



Surface Water Quality Rationale

Cement Creek and Animas River

Background

The Colorado Department of Public Health and Environment monitored water quality in Cement Creek and the Animas River following the Gold King mine release. Shortly after the mine release, certain water quality parameters dramatically increased. Throughout the month following the release, levels showed a marked decrease when compared to the peak. In Cement Creek, levels are still above the pre-release range, while in the Animas River, levels have returned to pre-release conditions. In general for both the creek and river, some metals exceed standards.

Analysis and Rationale

Following the mine release, Water Quality Control Division and the EPA collected water samples in order to monitor effects on water quality downstream of the release site. Physical and chemical water quality data was collected from Cement Creek, as well as multiple locations downstream along the Animas River. Sample collection began within 48 hours of the release and continued throughout the month of August into early September. Sampling sites were selected to monitor movement of the release downstream and for comparison with historic water quality data. Samples were analyzed by the CDPHE Laboratory Service Division while samples collected by EPA were analyzed by the EPA Region 8 laboratory.

Key sampling locations included Cement Creek above the confluence with the Animas River and the Animas River below Silverton.

Sample data and analysis included:

- Water pH, conductivity, dissolved oxygen and temperature data collected instantaneously upon sample collection.
- Total and dissolved fractions of samples analyzed¹ for some or all of the following metals: arsenic, selenium, cadmium, silver, uranium, calcium, iron, barium, molybdenum, nickel, boron, chromium, silicon, potassium, zinc, manganese, sodium, titanium, cobalt, magnesium, aluminum, and copper. All samples were subject to quality control/quality assurance protocols and all [data is publically available](#).

Colorado state waters are classified according to the uses that they are presently suitable or intended to become suitable; these use classifications may include aquatic life, recreation, water supply, agriculture, and wetland uses². The Water Quality Control Commission designates uses and then adopts standards for various water quality parameters designed to protect those uses on a segment by segment basis. The division compared the post-mine release data to water quality standards in order to determine whether the water body is attaining uses. The designated uses for Cement Creek include recreation and agriculture. Analysis of post-mine release data indicates that the creek is not meeting copper and zinc standards for agriculture use. The Animas River is divided into multiple segments, so the division focused on the stretch of river immediately downstream of Cement Creek and Silverton. The designated uses for this part of the river include aquatic life, recreation and agriculture. Analysis of post-mine release data shows that the river is not meeting standards for aluminum, cadmium, copper, lead, and zinc standards for the aquatic life use but is attaining standards designed to protect its other uses (recreation, agriculture). There is a [Total Maximum Daily Load \(TMDL\) Assessment for the entire Upper Animas River](#) basin which has been approved by EPA. This TMDL addresses loadings of multiple, mine-related metals and further implementation of the TMDL may address non-attainment of standards.

The division also compared post-mine release data to available historic data to determine whether water quality returned to pre-mine spill conditions. The historic data was compiled from a variety of sources, including the division, EPA, USGS and Colorado River Watch. In Cement Creek, the levels of most metals remain elevated as compared to pre-release data, while some metals, such as iron and aluminum, are now within the historic range. In the Animas River, concentrations of metals have returned to pre-mine release levels as shown by a comparison of data collected post-mine release to pre-release data. Continued long-term monitoring of the mine release impacted area by EPA may reveal further recovery of water quality in the Upper Animas River Basin.

¹ EPA methods 200.7 and 200.8

² Water quality Control Commission Regulation 31.13(1)