The Lake Tahoe Report

Take a Glimpse of Tahoe's Natural History

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Geologic time is hard to imagine, with vast stretches of time measured in millions of years. Lake Tahoe, on such a geologic time scale, is actually not very old. North America has been adding new blocks of crust to its western margin for hundreds of millions of years. Enormous blocks of stone have pushed and collided, generating so much pressure and heat, that they caused a series of meltdowns of the solid rock, deep below the surface. About 70 million years ago, chambers of liquid magma rose slowly toward the surface like gigantic underground hot air balloons. Most cooled and solidified, never reaching the surface. These formed the hard granite core of the future Sierra. Others erupted as volcanoes. For tens of millions of years, erosion and weathering wore away most of the old rock of the ancestral Sierra, and about 10 million years ago, the Sierra Nevada was a low range of granite hills, perhaps 2000 feet to 3000 feet high.

Then, the real period of mountain building began. Volcanoes began erupting, and huge blocks of crust began rising and falling to the beat of thousands of earthquakes. By about 5 million years ago, the Carson Range on today's east shore, and the Sierra Block on today's west shore had risen many thousands of feet in elevation. Another enormous block between these sank downward creating a trough thousands of feet deep. Volcanoes built high mountains across the north end of the trough, creating a natural dam. Mount Watson, Mount Pluto and Martis Peak the remnant cores of these volcanoes. Over time, waters filled the trough, and created Lake Tahoe. Yet, it would be many years before it looked like the lake we

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see today.

Over the next 3 million years, a series of ice ages created huge snowpacks, thousands of feet thick. Over time, these snowpacks grew into glaciers, and then melted, only to grow into giants once more. Slowly flowing rivers of ice ground their way from the Sierra crest to the lowlands, and some reached into the young Lake Tahoe. Emerald Bay is the footprint of such a glacier.

The summits and ridgelines of the Carson Range on Tahoe's east side received less snow than the Sierra Range to the west, just as they do now. They appear graceful and rounded in contrast to the shapes of Mount Tallac, Squaw Peak, and other west shore peaks, which were sculpted into their present shapes by the scour of millions of tons of moving ice. Twelve thousand years ago, the glaciers melted, leaving boulders called "erratics" scattered about the landscape. The rocky, gravelly debris left with the boulders began to be weathered into soil, and pioneering species of plants, microbes and animals began to claim the rock piles. In some places, topsoil took thousands of years to develop sufficient depth to nourish the great forests that would later grow in the basin.

When John Fremont, the first European-American credited as having seen Lake Tahoe, passed through in 1844, he was looking at an ecosystem that had been developing and changing continually since the glaciers melted. The soils were deep, and all the plants were well-adapted to the conditions of their niches. Natural disturbances from avalanches and earthquakes were rare enough and healed quickly. Fremont saw a forest system largely shaped over millennia by repeated low-intensity fires, sparked by lightening and Native Americans. These regular fires often cleaned out the forest floor without killing the mature trees, in fact contributing to forest health. The natural and undisturbed watersheds, many thousands of years old, prevented large quantities of nutrients or sediments from being carried into the lake itself.

Over millions of years, nature has created an extraordinary place, the Tahoe Basin, and set the conditions for its famously clear waters. Erosion and disturbance have always been a part of the forces that have shaped the Tahoe Basin. In the past, change was slower; nature and time allowed the lake to recover from such disturbances. However, human changes to the Tahoe ecosystem are not measured in geologic time. Since settlement and development began in the mid 19th century, we have become the single most important force that can either break or restore the ecosystem and determine the fate of the lake.