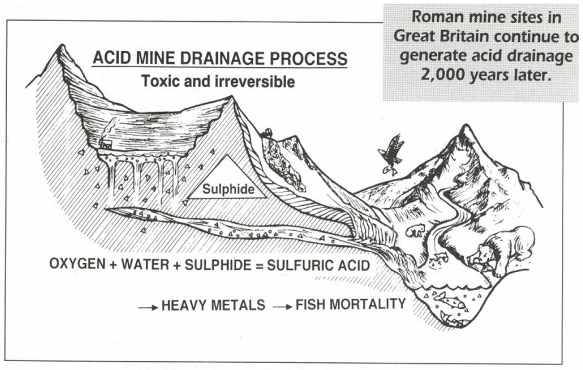
# HARDROCK MINING: ACID MINE DRAINAGE

Acid mine drainage is considered one of mining's most serious threats to water resources.[1] A mine with acid mine drainage has the potential for long-term devastating impacts on rivers, streams and aquatic life.




## HOW DOES IT FORM?

Acid mine drainage is a concern at many metal mines, because metals such as gold, copper, silver and molybdenum, are often found in rock with sulfide minerals. When the sulfides in the rock are excavated and exposed to water and air during mining, they form sulfuric acid. This acidic water can dissolve other harmful metals in the surrounding rock. If uncontrolled, the acid mine drainage may runoff into streams or rivers or leach into groundwater. Acid mine drainage may be released from any part of the mine where sulfides are exposed to air and water, including waste rock piles, tailings, open pits, underground tunnels, and leach pads.

## HARM TO FISH & OTHER AQUATIC LIFE

If mine waste is acid-generating, the impacts to fish, animals and plants can be severe. Many streams impacted by acid mine drainage have a pH value of 4 or lower – similar to battery acid.[2] Plants, animals, and fish are unlikely to survive in streams such as this. For example, acid and metals runoff from the Questa molybdenum mine in New Mexico has harmed biological life in eight miles of the Red River.[3]


## TOXIC METALS

Acid mine drainage also dissolves toxic metals, such as copper, aluminum, cadmium, arsenic, lead and mercury, from the surrounding rock. These metals, particularly the iron, may coat the stream bottom with an orange-red colored slime called *yellowboy*. Even in very small amounts, metals can be toxic to humans and wildlife. Carried in water, the metals can travel far, contaminating streams and groundwater for great distances. The impacts to aquatic life may range from immediate fish kills to sub-lethal, impacts affecting growth, behavior or the ability to reproduce.

Metals are particularly problematic because they do not break down in the environment. They settle to the bottom and persist in the stream for long periods of time, providing a long-term source of contamination to the aquatic insects that live there, and the fish that feed on them. Over 100 miles of the Clark Fork River in Montana, the Coeur d'Alene River in Idaho, and the Columbia River in Washington are contaminated by metals pollution from historic mining activities upstream.

## PERPETUAL POLLUTION

Acid mine drainage is particularly harmful because it can continue indefinitely --

causing damage long after mining has ended.[4] Due to the severity of water quality impacts from acid mine drainage, many hardrock mines across the west require water treatment in perpetuity. For example, government officials have determined that acid drainage at the Golden Sunlight mine will continue for thousands of years.[5] Water treatment can be a significant economic burden if the company files for bankruptcy or refuses to cover water treatment costs. For example, acid runoff from the Summitville Mine in Colorado killed all biological life in a 17-mile stretch of the Alamosa River. The site was designated a federal Superfund site, and the EPA is spending $30,000 a day to capture and treat acid runoff.[6] In South Dakota, Dakota Mining Co. abandoned the Brohm mine in 1998, leaving South Dakota with $40 million in reclamation costs – largely due to acid mine drainage.[7] And, at the Zortman Landusky Mine in Montana, the State of Montana was left with millions in water treatment costs when Pegasus Gold Corp. filed for bankruptcy in 1998.[8]

Even with existing technology, acid mine drainage is virtually impossible to stop once the reactions begin. To permit an acid generating mine, means that future generations will take responsibility for a mine that must be managed for possibly hundreds of years. Predictions about the success of managing this waste in the long term are, at best, speculative.[9]

**SOURCES:**


[1]USDA Forest Service 1993, Acid Mine Drainage from Impact of Hardrock Mining on the National Forests: A Management Challenge. Program Aid 1505. p. 12.

[2]Mineral Policy Center, Golden Dreams, Poisoned Streams, 1995.

[3]Atencio, Earnest, High Country News, "The mine that turned the Red River Blue," August 2000.

[4]Placer Dome 2002, Available: http://www.placerdome.com/sustainability/environment/reports/ard.html

[5]Montana Department of Environmental Quality, Draft Environmental Impact Statement, Golden Sunlight Mine, November 1997.

[6]U.S. Environmental Protection Agency, Liquid Assets, 2000.

[7]McClure, Robert. "The Mining of the West: Profit and Pollution on Public Lands". Seattle Post-Intelligencer, June 13, 2001.

[8]Ibid.

[9]Environmental Mining Council of B.C., Acid Mine Drainage: Mining and Water Pollution Issues in B.C., Brochure.


**CASE STUDY: ZORTMAN LANDUSKY**

- Zortman Landusky is a large open pit gold mine located in Montana adjacent to the Fort Belknap Reservation.
- In 1993, the Fort Belknap Council, State of Montana and the EPA filed suit against the company charging that the mine's discharges "present human health risks" and that "the acidity of the discharges would kill fish and aquatic life."
- In 1998, the company abandoned the site and filed for bankruptcy, leaving significant reclamation and water treatment costs from acid mine drainage and metals pollution.
- State and federal authorities have determined that acid runoff from the mine will have to be collected and treated in perpetuity.

***"Water treatment will have to go on for hundreds of years, possibly forever."***

Wayne Jepson, Montana State Regulator, Helena Independent Record, 2002.