NONPOINT SOURCE SUCCESS STORY

California

Restoration and Erosion Control Reduce Mercury in Clear Creek

Waterbody Improved

Water quality in Clear Creek and Hernandez Reservoir were identified as impaired due to mercury on the 1998 Clean Water Act (CWA) section 303(d) list. This was a historical area for mercury mining with more than 12 abandoned mines in the nearby vicinity. A mercury total maximum daily load (TMDL) adopted in 2004 identified abandoned mines and off-highway vehicle (OHV) use as the primary sources of mercury contamination. Between 2004 and 2008 the U.S. Bureau of Land Management (BLM) remediated several mines in the area, removed large volumes of contaminated soil, and closed the area to OHV recreation. Following restoration, data showed that Clear Creek no longer exceeded mercury water quality standards. It was removed from California's list of impaired waters in 2016.

Problem

Clear Creek in central California flows into the San Benito River about a mile upstream of the Hernandez Reservoir, and is a source of municipal water for the San Benito Water District (Figure 1). In 1998 monitoring data showed mercury concentrations exceeded the Central Coast Regional Water Quality Control Board's Basin Plan water quality objectives of 0.05 micrograms per liter (µg/L), resulting in the waterbodies being included on the CWA section 303(d) list for impaired waterbodies. To develop the mercury TMDL, staff assessed the full length of Clear Creek (approximately 10 miles long). The beneficial uses affected were Cold Freshwater Habitat (COLD), Warm Freshwater Habitat (WARM), and Municipal and Domestic Supply (MUN). Data indicated that total mercury levels in water in Clear Creek ranged from less than 1.0 µg/L up to 1.5 µg/L, exceeding the water quality objective of 0.05 µg/L (as expressed in the California Toxics Rule). Fish tissue taken from Hernandez Reservoir had fish tissue concentrations averaging about 0.6 milligrams (mg) mercury per kilogram (kg) tissue, which exceeds levels considered safe for fish consumption.

The TMDL for mercury in Clear Creek and Hernandez reservoir, adopted in 2004, established a water column numeric target of 0.05 µg/L for both Clear Creek and Hernandez Reservoir, as well as a target of 0.3 mg/kg methylmercury in tissue of trophic level 4 fish in Hernandez Reservoir. The TMDL concluded the primary source of mercury contamination to Hernandez Reservoir was Clear Creek, and the primary sources of mercury contamination to Clear Creek were

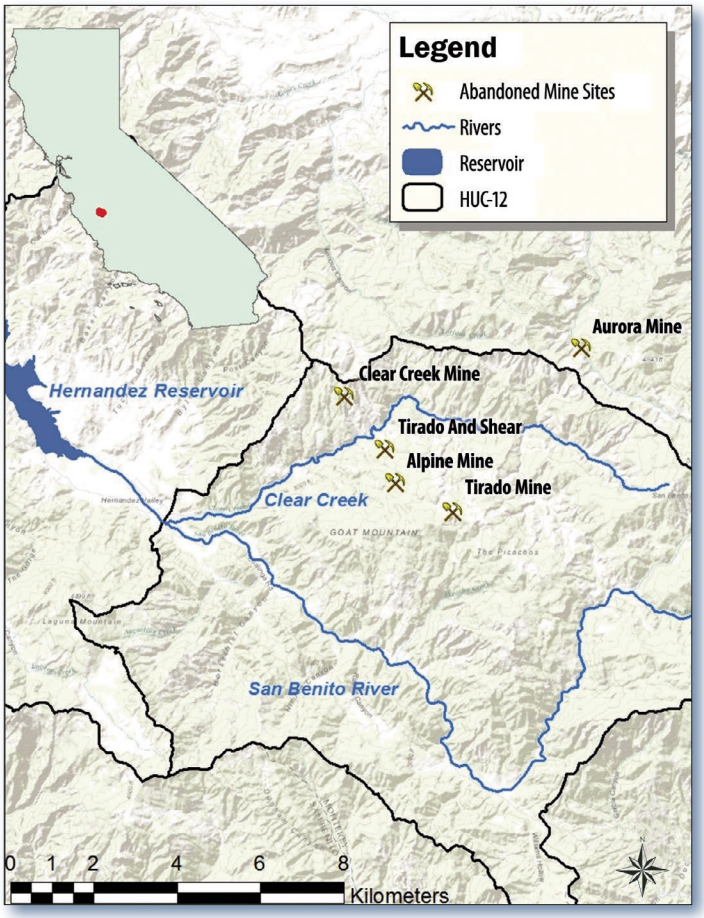

Figure 1. The Clear Creek watershed drains into the San Benito River. Abandoned mines contribute mercury downstream.

historic mining activities in the watershed, and the widespread recreational use of OHV on the many miles of abandoned roads in the watershed, with rain events introducing additional mercury to the waterbodies via sediment loading.

Story Highlights

In 2007 BLM updated the Clear Creek Management Area (CCMA) Resource Management Plan (RMP). The BLM closed roads that were heavily used by OHVs and implemented erosion control measures including, as noted in the RMP, using native soil and vegetation to improve slope stability and mitigate erosion. Fences and barriers were constructed to preclude access to riparian areas and closed areas to prevent OHV disturbance and off-site transport of metals and sediment. Abandoned mines in the area were also identified for remediation (see Figure 1). This included the removal of thousands of cubic yards of mercury waste rock and soils. All unearthed mining debris was removed as well. The removed rock, soils and debris were deposited into a nearby repository.

Results

Since the historic mines remediation and the closure of the area to OHV use, the TMDL numeric target has been met in Clear Creek. Monitoring data collected since 2007 (by both the BLM and the Central Coast Regional Water Quality Control Board) shows that mercury levels are currently meeting water quality targets and that mercury toxicity is no longer a threat for aquatic life or human health. Water quality monitoring data collected between 2007 and 2013 showed no exceedances for mercury (Figure 2). Clear Creek was removed from the impaired waters list in 2016. Hernandez Reservoir remains listed as impaired.

Partners and Funding

The California Central Coast Regional Water Quality Control Board (CCRWQCB) is responsible for developing and enforcing water quality objectives in the central coast of California. The CCRWQCB approved and adopted a mercury TMDL for Clear Creek and Hernandez Reservoir in 2004. The Central Coast Ambient Monitoring Program and Surface Water Ambient Monitoring Program provided funding for the monitoring data they collected.

The BLM manages millions of acres of public land. One of their premier programs maintains an inventory of abandoned mines, many of which have seen remediation efforts and reclamation actions. The Clear Creek watershed has many abandoned mines with naturally occurring mercury and asbestos. The BLM Hollister Field Office conducted remediation projects at many of these mine sites. In 2001 the BLM invested approximately $345,000 to remediate mine sites in the watershed. Entrance fees for recreational areas within the Clear Creek Management Area were also allocated to support the effort.

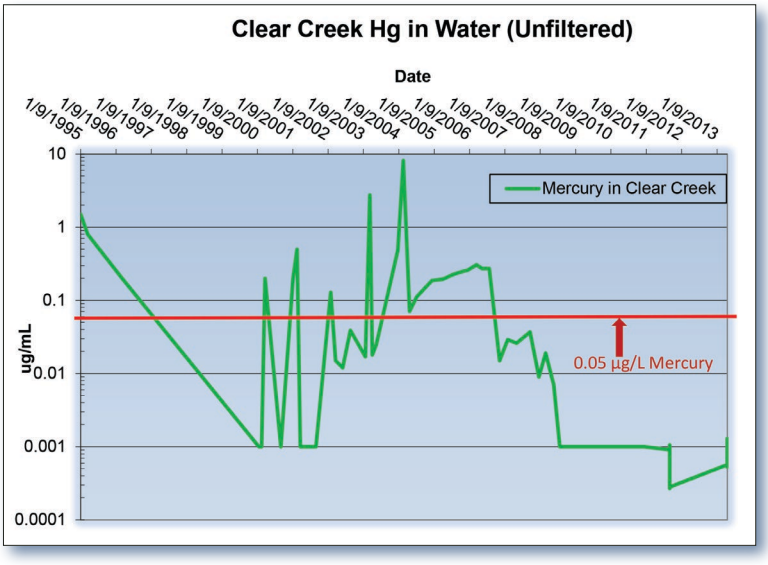

Figure 2. Concentration of mercury in Clear Creek from unfiltered water samples (1995 to 2013).

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