The Lake Fork River Enhancement Project: Lake City, Colorado

History
What’s We’ve Done
What We’ve Learned
What’s Next
Why a River Project?

- Settlement and Flood Control
- Historic Mining Impacts
- Development
1879

D4 Morphology
Areal Extent of Floods

**EXPLANATION**

Areal extent of major flood

Recurrence interval, in years

- 25 or more
- 50 or 50

- June 2-17 and Aug. 2, 1921 (water year 1921)
- June 4-July 1, 1957 (water year 1957)
- June 14-22, 1965 (water year 1965)
- June and July 1983 (water year 1983)
- May and June 1984 (water year 1984)
Historic Mining Impacts on Henson
Development
1975
Development
2008
Comparison of the river channels from 1950, 1975, and 2005 aerial photography at the north end of Lake City
C3 Morphology
What might improvements look like?
Increasing Bank Erosion: Example – Below 8 ½ Street Bridge
2005 aerial photograph showing existing gravel berms and potential area for restoration of Lake Fork River channel

- **Gravel berms**
- **1950 river channel**
- **Active river channel**
- **Channel islands**
River Enhancement Project Goal

- to enhance and protect the ecological health and recreational quality of the Lake Fork of the Gunnison and Henson Creek in the vicinity of Lake City
Project Phases

- Feasibility studies and planning (Funded 2009-2011)
- Property/easement acquisition phase (2011-2012)
- Construction (2012-2014)
- On-going management (2012-onwards)
Current Feasibility/Planning Phase

- Channel Topographic Survey
- Flood Plain Topography (LiDAR)
- Sediment Transport Study/Discharge Measurements
- Flood Plain Hydraulic Analysis
- Habitat Baseline Studies
- Community Outreach
- Participatory Design
- Long-term Management Plan
Channel Survey

• Over Two Miles of Surveyed Channel (over 24,000 survey points)
• Digital Elevation Model
• Topographic Map with ½’ Contours
• LIDAR Floodplain Mapping (to be completed late summer)
Sediment Transport Study

- Sediment Data Collection
  - Suspended Sediment
  - Bedload Sampling
- Discharge Measurements
Henson Creek
Bedload Transport Sampling Results

$y = 4 E^{-14} x^{4.9901}$

$R^2 = 0.8475$

Discharge (cfs) vs. Bedload Transport Rate (tons/hour)
Flood Plain Modeling

- Evaluate water surface elevations and 100-year floodplains for current conditions (update FEMA maps)
- Evaluate potential channel improvement options to ensure that proposed designs do not raise floodplains by more than 1 foot
River Enhancement Design Considerations and Constraints

- **Ownership**
  - Private
  - Town of Lake City
  - BLM

- **Access**

- **Type of Use**
  - Fishing/Boating/Trails

- **Channel Condition/Degradation**

- **Sediment Transport**

- **Flood Risk**
Enhancement Possibilities Options for Lake Fork and Henson Creek (varies by location)

- Channel Shaping/Narrowing
- Individual Rock Placements
- Rock Clusters for Pools
- Rock Vanes for Bank Protection and Habitat
- Large Structures for Large Pools
Enhancement

Limitations

- Channel Gradient
- Bank Height
- Sediment Transport
Henson Creek
Ownership – mostly BLM, Town easement

- High priority area - between diversion and parking area
  - Narrow and stabilize channel to protect trails
  - Rebuild Diversion Structure
  - Remove Old Pipes and Concrete
  - Add More Aggressive Rock Structures to improve fisheries and Seasonal Kayaking
Henson Creek

- Between Silver Street and confluence
  - Low Gradient. Limited to Some Rock Habitat, narrowing of channel, bank height
Lake Fork
Upstream of Henson Creek

- Lake Fork – Upstream of Confluence
  - Flooding
  - Low Gradient – Sensitive to Structure?
  - Minimal Bedload
Green = Right Top of Bank
Red = Left Top of Bank

Lake Fork Profile
Ave. Slope = 0.75%
- Narrowing of channel
- Limited rock placement
Confluence Area
Green = Right Top of Bank
Red = Left Top of Bank

Lake Fork Profile
Ave. Slope = 0.75%
Lake Fork Below Confluence
Green=Right Top of Bank
Red=Left Top of Bank

Lake Fork Profile
Ave. Slope = 0.75%
Lake Fork
Below 8½ Street Bridge
Tentative Alignment North End
Public Access and Recreation
Proposed “out of channel” improvements*

- Stabilize new reconstructed banks with riparian vegetation
- Revegetate adjacent barren areas (e.g. along public trail, Memorial Park)
- Additional trail areas connecting Pete’s Lake with community garden and Waterdog trail

*with adjacent landowner approval
Proposed “out of channel” improvements

- Public access improvements at Memorial Park, public roads/alleys
- Improved signage for private property boundaries
- Improved signage/maps for public fishing access
- Boating put-ins and take-outs (Memorial Park, Henson Creek trail, below water treatment facility)
Next steps

- Continued ideas generated with land owners and focus groups
- Acquire LIDAR and complete modeling/preliminary design
- Individual meetings with each land owner to approve designs
- Finalize concept plans
- Submission of proposals for funding
Partners/Donors

- CWCB
- NPS 319
- National Park Service, RTCA
- OSM/VISTA
- BLM Gunnison District
- Town of Lake City
- Hinsdale County
- Trails Commission
- Trout Unlimited