



Reflections Visitor Guide Summer/Fall 2020



Welcome!

At Crater Lake National Park, the health and wellbeing of our visitors and employees is our top priority. Throughout this pandemic we have followed guidance from the White House, Centers for Disease Control and Prevention (CDC), and state and local public health authorities to ensure that our operations comply with current guidelines and are adjusted as necessary in the interest of public health and safety.

As you enjoy all that the park has to offer, we ask that you be our partner in adopting social distancing practices and wear a face covering when indoors or when social distancing cannot be maintained. Please recreate responsibly to keep yourself and everyone around you safe while also protecting one of America's most treasured places for future generations to enjoy.

Craig Ackerman
Superintendent

Hours & Seasons

The park is open year-round, 24 hours a day. Some roads, trails, and facilities, however, are closed seasonally due to snow. The park's North Entrance Road and Rim Drive close for the season on November 1 (or earlier if there is significant snowfall).

Crews start plowing these roads in April, but opening dates vary. The North Entrance and West Rim Drive open sometime between mid-May and late June. The East Rim Drive opens sometime between mid-June and late July. Highway 62 and the road to Rim Village are plowed year-round.



Exploring Your Park

Thank you for visiting Crater Lake National Park. If you've been here before, you might notice a few changes this year on account of COVID-19. With public health in mind, boat tours and other ranger-led activities are not being offered, Crater Lake Lodge is open to overnight Lodge guests only, and some facilities, like the park's two visitor centers, are closed. Fortunately, the pandemic has not affected the park's outstanding scenery, hiking trails, roads, overlooks, and other recreational opportunities—many of which are described in this visitor guide. We hope you have a safe and enjoyable visit.

Services & Facilities

The following information was accurate at the time of publication but is subject to change at any time. To find out the current status of park facilities and their hours of operation, stop at one of the twelve information boards located throughout the park.

Restrooms

Restrooms at Rim Village and Mazama Campground are open 24 hours a day. Vault toilets are open 24 hours a day at Watchman Overlook, the North Entrance, the top of the Cleetwood Cove Trail, and the Vidae Falls Picnic Area (see map on page 5).

Drinking Water

A water bottle filling station is located outside the Mazama Village Store. At Rim Village, water from the restroom sinks is safe to drink. Bottled water can be purchased at the Mazama Village Store, Annie Creek Gift Shop, Rim Village Café, and Rim Village Community House.

Food & Dining

Food is available at Rim Village and Mazama Village. The **Rim Village Café** serves grab-and-go sandwiches, salads, and snacks. It's open year-round. The **Crater Lake Lodge Dining Room** also serves meals, but to comply with CDC guidelines it is currently open to overnight Lodge guests only. At Mazama Village, the **Annie Creek Restaurant** serves burgers, pizza, and other entrees. This year, it's open for lunch and dinner (dine-in or take-out), likely through September 27. The **Mazama Village Store** sells snacks, groceries, and camping supplies. It will likely be open this year through September 28.

Gifts & Books

The nonprofit Crater Lake Natural History Association sells books, maps, postcards, and souvenirs. This summer, it's operating out of the **Community House** at Rim Village. The park's concessioner, Crater Lake Hospitality, also offers a range of merchandise at the **Rim Village Gift Shop** (open year-round), the **Annie Creek Gift Shop** (likely open through September 27), and the **Mazama Village Store** (likely open through September 28).

Visitor Centers

Following guidance from public health authorities, both park visitor centers are currently closed. The park's 22-minute film is not being shown, but you can purchase the DVD for half price (\$7.50) at the Crater Lake Natural History Association bookstore, located in the Community House at Rim Village. The park's passport stamp is available there as well, and at the Post Office at Park Headquarters.

Exhibits

Many pullouts in the park have roadside exhibits. Midway through Rim Village, the Sinnott Memorial Overlook has geology displays, although the adjacent exhibit room is not open this year. For overnight guests at Crater Lake Lodge, exhibits on the history of the Lodge can be found on the ground floor, west of the lobby.

Post Office

A United States Post Office window is open 9:00 am–2:00 pm, Monday through Saturday, at the Steel Visitor Center at Park Headquarters.

Campgrounds

Mazama Campground (214 sites) is located 7 miles south of the lake near Highway 62. It's operated by the park's concessioner, Crater Lake Hospitality, and is scheduled to be open this year through September 27. All sites this year are reservable in advance (866-292-6720 or www.travelcraterlake.com), so there might not be any same-day availability. The campground offers tent sites (\$21 per night) and RV sites (starting at \$32). The campground has drinking water and flush toilets, but, with public health in mind, showers and laundry facilities are not operating. The park's other campground, **Lost Creek Campground** (16 sites, tents only) is closed this year.

Lodges

The park has two motels, both operated by Crater Lake Hospitality. **Crater Lake Lodge** (71 rooms) overlooks the lake at Rim Village. Rooms begin at \$200. This year, it's scheduled to be open through October 11. **The Cabins at Mazama Village** (40 rooms) are \$164 per night and will likely be open through September 27. For both facilities, advance reservations are highly recommended; call 866-292-6720 or visit www.travelcraterlake.com.

Gasoline

Self-serve, unleaded gasoline is available at the **Mazama Village Store** during business hours.

- 2... Activities, Rules to Know
- 3... FAQs, Climate Chart
- 4... Hiking Trails
- 5... Park Map, Scenic Overlooks
- 6... Feature Article
- 7... Butterfly & Moth Survey
- 8... Recommended Reading

Look Inside! →

Park Profile

Crater Lake National Park protects the deepest lake in the United States. Fed by rain and snow (but no rivers or streams), the lake is considered to be the cleanest large body of water in the world. The water is exceptional for its clarity and intense blue color.

The lake rests inside a caldera formed approximately 7,700 years ago when a 12,000-foot-tall (3,600-meter) volcano collapsed following a major eruption. The eruption may have been the largest in North America in the past 640,000 years. Later eruptions formed Wizard Island, a cinder cone near the southwest shore.

The park is central to the cultural traditions of local American Indian tribes, whose ancestors witnessed the lake's formation.

Today, old-growth forests blanket the volcano's outer slopes, harboring more than 700 native plant species and a wide variety of animals, including several that are rare or endangered.

- Park established: 1902
- Size: 183,224 acres (74,148 hectares)
- Number of visitors last year: 704,500
- Lake depth: 1,943 feet (592 meters)
- Lake width: 4.5 to 6 miles (7 to 10 km)
- Annual snowfall: 42 feet (13 meters)
- Last time the lake froze over: 1949



Artist Paul Rockwood's conception of Mount Mazama, the volcano that collapsed to form Crater Lake. If you gathered up the ash from Mount Mazama's catastrophic eruption and spread it evenly across the state of Oregon, it would form a layer 8 inches (20 cm) thick.



Wizard Island



Fishing at Cleetwood Cove



Junior Rangers



Black Bear Crossing the Pinnacles Road



National Park Service
U.S. Dept. of the Interior

Crater Lake Visitor Guide Summer/Fall 2020

This is the official trip-planner and newspaper of Crater Lake National Park. It is published twice a year and funded by the Crater Lake Natural History Association.

Park Phone: 541-594-3000
Website: www.nps.gov/crla
Mail: PO Box 7, Crater Lake, OR 97604
Email: craterlake@nps.gov



Sunset over Crater Lake



Bicycling on the East Rim Drive

Accessibility

Except for the Sinnott Overlook, developed areas in the park are generally accessible to individuals with mobility impairments. The most accessible path for people using wheelchairs is the paved promenade at Rim Village. The Godfrey Glen, Sun Notch, Pinnacles, and Plaikni Falls trails are accessible to all-terrain wheelchair users with assistance (see page 4). Multiple pullouts on Rim Drive have wheelchair-accessible wayside exhibits. We are working hard to improve our level of accessibility for all park visitors. We welcome your comments.

Electric Vehicle Charging Station

A 24-hour charging station is located by the Annie Creek Gift Shop. It has one standard (J1772) connector and one Tesla connector.

Emergencies

Dial 911 to report any emergency, 24 hours a day. First aid is available at the Ranger Station at Park Headquarters (8:00–4:30 pm).

Entrance Fee

From May 22 through October, the park's entrance fee is \$30 per vehicle (\$25 per motorcycle), good for 7

days. The rate is higher for commercial vehicles. Your fees are put to work improving visitor services and facilities. Thank you for supporting your national parks!

Internet

Wireless internet is available for guests of Crater Lake Lodge and The Cabins at Mazama Village, but speeds are slow.

Lost & Found

Visit the Ranger Station at Park Headquarters (8:00–4:30 pm) or call 541-594-3060.

Phones

Cell reception in the park is spotty. You may have luck at pullouts on the Rim Drive. A 24-hour emergency landline is located outside the "snow tunnel" entrance to the administration building at Park Headquarters.

Picnic Areas

Picnic areas are found throughout the park (see page 5). The Rim Village picnic area has fire grates.

Recycling

Combination trash/recycling bins can be found at more than 20 locations in the park. Recycling is currently limited to aluminum cans and newspaper.

Activities

Swimming

Swimming is allowed in Crater Lake, but the water is cold! Most people swim for just a few minutes. Swimming is permitted only at the bottom of the Cleetwood Cove Trail. The shoreline is rough and rocky; there are no beaches, and no lifeguards are on duty. Swimmers must stay within 100 yards (91 meters) of shore and not venture out of Cleetwood Cove. Snorkeling, scuba diving, long-distance swimming, and wetsuits are prohibited (see park rules below).

Fishing

Crater Lake is home to rainbow trout and kokanee salmon. Neither is native to the lake. Fishing is allowed at the bottom of the Cleetwood Cove Trail, where you'll find a short stretch of rocky shoreline. Fishing licenses are not necessary. There are no restrictions on the size, number, or type of fish taken. Fish may be released or kept. To prevent the introduction of other non-native organisms, *no organic bait of any kind may be used*. This includes fish eggs, PowerBait, and live or dead fish. Fishing is limited to artificial lures and flies only.

Bicycling

Bicycling is allowed on paved roads and the unpaved Grayback Drive. They are not allowed on trails, or off-trail. Helmets are required for riders under 16 years of age and are strongly recommended for all cyclists. The park's paved roads are narrow with heavy automobile traffic.

The most popular trip in the park is the 33-mile (53-km) Rim Drive, featuring spectacular views but also long climbs that gain a total of 3,800 feet (1,158 meters) in elevation. For a flatter, more relaxing ride, try the paved, 11-mile (18-km) bike path around Diamond Lake, 5 miles (8 km) north of the park. The closest place to rent bikes is Diamond Lake Resort.

The park's annual "Ride the Rim" event will not be happening this year. Typically, on two Saturdays each September, the East

Rim Drive is closed to motor vehicles so that bicyclists can enjoy 24 miles (39 km) of the Rim Drive without vehicle noise and traffic.

Junior Ranger Program

Are you between 6 and 12 years old? Pick up a free activity book, available 24 hours a day outside the Steel Visitor Center at Park Headquarters and the Community House (NHA Store) in the middle of Rim Village. To become a Junior Ranger and earn an official badge, complete the activities as you explore the park. When you get home, you can participate in additional fun activities online. Visit go.nps.gov/kids.



Backpacking

Over 95% of the park is managed as wilderness. Although some trails and locations are closed to backcountry camping (for example, there is no camping in the summer with a view of the lake), exploring the park's old-growth forests and volcanic landscapes can be a rewarding experience. Generally, backpackers must travel at least 1 mile from their vehicle in order to camp.

Before setting out, all backpackers must obtain a permit, in person, from the Ranger Station at Park Headquarters. (The one exception is through-hikers on the Pacific Crest Trail, who may instead sign the trail register as they enter the park.) Backcountry permits are free of charge and are available between 8:00 am and 4:30 pm daily. They are not available after hours or over the phone.

Sky Gazing

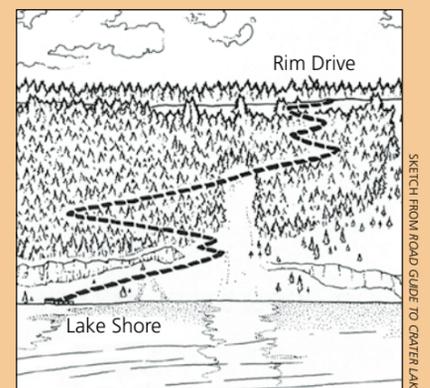
With clean air and unobstructed views, the rim of Crater Lake is a great place to observe astronomical events. Discovery Point is a favorite spot to watch the sunrise. For sunsets and moonrises, try Watchman Overlook, Cloudcap Overlook, or hike to the top of Watchman Peak.

Wildlife Viewing

The park is home to a variety of animals, but they can be difficult to spot. Many are active at night or shy away from humans. The most commonly seen animals are ground squirrels, chipmunks, marmots, ravens, jays, and deer. Lucky observers might spot a tree squirrel, pika, porcupine, fox, coyote, wolf, marten (a type of weasel), bald eagle, or herd of elk. Bobcats and mountain lions are present but are rarely seen. Approximately 50 black bears live in the park, but they also prefer to stay hidden. You might see one crossing a road. The only creatures that tend to pester people are mosquitoes (in July) and yellowjacket wasps (in August and September).

Hiking to Cleetwood Cove

The Cleetwood Cove Trail is the only legal access to the shore of Crater Lake. The hike is steep and strenuous: in 1.1 miles (1.7 km) it drops 700 feet (213 meters) in elevation. Walking back up is equivalent to climbing 65 flights of stairs! The trail is recommended only for those in good physical condition. It should not be attempted by anyone with heart, breathing, or walking problems. It is not accessible for people with mobility impairments. Hikers should wear sturdy shoes and carry water. Vault toilets are located at the top of the trail. Depending on snow conditions, the trail is usually open from mid-June to late October.



The Cleetwood Cove Trail drops 700 feet (213 meters) to the lake shore.



Crater Lake National Park belongs to everyone. We all share responsibility in protecting it. Please take a moment to become familiar with these important regulations. For a full list of the park's rules, visit go.nps.gov/regs.

Drones

Operating remote-controlled aircraft in the park is prohibited.

Feeding Animals

Do not feed wildlife, including birds and squirrels. Exposing them to our food alters their behavior, is bad for their health, and can be dangerous for you. Store food properly. Generally, this means in your vehicle or a campground food locker. Backcountry campers should hang their food or use a bearproof canister.

Guns

Firearms are allowed in the park in accordance with Oregon state laws. They are prohibited, however, in all park buildings.

Hiking and Climbing

Stay on trails. This prevents erosion, protects vegetation, and protects other hikers. Hiking and climbing inside the caldera are strictly prohibited. The only exception is the Cleetwood Cove Trail, the only safe and legal access to the lake shore. Serious injuries and deaths have occurred from falls inside the caldera. The walls consist of unstable rocks and soils.

Marijuana

Possession of marijuana is prohibited. Oregon state laws allowing the use of marijuana do not apply in the park, an area of federal jurisdiction.

Overnight Parking

The park is open 24 hours, but overnight parking is not allowed, except in the park's campgrounds, for guests at the park's motels, and for backpackers (permit required).

Park Features

Leave rocks, plants, animals, and artifacts undisturbed for others to enjoy. It is prohibited to collect, deface, disturb, or destroy natural or

cultural features. Do not approach, touch, feed, or disturb wildlife.

Pets

Pets are welcome in the park, but only in certain areas. Pets on leash are allowed on the Godfrey Glen Trail, Lady of the Woods Trail, Grayback Drive, and Pacific Crest Trail. Leashes must not exceed 6 feet (1.8 meters), and only one pet per hiker is allowed. Pets are not permitted on other trails, or off-trail. Pets on leash (or otherwise physically restrained) are also allowed in picnic areas, campgrounds, parking lots, and up to 50 feet (15 meters) away from paved roads. Popular places to walk a dog include Rim Village and Mazama Campground. Pets are not allowed inside buildings, including Crater Lake Lodge and The Cabins at Mazama Village. The above rules do not apply to service animals here to assist people with disabilities. Solid waste must be picked up immediately and disposed of properly, in a trash can or toilet.

Water Sports

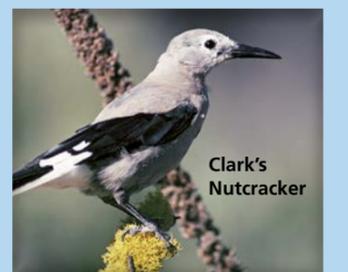
Snorkeling, scuba diving, and long-distance swimming are not allowed in Crater Lake. In 2012, after reviewing the threats posed by aquatic invasive species, the park placed a ban on the use of snorkels, wetsuits,

diving gear, flotation devices, and other equipment that might serve as vectors for the introduction of non-native organisms. This includes rafts, canoes, kayaks, and paddleboards. Swimming (in a standard swim suit) is allowed at the bottom of the Cleetwood Cove Trail.



Golden-Mantled Ground Squirrel

Help keep wildlife wild.
Please DO NOT FEED!



Clark's Nutcracker

Frequently Asked Questions

How deep is Crater Lake?

Crater Lake is 1,943 feet (592 meters) deep. It's the deepest lake in the USA—300 feet deeper than Lake Tahoe, which ranks 2nd—and the 9th deepest lake in the world. It's also the deepest lake in the world formed by volcanic activity.

Where does the water come from?

About 83% of the water comes from rain and snow falling directly on the lake's surface. The rest is runoff from precipitation landing on the slopes above the lake.

Is the water clean enough to drink?

Since there are no inlets carrying silt, sediment, and pollution into the lake, the water is very clean: cleaner than the water that comes out of your faucet at home!

How clear is the water?

With so few particles in the water, it is exceptionally clear.



When an 8-inch-wide instrument called a Secchi disk is lowered into the lake, the average depth at which it disappears is 102 feet (31 meters). Some days, Secchi disk readings surpass 130 feet (40 m)!

Why is the water blue?

The lake appears blue because it's very clean and very deep. When sunlight enters the lake, red, orange, yellow, and green light waves are absorbed by the water and converted into heat. Blue light waves are not absorbed; they are scattered by the water molecules, which sends some of them out of the lake and into our eyes.

If Crater Lake was dirtier (or shallower), other colors would be returned to our eyes, too. They'd be scattered by particles (or reflected off the bottom) before being absorbed.

Does the water level vary?

Each year, the level of Crater Lake fluctuates by only 2 to 3 feet. (Winter storms make it rise; dry summers cause it to fall.) Crater Lake is like your bathtub—halfway up the side, there's an overflow drain. The lake experiences twice as much precipitation as evaporation, but the caldera doesn't fill up because water seeps out through a porous rock layer along the north shore. Water leaks out at a rate of 2 million gallons every hour! The water goes deep underground and does not feed any nearby springs or rivers.

Does the lake freeze?

Ice rarely forms on Crater Lake, except during the coldest of winters. The lake contains a tremendous amount of water (5 trillion gallons) but has a relatively small surface area. The lake has not frozen over since 1949.

How did Crater Lake form?

Crater Lake occupies the shell of Mount Mazama, a collapsed volcano. The volcano once stood 12,000 feet (3,600 meters) tall, but its summit imploded after a major eruption 7,700 years ago. The eruption was probably 100 times the magnitude of the 1980 eruption at Mount St. Helens.

How do we know it happened 7,700 years ago?

Mount Mazama's caldera-forming eruption produced pyroclastic flows of ash and pumice that flattened the forests growing on the mountain. The age of the eruption has been determined by carbon-dating tree remains buried in the ash deposits.

Is Wizard Island the former summit of Mount Mazama?

Wizard Island is not the peak of the old mountain. It's a newer volcano—a cinder cone—that erupted out of the lake around 7,300 years ago. Three other eruptions have occurred in the lake since its formation, all

underwater. The most recent was a lava dome that grew to within 95 feet (29 meters) of the surface 4,800 years ago.

Could Mount Mazama erupt again?

According to geologists, future eruptions are almost guaranteed. This is one of 18 volcanoes in the United States that the US Geological Survey considers to pose a "very high threat" to human life and property. A major eruption, however, is not likely to happen again for thousands of years; the magma reservoir beneath Crater Lake has not had sufficient time to recharge itself.

Has the bottom of the lake been explored?

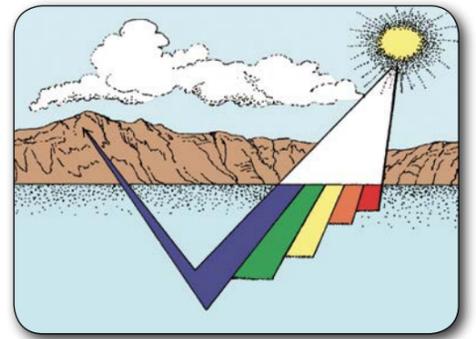
In the summers of 1988 and 1989, a one-person submarine called Deep Rover made 47 trips to the bottom of the lake. There, researchers discovered some amazing features: hydrothermal springs, 30-foot-tall chimneys of rock precipitated from the upwelling fluids, blue pools of mineral-rich water, and puffy mats of yellow bacteria surviving in the dark by oxidizing iron for energy.

Does anything live in the lake?

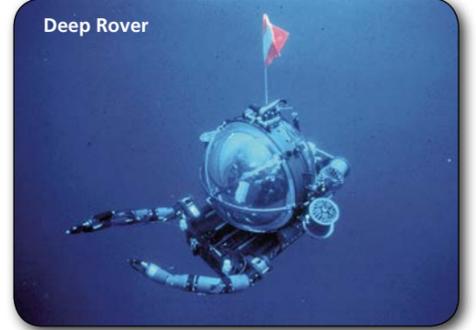
The lake is home to a variety of insects, worms, snails, amphibians, and small crustaceans. Most of the biomass in Crater Lake, however, is plant-based: aquatic moss carpets the floor of the lake at depths of 80 to 460 feet (25 to 140 meters). Nowhere else in the world does moss grow so far below the surface, a testament to Crater Lake's clarity and transparency to sunlight.

Are there fish in the lake?

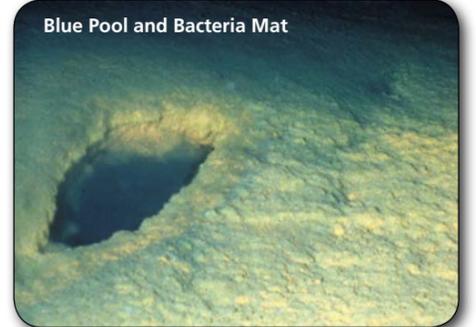
Crater Lake contained no fish until it was stocked for recreational fishing between 1888 and 1941. Six species were introduced, but only two have survived: rainbow trout and kokanee salmon. In 1915, crayfish were also added to the lake, as trout food. Recently, their population has exploded: 80% of the shoreline is now crayfish territory, and they've been found living at depths of up to 800 feet (250 meters). Like miniature vacuum cleaners, they eat everything in their path, reducing the abundance and diversity of native organisms.



Deep Rover



Blue Pool and Bacteria Mat



It's a Buoy!

Say Hello to the Park's New Weather Station

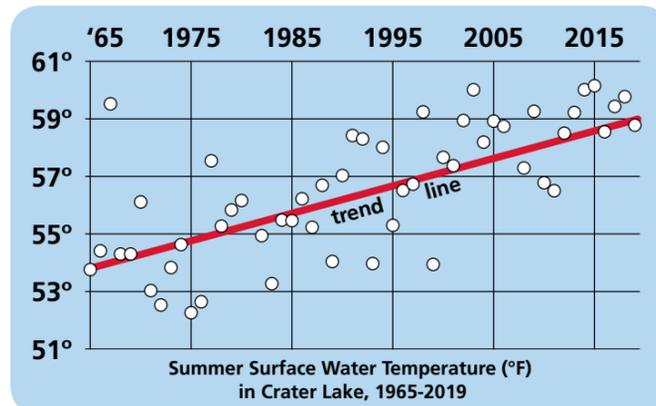
Park scientists are expecting an important delivery this summer. They have ordered a brand new weather station (purchased with funding from park entrance fees) and are excited to announce that it will be a buoy—a very big buoy! Due to arrive in late July, it will weigh 1,100 pounds and stand 9½ feet tall. It will be transported in three pieces, by tractor, down the Cleetwood Cove Trail, where it will be assembled and moved into position directly above the lake's deepest point. There, anchored to the bottom, it will collect data to help researchers study, among other things, how climate change is affecting Crater Lake.

Outwardly, the new buoy will resemble the park's current weather buoy (pictured to the right), which will be retired after 29 years on the job. And, like the current buoy, the new one will monitor a range of atmospheric and hydrologic conditions (air temperature, water temperature, wind speed, wind direction, humidity, and barometric pressure) while transmitting the data via radio signal to Park Headquarters, where it can be accessed

online (type "Crater Lake Mesowest stations" into a search engine). The National Weather Service is one regular user of the data; forecasters rely on real-time readings from Crater Lake to issue weather watches and warnings for this part of Oregon.

Despite its familiar appearance, the new buoy will possess a handful of capabilities that its predecessor does not. It will be outfitted, for example, with a sensor that can measure the height, period, and direction of waves on the lake. In the summer, this information will help park staff determine if conditions are safe for boat tours to operate, prior to each departure. In the winter, we'll learn—for the first time—how big the waves can get on Crater Lake during major winter storms.

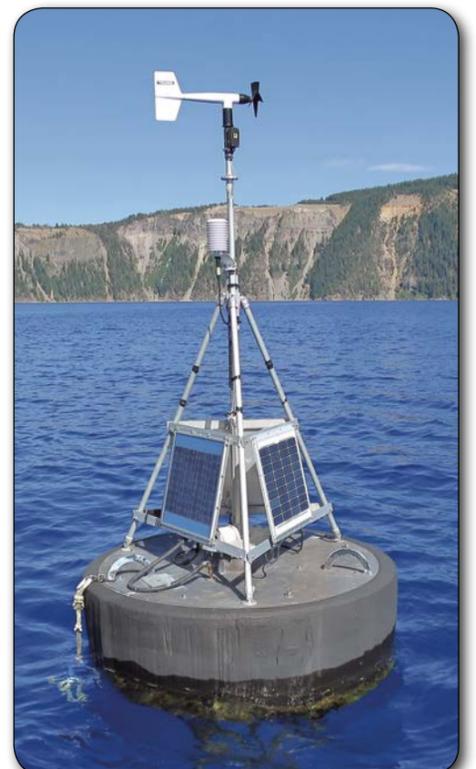
Other instruments will reveal how weather conditions above the lake are interacting with processes in the lake, such as algae formation and deep-water mixing. One will measure the level of dissolved oxygen in the water, another will detect the density of particles and concen-



Crater Lake is getting warmer. Since 1965, when scientists began keeping track, the average summer water temperature at the lake's surface has increased by 5° Fahrenheit (2.8°C). While this might be good news for people who swim in Crater Lake, it's probably not good news for the lake's native organisms. Warm surface water has trouble mixing with the cold water beneath it, limiting the circulation of oxygen and nutrients in the water column.

tration of chlorophyll at the surface, and a third will quantify how much light is entering the lake (i.e. cloudy vs. sunny skies). Temperature records from the current buoy have shown that the surface of Crater Lake is getting warmer (see the graph above); now researchers are seeking to understand how warmer water is impacting the lake's circulation and ecology.

If you'd like to wave hello to the park's new buoy (or wave goodbye to the old one, which will be removed soon after the new one is up and running), stop at one of the pullouts on the northeast side of the lake and look for a dark dot just over a mile from shore.



The park's current weather buoy has been operating on Crater Lake since 1991. Unfortunately, damage from wind, waves, snow, and ice has reduced the buoyancy of its foam core and compromised its electrical system.

Climate Chart

Summers at Crater Lake are short but generally warm and sunny. July, August, and September are your best bets for clear, dry weather. In May, June, and October, sunny days alternate with periods of rain and snow. Winters are long and snowy. Storms from the Pacific Ocean dump an average of 42 feet (13 meters) of snow at Park Headquarters. The park's tremendous snowfall is a result of its position at the crest of the Cascade Mountains.

Air temperature and snowfall averages are from Park Headquarters, 1931-2019. Water temperatures are from the years 1965-2019.

FAHRENHEIT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Daily High (°F)	34	35	37	42	50	58	69	69	63	52	40	34
Average Daily Low (°F)	18	18	19	23	29	34	41	41	37	31	24	19
Average Snowfall (inches)	100	81	83	45	19	4	0.2	0.1	3	21	61	93
Avg. Snow Depth (inches)	78	100	115	110	75	23	1	0	2	16	47	
Avg. Lake Surface Temp. (°F)	39	38	37	38	40	47	57	60	57	51	44	40

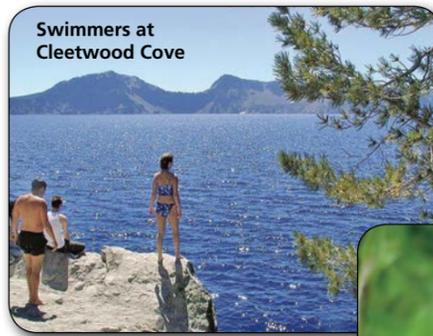
CELSIUS	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Daily High (°C)	1	2	3	6	10	15	21	21	17	11	4	1
Average Daily Low (°C)	-8	-8	-7	-5	-2	1	5	5	3	-1	-5	-7
Average Snowfall (cm)	254	206	211	115	49	9	0.5	0.3	7	53	155	237
Avg. Snow Depth (cm)	199	254	291	280	191	59	3	0	1	6	42	119
Avg. Lake Surface Temp. (°C)	4	3	3	3	4	8	14	16	14	10	7	5



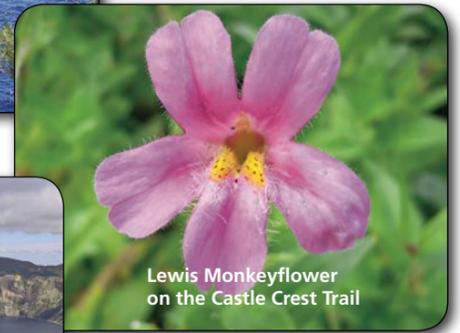
Let's Go Hiking!

Hi, I'm Ranger Madeline. We have 90 miles (145 km) of hiking trails here at Crater Lake. Our most popular day hikes are listed on this page. If you are visiting in June or early July, be aware that some trails might still be closed by snow. Please help us protect this special place by following a few important rules:

- ⚡ No hiking or climbing inside the caldera! The walls are dangerously steep and unstable. The one exception is the Cleetwood Cove Trail, the only legal access to the lake shore.
- ⚡ Leave all rocks, plants, animals, and artifacts undisturbed for the enjoyment of future hikers.
- ⚡ Overnight backpacking requires a permit, available at Park Headquarters between 8:00 am and 4:30 pm. Some areas are not open to backcountry camping.
- ⚡ Pets are allowed on the Godfrey Glen Trail, Lady of the Woods Trail, and Pacific Crest Trail. Pets must be leashed; only one pet per hiker (see page 2).
- ⚡ To protect vegetation and prevent erosion, please stay on the trails.



Swimmers at Cleetwood Cove

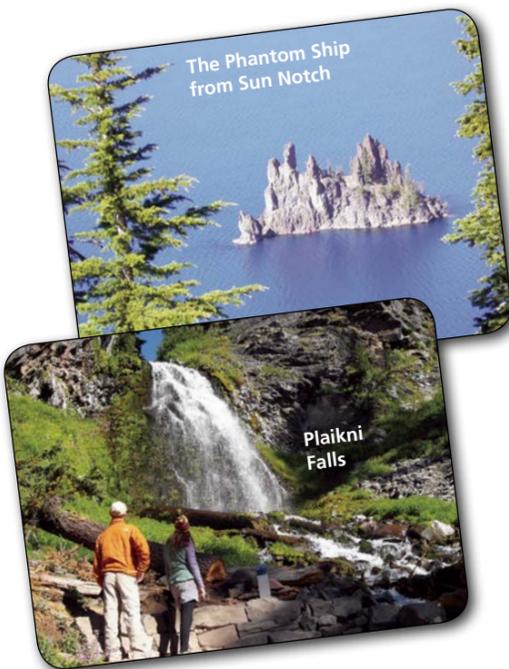


Lewis Monkeyflower on the Castle Crest Trail



Hiker atop Garfield Peak

Castle Crest	Lady of the Woods	Sun Notch	Trail	The Pinnacles	Godfrey Glen	Plaikni Falls
0.5 miles (0.8 km) loop trail	0.7 miles (1.1 km) loop trail	0.8 miles (1.3 km) loop trail	<i>Roundtrip</i>	0.8 miles (1.3 km)	1.1 miles (1.8 km) loop trail	2.0 miles (3.2 km)
100 feet (30 meters)	120 feet (37 meters)	150 feet (46 meters)	<i>Elevation Gain</i>	10 feet (3 meters)	50 feet (15 meters)	100 feet (30 meters)
20 minutes	30 minutes	30 minutes	<i>Time</i>	30 minutes	30 minutes	1 hour
Flowers, Meadow, Creek	Historic Architecture	Views of Phantom Ship	<i>Highlight</i>	Volcanic Spires	Peaceful Forest	Waterfall, Flowers
Loop trail through a lush meadow. Abundant wildflowers in July. The trail is rocky and slippery in places. Self-guiding brochures are available at the trailhead.	Loop trail around Park Headquarters. Self-guiding brochures, available at the trailhead, describe how early park architects integrated their designs with the natural landscape.	Short uphill walk through a meadow to the rim of Crater Lake. Great views of the Phantom Ship. Use caution near cliff edges. Accessible to strong, all-terrain wheelchair users with assistance.	<i>Description</i>	Easy walk along the rim of Pinnacle Valley. Great views of volcanic spires. Use caution near cliffs. Trail ends at park boundary. Accessible to all-terrain wheelchair users with assistance.	Easy stroll through an old-growth forest. May be closed for construction for much of 2020. Accessible to all-terrain wheelchair users with assistance. Self-guiding brochures are available at the trailhead.	Easy walk through an old-growth forest to a waterfall. Many flowers in July. The first ¾ is accessible to all-terrain wheelchair users with assistance, but the final ¼ might be too steep.
East Rim Drive, 0.5 miles (0.8 km) east of Park Headquarters. Can also access from the Steel Visitor Center.	Behind the Steel Visitor Center, on the south side of the building.	East Rim Drive, 4.4 miles (7.1 km) east of Park Headquarters.	<i>Trailhead Location</i>	End of the Pinnacles Road, 6 miles (9.7 km) southeast of the Phantom Ship Overlook.	2.4 miles (3.9 km) south of Park Headquarters.	Pinnacles Road, 1.2 miles (1.9 km) southeast of the Phantom Ship Overlook.
The flowers here are nourished by springs emerging from the hillside.	The trail's name refers to a sculpture of a woman carved into a boulder along the trail.	This U-shaped valley was carved by glaciers that once flowed down Mt. Mazama.	<i>Nature Note</i>	The Pinnacles are chimneys formed when hot ash cooled after the big eruption.	Trail is named after William Godfrey, a ranger who died in a blizzard here in 1930.	Snowmelt, not Crater Lake, is the source of Plaikni Falls' water.
Easy				Easy		

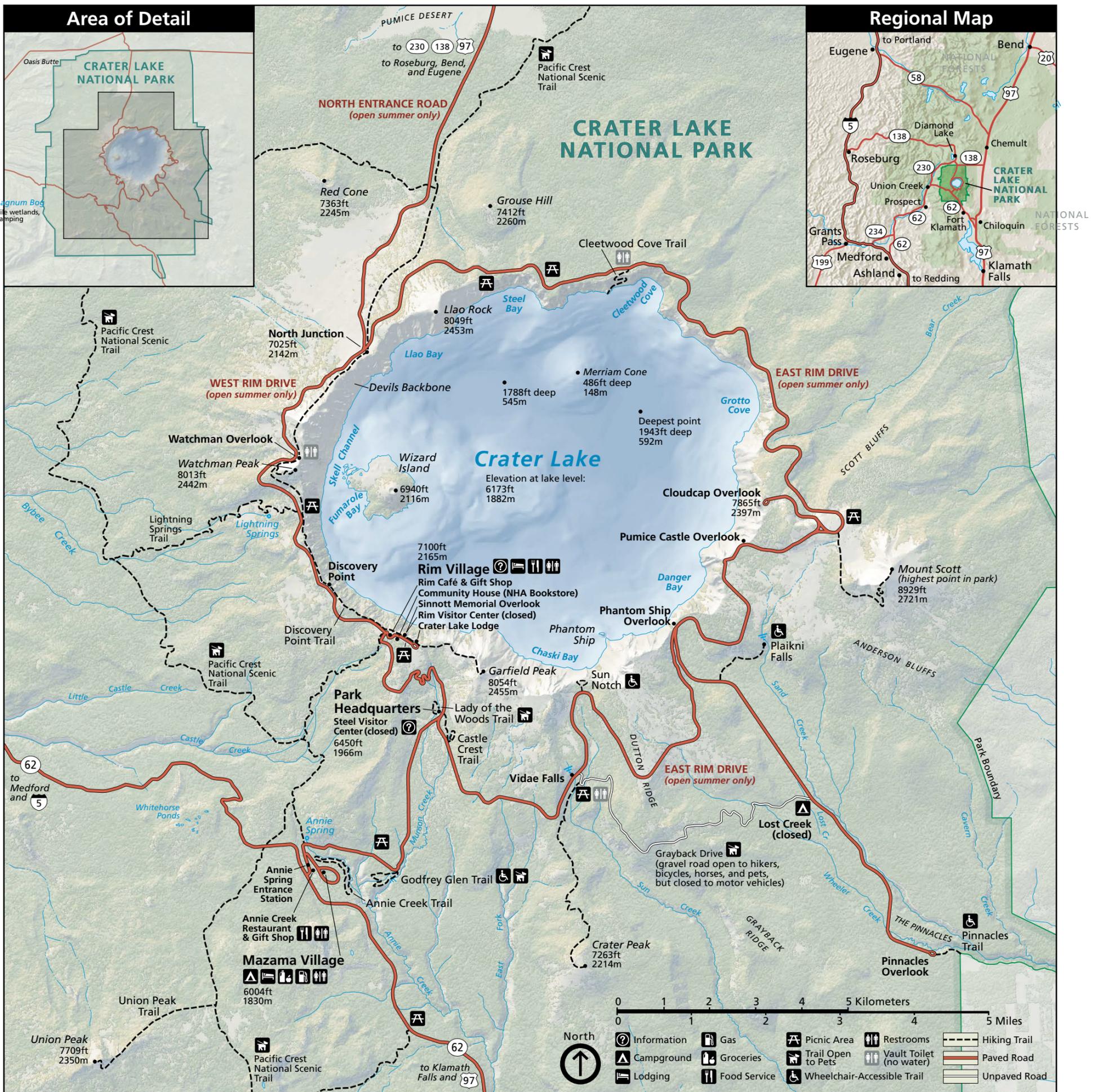


The Phantom Ship from Sun Notch

Plaikni Falls

Discovery Point	Trail	Watchman Peak	Annie Creek	Boundary Springs
2.0 miles (3.2 km)	<i>Roundtrip</i>	1.6 miles (2.6 km)	1.7 miles (2.7 km) loop trail	5.0 miles (8.0 km)
100 feet (30 meters)	<i>Elevation Gain</i>	420 feet (128 meters)	200 feet (61 meters)	400 feet (122 meters)
1 hour	<i>Time</i>	1 hour	1½ hours	3 hours
Lake Views	<i>Highlight</i>	Panoramic Views	Creek, Canyon, Flowers	Springs, Stream, Flowers
Trail along the rim of Crater Lake through a pretty forest of whitebark pines and mountain hemlocks. Great views of the lake and Wizard Island. Use caution near cliff edges.	<i>Description</i>	Moderate ascent to a fire lookout above Wizard Island. Spectacular views in all directions. Great place to watch the sunset. Trail may be closed until mid-July due to snow.	Moderately strenuous hike through a deep, stream-cut canyon. Lots of water, wildflowers, and sometimes wildlife. Self-guiding brochures are available at the trailhead.	Moderate walk to the headwaters of the Rogue River (see photo on back page). Trail starts outside the park's northwest corner and is shown on the map in the official park brochure.
West end of Rim Village, where the paved walk becomes a dirt path. Can also start from Discovery Point.	<i>Trailhead Location</i>	Watchman Overlook, 3.8 miles (6.1 km) northwest of Rim Village on the West Rim Drive.	Mazama Campground, behind the amphitheater (between loops D and E). Limited parking in Loop E.	Pullout on Highway 230 near milepost 19, 5 miles (8 km) west of the junction with Highway 138.
Gold prospector John Wesley Hillman first spotted Crater Lake near this point in 1853.	<i>Nature Note</i>	Built in 1932, the peak's historic fire lookout is still used by rangers today.	The canyon is carved into a layer of ash—200 feet (60 m) thick—from the big eruption.	The trail passes through a forest blackened by wildfire in 2015.
Moderate				

Cleetwood Cove	Garfield Peak	Mount Scott	Trail	Crater Peak	Union Peak	Pacific Crest
2.2 miles (3.5 km)	3.6 miles (5.8 km)	4.4 miles (7.1 km)	<i>Roundtrip</i>	6.5 miles (10.5 km)	9.8 miles (15.8 km)	2,650 mi (4,265 km) 1-way
700 feet (213 meters)	1,010 feet (308 meters)	1,250 feet (381 meters)	<i>Elevation Gain</i>	765 feet (233 meters)	1,600 feet (448 meters)	489,000 feet (149,000 m)
1½ hours	2 to 3 hours	3 hours	<i>Time</i>	3½ hours	5 to 6 hours	5 months
Swimming, Fishing	Panoramic Views	Panoramic Views	<i>Highlight</i>	Forest, Views, Solitude	Panoramic Views	Adventure, Achievement
The only legal access to the shore of Crater Lake. Strenuous trail with a steep grade, leading to a rocky shoreline. See page 3 for information on swimming and fishing.	Rocky climb to a high peak. Spectacular views along the way and at the top. Diverse plant life, many wildflowers. Top section may be closed until mid-July due to snow. Use caution near cliff edges.	Gradual ascent of the park's highest peak. Great views in all directions. Best in the morning, when the light is ideal for lake viewing. May be closed until mid-July due to snow.	<i>Description</i>	Moderate-to-strenuous hike to the summit of a small volcano. No lake views, but fine views of the Klamath Basin to the southeast. A peaceful walk through forests and meadows.	Long forest walk followed by a very steep climb. Great views from the top and interesting geology, but no view of Crater Lake. Top section may be impassable until mid-July due to snow.	In a typical year, several thousand PCT hikers pass through the park on their way from Mexico to Canada (or vice-versa). To walk in their footsteps, visit one of the park's two trailheads.
North side of the lake, 11 miles (17.6 km) from Rim Village if traveling clockwise on Rim Drive.	East end of Rim Village. Follow the paved promenade behind Crater Lake Lodge.	East Rim Drive, 14 miles (22.5 km) east of Park Headquarters.	<i>Trailhead Location</i>	East Rim Drive, 3 miles (4.8 km) east of Park Headquarters at the Vidae Falls Picnic Area.	Highway 62 at the Pacific Crest Trailhead, 1 mile (1.6 km) west of the Crater Lake road junction.	The Pacific Crest Trail makes two road crossings in the park. Each has a parking lot. See the map to the right.
In August, the average water temperature at the lake's surface is 60°F (16°C).	Rocky slopes along the trail are home to American pikas and yellow-bellied marmots.	Mount Scott is the park's highest peak—8,929 feet (2,721 meters) in elevation.	<i>Nature Note</i>	Upper Klamath Lake is the largest in Oregon, but its average depth is only 14 feet.	Union Peak is the core of an old volcano eroded by ice-age glaciers.	To see Crater Lake, most PCT hikers leave the official trail and walk along the West Rim.
Strenuous				Strenuous		



Highlights of the Rim Drive

The 33-mile (53-km) Rim Drive around Crater Lake is one of America's most scenic byways. The full loop is typically open from early July to late October. It can be driven, without stopping, in about an hour, but plan on at least 2 to 3 hours to enjoy the varied sights. The road is narrow, so use caution and be alert for bicyclists, pedestrians, and wildlife. There are more than 30 scenic pullouts along the way, many of which have roadside exhibits. Be sure not to miss these 7 "must-see" stops. For more information, pick up the excellent *Road Guide to Crater Lake National Park* (48 pages, \$7.95) at the bookstore in the Community House at Rim Village.



East Rim Drive

Discovery Point

Imagine seeing Crater Lake by accident. It was near this spot, on the back of a mule in 1853, that gold prospector John Hillman became the first European-American to stumble across what he called "Deep Blue Lake."

Watchman Overlook

This pullout offers an unmatched view of Wizard Island, a cinder cone that erupted out of Crater Lake approximately 7,300 years ago. To find it, drive 3.8 miles (6.1 km) west of Rim Village and look for a viewpoint lined with wooden fences.

Cloudcap Overlook

This overlook sits at the end of a 1-mile (1.6-km) spur road, the highest paved road in Oregon. Whitebark pines cling for survival here, dwarfed and contorted by the harsh winds.

Pumice Castle Overlook

Stop here to see one of the park's most colorful features: a layer of orange pumice rock that has been eroded into the shape of a medieval castle. Watch carefully for this unmarked viewpoint, located 1.1 miles

(1.8 km) west of the Cloudcap Overlook junction and 2.4 miles (3.9 km) east of the Phantom Ship Overlook.

Phantom Ship Overlook

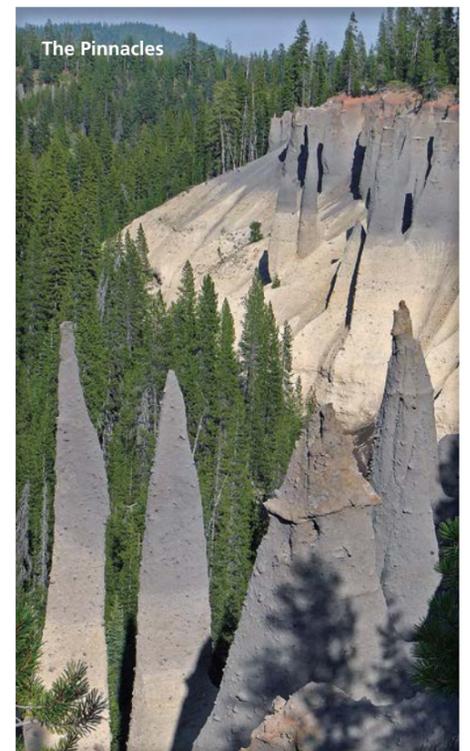
Nestled against the shore, Crater Lake's "other island" escapes detection by many park visitors. Though it resembles a small sailboat, the island is as tall as a 16-story building. It's made of erosion-resistant lava, 400,000 years old—the oldest exposed rock within the caldera.

Pinnacles Overlook

This overlook is well worth the 6-mile (10-km) detour from Rim Drive. Colorful spires, 100 feet (30 meters) tall, are being eroded from the canyon wall. The Pinnacles are "fossil fumaroles" where volcanic gases once rose up through a layer of volcanic ash, cementing the ash into solid rock.

Vidae Falls

Look for this cascading waterfall between Phantom Ship Overlook and Park Headquarters. A spring-fed creek tumbles over a glacier-carved cliff and drops 100 feet (30 meters) over a series of ledges. In summer, wildflowers flourish in the cascade's spray.



The Pinnacles

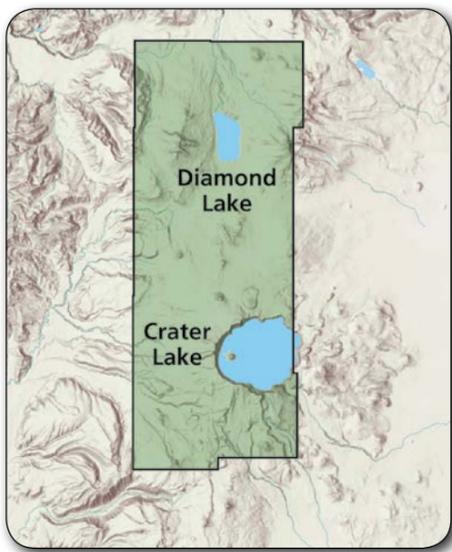


Figure 1. In 1886, William Steel proposed a national park that included both Crater Lake and Diamond Lake. He didn't realize that the boundary he'd specified left out some of Crater Lake's eastern shore.

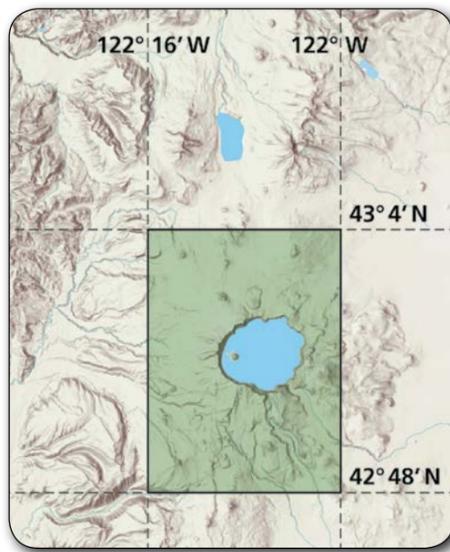


Figure 2. In 1898, Joseph Diller corrected Steel's error, but chose to exclude Diamond Lake. His boundary (which became the park's official boundary in 1902) mirrored that of a topographic map he'd helped to produce.



Figure 3. In the years that followed, William Steel and Stephen Mather tried to recapture Diamond Lake. In 1920, a bill to revise the park's boundary passed the US Senate but died in the House of Representatives.

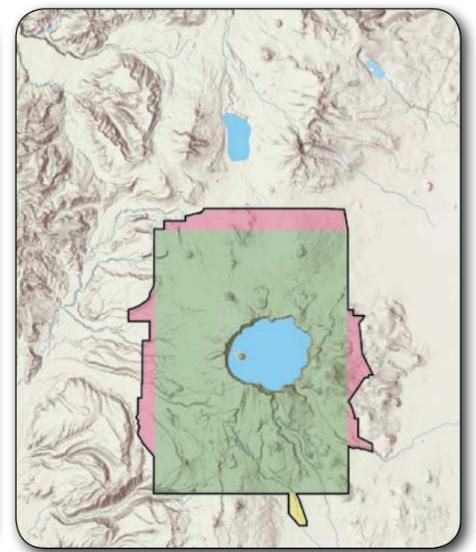


Figure 4. The park's current shape reflects additions made in 1932 (shown in yellow) and 1980 (shown in pink). In both cases, the land added to the park was transferred from the US Forest Service.

Drawing the Line: The Evolution of the Park's Boundary and the Battle Over Diamond Lake

One hundred years ago, Crater Lake National Park nearly became much larger. On April 5, 1920, the US Senate passed a bill that would have increased the size of the park by 92,800 acres, expanding its territory northward to include Diamond Lake, Mount Thielsen, and Mount Bailey. The bill's leading advocate, National Park Service director Stephen Mather, argued that the addition was "intended by nature." After all, Crater Lake and Diamond Lake are fraternal twins, both created 7,700 years ago by the cataclysmic eruption of Mount Mazama. (As the mountain's summit collapsed to form the basin now occupied by Crater Lake, a pyroclastic flow from the volcano impounded a creek to form Diamond Lake.) "This remarkable lake," wrote Mather of Diamond Lake, "with its stately forests, its broad sandy beaches, its rugged mountains, and its unexcelled opportunities for bathing and fishing, naturally belongs to the park." To commemorate the centennial of the Senate's approval of the bill, let's revisit this largely forgotten chapter in the park's history and examine the interesting evolution of the park's boundary over time. Why did the bill not become law? Why isn't Diamond Lake part of the park today? What accounts for the park's present size and proportions? And how did a round lake end up in the middle of a (roughly) rectangular park? As we'll see, national park boundaries often have less to do with natural features than with politics, peculiar circumstances, and the preferences of the people who draw the lines.

Whether or not "nature" intended for the park to include Diamond Lake, such was definitely the intention of the park's founding father, William Steel. Steel, a resident of Portland, journeyed to Crater Lake in the summer of 1885 as a tourist. Arriving at the rim, he found himself awed—and inspired to act. "Not a foot of the land about the lake had been touched or claimed," he later recounted. "An overmastering conviction came to me that this wonderful spot must be saved, wild and beautiful, just as it was, for all future generations, and that it was up to me to do something." Returning home, Steel drafted a petition that quickly gained the support of the state's newspaper editors, business leaders, elected officials, and public. It called on the president of the United States to issue an executive order to give temporary protection to Crater Lake and its environs (including Diamond Lake) while Congress undertook proceedings to establish a national park of the same dimensions—an area of 10 townships, 30 miles long by 12 miles wide (see Figure 1, above). The aim was to prevent the

territory from being settled, claimed, or parceled out before Congress could act. "Crater Lake," the petition stated, "is one of the natural wonders of the United States, if not of the world. It is a portion of the unappropriated vacant domain of the Government, and, in the opinion of your petitioners, should be . . . preserved as a Public Park for the people of the United States; to wit: Townships 27, 28, 29, 30, and 31 South, Ranges 5 and 6 East of the Willamette meridian." When presented with this petition, and at the urging of Oregon's congressional representatives, President Grover Cleveland signed the proposed decree on February 1, 1886.

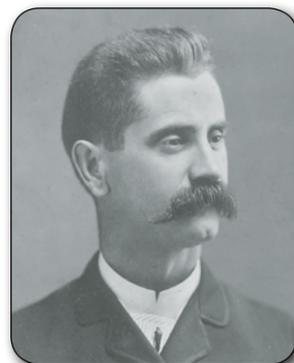
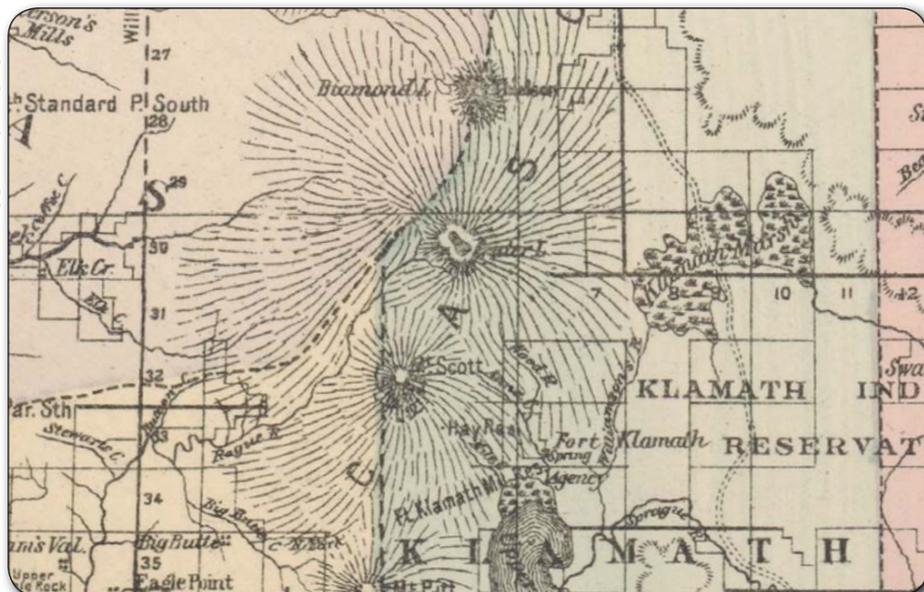
Unfortunately, there were two slight problems. First, many members of Congress were in no mood to follow through with the plan. Bills to establish Crater Lake National Park died in committee in both chambers in 1886, 1887, and 1892. The issue was not the park's worthiness, or its proposed size. It was rather that key legislators were opposed to the creation of national parks in general, worried that they'd become a drain on the national treasury. Federal parks would need Congressional funding for administration, visitor services, and infrastructure. Second, it slowly became evident that the park's proposed boundary, while fully embracing Diamond Lake, failed to capture the full expanse of Crater Lake. In choosing which townships to protect, William Steel had miscalculated. In his defense, Oregon's mountains had not been properly surveyed at that time (see the map below), so estimating the true position of Crater Lake relative to the township grid was essentially a stab in the dark. John Wesley Powell, the director of the US Geological Survey, may have been the first to notice the error. When asked by a Kansas senator to comment on the 1887 bill, he began by calling it "eminently wise and proper." Powell continued: "Crater Lake and Diamond Lake and their surroundings constitute a group of natural objects which will, in my belief, acquire increasing celebrity with the lapse of time. In respect to beauty and impressiveness this scenery is of the same order as that of Yosemite Valley or the finest parts of Yellowstone Park." But then, he warned: "I respectfully submit that great care and caution should be used at the outset to specify with accuracy the boundaries of the tract. . . . The eastern boundary will come very close to the eastern margin of Crater Lake, and . . . it is possible that the real position of the boundary, when it comes to be surveyed and marked, would run into the lake. . . . It would be well to leave the eastern boundary several miles further eastward."

The task of adjusting the proposed boundary eventually fell to USGS geologist Joseph Diller, a decade later. Diller was intimately familiar with Crater Lake, having been sent by Powell to study its formation in 1883 as part of the first USGS expedition to the area. He'd made a second visit in 1886 at the invitation of Steel, becoming a champion of Steel's national park idea and developing the now-accepted theory that Mount Mazama imploded rather than blew apart. In revising

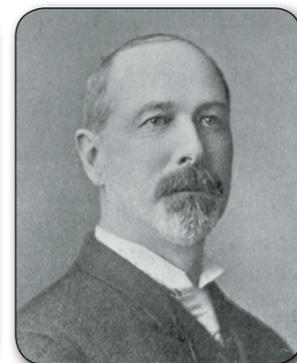


The sharp summit of Mount Thielsen (9,182 feet tall) towers over Diamond Lake and the Umpqua National Forest. Known as the "Lightning Rod of the Cascades," the peak is the glaciated remnant of an extinct volcano. In 1920, the area in this photo nearly became part of Crater Lake National Park.

the boundary, Diller did more than just shift the eastern edge. He made changes on all sides, resulting, most notably, in the elimination of Diamond Lake from the proposed reservation (see Figure 2). Instead of defining the park in terms of uncertain townships, he opted to fit each edge to a line of latitude or longitude. This made good practical sense—but why did he reduce the park's northern extent? To this day, the answer is unclear. It's possible that the move was strategic, designed to increase the likelihood that Congress would consent. In those days, park proponents were often asked to prove that the lands up for protection were commercially "worthless." Diller, for example, in a letter submitted to Congress in support of the first bill to feature his new boundary, wrote that the Crater Lake region "is well situated for a park, but is unfit for any other purpose. It contains no agricultural land, for at an average altitude of nearly 7,000 feet it is far above the limit of cereals. It is well timbered, but the timber is of no value for lumber. Its rocks are all fresh lavas and contain nothing whatever of value to the miner. Making the region a national park, therefore, would in no way conflict with the interests of the farmer, the miner, or the lumberman." Was Diller worried that lawmakers might view the Diamond Lake area as potentially valuable to these constituencies? Perhaps, but they hadn't made that claim in the past. It seems equally likely that Diller's decision



William Steel (1854–1934) was the park's founding father and second superintendent.



Joseph Diller (1850–1928) was the first geologist to study Crater Lake and its formation.



Stephen Mather (1867–1930) served as the first director of the National Park Service.

In the 1880s, much of Oregon had yet to be surveyed. As a result, maps were not very accurate. Township lines were incomplete, and features were often mislocated and mislabeled. It's easy to see how a map like this one, from 1887, might have led William Steel astray when he tried to determine which townships to protect to establish a park around Crater Lake and Diamond Lake. (The townships are the small squares on the map. Roughly 6 miles on each side, they were used to parcel out lands as the nation expanded. Crater Lake—with an oversized Wizard Island—is in the middle.)

to exclude Diamond Lake was more a matter of personal preference and, perhaps, convenience. In 1896, Diller had been involved in publishing the first USGS topographic map centered on Crater Lake. Like many maps of the era, its scale was 1 to 62,500, with one inch representing about one mile. Such maps were commonly known as “15-minute maps,” because they typically had room to display about 15 minutes of latitude and 15 minutes of longitude per sheet. It can’t be a coincidence that Diller’s chosen dimensions for the park were nearly identical to those of the USGS topo map he’d helped to produce. (They were just a fraction larger, taking in 16 minutes of latitude and 16 minutes of longitude.) Diller may have decided to forgo Diamond Lake simply because it didn’t fit on the map.

Whatever his motivation, and despite his revisions, the first few bills to incorporate Diller’s borders—in 1898, 1899, and 1900—succumbed to a familiar fate. In the House, the Speaker refused to let them come to a vote, concerned about their financial implications. The following year, though, when Theodore Roosevelt assumed the US presidency after the assassination of William McKinley, Steel and other park advocates saw their chance. They appealed directly to the conservation-minded president, who, in turn, pressured the Speaker to allow a floor vote. The bill was approved by the House, sailed through the Senate, and was signed into law by President Roosevelt on May 22, 1902, at last establishing Crater Lake National Park. As might be imagined, William Steel was delighted. Still, he was not completely satisfied with the borders of the 159,317-acre preserve, and over the next decade he tried to spark interest in reclaiming Diamond Lake. The effort gained momentum in 1913, when Steel became the park’s second superintendent, and in 1917, when Stephen Mather was appointed the first director of the fledgling National Park Service. Mather persuaded an Oregon senator to advance a bill extending the park’s northern reach by 9 miles (see Figure 3), and, in 1920, the Senate voted to approve.

A variety of arguments were put forth to justify the expansion. Mather deemed it necessary in order to “make this park as great a resort” as the other “very big national parks.” The Secretary of the Interior elaborated on Mather’s vision in the report that accompanied the bill: “Crater Lake National Park . . . while containing one of the most striking scenic attractions of the whole world, is known as the park with only the one attraction. . . . For this reason it does not draw the visitor as do some of the other parks with diversified scenery. . . . By enlarging the park northward as contemplated, important new attractions will be added. Diamond Lake, flanked by the snowy crest of Mount Thielsen on the east and the rugged outline of Mount Bailey on the west, will be a fit complement to the giant crater to the south and fulfill the ultimate destiny of the park as a gathering ground for the people. The country about Diamond Lake is undoubtedly one of the finest potential summer resorts in the entire Cascade range. There is excellent fishing in the lake. The broad open grass-covered reaches and the numerous small streams in the neighborhood offer unexcelled camping sites. The lake itself is so shallow at places that the bather can walk for hundreds of feet into the water without danger. . . . and . . . despite its elevation of 5,200 feet, the water is warm enough for comfortable bathing.” In addition to broadening the park’s recreational appeal, the bill’s supporters claimed that it would also help protect park resources. The park’s wildlife, for example, would now have access to a protected, lower-elevation retreat, where they could spend the winter, safe from hunting. And if the park located most of its facilities at Diamond Lake, the rim of Crater Lake could be spared from overdevelopment. Proponents also predicted that enlarging the park would boost Oregon’s economy. “Tourists would stay much longer in the state,” wrote the editors of Portland’s *Evening Telegram*, “and more of them would come.” One of the more interesting statements in support of the bill was made by George Goodwin, the chief civil engineer of the National Park Service. He believed that, for tourists, Diamond Lake was the perfect “antithesis” to Crater Lake, a place where they “would have an opportunity to camp, boat, bathe, fish, and to rest and relax. . . . It is true that rest and relaxation can be obtained at Crater Lake . . . but for some Crater Lake possesses the quality of awing and appalling, and for a few an enervating effect, and while they exclaim over its wonders, they do not receive from it the rest, peace, and enjoyment which . . . all should receive from a visit to a national park.”

Once the Senate gave the bill its blessing, many observers expected that the House of Representatives would follow suit. The *Medford Mail Tribune* reported that “the outlook . . . seems rosy.” The bill stalled, however, in the House Committee on Public Lands, in the face of stiff opposition from Diamond Lake’s new landlord—the US Forest Service. The bureau had been founded 15 years earlier, in 1905, when control of the country’s forest reserves was transferred from the Department of the Interior to the Department of Agriculture. When asked for his opinion on Diamond Lake, the Secretary of Agriculture asserted: “It has no particular scenic value.” Forest Service managers insisted that the area was more valuable for commercial use than for recreation. Among the uses they envisioned were logging, sheep and cattle grazing, and damming the lake for water storage and power generation. (Years later, NPS officials would allege that the USFS had intentionally overstated the area’s commercial potential and downplayed its recreational value, citing Forest Service plans to develop it as resort themselves.) Local opinion, for the most part, sided with the Forest Service. The Klamath County Wool Growers Association, for example, warned that the “annexation” would create “a breeding ground for wolves and other predatory animals.” Local recreationists favored the status quo because they appreciated the Forest Service’s permissive stance on hunting and pets, and its willingness (continued on back page)



So far, about 60 butterfly species have been spotted in the park by professional entomologist Dana Ross and his team of volunteer lepidopterists, pictured here. From left to right: Gary Pearson of Springfield, Oregon; Sean Mohren, the park’s terrestrial ecologist; and Linda Kappen of Applegate, Oregon.



The California tortoiseshell (*Nymphalis californica*) is one of the park’s most common butterflies. Some years, they fly by the thousands over the park’s high country. The caterpillars feed on species of wild lilac (*Ceanothus*), while the adults drink nectar from variety of flowers.

Lepidoptera Survey Reveals Hundreds of Species

Butterflies and moths are some of the most visible residents of Crater Lake National Park. Yet, despite their ubiquity, we tend to overlook them—especially when our eyes are focused on the lake—and we know surprisingly little about their presence here. (The last attempt to list the park’s butterfly species took place 60 years ago, and no one has ever tried to inventory the park’s moths.) Lately, however, researchers have been making strides to catalog the diversity of these important members of the park’s ecosystem.

Collectively, butterflies and moths make up a subset of insects known as Lepidoptera—a word that means “scaly wings” in Greek. Their wings consist of translucent membranes covered with scales that overlap like roof shingles. It’s the scales that give these animals their wide variety of colors and patterns. Butterflies tend to be more colorful than moths. Most are active during the day, have slender antennae that end in small knobs, and prefer to rest with their wings pointed to the sky. Most moths are active at night, have “unclubbed” antennae, and rarely perch with upright wings.



Moth traps are used to sample the park’s nocturnal Lepidoptera. A battery-powered, ultraviolet bulb is suspended over a bucket containing a gaseous pesticide.

The latest effort to sample the park’s Lepidoptera was launched in July of 2014, when the park undertook a one-day Butterfly BioBlitz. A “BioBlitz” is a quick assessment of the number of living things in a particular place. With the help of Dana Ross—an entomologist affiliated with Oregon State University who specializes in Lepidoptera—small teams made up of scientists, volunteers, park staff, and students fanned out across the park and documented the species they encountered. Ross returned to the park in 2015 and 2019, making a total of 6 more visits. On each trip, he and several volunteers spent 4 days and 3 nights canvassing the park.

Some butterflies and moths they were able to identify in flight. Others they captured with nets, then examined and released. For most species, they also retained one or two “voucher specimens” for the park’s museum collection. To survey the park’s nocturnal flyers, they deployed special traps. Although the traps were lethal, the moths that were captured represented just a tiny fraction of the individuals in the immediate area, so there was virtually no impact on the park’s overall numbers. (Vastly more Lepidoptera are killed by automobiles, city lights, and natural predators than by scientists waving nets.)

The results of the project have been eye-opening. Thus far, within the borders of the park, Ross and his team have documented about 60 species of butterflies and more than 300 species of moths. They have also discovered two previously unknown populations of a butterfly called the Sierra Blue (*Agriades podarce klamathensis*), one of several fairly rare species that the park helps to protect. With much of the park still yet to be surveyed, Ross estimates that we may eventually record upwards of 90 butterfly species and potentially 600 to 700 types of moths.



The underside of the California tortoiseshell looks like tree bark or a dead leaf. This keeps the butterfly hidden from predators when it’s resting or hibernating. (While most Lepidoptera overwinter as caterpillars or pupae, this one survives as an adult.)

The park’s diversity of Lepidoptera is largely a reflection of the diversity and health of its native plant communities. The park is home to more than 700 native plant species and, thanks to the park’s botany crew, is relatively free from widespread invasives. Butterflies and moths undergo a 4-stage life cycle, spending time as an egg, larva, pupa, and adult. In their larval stage, they feast on native foliage. The caterpillars of most species are quite picky, foraging on just a few types of closely related vegetation. Some have only one host plant. If it disappears from the landscape, so does that species of butterfly or moth.

As adults, Lepidoptera consume nothing but liquids, which they sip through a tubular “proboscis” that functions like a drinking straw. Most adults don’t stray far from their larval host plants, but they will drink nectar from a greater number of species. In doing so, they play a critical role in plant pollination. When a butterfly or moth probes a flower in search of the sweet syrup at the base of the petals, grains of pollen get stuck to its body and legs. When the insect moves to the next flower, some of the pollen brushes off, where it can fertilize the plant’s seeds.

As you explore the park this summer, watch for Lepidoptera performing this important task. As you do, take a few minutes to notice the beauty and variety of these interesting organisms.



Project leader Dana Ross sorts through a bucket of dead moths. This one contained an abundance of pandora moths (*Coloradia pandora*). In 2019, the species experienced a population explosion. The pandora is one of 300-plus moth species that have been identified in the park so far. Pandora caterpillars feed on the needles of ponderosa pine trees. The adults do not eat or drink.

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Ski Patrollers

Volunteer Your Time

Looking for a hands-on way to help the park? Consider sharing your time and talents as a Crater Lake VIP (Volunteer-In-Parks). Full-time volunteers are needed in the summer and winter to help staff visitor centers and present interpretive programs. Opportunities are advertised several times each year at www.volunteer.gov. Volunteers are provided free housing in exchange for 3 months of service. To volunteer periodically, join The Friends of Crater Lake, a nonprofit organization whose members help with special projects and events and operate a winter information desk at Rim Village. Learn more at www.friendsofcraterlake.org. Or join the Crater Lake Ski Patrol, whose members assist winter visitors and maintain the park's cross-country ski trails. Identifiable by their bright red parkas, they receive training in wilderness first aid, search and rescue, map and compass use, and avalanche safety in exchange for at least 6 days of service. For more information, visit www.craterlakeskipatrol.weebly.com.



Kari Bertram of Coeur d'Alene, Idaho, spotted this red fox in Mazama Village. Red foxes are not always red—most at Crater Lake are silver to black.

Report Your Wildlife Sightings

Scientists need your help! If you spot any interesting animals during your visit or witness any unusual behavior, please let us know! Your observations will help us learn which animals live in the park and how they use it. In 2019, visitors and employees submitted 98 reports of 49 different species, including the northern pygmy owl, black-backed woodpecker, white-tailed jackrabbit, mountain lion, and gray wolf. To share your sighting, email craterlake@nps.gov. Let us know the date and precise location of your encounter, a detailed description of what you saw, and your name and contact info, in case we have follow-up questions. And if you captured any photos, send them along (ideally with permission for us to use them in reports and publications). Photographic evidence can be very important in confirming the identity of some species. Just remember that approaching, feeding, or disturbing wildlife is strictly prohibited—so please keep your distance. Thanks for your participation!

Buy Crater Lake License Plates

If you live in Oregon, consider choosing Crater Lake license plates for your vehicle. For a one-time charge of \$30, you can outfit your car with these beautiful plates while supporting park projects. You can purchase them at any time, not just when buying a new vehicle or renewing your registration. Visit any DMV office or www.oregon.gov/odot/dmv for details. Proceeds go into an endowment that funds the operation of the park's Science and Learning Center—two historic structures near Park Headquarters (the original Superintendent's Residence and Chief Naturalist's Residence) that now provide living and working space for visiting scientists, teachers, and artists. The Science and Learning Center draws researchers and educators to Crater Lake from around the world, encouraging them to use the park as an outdoor laboratory and classroom. For more information, visit go.nps.gov/slc.

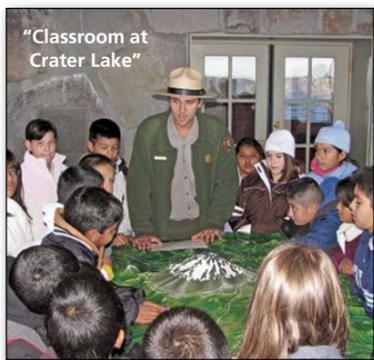


Contribute to the Crater Lake Trust

The Crater Lake National Park Trust is a nonprofit organization that raises private funds to support park projects and connect the park with surrounding communities. Each year, for example, it helps fund field trips to the park for more than 5,000 grade-school students. In a program called "Classroom at Crater Lake," kids engage in hands-on science and learn about wildlife, old-growth forests, and winter ecology. Learn more at www.craterlaketrust.org. Share your love of the park by making a tax-deductible gift.

Share Your Comments

Whether you have a compliment, concern, or suggestion, we'd like to hear from you! This is your park, and we value your input on how best to manage it. To provide feedback, complete a comment form at the visitor center or send an email (or letter) to the park's Superintendent (see addresses on page 2).



"Classroom at Crater Lake"

Drawing the Line *(continued from page 7)*

to lease land along the shore of Diamond Lake for summer homes. They were anxious about the restrictions (and entrance fees) that NPS jurisdiction might bring. In the end, with detractors on several fronts, the House bill never made it out of committee—but efforts to expand the park continued. In the 1920s and 30s, proposals were put forth to incorporate not only Diamond Lake, but areas much further afield including Union Creek and Mount McLoughlin. As the requested acreage increased, so did the rhetoric, sometimes escalating into hyperbole. "Here is a park so small that it does not extend to the base of the mountain in whose crater the lake lies," complained NPS director Arno Cammerer in 1935. "In the protection of wildlife and primitive conditions, Crater Lake National Park is almost useless." Writing against the addition of Mount McLoughlin to the park, a Forest Service manager warned of "hordes of insect pests. . . flies and mosquitoes" that would "make the use of the area by the public impractical" and render it "unattractive to tourists."

Amidst all the debate, the two bureaus did manage to come together and agree on a modest transfer of land. In 1932, the USFS turned over 973 acres of old-growth forest along Highway 62 in order to give the park a more attractive southern entrance and to protect the trees along the highway in perpetuity (see Figure 4). The park's "panhandle," as it is now known, features tall ponderosa pines intermixed with a smattering of equally impressive sugar pines and Douglas fir. Another land transfer—this time comprising 22,934 acres—was negotiated in 1980. In the late 70s, the Forest Service had undertaken a nationwide inventory of its "roadless areas"—the places in its domain, still in relatively pristine condition, where highways and logging roads had not yet been constructed. To forever save these places from the damaging impacts of roadbuilding, the bureau asked that Congress designate them as wilderness areas. Among the roadless parcels identified by the USFS were three narrow strips of land just outside

Crater Lake National Park. Rather than turn them into small, fragmented wilderness units, Oregon senator Mark Hatfield suggested that Congress pass legislation to transfer them to the NPS. Today, as part of the park, they are managed as wilderness, and they contain some notable features—such as Thousand Springs, Boundary Springs, Bear Butte, and Spruce Lake—that exemplify important aspects of the park's geologic and hydrologic story. (NPS policy allows parks to expand their borders to take in "significant resources" that pertain to the purposes of the park.)



Boundary Springs, in the northwest corner of the park, form the headwaters of the Rogue River. The springs are so named because they straddle the park's original, 1902 boundary. (The 1980 expansion brought them fully into the park.) The springs are fed by snowmelt percolating through pumice from Mount Mazama's big eruption. They can be reached by a 5-mile (roundtrip) hike from a pullout on Highway 230.

The past 40 years have seen no further changes to the park's contours. Its size has held steady at 183,224 acres, and no future additions or subtractions are likely. Yet, while the park's boundary may now be set, as the story of its evolution shows, there was nothing



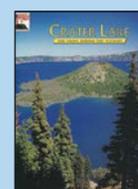
The park's "panhandle" was added in 1932 to showcase and protect a stand of old-growth ponderosa pines. They can best be enjoyed at the Ponderosa Picnic Area, near the south entrance. Press your nose to the orange bark and cast your vote in the age-old debate: does it smell more like butterscotch or vanilla?

inevitable about its present size or shape. If not for a mapping error in 1886—and the creation of a 15-minute topo map in 1896—the park would likely be much larger than it is today. It's interesting to ponder what a "Greater Crater Lake National Park" (as Stephen Mather once called it) would have looked like, with Crater Lake and Diamond Lake developing under the umbrella of the same agency. On the other hand, there was also nothing inevitable about the park's very existence. Had a tourist from Portland not journeyed to Crater Lake and then doggedly pursued its protection, this might not be a public park at all. National parks are human constructs, contingent on the actions of individual actors and on the unfolding of unpredictable events. So too are park boundaries. Like state borders, they sometimes align with natural features, such as rivers and mountain ranges. But more often they are the consequence of political negotiations, financial considerations, real estate transactions, and—as we've seen in the case of this park—methods of land allocation and demarcation. And though they often defy common sense, they are critically important, because they affect our ability to deal with issues ranging from climate change to wildfires to invasive species. Maybe, understanding how our boundaries came to be—and who drew the lines—can inform, to some extent, the decisions we make in the future.

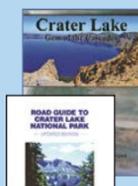
Shop at the Natural History Association Bookstore

When you shop at the visitor center bookstore (this year being operated out of the Community House in Rim Village), all proceeds from your purchase are invested back into the park. The store is operated by the Crater Lake Natural History Association, a nonprofit organization established in 1942 to support the park's educational and scientific programs. The association funds a variety of important projects, including the printing of this visitor guide. Some of the store's offerings are described below. For a complete list of merchandise and to shop online, visit www.craterlakeoregon.org. You can also order by calling 541-594-1109.

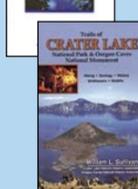
Recommended Reading



Crater Lake: The Story Behind the Scenery
Large photos with detailed captions accompany the text of this popular book. 48 pages, \$11.95.



Crater Lake: Gem of the Cascades
A comprehensive guide to the park's geologic story, written by a former ranger. 168 pages, \$15.95.



Road Guide to Crater Lake National Park
Consult this guide as you circle the lake for a deeper understanding of the park's features. 48 pages, \$7.95.



Trails of Crater Lake & Oregon Caves
A detailed guide to 24 hikes. 112 pages, \$14.95.



Crater Lake Topo Map
Great for backpacking. Waterproof and tearproof. 1:55,000 scale. \$14.95.



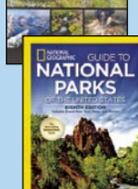
Plants & Animals of Crater Lake Nat'l Park
This folding, waterproof guide will help you identify the park's most visible species. 11 pages, \$6.95.



Volcanoes
Folding, waterproof guide to volcanoes, lava rocks, and plate tectonics. 11 pages, \$7.95.



Star & Planet Guide
Rotating "planisphere" for locating stars, planets, and constellations in the night sky. \$7.99 small, \$11.99 large.



101 Wildflowers of Crater Lake Nat'l Park
Detailed descriptions and vivid photos of the park's most common flowers. 74 pages, \$14.95.



Trees To Know in Oregon
Tree identification is easy and enjoyable with this photo-packed, fact-filled guide. 153 pages, \$18.00.



Crater Lake: Into the Deep DVD
Own the film shown at the visitor center. Discover the park's significance and explore the lake's violent past. 22 minutes, \$7.50.



Guide to the National Parks of the United States
This best-selling book from National Geographic features 380 stunning photos and 80 color maps. 480 pages, \$28.00.



CRATER LAKE
NATURAL HISTORY ASSOCIATION
www.craterlakeoregon.org