

MINING

DINERO REMEDY MITIGATION AND MONITORING PROJECT

Conducted by: Colorado Mountain College Natural Resource Management Institute and U.S. Bureau of Land Management

On the Web:

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Project Partners: US Geological Survey, Colorado Department of Reclamation, Mining and Safety, Lake Fork Watershed Working Group (LFWWG) and Trout Unlimited

Contract Period: 2004-2008

NPS Funding: \$15,385

Matching Funds: \$26,608

The goal of the Dinero Remedy Monitoring and Mitigation project on the Lake Fork of the Arkansas River Basin was to remedy the sites where Dinero Mine waste piles were located before being moved to an adjacent repository in 2004. Hydrologic monitoring was conducted in order to determine any reduction in heavy metals loading from the Dinero Tunnel Complex.

The project area is located on BLM and privately owned land in the Sugarloaf Mining District below the Turquoise Reservoir Dam and west of the City of Leadville in Lake County Colorado.

Historic mining activity related to the Dinero Mining Complex resulted in substantial mine waste piles, groundwater discharge from abandoned mine tunnels, and surface water contamination within Sugar Loaf Gulch.

The primary issue of the complex was the presence of two very large waste piles (75,000 cubic yards) located directly in the stream flow path in Sugarloaf Gulch (the primary drainage of the Dinero Complex) and their affect on the water quality of Lake Fork.



Dinero Mine Waste piles above the Sugarloaf wetland prior to their relocation.

The piles were successfully removed in the summer of 2004 to an adjacent repository where they were capped and reclaimed. The overall goal was to reduce the loading of

aluminum, cadmium, manganese, and zinc into the Lake Fork of the Arkansas River originating from Sugarloaf Gulch.

In order to account for the reduction of metals loading, water was sampled and analyzed above, at, and below the confluence of Sugarloaf Gulch and the Lake Fork. These three sites were monitored before, during and after the major reclamation efforts conducted in the Dinero Complex.



below the Dinero Tunnel.

The BMP's implemented in the Dinero Mining Complex included:

- Erosion control measures on exposed slopes and stream channels;
- Amendment of soil in mine waste footprints resulting from mine waste relocation activities;
- Revegetation of the remediated sites; and,
- Post construction monitoring of the Lake Fork

CMC NRM students planting willows along the staging ponds

The project successfully mitigated the Dinero mine waste footprints. However, as of September 2008, the target metals loading reduction goal of 50% for aluminum, cadmium, manganese, and zinc into the Lake Fork has not been achieved. The LFWWG anticipated that a period of 3 to 5 years would be needed before any noticeable reduction in metals loading would occur due to the extensive construction activities that occurred because of the mine waste relocation.

It is also likely that metals retained in the Sugarloaf Wetlands may be a significant source of heavy metals that may have long-term effects on metals loading into the Lake Fork. The Dinero Bulkhead project, scheduled to be completed in fall 2009, will result in complete cessation of flow from the Dinero Tunnel, which will likely have a significant impact on metals loading.



View of mitigated mine waste footprints and retention ponds.