



Geologic Resources Inventory Fact Sheet

Fact Sheet Compiled in 2023

The *Geologic Resources Inventory* provides geologic map data, a written report, a map poster, and pertinent information to support resource management and science-informed decision making.

Scan QR code for access to the full report, map poster, and GIS data



<https://irma.nps.gov/DataStore/SavedSearch/Profile/2796>

Geologic Features and Processes

Crater Lake



The maximum depth of Crater Lake is 594 m (1,949 ft), making it the deepest lake in the United States, second deepest lake in North America, and seventh deepest lake in the world. In addition to depth, Crater Lake’s remarkable clarity and blue color are treasured features. *Page 26.*

Mount Mazama



Mount Mazama consisted of a succession of overlapping shield and stratovolcanoes built upon lava flows older than 400,000 years. The climactic eruption of Mount Mazama lasted only a few days but erupted approximately 50 km³ (12 mi³) of magma. The eruption and collapse of Mount Mazama created the Crater Lake caldera, which is 1,200 m (3,900 ft) deep and 8–10 km (5–6 mi) across at the rim. Since the formation of the caldera 7,700 years ago, volcanic and sedimentary materials have been filling the basin. *Page 18.*

Mount Mazama Ash



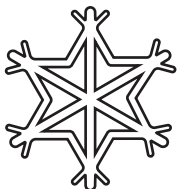
The short-lived nature of the climactic eruption and the extent and thickness of the deposit make Mazama ash a valuable stratigraphic marker (indicator of a certain geologic time across a regional landscape). *Pages 22–23.*

Regional Volcanoes



Mount Mazama and the Crater Lake caldera are situated among regional volcanoes (cinder cones and shield volcanoes) that are characterized by dominantly basaltic andesitic lava flows. Spreading northwest, southwest, and east of the Crater Lake caldera, these cones and shields are manifestations of regional volcanism. *Pages 23–24.*

Glacial Features



The park was born of “fire and ice” in a place where volcanoes and glaciers met. No glaciers occur on the landscape today, but features such as tuyas (table mountains), provide evidence of past glacial activity and lava-ice interactions. In addition, the park contains classic glacial features such as till and moraines (accumulations of debris), glacial polish and striations (areas where glacier passed over bedrock, smoothing and scratching it), and U-shaped valleys (valleys formed by glaciation that have a characteristic U shape in cross section). *Page 29.*



NPS Photo by Caitlin Hosken



Geologic Issues (Pages 7–16)

Volcano Hazards

The annual probability of an eruption occurring near Crater Lake is about one chance in 10,000. The most likely site for future activity is the postcaldera volcanoes, which are concentrated in the western half of the caldera.

Slope Movements

Slope movements enlarge the Crater Lake caldera and formed its distinctive scalloped outline. Slope movements can lead to landslides that threaten human life and property.

Seismic Activity

Earthquake hazards in the greater Crater Lake area include damage to structures, utilities, communication lines, and transportation systems as a result of seismic shaking.

Hydrothermal Features and Geothermal Development

Physical evidence of hydrothermal activity includes warm, solute-laden water, bacterial mats associated with venting of warm water, and high silica spires (subaqueous thermal-spring deposits). Crater Lake is included in the Geothermal Steam Act, which helps protect the geothermal system at the park against leasing and development.

Disturbed Lands Restoration

The park contains 10 ha (25 ac) of disturbed lands that need to be restored through site preparation, erosion mitigation, and revegetation efforts.

Abandoned Mineral Lands

Fifteen surface mines are in the park, and five of these are in need of hazard mitigation, including signage, closure, or restoration.

NPS photo by Caitlin Hosken



Vidae Falls

Geologic History

The geology of Crater Lake spans about 700,000 years. Pages 37–39.

Regional Volcanism

- For 700,000 years, and episodically since 200,000 years ago, cinder cones and shield volcanoes have erupted as part of regional volcanism.



Garfield Peak Trail
NPS photo

Buildup of Mount Mazama

- 7,700 years ago, the Crater Lake caldera formed as a result of a climactic eruption.
- Lack of support from the roof of the magma chamber caused the caldera to collapse.

Postcaldera Volcanism and Basin Filling

- The basin that now contains Crater Lake is the collapsed caldera of Mount Mazama. In a matter of only a few hundred years, the 1,200-m- (3,900-ft-) deep caldera was partially filled.
- Initially, hundreds of meters of debris accumulated as the caldera subsided and its walls failed inward. Afterward, renewed volcanic activity vented lava onto the floor of the Crater Lake caldera and deposited the andesites of east basin, central platform, Merriam Cone, and Wizard Island.
- Since 4,800 years ago, the geologic history of the caldera floor is marked by a distinct absence of volcanic activity. Slope movement on the caldera walls continues, but on a reduced scale and rate than during failure of the caldera walls.