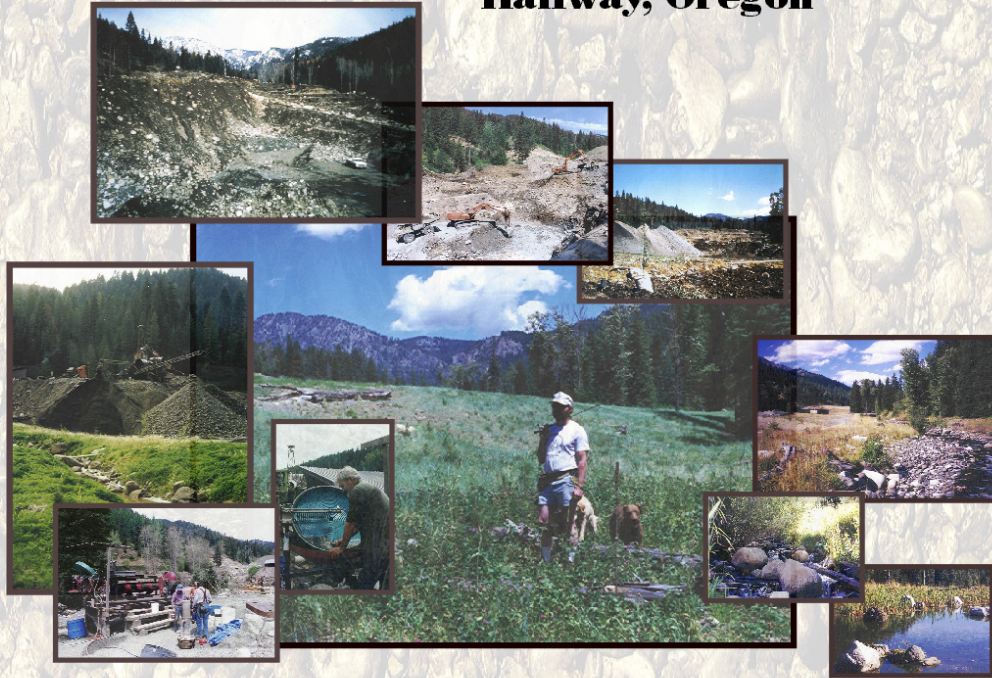


Bonanza Mining, Inc.

Halfway, Oregon



An Environmental Success Story

**“Where our reclamation
is the future generations’
recreation“**



BONNANZA/DESERT ROSE MINING, INC. PINE CREEK RECLAMATION PROJECT

Halfway, Oregon



An Environmental Success Story

Situation

Bonanza wanted to develop its Pine Creek placer gold mine near Halfway, Oregon, so that it would be profitable but still serve as a model for ecological mining. To accomplish this goal, the company did extensive preplanning on how to reclaim and restore the mined land. Now, because of this advance preparation, lush vegetation has covered the former mine site that will turn into a native species forest as the plants and trees mature.

Background

Bonanza began mine development in 1986 on patented ground along Pine Creek near Halfway in Baker County, Northeastern Oregon. US Forest Service land surrounds the placer mine property and is located several miles south of the historic mining district of Cornucopia and the Eagle Cap Wilderness Area. Prior to Bonanza, approximately 10 acres were affected by historic mining attempts including drift placering, which were re-mined and reclaimed.

The operation began as a three-acre disturbance by extracting free gold from a glacial till deposit along bedrock. The depth of mining ranged from 25 feet to 100 feet. Surficial gravels and glacial till were stripped to within 15 feet of bedrock and used as backfill for concurrent reclamation in the mined out areas. The bottom 15 feet was processed utilizing gravity separation techniques using water. During the life of the mine 1.3 million yards of overburden (glacial till) were excavated and backfilled. Approximately 335,000 yards were processed for gold removal. A total 45 acres were disturbed. At any one time, because of concurrent reclamation, the largest disturbance was 31 acres. Mining was completed in the fall of 1992.

Action/Solution

During mining, springs, seeps and other surface flows were diverted around the active areas. The mine process water was re-circulated in a closed system to protect Pine Creek. A unique system for re-circulation of sediment laden process water was developed where the mined out pit floor was used for primary containment. Oversize material (2" to 15") was placed on the pit floor along with an 8-inch steel pipe. Subsequent layers of smaller gravels and sand were placed over the oversize material and the discharge water was placed into this area. The water which filtered through this material entered the pipe and was discharged into the containment ponds located below. This significantly reduced the amount of sediments entering the ponds. The ponds were sized to contain a 25-year flood event. Initially however, because of physical constraints including depth of mining and watershed size, annual runoff had to be discharged into Pine Creek. A closed water system was in place by 1990. The discharge was done under a Department of Environmental Quality water permit. For sediment removal prior to discharge, a chemical flocculent was added. This chemical was safe on the fisheries.

Pine Creek is considered a young channel geomorphically, it is a braided system. Primarily because of steep channel gradient and high seasonal flows Pine Creek has meandered back and forth across the canyon bottom many times. To maximize gold recovery, Pine Creek was successfully diverted twice into pre-

existing, abandoned channels. The diversions were under permits issued by the Division of State Lands and Army Corps of Engineers. In both instances fish began using the diverted channels immediately. When completing the second diversion Oregon Department of Fish and Wildlife (ODF&W) and company personnel shocked the fish and removed them from the old channel. To improve stream habitat Bonanza and ODF&W worked together. Woody debris was cabled in place in the new channel and large rocks were placed to reinforce the banks and to create pool areas for fish habitat. The banks of the channel were planted with native propagated alders, willows and black cottonwood, and seeded with legumes for initial stabilization.

Reclamation began in 1989, concurrent with active mining, and significantly increased as annual production increased. Prior to mining, the soil cover was stripped and stockpiled separately from the overburden. A significant portion of the site did not have a soil cover because of past mining activities and areas where gravels were exposed to the surface because of stream action. To improve the quality of re-vegetation establishment; Soil material was constructed by mining sand and silts fines separated from the gravels during mineral processing and then mixed with straw and manure. To accomplish this, the operator traded loads of manure and straw for loads of gravel with the local farms and ranches near Halfway.

During reclamation more than 5000 conifers were planted. Local sources of native plants including dogwood, black cottonwood, chokecherry, wild rose, snowberry, willows, cattails and alder were identified and propagated on site. Annually all areas where soil and other erosive materials were stored were seeded and mulched. On the final reclaimed surface, logs were placed perpendicular to the slope to control run off and for microhabitat creation. Two separate wetland areas were left in the upper pit by impounding ground water seepage along the bedrock/backfill interface. At the last DOGAMI inspection the wetland areas were full of thousands of frogs. A blue heron had found the shallow pounds and was busy feeding on the frogs.

Results

In 2001 the trees and vegetation are well established along Pine and Deep Creeks, and the wetlands have created more habitat diversity at the site; elk, deer, hawks, eagles, frogs, salamanders, blue herons, geese and ducks have been observed. Some of the trees have grown to heights exceeding twenty feet. The creeks look natural, and in places the vegetation grows up and over the creek. New residents to the area are surprised when they find out that in recent times there once was an open pit mining operation at that location.

In 1990, Bonanza was recognized by the Oregon Department of Geology and Mineral Industries (DOGAMI) for exceeding permit and reclamation requirements, and was presented the Oregon Operator of the Year award. In 1993, Bonanza received the Oregon Outstanding Reclamation award presented by DOGAMI. In 1994, Bonanza received the National Outstanding Reclamation of the Year award presented by the National State Land Reclamationists.

For additional information, contact:

Terry Drever Gee
Gaia Resource
42364 Salmon Creek Rd.
Baker City, Oregon 97814
1 (541) 523-6228 phone/fax
tdreverg@live.com

