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After the Gold King mine spill: hydrologic investigations to support acid mine drainage remediation near Silverton, Colorado, USA

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The Bonita Peak Mining District Superfund site consists of 48 abandoned hard rock mines across three headwater drainages in the volcanically derived San Juan Mountains near Silverton, Colorado, USA. Several of the mine sites produce acid mine drainage (AMD), impairing downstream surface waters. This research examines the physical and chemical properties of precipitation, streamflow, seeps and springs, and draining mines to better understand the surface water and groundwater interactions leading to the generation of AMD. Specifically, the spatial and temporal variability of water chemistry (metals, ions, alkalinity, stable water isotopes, and rare earth elements) and water quantity (precipitation and streamflow) are analyzed to better understand how the draining mines interact with the catchment hydrology. Innovative techniques for operating instrumentation in low pH waters located in remote snow dominated mountain terrain will also be highlighted. Results help identify both natural and anthropogenic sources and pathways of metals contamination to surface waters and support a remedial investigation by the United States Environmental Protection Agency's Superfund program to protect human health and the environment from legacy mining impacts.