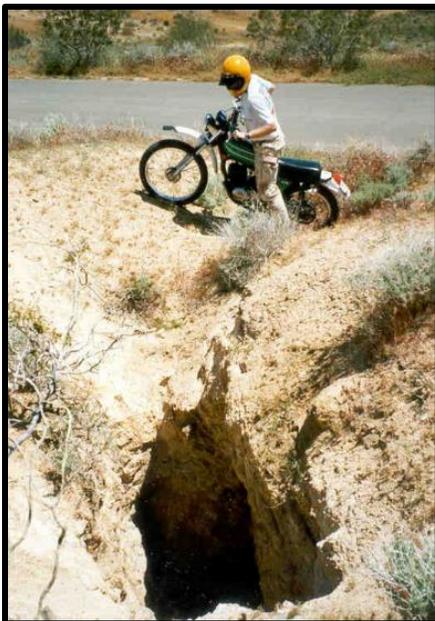


### **Hazard Management: Remediating Physical Hazards at Abandoned Mine Sites**

The California Department of Conservation (DOC) Abandoned Mine Lands Unit (AMLU), in the Division of Mine Reclamation, partners with public landowning agencies, as well as land trusts that conserve land for public uses, to manage hazards associated with California's mining history and protect onsite wildlife and cultural resources. The AMLU estimates that California has tens of thousands of abandoned mines, many dating from the late 19th and early 20th centuries, and hundreds of thousands of abandoned mine features—such as shafts and adits (vertical and horizontal openings), wastes, and equipment and buildings left in a state of disuse and disrepair. These legacy mines are found in all 58 counties on public lands – about 64% on federal lands and about 4% on lands owned or managed by state and local governments – and privately owned lands (about 32%). More than 50% are in Kern, Inyo, and San Bernardino Counties, and a large concentration are in the “Mother Lode” counties of Sierra, Nevada, Placer, El Dorado, Amador, Calaveras, Tuolumne, Mariposa, Plumas, and Madera.

The AMLU provides funding and expertise to remediate legacy abandoned mines that contain features that are physical dangers and that potentially pose a threat to human life by causing injury or death (see AMLU's [Safety Fact Sheet](#)). Public exposure to these hazards is increasing due to population growth and greater recreational use of public lands. Remediation projects target priority sites identified during staff assessments of legacy mined lands (typically high hazard, high public visitation areas near residences, roads, trails, campgrounds, and off-highway vehicle recreation areas).

Since 2006, the AMLU's primary funding to remediate safety hazards at legacy abandoned mines comes from a fee collected on gold and silver production in California (\$5 per ounce for gold and 10¢ per ounce for silver; Chapter 794, Statutes 2003; Public Resources Code section 2207(d)(4)(B)) and from federal reimbursements and awards. As of December 2020, the AMLU and its partners have jointly remediated more than 1,500 high-risk physical safety hazards on public abandoned mine lands.



A dirt bike rider peers into an abandoned mine shaft near a road. Photo: DOC Archives

### **AMLU Physical Hazard Remediation Projects**

AMLU physical hazard remediation projects are typically performed by small businesses under contract to the DOC or by agency staffs. AMLU staff coordinates closely with the public landowning agency, which approves the project, and all projects are conducted in accordance with the California Environmental Quality Act and/or National Environmental Policy Act. Types of projects include: wire fencing; backfills; polyurethane foam (PUF) closures; fitting with concrete plugs, steel caps, or high-tensile steel wire mesh; bat-compatible gates, culvert gates, and cupolas; demolition of unstable structures; and trash removal. Remediation costs include construction labor and materials, biological and cultural surveys, and environmental documentation. Costs vary depending on the number, size, type, and location of mine features and biological and cultural resources present at a mine site.

The photographs below show examples of several AMLU-funded projects.



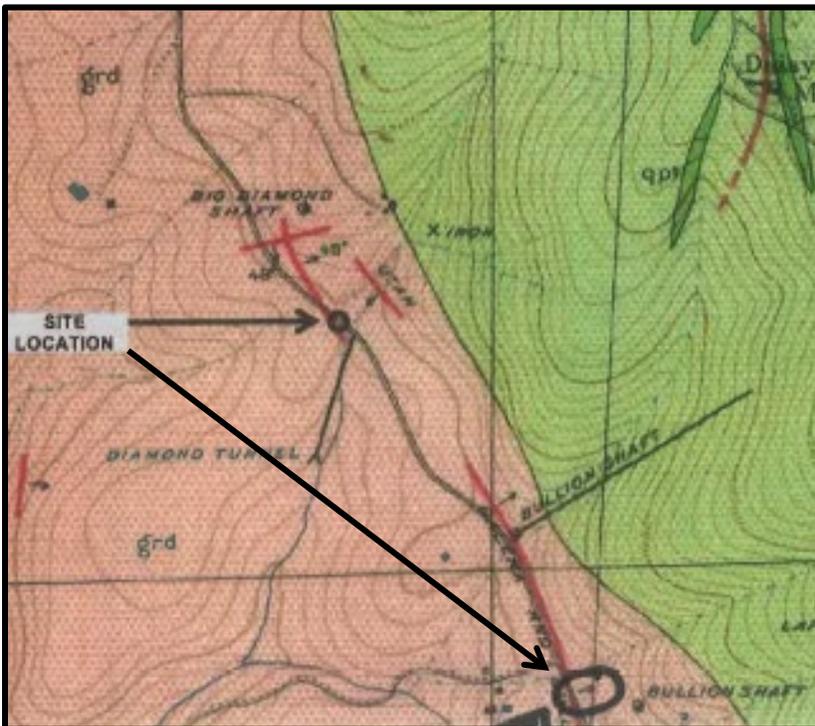
Fencing installed around hazardous mine shafts on State land in San Bernardino County. Photo: DOC (2015)



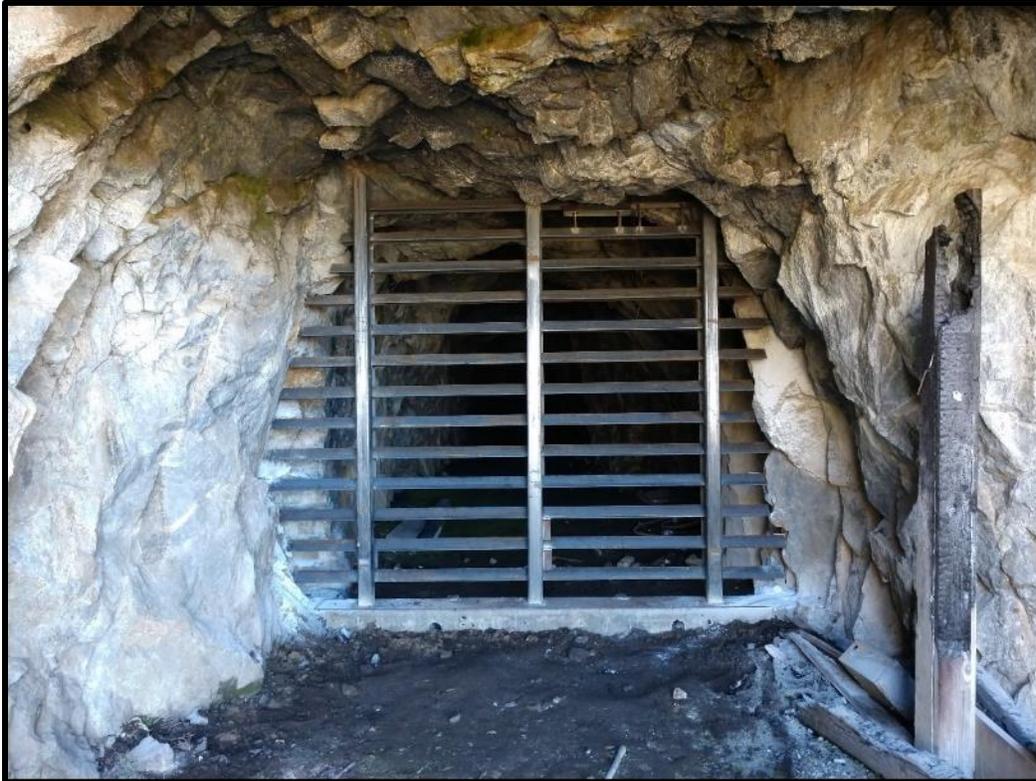
Fencing installed around a hazardous mine shaft adjacent to a dirt road on State land in San Bernardino County. An AMLU contractor later permanently backfilled the opening, which was increasing in size, with a backhoe using onsite material. Photos, DOC (2002-2007)



An AMLU contractor (bottom center of photograph above) examines a hazardous shaft on U.S. Bureau of Land Management (BLM) land in Kern County that was discovered near multiple residences by a homeowner's young son. The mine shaft was subsequently sealed with expanding polyurethane foam (PUF) (left). The PUF plugs were then covered with soil, leaving no sign of the shaft. Photos: DOC (2018)



When two abandoned mine shafts opened on the shoulder of a public road, the AMLU provided funding to the Nevada County Department of Public Works to help close the mine openings. An engineering firm hired by the County cut away asphalt around the openings, excavated loose material to define the size and shape of each subsidence, and cast in place tapered concrete plugs from high-strength, quick-curing concrete. Photos and map: DOC (2019)



Bat gate installed on adit in the U.S. Forest Service (USFS) Sequoia National Forest in Kern County. The gate allows access for bats and other wildlife that use abandoned mines for habitat or shelter while keeping humans safely out. Photos, DOC (2019)



One of many cupolas installed on shafts on federal abandoned mine lands in Inyo County. Like bat gates, cupolas allow access for bats and other wildlife that use abandoned mines for habitat or shelter while keeping humans safely out. For this project, the AMLU tasked its primary contractor to also train other small businesses to build abandoned mine safety structures. Photos, DOC (2006)



Clockwise from top left corner: (1) Staff inspecting a cupola on National Park Service land in the Mojave National Preserve, San Bernardino County; (2-3) Contractor building a bat gate on State Parks land in the Providence Mountains State Recreation Area, San Bernardino County; (4) Geo-mesh cable net installed over a feeder shaft on BLM land, Nevada County; (5) Contractors building a culvert gate below a public school, El Dorado County. Photos, DOC (2020, 2021, 2007, 2006)