

Frequently Asked Questions (FAQs)

The following are responses to questions received by staff of the Division of Mine Reclamation (DMR) Abandoned Mine Lands Unit (AMLU).

Reporting Abandoned Mines and Emergencies

1. What should I do in an emergency involving an abandoned mine?

Call 911 or contact your local sheriff's office. If someone falls into or is trapped in an abandoned mine, do not try to rescue the victim yourself. Rescue attempts should only be made by professionals with proper training and equipment.

To report an abandoned mine, email us at DMR@conservation.ca.gov or call the DMR toll-free hotline at **877-OLD-MINE (877-653-6463)**. Please provide the mine location (e.g., global positioning system point [latitude-longitude], name of nearest road, Assessor's Parcel Number) and a description of the mine. And remember to "**Stay Out! Stay Alive!**"¹

General Information

2. What is an abandoned mine and how many are there in California?

An abandoned (aka old or legacy) mine is one that ceased operation before laws were passed requiring reclamation of mined lands. These mines remain on the landscape with their potential safety and contamination hazards, which include shafts and adits (vertical and horizontal openings), wastes, and equipment and buildings left in a state of disuse and disrepair. The AMLU estimates that California has hundreds of thousands of mine features on tens of thousands of abandoned mine sites statewide.

3. Where are California's abandoned mines located?

Legacy mines were abandoned in all 58 counties on public land (about 64% on federal lands and about 4% on lands owned 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 is in the "Mother Lode" counties of Sierra, Nevada, Placer, El Dorado, Amador, Calaveras, Tuolumne, Mariposa, Plumas, and Madera.

4. Are abandoned mines dangerous?

Yes! Every year, people are injured or killed in accidents on abandoned mine lands (AML) in California. Many mines in California that are now abandoned date back to the Gold Rush and can be an irresistible, and deadly, draw for children and adults. For the explorer, hiker, or off-roader, abandoned mine hazards are not always apparent.

- Mines from the Gold Rush era were temporary by their nature. Miners added support inside mines as needed to compensate for the loss of structural integrity caused by removing rock, but rotting timbers and unstable rock formations make cave-ins a real danger even where abandoned mine openings look sturdy.

¹ **Stay Out - Stay Alive!** is part of the U.S. Mine Safety and Health Administration's (MSHA) national campaign to warn the public about dangers associated with old mines (see www.msha.gov).

- Vertical shafts can be hundreds of feet deep. At the surface, they may be unprotected, hidden by vegetation, or covered by rotting boards.
- Other hazards at abandoned mine sites include the following.
 - Darkness and debris can disorient visitors, leaving them lost underground.
 - Internal workings such as winzes, drifts, and stopes present falling hazards.
 - Unstable dynamite or blasting caps can detonate at any time.
 - Rattlesnakes, mountain lions, bears, and other wildlife may use abandoned mines for shelter or habitat.
 - Pockets of oxygen-depleted air or lethal gas (such as carbon monoxide) can cause asphyxiation.
 - Dust particles at mine sites may cause diseases such as hantavirus or valley fever or other health problems due to naturally-occurring elements such as asbestos, arsenic, or chromium.
- Debris control dams, such as those built in the Sierra Nevada to hold back hydraulic mine debris, are potential hazards due to their unknown structural stability and potential to store mercury-contaminated sediment.
- Mining-related environmental hazards can also affect watersheds. For example, a site may contain toxic waste generated during historic ore processing that can be washed downstream or become windborne. Water in a mine can react with sulfide-bearing rock to produce acid-generating conditions and leach heavy metals from rock. Bacteria can transform mercury into methylmercury (MeHg), which bioaccumulates in the aquatic food chain; fish and seafood consumption is a major pathway by which humans are exposed to MeHg.

5. How are hazardous abandoned mine sites and features identified and managed?

The first step in managing safety and environmental hazards associated with abandoned mines is to document the types of hazards present. The AMLU works with state, federal, and local agencies and non-governmental organizations to compile and consolidate knowledge about abandoned mine sites and prioritize inventory and remediation activities based on areas having high potential threat to public health and safety and the environment. The AMLU uses multiple survey techniques, including geographical information systems [GIS], literature research, and field work.

An inventory of hazards at an abandoned mine site begins with a visit based on its mapped location, information from the landowning agency, or notification from a member of the public. The type, number, and size of mine features, such as open shafts and adits, are then documented and mapped. Factors used to prioritize relative physical hazard risks include public accessibility, proximity to population centers and recreation areas, and current land uses. Typical remedies to mitigate physical hazards include removal of hazardous structures and debris, installation of gates and cupolas on adits and shafts (designed to keep people safely out, but allow use by bats and other wildlife), fencing, backfilling, and filling using polyurethane foam (PUF).

Prioritizing relative environmental hazards includes evaluating accessibility, identifying potential receptors, proximity to population centers, land and water use, habitat values, and other factors. These processes begin by evaluating the site for the presence of harmful contaminants in sediment, soil, or water (for example ARD, arsenic, copper, mercury, or lead) and then determining through additional sampling whether the contaminants are present at dangerous levels exceeding human and ecological exposure standards. These sites are typically treated according to federal and state hazardous waste and environmental clean-up laws and processes. Typical remedies to mitigate environmental hazards can include source removal, encapsulation, and active or passive treatment. Some remedies, such as those involving water treatment or encapsulation, require long-term operation and maintenance.

6. How can I find historical information on a named abandoned mine or mining claim or learn what was mined on a site?

Information on abandoned mines or mining claims may be available at several sources.

- The California Geological Survey (CGS; formerly California Division of Mines and Geology [CDMG]) library in Sacramento is a good resource (see their website at <https://www.conservation.ca.gov/cgs/library>). If you are interested in the history, production, or other specifics of a named mine or data on a specific commodity, look for the yearly Reports of the State Mineralogist (published from the 1880s to 1950s), CDMG County Reports, and CDMG Mineral Bulletins.
- Geospatial data and an interactive map are currently located and maintained on the U.S. Geological Survey (USGS) Prospect and Mine Related Features dataset at <https://mrdata.usgs.gov/usmin/map-us.html>. The Mineral Resources Data System (MRDS), formally called Mas/Mils and maintained by the USGS at <https://mrdata.usgs.gov/mrds/>, displays locations of mines and mineral deposits, along with some details about the mining operation. MRDS was recently updated to include new information on deposit type, which is useful to prioritizing abandoned mine sites for assessment.²
- Topozone, at <https://www.topozone.com/>, displays USGS topographic maps with mine symbols (mine symbols are explained on the bottom of Page 3 here: <http://pubs.usgs.gov/gip/TopographicMapSymbols/topomapsymbols.pdf>).
- Public land information can be found at the Bureau of Land Management Locatable Minerals website (<https://www.blm.gov/programs/energy-and-minerals/mining-and-minerals/locatable-minerals>) and Navigator website (<https://navigator.blm.gov/home>).
- Queries of known mine names at <https://www.mindat.org/> (using the “Locality Search” on the far-right side of the page can return a list of publications that mention the mine) or through general web searches.

² Long, K.R., Alpers, C.N., Orlando, J., and Orris, G.J., 2021, Update of the Mineral Resources Data System for California including Mineral Deposit Types. See: <https://doi.org/10.5066/P9HTERGK> or <https://www.sciencebase.gov/catalog/item/5e47462de4b0ff554f6837d1> (if the doi.org link is not active, use the ScienceBase link in the interim).

- You may be able to find if a claim was recorded or if bound volumes of mine patents, claims, or other records exist by visiting local historical societies or a county recorder's or assessor's offices.

Real Estate-Related Questions from Current or Prospective Property Owners

7. What State laws apply to owners of property that contains an abandoned mine?

The following laws that address abandoned excavations may be applicable.³

Government Code

- **Section 50230(d).** As used in this article: ... (d) "Abandoned excavation" means any abandoned mining shaft, pit, well, septic tank, cesspool, or other abandoned excavation dangerous to persons legally on the premises where the abandoned excavation is located or to minors under the age of 12 years; and any facilities or equipment used in connection with drilling oil, mining or exploring for minerals or diatomaceous soil which have been abandoned and which constitute a hazard endangering the safety and welfare of the people.
- **Section 50231.** The legislative body may declare by resolution as public nuisances and abate all abandoned excavations located upon private property within the local agency. The resolution shall contain a statement of the facts which constitute the nuisance

Health and Safety Code (H&SC)⁴

- **Section 115700(a).** Every person owning land in fee simple or in possession thereof under lease or contract of sale who knowingly permits the existence on the premises of any abandoned mining shaft, pit, well, septic tank, cesspool, or other abandoned excavation dangerous to persons legally on the premises, or to minors under the age of 12 years, who fails to cover, fill, or fence securely that dangerous abandoned excavation and keep it so protected, is guilty of a misdemeanor.
- **Section 115705.** The board of supervisors may order securely covered, filled, or fenced abandoned mining excavations on unoccupied public lands in the county.
- **Section 115710.** The board of supervisors shall order securely fenced, filled, or covered any abandoned mining shaft, pit, or other excavation on unoccupied land in the county whenever it appears to them, by proof submitted, that the excavation is dangerous or unsafe to man or beast. The cost of covering, filling, or fencing is a county charge.
- **Section 115715.** Every person who maliciously removes or destroys any covering or fencing placed around, or removes any fill placed in, any shaft, pit, or other excavation, as provided in this part, is guilty of a misdemeanor.

³ Laws and regulations can change at any time, so we recommend you check with an expert.

⁴ The sections below are "not applicable to any abandoned mining shaft, pit, well, septic tank, cesspool, or other abandoned excavation that contains a surface area of more than one-half acre." (H&SC section 115720.)

8. Must a property owner inform a potential buyer about the presence of an old, or legacy abandoned mine on or adjacent to the property?

Generally speaking, California law requires sellers of real property to disclose important or “material” facts that may affect the property’s value or desirability. This includes the disclosure of certain “natural” environmental hazards related to flood zones, seismic and earthquake hazard zones, etc. Buyers or sellers of real property should discuss their rights and responsibilities with their real estate agent and may want to contact a real estate law attorney to determine if the presence of an abandoned mine on or adjacent to the property must be disclosed. You may also be able to obtain general information related to certain environmental hazards from your realtor, local planning department, or other sources. For example, the informational booklet entitled “Residential Environmental Hazards: A Guide for Homeowners, Buyers, Landlords, and Tenants” (California Environmental Protection Agency 2011; see <https://www.cdph.ca.gov/Programs/CCDCPHP/DEODC/CLPPB/CDPH%20Document%20Library/ResEnviroHaz2011.pdf>) provides general guidance on environmental hazards related to many substances, including naturally-occurring minerals such as asbestos that have been mined for various purposes, as well as a list of agencies to contact.

9. I have seen Disclosure Statements state that a property is located within 1 mile of an abandoned mining operation or that the property is designated as a hazardous waste property or a border zone property. What do these statements mean?

If you are considering purchasing real property, you should review any information you receive from the seller or the seller’s agents with your real estate agent as to what effect this information may have on the value or desirability of the property. You should also consider speaking to a qualified real estate attorney where appropriate. The accuracy of the seller’s information depends greatly on its source and its interpretation, so you should ask the seller where they obtained the information, how was it interpreted, and what was the source of any database used to generate such a determination. Many legacy abandoned mines are not recorded in electronic databases, and when they are, the information may not be detailed enough to accurately define, differentiate or locate the mine feature, such as a potentially hazardous vertical shaft or horizontal adit or mine waste.

If the property is designated as a hazardous waste or border zone property, contact your local planning or environmental health department or the Department of Toxic Substances Control (DTSC). According to the DTSC, the intent of California’s Hazardous Waste and Border Zone statutes is:

- Hazardous Waste Property: to prevent exposure to substances that could create a significant health hazard by requiring DTSC approval for changes in land use on sites contaminated with hazardous waste
- Border Zone Property: to prevent new incompatible land uses proximate to a site contaminated with hazardous waste where there is a potential for exposure to hazardous substances that could create a significant health hazard

10. How do I investigate if a legacy abandoned mine is on my property?

When legacy abandoned mine features are not obvious, a thorough inspection of a property site by a qualified person is the only way to assess if such a mine is present. Many mine sites were undocumented and unmapped, leaving open the possibility that an unrecorded mine may be located on a property. If you are concerned that hidden surface or underground workings might be present on your property, you may need to consult with a geologist, geophysicist, or geotechnical engineer about detection methods (e.g., drilling, or remote sensing/geophysical methods such as ground-penetrating radar, electrical imaging, and microgravity surveys).⁵

The DTSC publication "Abandoned Mine Lands Preliminary Assessment Handbook" provides basic information for conducting an initial investigation of AML sites and aids in the identification of mining features, constituents of concern and potential health risks. According to the DTSC, the purpose of this guidance document is to provide: (1) non-technical information explaining the concerns associated with AML sites to AML property owners, developers whose projects may be on or adjacent to AML sites, and local planners who make land use decisions; and (2) technical information for environmental consultants, local environmental health officials, and other state and federal agencies who must evaluate California AML sites.

⁵ According to geology professor Don Steeples "Locating underground mine workings in the absence of mine maps is not impossible, but it can be expensive and time consuming.... Because of the time and expense associated with extensive drilling, remote sensing and geophysical methods have been employed to search for [abandoned mines.... While these methods have proved successful in some cases, drilling is still necessary to confirm interpretations of geophysical and remote sensing data. In addition, the absence of evidence of a mine is not evidence of absence of a mine, and there are many opportunities for error in the modeling and geophysical surveys needed to detect voids." (National Academy of Sciences, 2002.)

Table 1. List of Terms

Term	Description
Acid mine drainage (AMD)	Water from a mine or mine waste pile that contains sulfuric acid, mainly due to oxidation of pyrite or other ferrous minerals.
Acid rock drainage (ARD)	A more general term for acid mine drainage that includes naturally-occurring acidic waters.
Adit	A horizontal passage or opening driven from the surface, generally to explore or open a mineral deposit. An adit is open to the surface at one end; a tunnel is open at both ends.
AMLU Hotline	A toll-free telephone number, 877-OLD-MINE (877-653-6463) , to report legacy abandoned mines in California.
Arrastra or Arrastre	A circular rock-lined basin used in the west and southwest U.S. in the 18th and 19th centuries in which broken ore is pulverized by stones attached to a pillar and dragged around the basin.
Backfill	Soil, overburden, mine waste, or imported material used to replace material removed during mining. Also refers to the technique used to close a mine opening by filling with such material.
Border Zone Property	A property, defined by California Health and Safety Code (H&SC) Section 25117.4, as: "Any property designated as border zone property pursuant to [H&SC] Section 25229 which is within 2,000 feet of a significant disposal of hazardous waste, and the wastes so located are a significant existing or potential hazard to present or future public health or safety on the land in question."
California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Sections 21000 et seq.).	The CEQA and its implementing guidelines (California Code of Regulations Sections 15000 et seq.) address the process of disclosure and review of environmental impacts. The lead state, local, or federal agency must complete its environmental review of a project pursuant to the CEQA or National Environmental Policy Act (NEPA) before the AMLU can remediate, or provide remediation funds to remediate, hazardous mine openings.
Collar	The surface opening to a shaft. Also refers to the timbering or concrete around the surface opening of a shaft.
Cribbing	Planks or small timbers placed along the sides of a shaft, winze, or raise to stabilize the interior walls and prevent rocks from falling.
Crosscut	A horizontal passage driven to intersect an ore deposit, or in general across the strike of the rock formation; a connection from a shaft to an ore deposit.
Crusher	A machine for crushing rock or other materials. See also stamp mill.
Cyanide	A salt or ester of hydrocyanic acid. In solution, cyanide is used to dissolve gold and silver from unwanted material for later recovery.
Decline	A downwardly-sloping passage. See also incline.
Drift	A horizontal passage underground that runs the length (parallel) of a vein or rock formation as opposed to a crosscut, which crosses perpendicular to the rock formation.
Dump	A pile or heap of extracted rock on the surface.

Term	Description
Feature	A single human-made object or disturbance associated with mining, such as a shaft or adit, tailings, machinery and facilities, etc. A mine site can be comprised of one or more features.
Gangue	The commercially worthless mineral material associated with economically valuable metallic minerals in an ore deposit.
Glory hole	A steep-sided, funnel-shaped surface excavation connected to underground workings. In glory-hole mining, rocks blasted off the sides of the excavation fall into the underground workings, from which they are then removed. Also referred to as a large open hole typically associated with a mined-out or widened shaft.
Hard-rock mining	A technique of mining used when mineralized rock occurs deep beneath the surface. To reach the ore body, remove ore and waste, and provide ventilation, miners excavated a shaft or adit. Within the ore deposit, horizontal passages called drifts (parallel to the vein or ore body) and crosscuts were developed on several levels to access stopes.
Hazardous Waste Property	A property, defined by California H&SC Section 25117.3(a), as "Land which is either of the following: (1) Any hazardous waste facility or portion thereof, required to be permitted pursuant to this chapter, which has a permit for disposal from the department or has submitted an application for such a permit. (2) A portion of any land designated as a hazardous waste property pursuant to [H&SC] Section 25229 where a significant disposal of hazardous waste has occurred on, under, or into the land resulting in a significant existing or potential hazard to present or future public health or safety."
Headframe	The vertical steel or timber frame at the top of a shaft that supports the hoist system used to raise and lower workers and equipment and to remove ore from the shaft.
Heavy metal	Principally the metals zinc, copper, cobalt, and lead. May also include one or more of the following metals: bismuth, cadmium, chromium, gold, indium, iron, manganese, mercury, molybdenum, nickel, palladium, platinum, silver, thallium, tin, and vanadium.
Hoist	A drum on which wire cable is wound in the engine house, as the cage or skip is raised in the hoisting shaft. Also refers to the engine with a drum used for winding up a load from a shaft.
Hydraulic mining	A form of mining that used high-pressure jets of water to dislodge rock material or move sediment.
Incline	An upwardly-sloping passage. See also Decline.
Lagging	Planks or small timbers placed along the roof of a horizontal passage to prevent rocks from falling, rather than to support the main weight of the overlying rocks.

Term	Description
Leaching	The removal in solution of the more soluble minerals by percolating waters. Also refers to the process of extracting a soluble metallic compound from an ore by selectively dissolving it using a suitable solution (termed a "lixiviant"), such as water, sulfuric acid, hydrochloric acid, cyanide, etc.
Levels	Drifts at different elevations of a mine.
Mill	A mineral treatment plant in which crushing, grinding, and further processing of ore is conducted to produce a product.
Mine	All mineral-bearing properties of whatever kind or character, whether underground, or in a quarry or pit, or any other source from which any mineral substance is or may be obtained (PRC Section 2200). These resources include precious metals, precious stones, building stones, aggregate, and solid fuels. Also refers to the location where solid mineral resources are extracted from the earth.
Mine waste	Solid waste from mining operations, including waste rock, tailings, and slag. "Mining waste" includes the residual of soil, rock, mineral, liquid, vegetation, equipment, machines, tools, or other materials or property directly resulting from, or displaced by, surface mining operations (PRC Section 2730).
Mining district	An area containing multiple mines for a particular mineral commodity or commodities.
National Environmental Policy Act (NEPA) (42 U.S.C. 4371 et seq.)	Addresses the process of disclosure and review of environmental impacts. The lead federal agency must complete the required environmental review pursuant to the NEPA before the AMLU can remediate, or provide remediation funds to remediate, hazardous mine openings on federal lands.
National Historic Preservation Act (16 U.S.C. 470 et seq.)	Provides a process for registration of properties significant in national, state, and local history on the National Register of Historic Places. Ensures planning considerations and recognizes state historic preservation initiatives and laws.
Open-pit or open-cut mining	A surface mining technique where barren rock material over an ore body requires drilling and blasting to break it up for removal. A typical mining cycle consists of drilling holes into the rock in a pattern, loading the holes with explosives or other blasting agents, and blasting the rock to break it into a size suitable for loading and hauling to the mill, concentrator, or treatment plant for processing.
Ore	A mineral deposit containing a metal or other valuable resource in economically viable concentrations.
Pit	A surface excavation of relatively large dimensions from which ore and waste have been extracted.
Placer	A surficial mineral deposit formed by mechanical concentration of mineral particles from weathered debris. This process usually involves water.
Placer mining	A mining technique where gravel, sand, or talus (rock debris) is removed from deposits by hand, hydraulic nozzles, or dredging.

Term	Description
Portal	The surface entrance to an adit or tunnel.
Raise	A vertical or inclined passage driven upward from a level (drift or crosscut) to connect with a level above, or to explore surrounding rock for a limited distance. A raise does not daylight at the surface.
Shaft	A vertical or declined opening driven from the surface to open and service a mine. It is usually equipped with a hoist at the top, which lowers and raises a conveyance for handling miners and material.
Slag	Solid waste material from smelting activity, consisting mostly of silicate minerals and glass; may contain elevated concentrations of heavy metals and metalloids in forms that are leachable.
Sluice box	A long, inclined trough for washing or separating ores.
Stamp mill	A historical apparatus powered by steam or water that used heavy iron pestles (stamps), generally grouped in units (batteries), which rose and fell like pile drivers to pound rocks to a fine powder. Stamp milling and amalgamation (collection with mercury) were often combined to recover gold and silver from the crushed rock.
Stockpile	Broken ore accumulated in a pile on the surface before processing or shipment.
Stope	An excavation in a mine from which ore is extracted.
Sump	An excavation underground for the purpose of catching or storing water. The bottom of a shaft is commonly used for this purpose.
Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Sections 2710 et seq.)	Requires new and existing mines to have an approved reclamation plan and financial assurances sufficient to cover the estimated cost of reclamation. Intended by the Legislature to create and maintain an effective and comprehensive surface mining and reclamation policy with regulation of surface mining operations so as to assure that: (a) adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses; (b) the production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment; and (c) residual hazards to the public health and safety are eliminated.
Tailings or Tailing pile	Processed material rejected from a mill after the desired minerals have been extracted.
Tailings pond	A pond with a constraining wall or dam into which mill effluents are run.
Tunnel	A horizontal underground passage open at both ends. This term is often incorrectly applied to an adit (which is open at only one end).
Vein	A definable linear zone of mineralized rock.
Waste rock	The barren rock from a mine or the part of the ore deposit that is too low in grade to be of economic value at the time of mining.
Winze	A vertical or declined passage driven downward from a level (drift or crosscut) to connect with a level below or to explore surrounding rock for a limited distance. A winze does not daylight at the surface.