

BEST MANAGEMENT PRACTICES PROJECT (MINING): ST. MARY'S PROJECT

Conducted by: Colorado Division of Minerals and Geology
 On the Web: <http://mining.state.co.us/>
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Top: Tailings-tainted runoff makes its way toward the St. Mary's/Alice subdivision prior to the project. Middle: A crew prepares the French drain. Bottom: Volunteers spread ground limestone on tailings deposits in Little Creek.

In 1883, the Alice Mine was the most extensive placer mine in Clear Creek County. Gold, silver and copper were later mined through a 250 foot long adit (horizontal mine opening) and glory hole. The mine was active until 1938. Drainage from the inactive glory hole and mill tailings polluted nearby creeks with metals.

In 1998, the Colorado Division of Minerals and Geology, under the Inactive Mine Reclamation Program, completed the St. Mary's project northwest of Idaho Springs in the Alice/St. Mary's Glacier housing subdivision. The project, funded in part by an NPS grant, was designed to reduce metals concentration in nearby Little Creek, Silver Creek and Fall River from the Alice Mine.

The project goal was to demonstrate the viability of best management practices (BMPs) that could be deployed and maintained by small mountain communities.

Site research indicated that there was too much wood in the tailings for on-site neutralization. Instead, a French drain system was installed to intercept ground water before it became contaminated by the mill tailings.

Earlier, the glory hole (An open pit from which ore is extracted) was backfilled with approximately 100,000 cubic yards of mill tailings, contaminated sediments and locally available fill to reduce the amount of acid mine drainage. Before backfilling, surface water entered the glory hole, and contaminated water continually flowed from the mine. Sealing the glory hole also reduced acid mine drainage from the mill tailings, and eliminated the safety hazard posed by an open mine.

The second phase of the project addressed ongoing drainage issues. During spring runoff, acid mine drainage occurred at the lower adit of the filled glory hole, although at half of its original volume and for only about 30 days a year.

The lower adit was excavated, and an anoxic limestone drain was constructed. This

treatment method works on highly acidic mine drainage where the water is devoid of oxygen. When the mine drainage passes through the limestone, alkalinity is added but the metals do not precipitate. Once the mine drainage is exposed to the air, the metals precipitate.

A second metals source was a tailings pile which was not moved during the earlier work. Housing development on the site and the presence of underground utilities made moving the material economically unfeasible. This material was located in a sedge wetland, and the mill tailings were continually wet, as acid mine discharge flowed from them perennially.

A system of French drains was used to intercept ground water before it contacted the tailings and re-route the flow to avoid contamination. The drains were constructed of narrow trenches lined with filter fabric and filled with a gravel/limestone mix to a depth of about 10 feet. In the bottom of the trench, a perforated pipe collected and carried the uncontaminated water away from the tailings. Excess excavation material was used as topsoil for the adjacent mill tailings, which were subsequently revegetated.

Eroded mill tailings also had been deposited on the banks of Silver Creek. This material, carried from the tailings area by wind and water, was interspersed along the banks and contributed to metals loading. On four different occasions, volunteers assisted with the revegetation and neutralization of the scattered mill tailings. These efforts included adding ground limestone, reseeding and the addition of willow wattles.

The work done at the Alice Mine has resulted in dramatic improvements in the water quality of Silver Creek and demonstrated effectiveness of the BMPs. Work remains to be done to bring the metals concentration in Silver Creek below the chronic toxicity standards for brook trout.