

# Hydraulic mining in california



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The invention of hydraulic mining is generally attributed to Edward E. Matteson near Nevada City, California in February of 1852 (May, Philip: 1970). Within 5 years of this invention the mining engineers of the Sierra Nevada had constructed five thousand miles of ditches and flumes to supply the water needed to power the monstrous hydraulic monitors (nozzles). About 26 million ounces of gold was recovered by the process of hydraulic mining in the Sierra Nevada Mountains of California, but at the cost of thirteen billion cubic yards of earth (about 2.4 cubic miles!) being washed away (McPhee, John: 1993). Though irreparable harm was done to the mountain streams and fertile farmland valleys of the American and Yuba Rivers, great good was also brought about.

By the end of the American Civil War, seven hundred and eighty-five million dollars had come from California's gold fields. Quoted from the memoirs of the early Californian pioneer John Bidwell: The North Bloomfield Gravel Mining Company: In the spring of 1851, three prospectors ran across a rich deposit of gravel in the hills about ten miles northeast of Nevada City. The miners immediately set up camp and commenced working the gravels, determined to make a fortune. As the story goes, their supplies began to run low a few weeks later and one of the men was sent to town for additional provisions, being strictly warned about keeping their find secret.

After purchasing the supplies, the miner headed to the saloon where he bought a round of drinks for the house, paying with a handful of gold nuggets. Try as they might, the saloon patrons could not get the miner to reveal the source of his newfound wealth, so when he left they secretly followed him back to his camp. The followers were elated at finding the rich

new diggings and quickly began working along the creek, with high hopes of striking it rich. But try as they might, pan after pan yielded nothing but dirt.

The trip was declared a “ Humbug,” and so they named the creek. Two years later, with the advent of hydraulic mining in the region, a town sprang up near the creek, a town called Humbug. As hydraulic mining became more and more prevalent, the town grew and was soon an important mining center for the region. When the post office was established on June 1 of 1857, the Humbugians felt their town needed a more melodious name, so votes were cast to decide the matter. Bloomfield was the people’s choice, to which the post office added “ North” to distinguish it from Bloomfield in Sonoma County.

North Bloomfield prospered greatly, due mainly to the highly productive Malakoff Mine, and claimed some seventeen hundred residents, which included a large settlement of Chinese immigrants. To provide for the needs of its citizens and visitors, the town offered eight saloons, five hotels, three lodging houses, two dry goods stores, two grocery stores, two breweries, two livery stables, two churches, a barbershop, a blacksmith, a butcher, a baker, a school, a post office, and daily stage and freighting service to all points out. Although hydraulic mining, described as “ a devilishly successful method of blasting gold from the ground,” was born when Antoine Chabot first used a hose to wash loose gravel on his claim at Buckeye Hill, it was here at the Malakoff Mine that the method realized its full potential. The gold the miners were after here along the San Juan Ridge was located in “ deep gravels,” ancient riverbeds that had dried up some fifty million years ago. Since that time, the powerful geologic forces that created the Sierra Nevada have

twisted, moved, broken, and buried those ancient river channels and their gold deposits, often times under several hundred feet of low grade or worthless dirt.

And the most efficient and economical way to move that dirt and get the gold was hydraulic mining. This method of mining consists of simply blasting a hillside with tremendous, high-pressure streams of water shot from a giant nozzle known as a " monitor. " These jets of water were so powerful that a strong man could not strike a crowbar through a six-inch stream. A fifty-pound boulder placed on the spray would be hurled fantastic distances, and records show that men and animals were killed by the force of the water alone at distances of more than two hundred feet from the nozzle.

The mountains, which faced the onslaught of these terrible forces of water, simply disintegrated, bringing down tons of rock, gravel, pay dirt, small animals, and vegetation. The gold-bearing sludge then traveled through a deep cut or tunnel, which was lined with a series of sluices to catch the gold, the remaining muddy water being discharged into any nearby canyon or river. To supply the water necessary for these operations, an enormous system of dams, lakes, and reservoirs was created to collect and store the water. And to get the water to the mines, hundreds of miles of ditches, tunnels, flumes, and pipelines had to be constructed. This was expensive and only the larger mining companies could afford the investment. It is estimated that by 1882, more than \$110 million had been invested in hydraulic mining in California.

The North Bloomfield Gravel Mining Company operated the Malakoff Mine, the world's largest hydraulic operation. In an effort to provide better drainage needed to reach the richest deposits, the company embarked on one of the greatest mining engineering feats of all time, carving an eight thousand foot long drainage tunnel through solid bedrock. Hamilton Smith was the engineer in charge of digging the tunnel, and after thirty months of intense activity he saw his tunnel completed on November 15 of 1874, which allowed the company to mine the deep gravels and dump the tailings directly into the South Yuba River. The company reached its peak after completing the tunnel, operating seven giant monitors twenty-four hours a day, seven days a week, and processing fifty thousand tons of gravel per day. In this manner, more than forty-one million yards of earth were mined, which resulted in creating the Malakoff mine pit, a spectacular canyon some seven thousand feet long and three thousand feet wide, which reached a depth of nearly six hundred feet at the peak of mining operations.

Although hydraulic mining proved to be extremely profitable, it also proved to be disastrous to the environment. The waste gravel, mud, and water from the mining operations were initially dumped into Humbug Creek and later into the Yuba River. These tailings polluted the streams, killed the fish, and rendered the Sacramento and Yuba rivers un-navigable for ocean going vessels for more than one hundred years. The silt from hydraulic mining reached as far as San Francisco Bay and on through the Golden Gate.

At Marysville, debris from the Malakoff mine choked the Yuba until the river bottom was higher than the adjacent town, causing severe flooding and damage. And as the bed of the Sacramento River rose, floods struck the rich

agricultural areas in California's great Central Valley, resulting in millions of dollars in damages for local farmers. The Judge Lorenzo Sawyer's decision on hydraulic mining in California in 1884 and its impact and significance: The many millions of tons of slit, sand and gravel washed down from the mines was the industry's undoing (Kelly, Robert L, Gold VS. Grain, The Hydraulic Mining Controversy in California's Sacramento Vally. Arthur H.

Clark Company, 1959). The massive volume of debris that resulted from hydraulic mining clogged streams and rivers from the foothill outlets to the mouth of San Francisco Bay, obstructing navigable rivers and reducing their ability to carry flood waters. The debate comes to an end in 1884, when federal circuit judge Lorenzo Sawyer issued an injunction against the industry discharging its debris. With the Sawyer injunction, the industry collapsed and the hydraulic miners abandoned the diggings for other work. Over the next ten years, plans for local and regional dams to restrain mining debris ere discussed and in 1893 legislation carried Amador Country Congressman Anthony Caminetti was signed. The Caminetti Act provided for the US Army Corps of Engineers to license the operation of individual hydraulic mines once they had demonstrated that their debris would not be discharged to the rivers.

But for most mines it was too late: their ditches and flumes had failed, capital for adequate debris dams was difficult to raise, and their workers had moved on. After the hydraulic mining industry was shut down, most of the mining water systems were abandoned as too expensive to operate. Many, though were adapted for irrigation and/or hydropower use, and continue to serve us today.