis
  o Multijurisdictional and community support

• Funding tool
• Communication and organizing tool
• Staff direction and work plans
**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
Project Implementation

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

• Land Use Code
  o Special Review and Limited Impact Special Review, Article 4-601.A.12
  o Site Plan Review, Article 4-806.A.3. & A.6
  o Hazard Mitigation Review, Article 19-300.C.7.a
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).”
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
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
  o Projects considered on a case-by-case basis
  o Dependent on resource availability
• Complete CWCB Watershed Planning grant activities
  o Lower Boulder Creek Master Plan (UDFCD)
  o Fourmile Canyon Creek
• Continue communication and outreach activities
Plan Adoption

Feedback on Plans
• Planning Commission January 21
• POSAC January 22

Adoption
• BOCC February 26
Julie McKay
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Email: jmckay@bouldercounty.org
Website: www.BoulderCountyCreekPlan.org