

Why So Blue, Crater Lake?

Here's the story of an enormous volcano that blew its top, leaving behind one of the most beautiful, other-worldly places on earth: Crater Lake National Park—home of the planet's bluest water.

What Goes Up...

Rising roughly 12,000 feet above sea level, Mount Mazama wasn't the highest of the Cascades volcanoes. Its peak fell slightly short of Mount Shasta (to the south in California) and Mount Ranier (to the north in Washington). But in terms of pure mountainous girth, Mazama was the undisputed heavyweight champion of the Pacific Northwest. For more than 400,000 years, the composite volcano grew layer by layer in spits and spurts over the top of a giant subterranean magma chamber in what is today southern Oregon. Mild eruptions, lava flows, gassy vents, and glaciation created a rugged landscape marked by frequent change. The biggest change occurred just 7,700 years ago (a mere blip on the geologic time scale). Mount Mazama erupted in spectacular fashion. Ten cubic miles of ash and lava shot 30 miles into the sky.

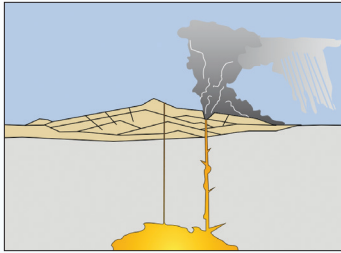
Pyroclastic flows laid waste to entire pine forests. One lava flow carved out 40 miles of what later became the Rogue River. Ash covered the

ground as far away as Nebraska. The eruption ranks as a VEI 7, or "super-colossal," on the USGS's Volcanic Explosivity Index. (The scale only goes up to 8.) Put into perspective, Mazama's eruption was 42 times stronger than Mount St. Helens' blowup in 1980. Geologists believe it to be the most violent Cascades eruption of the past million years.

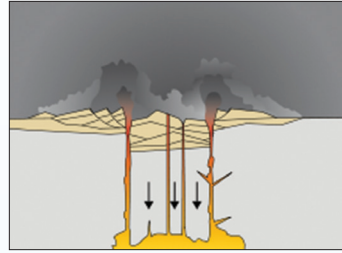
...Must Come Down

Because Mount Mazama was so wide, after all the lava emptied from the chamber, there was nothing left to hold up the mountain. Result: Several million tons of earth, rock, and ash collapsed into the chamber. When the dust cleared, what had been a mountain was now a mountain-sized hole. The volcanic *caldera* formed a nearly perfect circle six miles wide and 4,000 feet deep. Over the next few centuries, the volcanic activity slowly subsided while the caldera steadily filled up with snow and rain. Crater Lake was born.

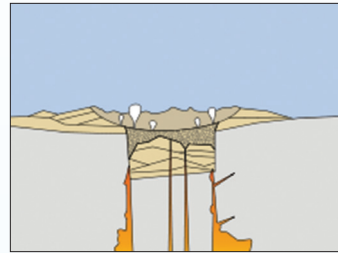




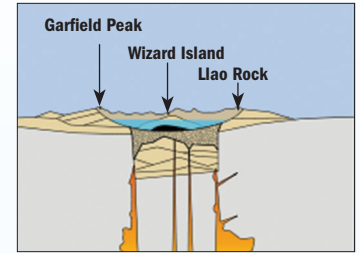
Eruption of
Mount Mazama



Caldera collapse



Steam explosions



Crater Lake today

Clash of the Titans

Because the eruption occurred so recently (in terms of the earth's history), there were witnesses. The Klamath and Modoc Indians both lived nearby, and the mountain blast shook them to the core. The Klamaths' name for Mazama was *Moy-Yaina* ("Big Mountain"). The Indians, believing the lake to be sacred ground, also kept its existence a secret from white settlers. A group of gold prospectors finally discovered the lake by accident in 1853. Struck by its beauty, they spread the word to others. Before long, curious adventurers made the harsh journey through thick forests, across hardened lava fields, and up the steep terrain to see it for themselves.

The Father of Crater Lake

One such adventurer was William Gladstone Steel, who made it to the southwestern part of the rim (called Discovery Point) in 1885. He was amazed:

All the ingenuity of nature seems to have been exerted to the fullest capacity to build one grand awe-inspiring temple the likes of which the world has never seen before.

Rising from 1,000 to 2,000 feet above the shore, the rim of Crater Lake offers incredible views. The first sight to strike Steel (and most visitors) was the crystal-clear blue water. It was bluer than the sky. Across the lake, the vertical cliffs of the rim were also colorful, marked by towering castles of orange lava deposits, bright yellow lichen, white speckles of snow, and forests of evergreen trees. On a calm day glassy reflections on the water create abstract patterns of the shore six miles away.

Steel was also taken by Crater Lake's other prominent feature, a conical island that rises more than 700 feet out of the southwestern portion of the lake. It's also covered with volcanic rock and forests of pines, fir, and hemlock. Reminding Steel of a sorcerer's cap, he named it Wizard Island. Over time, Steel named several more of Crater Lake's features, including Llao Rock and Skell Head. And he was the one who called the ex-mountain "Mazama," the name of his mountaineering club.

*Crater Lake panorama,
with a view of Wizard Island*





One of Uncle John's writers frolicking on Wizard Island

A Park is Born

Steel became Crater Lake's biggest advocate. He brought in tourists, scientists, surveyors, and developers. In 1886 he hired Clarence Dutton of the United States Geological Survey to measure the lake's depth, who wrote:

As the visitor reaches the brink of the cliff, he suddenly sees below him an expanse of ultramarine blue of a richness and intensity which he has probably never seen before, and will not be likely to see again.

Steel and Dutton knew the lake was deep, but it wasn't until they lowered a piano wire at various points along the surface that they grasped just how deep: nearly 2,000 feet.

Steel was instrumental in convincing President Theodore Roosevelt to designate the area as the sixth U.S. national park in 1902. However, if Steel had gotten his way, there would have been a lot of development there: He wanted to build an elevator to take visitors from the top of the rim to the shore, and a bridge to Wizard Island. His colleagues at the National Park Service wanted to keep the area pristine, though, and Steel lasted only three years as Crater Lake's superintendent before he was ousted. Today, there is minimal evidence of man's impact at the park.

A Lake Like No Other

Crater Lake wears its geologic past on its sleeves. You can actually look at the inside of a sleeping volcano. Here's some of the science and superlatives of the "Gem of the Cascades."

- **That's deep.** Modern sonar readings show that Dutton was pretty close to the mark. The lowest part of the lake bed is 1,949 feet beneath the surface. That ranks Crater Lake as the deepest lake in the United States, and the ninth deepest on earth. If the Empire State Building were lowered into the lake (not counting for water displacement), by the time the ground floor reached the bottom, the top of the spire would be 500 feet below the surface.
- **A perfect balance.** Most of the world's lakes are fed by streams and rivers, and drain into streams and rivers. Crater Lake does neither. It is filled solely by precipitation. (Average rainfall per year: 66 inches. Average snowfall: 44 feet.) The lake loses its water through evaporation (and to a lesser extent, by seepage into the porous rock). These processes—precipitation and evaporation—balance each other out so well at Crater Lake that the surface rises and falls only by a few feet every century. Plus, because of Crater Lake's great depth, the surface rarely freezes.
- **I can see clearly now.** Crater Lake contains what may be the clearest, purest water known to exist. In most lakes that boast clear water, you can see about 16 feet below the surface in broad daylight. But in Crater Lake, it's possible to see to depths of more than 100 feet. The deepest scientific measurement has been 142 feet, a world record. Several factors contribute to the lake's clarity: Because no rivers run into it, no silt gets deposited. There's little pollution because of Crater Lake's remoteness (the nearest big cities—Portland, San Francisco, and Reno—are each hundreds of miles away). There are also very few organic materials or dissolved minerals in the water, and the human impact around and on the lake is minimal.

- **The blues.** How can the water be so clear—and so blue—at the same time? Actually, it's so blue because it's so clear...and so deep. Here's how it works: As sunlight penetrates the lake, it absorbs all the colors of visible light except for blue, which it reflects back. The deeper and clearer the water, the more blue gets reflected.
- **New growth.** Wizard Island is one of two new volcanoes that have risen out of Mazama's caldera (the other is still underwater). At barely 6,000 years old, the island is very young, yet many of the trees that grow on it are very old, some more than 800 years.
- **Phantom ship.** Mazama's demise unearthed some very old rock formations, including Crater Lake's other island, Phantom Ship. This spire of 400,000-year-old andesite lava was left behind by an ancient eruption. When viewed from the rim, the island looks like an old sailing ship, hence the name. The rocky spires rise 163 feet above the surface; the island itself is about 300 feet long. Clinging to the rocks are an astounding seven species of trees.
- **Going down.** There have been a few scientific

expeditions—manned and unmanned—to see what lies at the bottom of Crater Lake. Scientists have learned that the area is still active—steam vents enter the water at great depths. That allows primitive life-forms to exist more than 1,000 feet below the surface, which actually receives faint bits of sunlight on clear days. But perhaps the biggest surprise came at depths of 100 to 460 feet along the lake walls—forests of moss several stories thick.

The Future of Crater Lake

Will the volcano erupt again? Most likely. The constant change that shaped the region is still in flux. What scientists don't know is how much magma—if any—still remains in the chamber, and just how much pressure is building up. Future activity is likely to happen just east of the lake, where the geologic “hot spot” now lies. What's more worrisome is the chance of a large earthquake causing landslides and huge waves on the surface. A cataclysmic seismic event could rupture the rim wall and cause the lake to drain, creating a flood of 4.6 trillion gallons of water. But for now, Mazama remains at rest.



Phantom Ship at Crater Lake