NORTH EMPIRE CREEK: RECLAMATION ON ABANDONED MINE LANDS

Presentation For:
Colorado School of Mines
2017 Abandoned Mines Summit
November 14, 2017
1983-Clear Creek/Central City Superfund “Study Area” designated

1990-Culture of Cooperation-Forum /McClelland Project

1991-Upper Clear Creek Watershed Association (UCCWA) formed, focus on waste water discharge

1997-Clear Creek Watershed Foundation incorporated as a 501(c)3 non-profit organization, focus on orphan mine remediation

2003-Action Memorandum, CCWF acts as GOOD SAMARITAN Action Officer for EPA Region 8

TO DATE-CCWF $4.5 Million placed
North Empire Creek Restoration

MINE WASTE REMOVAL
STREAM RESTORATION
DRAINAGE CONTROL
WATER QUALITY IMPROVEMENT
North Empire Creek Basin, located north of Empire, once held one of the most affluent gold mining sites within Clear Creek County.

Past mining activities have included surface mining, hydraulic placer mining and lode mining.

As a result of the mining extraction and treatment processes, the land, surface waters, and plant life of the North Empire Creek Basin were contaminated.
Complex Land Ownership

- There can be separate surface and subsurface land ownership

- Average mining claims are usually long and rectangular in shape, 150 x 1500 feet totaling 5.16 acres

- In Clear Creek County mine claim data shows 3,071 total mines, 112 active and 2,959 closed (https://thediggings.com/usa/colorado/clear-creek-co019)

- Private, County, State and Federal land is dispersed randomly
Water Quality: Sampling & Analysis Plan (SAPP)
Phase I: Upper North Empire Creek
Best Management Practices

Upper North Empire Creek Restoration Project - Conqueror Mine Area

• High-gradient drainage system with very steep side slopes, acid mine drainage and significant contamination from heavy metals.

• Where the Conqueror pile was removed, the pH of creek was 3.2, extremely acidic. Now downstream from the pile is a pH above 7.3.

• Moved the Conqueror mine waste to the repository, 200 vertical feet above the stream and ¼ mile away.
Phase II: Middle North Empire Creek
Best Management Practices

Middle North Empire Creek Restoration Project

Mining features addressed as part of this project included:

1. Two mine waste piles (4,000 CY) that had split into four piles (N-S and E-W) by the active channel of North Empire Creek.
2. A fluvial fan behind a remnant water impoundment containing 4,450 CY of highly mineralized sediment.
3. The large (0.5 surface acre) Gold Dirt mine waste pile, which was adjacent and eroding into the creek.
4. The steep Equator mine waste pile (0.45 surface acre) with its toe in the actual creek channel.
Phase III: Lower North Empire Creek
Best Management Practices:

Lower North Empire Creek Remediation Project

1. Upland Run-off and Sediment Controls
2. Stream Bypass
3. Excavation of Mine Waste
4. Construction of Channel
5. Channel Stabilization
6. Revegetation

Benson Mine Waste Pile

Bay State Mine Waste Pile
Upland Interceptors and Sediment Controls

- Main interceptor at the Benson Mine cribbing
- Additional interceptors placed to the south of Benson Mine cribbing and north at a secondary run-off area
Catchment Basins (Sediment Storage Embankments)

- Union Pit overflow
- Sprinkle Pit overflow
Private Road
253 Run-off
Ditches

- Gradient Challenges
- Low Flow Crossings
Next Actions: Stream Bypass & Excavation of Mine Waste
Thank You To Our Project Partners!

CDPHE
Water Quality Control Division
Department of Public Health & Environment

SEAL OF CLEAR CREEK COUNTY
COLORADO

COLORADO DIVISION OF RECLAMATION MINING & SAFETY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

COLORADO SCHOOL OF MINES
EARTH • ENERGY • ENVIRONMENT
Clear Creek Watershed Foundation
Advancing Watershed Sustainability

Welcome to the Clear Creek Watershed Foundation.

www.clearcreekwater.org
Watershed Community Action

- Clean & Safe Water
- Watershed Knowledge
- Restored Lands
- Stewardship & Sustainability
- Healthy Habitats

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