

The Sierra Fund's Gold Country Recreational Trails and Abandoned Mines Assessment

Executive Summary

One hundred fifty years of mining in the Sierra Nevada left their mark on the mountain range. Today, the region is riddled with abandoned mine shafts and tunnels—and other dangers may not be apparent at first glance.

Abandoned mines pose more than just physical hazards. Arsenic, lead and asbestos may also be present in the area.



The Sierra Nevada is rich with gold, and other heavy metals and minerals—some of which are toxic. Of particular concern in the region are naturally occurring **arsenic, lead, chromium and asbestos**, which people may be exposed to by breathing dust. Historic mining activities made these toxins much more available for human exposure by crushing the rocks, and distributing them over the surface. In addition, roads were constructed to access the mine sites, and many are still used for travel and recreation today. The main exposure route is through breathing dust.

In 2009, The Sierra Fund initiated a study to learn whether recreational hikers, mountain bikers, horseback riders, and off-highway vehicle (OHV) riders may be exposed to toxins at abandoned mine sites. To learn this:

1. Popular trails in the Downieville, Nevada City, and Foresthill areas were mapped with GIS.
2. Known abandoned mine sites were mapped over the trails, and sites of concern were identified where an abandoned mine was within 30 feet of the popular trail.
3. Scientists took soil samples from the surface of the trail or next to the trail at sites of concern, and sent the samples to labs for analysis.



Scientists took soil samples from trails adjacent to abandoned mines.

FINDINGS

The Recreational Trails Assessment reveals an urgent need for further testing in certain areas to quantify and address likely risks to human health. The most serious problem was found at the Foresthill OHV Area. In this designated recreation area on Forest Service land, families were riding OHVs on soil containing up to 40% asbestos fibers, as well as off-the-charts levels of lead. Other areas of concern were identified with high levels of arsenic, lead and asbestos.

See table on the reverse for a detailed summary of results.



The Marall Chrome Mine pit, in the popular Foresthill OHV area, where samples showed extremely high levels of asbestos and lead.

Levels of concern were based on state and federal standards for exposure. For the purposes of this study, lead over 270 mg/kg, arsenic over 1,000 mg/kg, and any amount of asbestos, were considered of concern. More testing is needed to learn about the risk to human health in areas where high levels of toxic materials were found.

FORESTHILL AREA:

FINDINGS OF CONCERN:

Foresthill OHV Area (Marall Chrome Mine, Loop Trails and Staging Areas)	Lead (max. 4,790 mg/kg) at Marall Chrome Mine pit, Chrysotile asbestos (max. 40%) at Marall Chrome Mine pit and Loop 4 Trail
Michigan Bluff/Western States Trail	None

DOWNIEVILLE AREA:

Eureka Diggings	None
Saddleback Road	Lead (max. 1,570 mg/kg) at Monte Christo Mine, Chrysotile asbestos (max. 14%) along Saddleback Rd.
Downieville East (Downieville Mtn Bike and Big Boulder Trails)	None
Columbo Mine	Arsenic (max. 442 mg/kg) near Columbo Mine
Downieville First Divide	None
Downieville West (North Yuba Trail Extension)	Arsenic (max. 439 mg/kg) in Slug Canyon on the North Yuba Trail Extension
Goodyears Bar	Chrysotile asbestos (max. 15%) on the North Yuba Trail

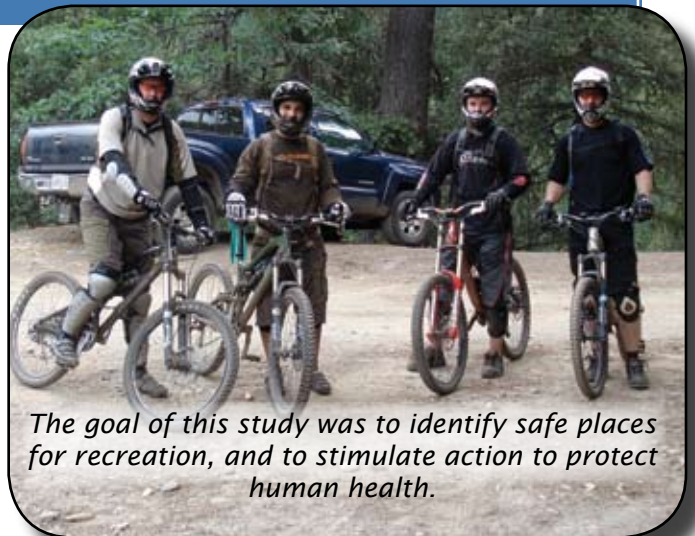
NEVADA CITY AREA:

Nevada City West (Tribute, Newtown Ditch, Manzanita Diggings and Round Mountain Trails)	Tremolite asbestos (max. 15%) along the Newtown Ditch Trail
Nevada City East (Gracie Mine, Cascade Ditch and Banner Mountain Trails)	Arsenic (max. 4,050 mg/kg) on Banner Mountain Trail and above Little Deer Creek

RECOMMENDATIONS

This study was designed to help identify areas that require further evaluation. Key recommendations:

1. Clear, visible advisories in areas that are known to be contaminated by substances that are dangerous to human health
2. Additional sampling of contaminated areas
3. A dust exposure study that looks at exposure scenarios of different recreational activities
4. A survey of people recreating in these areas to learn more about their exposure, and effective outreach and education methods



A full copy of the *Recreational Trails and Abandoned Mines Assessment* may be downloaded at:
www.SierraFund.org/campaigns/mining



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