Crater Lake

National Park Service
U.S. Department of the Interior

Reflections
Visitor Guide

Summer/Fall 2014

Park News

- **Pets are Now Allowed on Three Park Trails**
  Take Fido for a hike! Three of the park's trails are now pet-friendly. Pets on leash are welcome on the Godfrey Glen Trail, Lady of the Woods Trail, and Pacific Crest Trail. Only one pet per hiker is permitted. To give your pet a view of the lake, your best bet is still to stroll along the paved paths at Rim Village.

- **Road work: 15-Minute Delays are Possible**
  Road repairs and paving might delay your trip through the park this summer. Thanks for your patience! Along Rim Drive, the park will also be removing loose boulders from the slopes above the road (to reduce the risk of rockfalls).

- **Park Conserves Water in Response to Drought**
  For three years running, southern Oregon's weather has been drier than normal. Here at Crater Lake, last winter's snowfall was only 50% of average. In response, the park has installed low-flow toilets and faucets in all public restrooms, as well as low-flow showers in employee housing. In 2013, we reduced our water usage by 15%, but we need to do more. Please help us conserve water during your visit.

- **East Rim Drive will be Vehicle-Free on Sept. 20 & 27**
  On two Saturdays this September, the park's East Rim Drive will be closed to motor vehicles. Visitors with bicycles will have the opportunity to enjoy 24 miles (39 km) of scenic roadway without vehicle noise and traffic. Check the park's website (www.nps.gov/crla) to learn more about this special event.

Welcome!

Thank you for visiting your national park. Here at Crater Lake, you'll find opportunities to refresh your spirit, awaken your senses, and connect with the natural world.

The National Park Service protects more than 400 special places, saved by the American people so that everyone can experience our heritage. We at Crater Lake are proud to be stewards of this national treasure.

Park rangers and maintenance staff are here to assist you in making your visit safe, rewarding, and fun. If there is anything we can do to help, please ask. Enjoy your park!

Craig Ackerman
Superintendent

Climb a Sleeping Volcano

Plus 10 Other Ways to Enjoy Your Park

Hiker on Garfield Peak

If you like volcanoes, you've come to the right place—Crater Lake National Park is home to more than 40 of them! Every peak, cone, and hill that you see is a volcano that erupted in the past 500,000 years. (Trivia question: why *can't* you see the park's youngest volcano, which is only 4,800 years old? Answer: because it erupted underwater, below the surface of Crater Lake!)

Many of the park's volcanoes are extinct. They include Mount Scott, Union Peak, and Wizard Island (all of which you can climb; *see page 4*). But the park's most powerful volcano—the one that holds Crater Lake—is likely to erupt again. The peaks on the rim of this sleeping giant offer some of the finest views in the park.

One of these summits can be reached by car! Cloudcap Overlook *(see page 5)* sits at the end of the highest paved road in Oregon—7,865 feet (2,397 meters) above sea level. Two other summits can be climbed on foot. The Watchman Peak Trail (1 hour round-trip, *see page 4*) ascends to a fire lookout with jaw-dropping views of Wizard Island. In summer, rangers lead hikes to the top at sunset *(see page 3)*. Rangers also lead hikes up the Garfield Peak Trail (2 to 3 hours round-trip), perhaps the most interesting trail in the park. It features a variety of flora, fauna, and panoramic vistas, such as those in the photos above. Apart from volcano-climbing, here are 10 other ways to make your visit to Crater Lake memorable, meaningful, and fun:

Drive Around the Lake
Rim Drive is a 33-mile (53-km) road that encircles Crater Lake. More than 30 pullouts offer dramatic views of the park's volcanic scenery. Allow 2 to 3 hours *(see page 5)*.

Watch the Park Film
Explore the park's violent past and its present tranquility in this 22-minute film, shown on the hour and half-hour at the Steel Visitor Center at Park Headquarters.

Attend a Ranger Program
Discover the wonders of Crater Lake with those who know the park best. Talks, walks, kids programs, boat tours, and trolley tours are offered daily *(see page 3)*.

Find the Phantom Ship
Anchored near the lake's south shore is an island that seems to be sailing away. To see it, hike to Sun Notch or drive to the viewpoint named in its honor *(see page 5)*.

Visit the Pinnacles
Formed during the same eruption that gave birth to the lake, these colorful volcanic spires are tucked away in the park's southeast corner *(see page 5)*.

Tour Crater Lake Lodge
For a glimpse into an earlier era, check out the history exhibits—and walk through the Great Hall—of Crater Lake Lodge, renovated in the 1990s but first opened in 1915 *(see page 2)*.

Visit the Sinnott Memorial Overlook
With panoramic views and fascinating exhibits, this is the place to learn about the park's geologic story and history of scientific investigation *(see page 2)*.

Have a Picnic
The viewpoints and picnic areas along Rim Drive are perfect for outdoor eating *(see page 5)*. Stop by the Rim Village Café for grab-and-go sandwiches, salads, and snacks.

Relax
Find a peaceful spot and attune yourself to the sounds and rhythms of the park. The Lodge veranda and the quiet pullouts on the lake's north side are favorite spots to unwind.

Touch the Water
The trail to the lake shore is steep, dusty, and often crowded, but the water at the bottom is some of the world's purest. Swim, fish, or simply dangle your toes *(see page 3)*.

Snow plow at Rim Village

When is the Park Open?

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

Crews begin plowing these roads in April, but opening dates vary. The North Entrance Road and West Rim Drive tend to open in early June. The East Rim Drive typically opens in early July. Highway 62 is open year-round. The road to Rim Village is also open year-round, except after heavy snowstorms.

2 ... Camping, Lodging, Food
3 ... Ranger Programs
4 ... Hiking Trails
5 ... Driving Map
6 ... Feature Articles
7 ... Feature Articles
8 ... Climate Chart

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.

Today, old-growth forests and open meadows blanket the volcano's outer slopes, harboring a variety of plants and animals, including several rare species. The area is central to the cultural traditions of local American Indian tribes, and the park provides unique opportunities for scientific study and public enjoyment.

- Park established: 1902
- Size: 183,000 acres (74,060 hectares)
- Visitors per year: About 500,000

- Lake depth: 1,943 feet (592 meters)
- Lake width: 4.5 to 6 miles (7 to 10 km)

- Annual snowfall: 43.5 feet (13.2 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

Rim Visitor Center

Bicyclist on East Rim Drive

Exhibits at the Sinnott Memorial Overlook

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Crater Lake Visitor Guide
Summer/Fall 2014

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 through sales made in the visitor center bookstores.

Park Mailing Address:
PO Box 7, Crater Lake, OR 97604

Phone: 541-594-3000
Website: www.nps.gov/crla
Email: craterlake@nps.gov

Accessibility
Except for the Sinnott Memorial Overlook, developed areas in the park are generally accessible to individuals with mobility impairments. Wheelchair-accessible paths include the Rim Village promenade and the Pinnacles Trail. The Godfrey Glen, Sun Notch, and Plaikni Falls trails are accessible to wheelchair users with assistance *(see page 4)*. Multiple pull-outs on Rim Drive have wheelchair-accessible wayside exhibits. Some ranger programs are accessible to people with limited mobility and other impairments *(see page 3)*. We are working hard to improve our level of accessibility for all park visitors. We welcome your comments.

ATMs
The Mazama Village Store and Rim Village Gift Shop have ATMs.

Drinking Water
Water faucets can be found at Rim Village, Mazama Village, and inside the Steel Visitor Center. Bottled water can be purchased at the Rim Village Café, the Mazama Village Store, and the bottom of the Cleetwood Cove Trail (when boat tours are operating).

Emergencies
Dial 911 to report any emergency, 24 hours a day. First aid is available at visitor centers and the ranger station at Park Headquarters.

Entrance Fee
The entrance fee for Crater Lake National Park is $10 per family car, 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!

Gasoline
Self-serve gasoline is available at Mazama Village from May 17 through October 13.

Internet
Wireless internet is free for guests of Crater Lake Lodge and The Cabins at Mazama Village. Public Wi-Fi is available at Crater Lake Lodge and the Annie Creek Restaurant for $4 per hour or $10 for 24 hours.

Lost & Found
Contact a ranger at either visitor center or call 541-594-3060.

Phones
Cell-phone coverage in the park is unreliable. Reception depends on your location and provider. Pay phones are located outside the Mazama Village Store and inside Crater Lake Lodge.

Picnic Areas
Picnic areas are found throughout the park *(see page 5)*. The Rim Village picnic area has fire grates. Most picnic areas have vault toilets but no running water.

Post Office
A U.S. Post Office is open Monday through Saturday in the Steel Visitor Center. Summer hours are 9:00 a.m.–noon and 1:00–3:00 p.m.

Recycling
Combination trash/recycling bins can be found around the park at more than 20 locations. Recycling is currently limited to aluminum cans and plastic bottles. All bins can accept both.

Restrooms
Restrooms with flush toilets and running water are located in Rim Village, Mazama Village, and the Steel Visitor Center (9:00 a.m.–5:00 p.m.). Vault toilets are located at most picnic areas, Watchman Overlook, and both ends of the Cleetwood Cove Trail *(see map on page 5)*.

Showers & Laundry
Coin-operated showers and laundry machines are available at Mazama Campground.

Services & Facilities

Camping

The park has two campgrounds. Both sit in forests south of the lake. Holders of an "America the Beautiful" Senior Pass or Access Pass are entitled to a 50% discount. For a list of campgrounds outside the park, ask at a visitor center.

Mazama Campground (212 sites) is located 7 miles south of Rim Village near Highway 62. In 2014, it will be open from May 30 through October 5, weather permitting. 75% of the campsites for July, August, and September are reservable in advance by calling 888-774-2728 or online at www.craterlakelodges.com. The rest are available on a first-come, first-served basis. Typically, there are sites available until late afternoon or early evening. The campground offers tent sites ($21 per night) as well as RV sites ($29). Some of the RV sites have electric hookups ($35). There are many pull-through sites; some can accommodate RVs as long as 50 feet (15 meters). Each site has a picnic table, fire ring, and food locker. Black bears are rarely seen, but campers are advised to store all food in their locker or their vehicle. The campground has drinking water, flush toilets, showers, and laundry facilities. A nearby general store sells groceries, firewood, and gasoline. You can contact the campground directly during the summer at 541-594-2255 ext. 3610. Mazama Campground is operated by the park's concessioner, Xanterra Parks & Resorts.

Lost Creek Campground (16 sites) is for tent-camping only ($10 per night). It is located on the spur road to the Pinnacles Overlook. It usually opens in early July and closes in mid-October. Registration is self-service, and reservations are not taken. The campground often fills up, so arrive early to secure a site. It has running water, sinks, and flush toilets. Each site has a picnic table, fire ring, and food locker. Payment can be made by cash or check. This campground is operated by the National Park Service.

Food & Dining

The **Annie Creek Restaurant**, located in Mazama Village, serves breakfast, lunch, and dinner (7:00 a.m.-9:00 p.m. during the peak season, June 20-September 1). Options include gourmet burgers, vegetarian lasagna, a soup & salad bar, and pizza, including take-out. Wireless internet is available at $4 per hour. In 2014, the restaurant is scheduled to be open from May 23 through October 5.

The **Crater Lake Lodge** dining room offers fine dining in a casual atmosphere. The menu features gourmet Northwest cuisine made with local ingredients. Reservations are recommended for dinner (5:00-10:00 p.m. during the peak season, June 13-September 30) but are not taken for breakfast (7:00-10:30 a.m.) or lunch (11:30 a.m.-2:30 p.m.). Appetizers, drinks, and desserts are also available from 2:30 p.m. until closing in the Great Hall and on the veranda. Dinner reservations can be made by calling 541-594-2255 ext. 3217. In 2014, the dining room will be open from May 16 through October 12.

The **Rim Village Café** serves lighter fare including salads, soup, snacks, breakfast pastries, and grab-and-go sandwiches. The café is open year-round. Peak season hours are 9:00 a.m.-8:00 p.m. (June 13-September 1).

The **Mazama Village Store** sells groceries, camping supplies, firewood, and gasoline from May 17-October 6. Peak season hours are 7:00 a.m.-9:00 p.m. (June 6-September 2).

Lodging

The park has two motels, both operated by Xanterra Parks & Resorts. For information and reservations, call 888-774-2728 or visit www.craterlakelodges.com. For a list of lodging options outside the park, ask at a visitor center.

Crater Lake Lodge (71 rooms) is located in Rim Village, overlooking the lake. In 2014, it will be open from May 16 through October 12. Rooms range from $167 to $294 per night. Advance reservations are highly recommended. **The Cabins at Mazama Village** (40 rooms, $144 per night) are located 7 miles south of Rim Village. Operating dates for 2014 are May 23 through October 5.

Visitor Centers

There are two visitor centers in the park. Rangers are ready to answer your questions and help with trip-planning. The Crater Lake Natural History Association sells books, maps, postcards, and other items *(see page 8)*.

The **Steel Visitor Center**, located at Park Headquarters, is open daily from 9:00 a.m. to 5:00 p.m. A 22-minute film is shown on the hour and half-hour. It explores the park's significance and the lake's violent, volcanic past. The **Rim Visitor Center**, located in Rim Village, is open daily from 9:30 a.m. to 5:00 p.m. from June through late September.

Exhibits

The **Sinnott Memorial Overlook**, perched on a rock ledge behind the Rim Visitor Center, features an enclosed exhibit room and an open parapet with spectacular views of the lake. The overlook contains a relief model and exhibits on the park's geologic story and lake research. Ranger talks are presented daily from June 27 through September 1 *(see page 3)*. The overlook is open daily (weather permitting) from late June through October. Hours are 9:30 a.m.-6:30 p.m. in July and August, 9:30 a.m.-5:00 p.m. in June and September, and 10:00 a.m.-4:00 p.m. in October. The overlook is located down a steep, historic walkway with stairs and, unfortunately, is not accessible to people with limited mobility.

Crater Lake Lodge features exhibits on the history of tourism in the park and the history and renovation of the lodge. The exhibits are open daily, around-the-clock, from May 16 through October 12. They are located on the ground floor, west of the lobby.

Gifts & Books

The **Rim Village Gift Shop** is open all year. Peak season hours are 9:00 a.m.-8:00 p.m. (June 13-September 1). The **Annie Creek Gift Shop**, in Mazama Village, is open from May 23 through October 5. Peak season hours are 8:00 a.m.-9:00 p.m. (June 20-September 1). Both gift shops are operated by Xanterra Parks & Resorts. You can also shop online at www.craterlakelodges.com/shop. A different selection of books and gifts is also available at the park's two visitor centers *(see page 8)*.

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 www.nps.gov/crla/parkmgmt/lawsandpolicies.htm.

Camping
Camping is limited to developed campgrounds and some backcountry areas. Permits are required for backcountry camping *(see page 3)*.

Driving
Use pullouts to enjoy the views. Do not stop in the road. Observe posted speed limits, and watch for wildlife, bicyclists, and pedestrians. Off-road travel is prohibited.

Fires
Fires are allowed only in designated rings in the Rim Village Picnic Area and campgrounds. Fires may be restricted at certain times; ask a ranger.

Food
Store food properly. Generally, this means sealed in your vehicle or a campground food locker. Backcountry campers should use bearproof canisters or hang food from a tree. Exposing wild animals to our food alters their behavior, is bad for their health, and can be dangerous for us.

Hiking and Climbing
Stay on trails. This prevents erosion, protects vegetation, and protects other hikers. Shortcutting trails is prohibited. 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 steep, unstable rocks and soils.

Park Features
Leave rocks, plants, animals, and artifacts undisturbed for others to enjoy. Collecting, defacing, destroying, or disturbing natural, cultural, or historical features is prohibited.

Pets
Pets are welcome in some 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 developed areas, provided they stay within 50 feet (15 meters) of parking lots, roads, picnic areas, and campgrounds. Popular places to walk a dog include Rim Village and Mazama Campground. Pets are not allowed inside buildings, including Crater Lake Lodge and the Mazama Cabins. The above rules do not apply to service animals here to assist people with disabilities. Solid excrement must be picked up immediately by the person in control of the pet and disposed of in a trash or solid-waste receptacle.

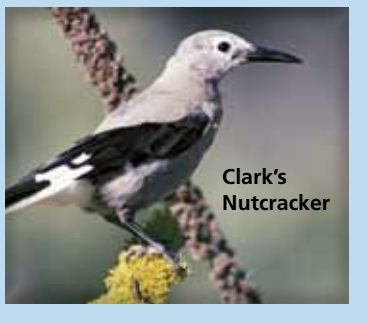
Viewpoints
Stay back from the edge of the caldera. Do not go beyond established fences and rock walls. Falling may cause injury or death.

Weapons
Firearms are prohibited in all posted park buildings.

Wildlife
Never feed wildlife. This includes birds and squirrels. Feeding animals is dangerous for you, bad for them, and harmful to the ecosystem. Feeding, touching, disturbing, or approaching wildlife is prohibited.

Golden-Mantled Ground Squirrel

Help Keep Wildlife Wild. Please DO NOT FEED!


Clark's Nutcracker

Boat Tour on Crater Lake

Sunset over Crater Lake

Trolley Tour on Rim Drive

Trolley Tours

Rim Drive is one of America's most scenic byways, but it's hard to appreciate the views with your eyes on the road. Fortunately, you can leave the driving to someone else. Ranger-guided trolley tours circle Crater Lake daily. Tours begin and end at Rim Village, spend 2 hours traveling clockwise around the lake, and stop at a minimum of 4 scenic overlooks. See below for departure times and ticket prices. The buses are enclosed, climate-controlled, wheelchair accessible, and seat 25 passengers. They resemble old streetcars, but they run on modern technology: powered by compressed natural gas, they emit 30-40% less pollution than gasoline-powered vehicles. The trolleys are owned and operated by The Shuttle Inc. of Klamath Falls.

Activities

Backcountry Camping

Over 95% of the park is managed as wilderness. Although some areas are closed to backcountry camping (for example, there is no summer camping with a view of the lake), exploring the park's old-growth forests and volcanic landscapes can be a rewarding experience.

All campers not staying in the park's developed campgrounds must obtain a backcountry permit. The only exception is through-hikers on the Pacific Crest Trail, who may instead sign the trail register as they enter the park. Permits are free and are available at Park Headquarters, from the visitor center or ranger station, between 9:00 a.m. and 5:00 p.m.

Bicycling

Bicycling at Crater Lake is allowed on paved roads and on the unpaved Grayback Drive. Bicycles are not allowed on park trails, with one exception: the Pinnacles Trail. Park roads are narrow with few shoulders and considerable automobile traffic. Helmets are required for persons under 16 years of age and are strongly recommended for all cyclists.

Bicycling on park roads is physically demanding yet can be exceptionally rewarding. The most popular route is the 33-mile (53-km) Rim Drive, featuring spectacular views but also long, steep grades and climbs totaling 3,800 feet (1,158 meters). For details, pick up a bicycling handout at either visitor center.

Fishing

Originally, Crater Lake contained no fish. Between 1888 and 1941, however, 6 species were introduced. Today, only rainbow trout and kokanee salmon remain. Fishing is allowed at the bottom of the Cleetwood Cove Trail, where you'll find .25 miles (.4 km) of rocky shoreline. Wizard Island, reachable by tour boat, is also open to fishing.

Fishing licenses are not required. There are no restrictions on the size, number, or species taken. Cleaning fish in the lake is prohibited; pack out your catch. To prevent the introduction of 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.

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 Cleetwood Cove and at Wizard Island, which requires a boat tour to reach. The shoreline at both locations is rocky; there are no beaches.

Snorkeling, scuba diving, and long-distance swimming are not allowed. In 2012, after assessing the threats posed by aquatic invasive species, the park placed a ban on the use of snorkels, wet suits, diving gear, and other equipment that could serve as vectors for the introduction of non-native organisms. We hope you will understand our caution on this issue and the importance of protecting the lake from a threat to its ecology that could be irreversible.

Wildlife Viewing

The park is home to many animals, but they can be difficult to spot. The most visible animals are deer and squirrels. Herds of elk are sometimes seen in the meadows along Rim Drive. Bobcats and mountain lions are present but rarely seen. Lucky observers might spot a fox, black bear, marmot, porcupine, grouse, or bald eagle. Dawn and dusk are the best times to look.

Kids: You Can Become a Junior Park Ranger!

Are you between 6 and 12 years old? Do you want to learn while having fun at Crater Lake National Park? Here are 2 different ways:

- Pick up a free activity book at either visitor center. Explore the park, complete the activities, then return the book to a ranger to earn a Junior Ranger BADGE.
- Meet behind the Rim Visitor Center at 1:30, 3:00, or 4:30 p.m. (June 27-Sept. 1) and participate in a free, 20-minute activity. Complete one activity to earn a Junior Ranger PATCH.

Boat Tours

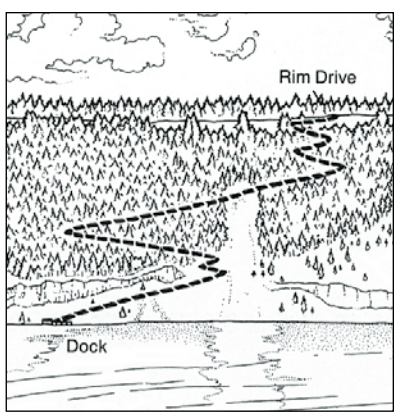
Join a park ranger for a 2-hour cruise around Crater Lake. See the box below for departure times and ticket prices. Boat tours on Crater Lake are operated by Xanterra Parks & Resorts in partnership with the National Park Service.

Tickets
Each boat holds 37 passengers. 18 tickets for each tour (July 4-Sept. 19 only) are available for advance purchase by calling 888-774-2728. The remaining 19 tickets for each tour (and all tickets from June 27-July 3) are available from automated kiosks inside Crater Lake Lodge and the Annie Creek Gift Shop. These tickets go on sale exactly 24 hours in advance of each tour. Sales continue until the tour is sold out or until 2 hours remain before departure. At that time, if a tour is not sold out, remaining tickets can be purchased from a ticket booth (open daily at 8:30 a.m.) at the top of the Cleetwood Cove Trail, until 45 minutes before departure. Ticket holders should arrive at the trailhead at least 45 minutes before their tour to allow time to hike down the 1.1-mile (1.7-km) trail to the lake.

Types of Tours
Standard tours are 2 hours long, ranger-narrated, and circle the entire lake. They pass close to Wizard Island but do not stop. The 9:30 a.m. Wizard Island Tour includes a standard tour plus a visit to Wizard Island, where passengers disembark for 3 hours to hike, fish, swim, and relax on their own. (Up to 6 tickets per day are also available for people wishing to spend 6 hours on the island.) The 12:45 p.m. Wizard Island Shuttle consists of a 1-hour (round-trip) ride to the island plus a 3-hour stay there. It does not circle the entire lake and does not include a narrated tour. See page 4 for details on the island's two hiking trails.

What to Bring
- ☑ Bring plenty of drinking water. Bottled water is available for purchase at the bottom of the Cleetwood Cove Trail.
- ☑ Bring a lunch or snack, especially if visiting Wizard Island. Light snacks are available for purchase at the top of the Cleetwood Cove Trail.
- ☑ Sunscreen, sunglasses, and a hat are recommended for sun protection. The boats are not covered.
- ☑ Bring a jacket. Weather on the lake can be windy and chilly.
- ☑ Wear sturdy footwear, especially if visiting Wizard Island.

Hiking to Cleetwood Cove
The Cleetwood Cove Trail is the only legal access to the shore of Crater Lake *(see map on page 5)*. 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 and bottom of the trail. Depending on snow conditions, the trail usually opens in late June and closes in late October.



The Cleetwood Cove Trail drops 700 feet (213 meters) to the lake shore. Sketch from *Road Guide to Crater Lake*.

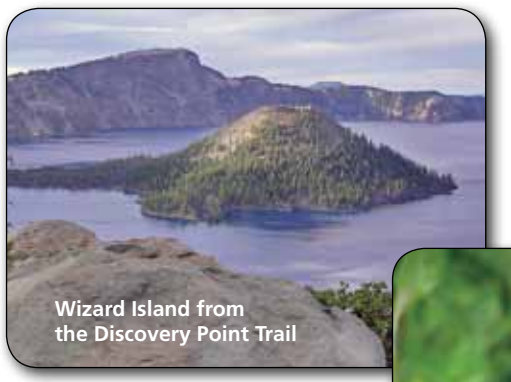
Ranger-Led Activities

Ranger-Led Activities	June 27–Sept. 1	May 16–June 26 & Sept. 2–Oct. 12
Ranger Talks at Rim Village Join a ranger to deepen your understanding of Crater Lake. Topics vary; check posted schedules. Meet at the Sinnott Memorial Overlook for the talks at 11:30, 1:00, and 2:30. Meet on the back porch of Crater Lake Lodge (accessible to wheelchairs) for the 4:00 talk. (20 minutes)	**11:30 a.m.** **1:00 p.m.** **2:30 p.m.** **4:00 p.m.** ♿	Check posted schedules
Junior Ranger Activity ♿ Kids participate in a ranger-led activity to learn about Crater Lake and earn a Junior Ranger patch. Meet behind the Rim Visitor Center. Geared for ages 6 to 12. (20 minutes)	**1:30 p.m.** **3:00 p.m.** **4:30 p.m.**	Check posted schedules
Afternoon Hike Hike with a ranger to discover Crater Lake. Trails vary by day of the week. See page 4 for trail details. For Garfield Peak, meet on the back porch of Crater Lake Lodge. For Sun Notch and Plaikni Falls, meet at the trailhead. Be sure to carry drinking water. Sunday, Wednesday: **Sun Notch** (1 hour, easy, great views of the Phantom Ship) Mon., Thurs., Sat.: **Plaikni Falls** (1.5 hours, easy, hike to a hidden waterfall) Tuesday, Friday: **Garfield Peak** (2.5 hours, 1000' elevation gain, spectacular views)	**2:00 p.m.**	Check posted schedules
Watchman Peak Sunset Hike Ascend to a breathtaking viewpoint and watch the sun go down over the Cascade Mountain Range. Meet at the Watchman Overlook, a parking area with wooden fences 3.8 miles (6.1 km) northwest of Rim Village. Flashlights are not needed. See page 4 for trail details. (1.5 hours)	July 4-31 **7:30 p.m.** August 1-10 **7:15 p.m.** August 11-20 **7:00 p.m.** August 21-31 **6:45 p.m.**	Sept. 1-7 **6:30 p.m.** Sept. 8-14 **6:15 p.m.**
Evening Program ♿ Relax under the stars as you learn about the park. Check posted schedules for topics. Meet at the Mazama Campground Amphitheater, between loops D and E. (45 minutes)	June 27-July 31 **9:00 p.m.** August 1-20 **8:30 p.m.** Aug.21-Sept.1 **8:00 p.m.**	Check posted schedules
Rim Drive Trolley Tour ♿ Circle the lake on a ranger-narrated tour of Rim Drive. See the top of this page for more information. Tickets are sold from a trolley parked by the Community House in the middle of Rim Village. Tickets may be purchased the day of the tour, or the day before, from 9:00 a.m. to 3:00 p.m. To reserve tickets further in advance, call 541-882-1896 or visit www.craterlaketrolley.com. Tours cover a variety of topics. (2 hours) **Ticket Prices**: $25 Adult (age 14 to 59); $22 Senior (age 60 and up); $15 Child (age 5 to 13); Free Young Child (under 5 years); $70 Family Rate (2 adults plus kids)	**10:00 a.m.** **11:00 a.m.** **12:00 p.m.** **1:00 p.m.** **2:00 p.m.** **3:00 p.m.**	Sept. 2-Oct. 12 (weather permitting): **10:30 a.m.** **12:00 p.m.** **1:30 p.m.** **3:00 p.m.**
Crater Lake Boat Tour For a different perspective on Crater Lake, take a ranger-narrated boat tour. See the right-hand column of this page for detailed information. Note: Taking a boat tour requires hiking down—and back up—one of the steepest trails in the park. Tours cover a variety of topics. (2 hours) **Ticket Prices**: Standard Tour $37 Adult (age 13 and up), $25 Child (age 3* to 12); Wizard Island Tour $52 Adult (age 13 and up), $34 Child (age 3* to 12); Wizard Island Shuttle $42 Adult (age 13 and up), $28 Child (age 3* to 12) *Kids must be at least 3 years old to take a boat tour. Engine noise, sun exposure, wind, and occasional rough water make tours extremely unpleasant for infants and toddlers.	Standard Tours **9:35 a.m.** **10:30 a.m.** **11:30 a.m.** **1:30 p.m.** **2:30 p.m.** **3:30 p.m.** Wizard Island Tour **9:30 a.m.** Wizard Island Shuttle **12:45 p.m.**	Sept. 2-14: see schedule to left Sept. 15-19: Standard Tours **10:00 a.m.** **1:00 p.m.** **3:00 p.m.** Wizard Island Shuttle **9:30 a.m.**

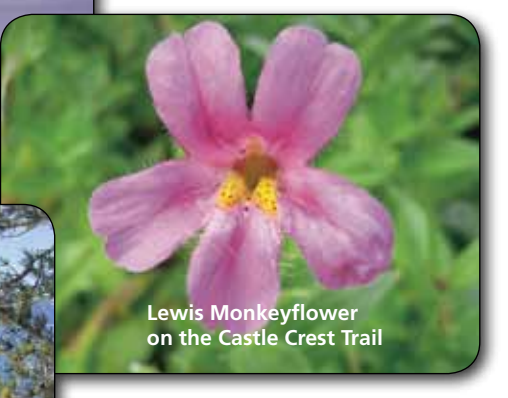
Activities are free of charge except for trolley & boat tours. Programs are subject to cancellation due to weather or unforeseen circumstances.

Let's Go Hiking!

Hi, I'm Ranger Emily. 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 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:



Wizard Island from the Discovery Point Trail



Lewis Monkeyflower on the Castle Crest Trail

Swimmers at Cleetwood Cove

- 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 9:00 a.m. and 5:00 p.m. 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.

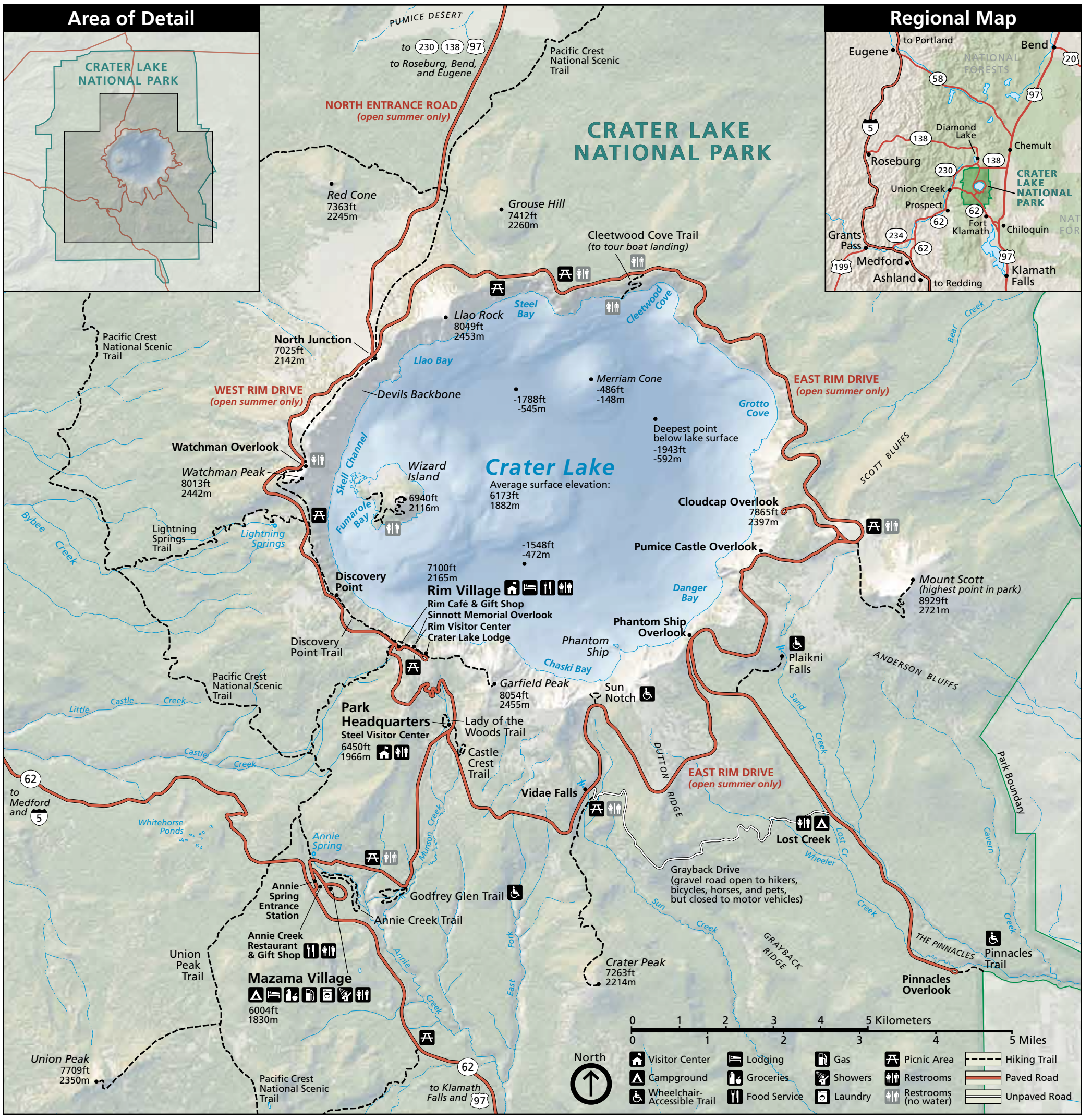
Castle Crest	Lady of the Woods	Sun Notch ♿	*Trail*	The Pinnacles ♿	Godfrey Glen ♿	Plaikni Falls ♿
0.5 miles (0.8 km) loop trail	0.7 miles (1.1 km) loop trail	0.8 miles (1.3 km) loop trail	*Round-Trip*	0.8 mile (1.3 km)	1.1 mile (1.8 km) loop trail	2.0 miles (3.2 km)
100 feet (30 meters)	120 feet (37 meters)	150 feet (46 meters)	*Elevation Gain*	10 feet (3 meters)	50 feet (15 meters)	100 feet (30 meters)
20 minutes	**30 minutes**	**30 minutes**	*Time*	**30 minutes**	**30 minutes**	**1 hour**
Flowers, Meadow, Creek	**Historic Architecture**	**Views of Phantom Ship**	*Highlight*	**Volcanic Spires**	**Peaceful Forest**	**Waterfall, Flowers**
Loop trail through a beautiful 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 wheelchair users with assistance.	*Description*	Easy walk along the rim of Pinnacle Valley. Great views of volcanic spires. Use caution near cliffs. Trail ends at park boundary. Accessible to wheelchair users with assistance. Open to bicycles.	Easy stroll through an old-growth forest, with some canyon views. Dirt path; accessible to 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 wheelchair users with assistance, but the final, short climb to the falls 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.	*Trailhead Location*	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.	*Nature Note*	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

Hikers at Plaikni Falls

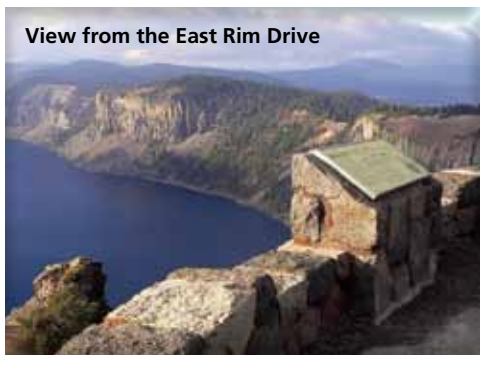
Discovery Point	*Trail*	Fumarole Bay	Watchman Peak	Annie Creek
2.0 miles (3.2 km)	*Round-Trip*	1.8 miles (2.9 km)	1.6 miles (2.6 km)	1.7 miles (2.7 km) loop trail
100 feet (30 meters)	*Elevation Gain*	150 feet (46 meters)	420 feet (128 meters)	200 feet (61 meters)
1 hour	*Time*	**1 hour**	**1 hour**	**1½ hours**
Lake Views	*Highlight*	**Swimming, Fishing**	**Panoramic Views**	**Creek, Canyon, Flowers**
Trail along the rim of Crater Lake through a pretty forest of whitebark pines and mountain hemlocks. Fine views of the lake and Wizard Island. Use caution near cliff edges.	*Description*	Rocky trail along the shore of Wizard Island. Becomes hard to follow upon reaching Fumarole Bay; there is no official endpoint. The bay's shallow, clear water is good for fishing and swimming.	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 early July due to snow.	Moderately strenuous trail through a deep, stream-cut canyon. Lots of water, wildflowers, and sometimes wildlife. Self-guiding brochures are available at the trailhead.
West end of Rim Village, where the paved walk becomes a dirt path. Can also start from Discovery Point.	*Trailhead Location*	Wizard Island dock, reachable only by boat tour or shuttle from Cleetwood Cove. See page 3 for information.	3.8 miles (6.1 km) northwest of Rim Village. Park at the viewpoint surrounded by wooden fences.	Mazama Campground, behind the amphitheater, located between loops D and E. Limited parking in E Loop.
Gold prospector John Wesley Hillman first spotted Crater Lake near this point in 1853.	*Nature Note*	Abundant lichen on the tree trunks is an indication of excellent air quality.	Built in 1932, the peak's historic fire lookout is still used by rangers today.	The creek provides the park's drinking water, named the best tasting in Oregon in 2004.
		Moderate		

Wizard Summit	Cleetwood Cove	Garfield Peak	*Trail*	Mount Scott	Crater Peak	Union Peak
2.2 miles (3.5 km)	2.2 miles (3.5 km)	3.6 miles (5.8 km)	*Round-Trip*	4.4 miles (7.1 km)	6.2 miles (10.0 km)	11 miles (17.7 km)
760 feet (232 meters)	700 feet (213 meters)	1,010 feet (308 meters)	*Elevation Gain*	1,250 feet (381 meters)	765 feet (233 meters)	1,600 feet (448 meters)
1½ hours	**1½ hours**	**2 to 3 hours**	*Time*	**3 hours**	**3½ hours**	**5 to 6 hours**
Views, Summit Crater	**Swim, Fish, Boat Tours**	**Panoramic Views**	*Highlight*	**Panoramic Views**	**Forest, Views, Solitude**	**Panoramic Views**
Rocky climb to the top of Wizard Island. Spectacular lake views, interesting geology. A 0.3-mile (0.5-km) path leads around the 90-foot-deep (27-meter) crater at the summit.	The only legal access to the shore of Crater Lake. Strenuous trail with a steep grade. The trail descends to a rocky shoreline at Cleetwood Cove. See page 3 for detailed information.	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.	*Description*	Gradual ascent of the park's highest peak. Great views in all directions. Best in morning, when the light is ideal for lake viewing. May be closed until mid-July due to snow.	Moderate-to-strenuous walk 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.
Wizard Island dock, reachable only by boat tour or shuttle from Cleetwood Cove. See page 3 for information.	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.	*Trailhead Location*	East Rim Drive, 14 miles (22.5 km) east of Park Headquarters.	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 dead trees at the summit have been killed by dwarf mistletoe, a parasitic plant.	Below 200 feet (61 meters), the water in Crater Lake stays 38°F (3°C) year-round.	Rocky slopes along the trail are home to American pikas and yellow-bellied marmots.	*Nature Note*	Mt. Scott is the park's highest peak—8,929 feet (2,721 meters) in elevation.	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 glaciers during the last Ice Age.
Strenuous				***Strenuous***		



Highlights of the Rim Drive

Rim Drive is a 33-mile (53-km) road that encircles Crater Lake. It is one of America's most scenic byways, with spectacular views in all directions. The loop is typically open from early July to late October. It can be driven, without stopping, in about an hour, but at least 2 to 3 hours are necessary to enjoy the varied sights. The road is narrow, so buses and motorhomes should use caution. There are more than 30 scenic pullouts along the route, 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, $5.95) at either visitor center.


View from the 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 this unmarked pullout, 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

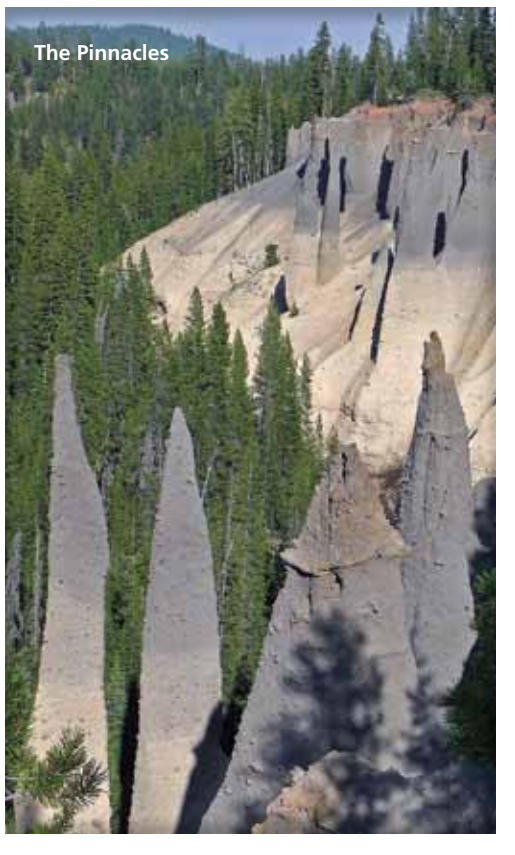
Nestled against the shore, Crater Lake's "other island" escapes detection by many park visitors. Though it resembles a small sailboat, the island is as tall as a 16-story building. It's made of erosion-resistant lava, 400,000 years old—the oldest exposed rock within the caldera.

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 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

Crater Lake's fire season is short but intense. Between mid-June and mid-October, lightning starts an average of 13 fires in the park each year.

Greg Funderburk, Fire Management Officer

A Question of Suppression

Healthy Forests Require Fire, but Reversing a Century of Suppression is Not Easy

Here's a fact that may surprise you: Crater Lake occupies only 7% of the park that bears its name. The vast majority of Crater Lake National Park is comprised of old-growth forest. These trees (and the biodiversity that they harbor) are central to the park's significance. Protected from logging, some of the trees here are ancient and giant. Even so, parts of the forest are not in good health. A century of fire suppression has had a number of negative consequences that are now proving difficult to reverse. Restoring fire to the landscape—and restoring the health of our forests—is a challenging task.

In 1902, when the park was established, the consensus among federal land managers was that protecting our nation's forests meant preventing them from burning. Early detection and aggressive suppression were the policies of the day. To spot fires quickly, the park erected lookouts atop Mount Scott in 1926 and Watchman Peak in 1932. To reach fires quickly, they bulldozed a network of dirt roads across the park in the 1930s. Many of these roads, which totaled 130 miles (209 km) in length, were built by the Civilian Conservation Corps. The effort paid off: all fires in the park from 1902 through 1977 were contained and extinguished.

In recent decades, our understanding of the role of fire has completely changed. "It's now seen as a necessary and vital part of the ecosystem," says Greg Funderburk, the park's Fire Management Officer. Our plant and animal communities evolved in the presence of fire, and many of them depend on it. Certain plants require fire for seed germination. Others depend on it to control the growth of rival species and pathogens, as in the case of the ponderosa pine *(see box at right)*. Some mammals need fire to create grasslands for grazing, and a variety of birds, bats, and insects make their homes in fire-killed trees. The black-backed woodpecker, for example, lives almost exclusively in recently burned areas, foraging for beetles that feed on dead wood. In short, fires promote biodiversity by creating a range of habitats.

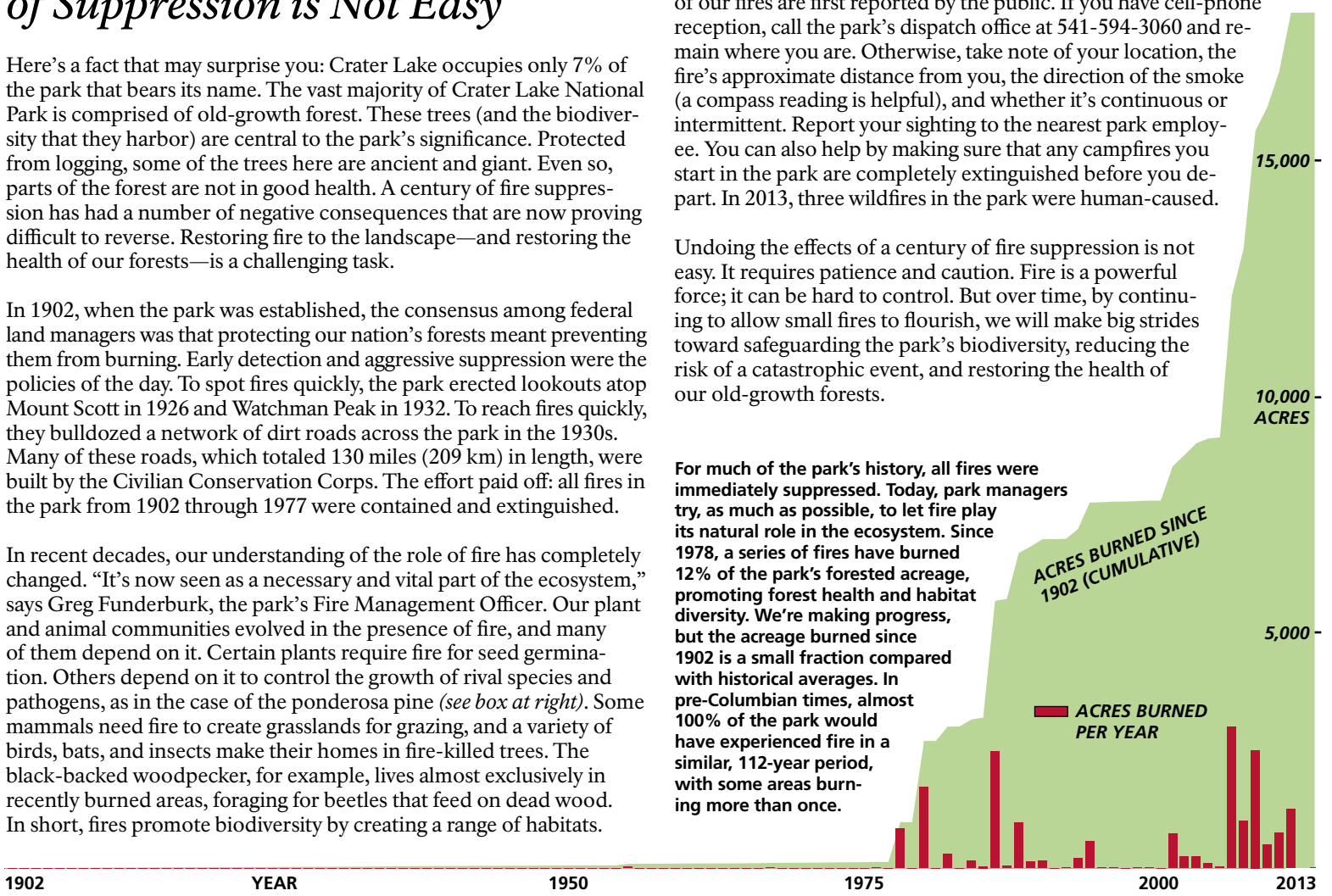
Without fire, forests become unnaturally dense with live trees and dead woody debris. And this is where our current challenge lies. The park's decades-long accumulation of trees, branches, twigs, needles, and logs has set the stage for a potential conflagration, a fire so hot and intense that it would actually have a negative impact on forest health. "In our ecosystem," explains Funderburk, "the most beneficial fires are generally those with mixed severity, with some patches left untouched. What we're trying to prevent is a blaze that consumes a large section of the park and burns with such intensity that it cooks the soil, kills all the trees, and renders that zone unproductive for many years." We have to be careful—all the more so because of climate change, which is making Crater Lake's summers longer and warmer.

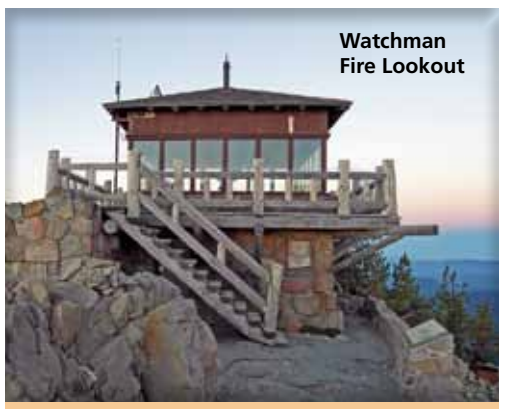
That's why Funderburk and his crew are still forced to suppress the majority of fires that erupt in the park, especially in mid-summer, when conditions are driest. Of the 18 fires ignited here by lightning in 2013, only three—all in September—were allowed to grow, although none burned more than a few acres, due to rain and snow. The rest were suppressed by firefighters on foot, sometimes with support from aircraft. (The park abandoned its fire roads in 1970; most of the park is now managed as wilderness.) Nevertheless, we are making slow progress, creating a mosaic of small burned areas that will provide some defense against large fires in the future. Since 1978, when managers began looking for opportunities to let fire affect the park's landscape, a total of 18,000 acres (7,300 hectares) have been burned.

If you see a plume of smoke during your visit, let us know! Many of our fires are first reported by the public. If you have cell-phone reception, call the park's dispatch office at 541-594-3060 and remain where you are. Otherwise, take note of your location, the fire's approximate distance from you, the direction of the smoke (a compass reading is helpful), and whether it's continuous or intermittent. Report your sighting to the nearest park employee. You can also help by making sure that any campfires you start in the park are completely extinguished before you depart. In 2013, three wildfires in the park were human-caused.

Undoing the effects of a century of fire suppression is not easy. It requires patience and caution. Fire is a powerful force; it can be hard to control. But over time, by continuing to allow small fires to flourish, we will make big strides toward safeguarding the park's biodiversity, reducing the risk of a catastrophic event, and restoring the health of our old-growth forests.

For much of the park's history, all fires were immediately suppressed. Today, park managers try, as much as possible, to let fire play its natural role in the ecosystem. Since 1978, a series of fires have burned 12% of the park's forested acreage, promoting forest health and habitat diversity. We're making progress, but the acreage burned since 1902 is a small fraction compared with historical averages. In pre-Columbian times, almost 100% of the park would have experienced fire in a similar, 112-year period, with some areas burning more than once.





Watchman Fire Lookout

Nobody Home?

If you hike to the top of Mount Scott or Watchman Peak this summer, you'll likely find the fire lookouts empty. As recently as 10 years ago, both buildings were staffed daily, but now they're infrequently used. Once, the lookouts were essential: spotters determined the location of fires through triangulation. Nowadays, though, the park employs aircraft to fly above new fires and pinpoint their coordinates using GPS.

Lookouts still serve one vital purpose—they help ensure the safety of crews on the ground. When firefighters approach a blaze on foot, visibility is limited. Surrounded by trees (and sometimes smoke), they may not be able to detect changes in the fire's behavior and direction of travel. An observer in a lookout can relay this important information to them via radio.

When Fire's Not the Answer

Almost 20,000 acres (8,100 hectares) of the park are dominated by ponderosa pine trees. You can see these majestic, orange-barked trees along Highway 62 near the park's south entrance. Historically, these pines relied on periodic fires to keep rival trees, such as white firs, at bay. Protected by thick bark, they can tolerate low-intensity ground fires, which, before European settlement of this area, likely swept through each grove of ponderosas every 10 to 30 years.

Unfortunately, fire suppression has allowed a dense understory of white firs to develop, as seen in the photo above. Ponderosa seedlings, which require ample sunlight, are unable to grow in the firs' shade. The firs also compete with mature pines for water and nutrients, and they can become a "fuel ladder" by which surface fires climb into the pines' vulnerable crowns.

The park has tried ousting the white firs through prescribed (park-ignited) burns, but the resulting fires have been too hot, killing the giant ponderosas as well. At this point, there is too much accumulated fuel in the forest for a low-intensity fire to be manageable. To save our ponderosas, the park is exploring the idea of removing the white firs by hand (and machine). Thinning the forest might be the safest and most ponderosa-friendly way of restoring these groves to their pre-suppression condition.

The park already employs manual thinning in our campgrounds and developed areas, in order to lower the risk of a "crown-to-crown" fire that could spread quickly, threatening human life and the park's historic buildings. And along Highway 62, the park is in the midst of a 5-year project to remove small trees and shrubs along both sides of the road. Should a high-intensity fire break out in the park, the road corridor might provide us with an opportunity to slow or stop its spread.

Wanted: Your Wildlife Observations

Park scientists need your help! If you spot any interesting animals during your Crater Lake visit, or if you observe any unusual behavior, please let us know. Each summer, only two or three employees are dedicated to the park's wildlife program. And for the most part, they spend their season working on specific projects. (Current projects include surveying for Northern spotted owls, studying the sensitivity of American pikas to climate change, and tracking the distribution of the park's rare subspecies of red fox.) They have little time to observe other animals.

That's where you come in! By being our eyes and ears—and reporting what you see—you can help us learn which animals live in the park and how they are using it. In 2013, we received 106 observations of 32 different species, including two that had never been photographed in the park before: the muskrat and Eurasian collared dove. Other species that were spotted included the broad-footed mole, peregrine falcon, porcupine, great blue heron, coyote, sooty grouse, and northern alligator lizard. Your observations will help us update our species lists, help us understand where different species reside, and will help guide the direction of future research.

To report your sighting, send an e-mail to craterlake@nps.gov or find a ranger at a visitor center. Let us know the date and precise location of your encounter, a detailed description of what you saw, as well as 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 verifying the identity of certain species. Just remember that approaching, feeding, and disturbing wildlife is strictly prohibited—so please keep your distance. Thanks for your participation!

Leslee Sorensen and John Clark of Roswell, Georgia, captured this remarkable photo last September. While gazing down at Crater Lake from a roadside overlook, they spotted a black bear *(Ursus americanus)* climbing up the steep slopes below them. It reached the rim, crossed the road, and vanished into the forest. The park is home to an estimated 30 to 70 black bears, but never had one been reported inside the caldera.

This burrowing owl *(Athene cunicularia)* was the first of its species to be documented in the park. Michael and Tarn Stevens of Bend, Oregon, noticed it camouflaged against the rocks of the Pumice Desert. Burrowing owls nest in underground holes, typically ones excavated by other animals. They have long legs and sometimes chase their prey (insects, reptiles, and small mammals) on foot.

Tom Fenske of Corvallis, Oregon, spotted this red fox *(Vulpes vulpes)* along the East Rim Drive last August. Red foxes are not always red—most at Crater Lake have fur ranging from silver to black. No matter their color, they all have a long tail with a white tip.

Park Battles Foreign Flowers

Can We Win the War on Weeds?

Picking flowers in a national park is strictly against the rules. Flowers provide food for wildlife, protect soil from erosion, and produce seeds for their own regeneration. Why, then, does the staff of Crater Lake National Park harvest flowers on a regular basis? In 2013 alone, employees and volunteers collected and destroyed nearly 60,000 flowering plants! Well, just like the U.S. military is tasked with defending our country from potentially harmful foreign powers, the National Park Service is working hard to repel the invasion of potentially harmful foreign flowers. Non-native plants are a big threat to the park's—and our nation's—biodiversity.

In the past 10,000 years, the biota of this area has undergone several huge transformations. The eruption and implosion of Mount Mazama (the event that created the Crater Lake caldera, *see page 1*) did not just destroy the top of a towering volcanic peak, it also obliterated—through lava, ash, and toxic gases—most, if not all, of the life forms that flourished in the mountain's shadow. 7,700 years ago, the land here was barren. Over time, however, an amazing diversity of flora and fauna returned to colonize the flanks of the volcano, including 678 species of vascular plants. The landscape changed from "no growth" to "old growth," as species-rich forests and meadows slowly developed.

Jen Beck, Park Botanist

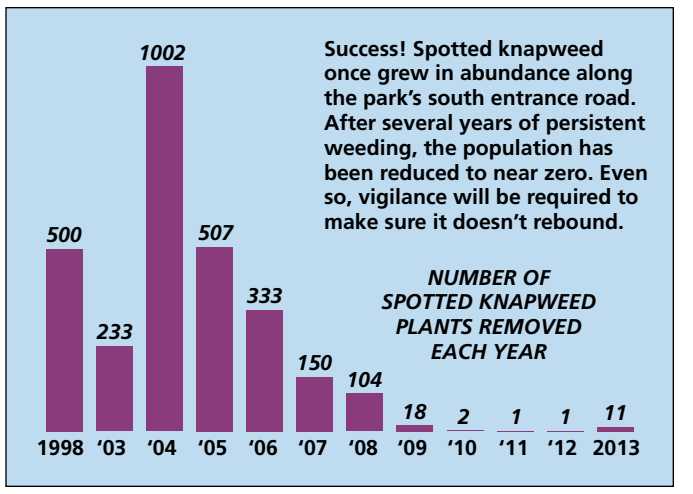
More recently, a second wave of colonization has occurred. At least 62 new plant species have made inroads into the park, primarily in the past few decades. Just last year, three new species were discovered: dyer's woad, tall lettuce, and field bindweed. Unlike the previous colonists, these new arrivals have come from overseas, brought to North America, by accident or intention, by humans. And instead of bolstering the park's biodiversity, they are jeopardizing it. Without local enemies and pests, non-native plants have a competitive advantage. They can spread quickly and uncontrollably, taking over vast swaths of land and leading to the decline—and even extinction—of native species, including animals, which depend on native plants for food and shelter. In a variety of ways, non-native vegetation can drastically alter an ecosystem.

Here at Crater Lake, the most dangerous intruders include St. John's wort, bull thistle, Canada thistle, spotted knapweed, sheep sorrel, and wooly mullein. They are most commonly found along transportation corridors, such as roads and trails, having been introduced on the wheels of automobiles and the soles of hiking boots. They've also been found deep in the park's backcountry, and several species have managed to colonize the shore of Crater Lake. The extent of the infestation is not fully known; most of the park has not yet been surveyed.

Compared with other national parks, though, Crater Lake's flora appears to be relatively pristine. Some plant communities are still composed only of native members. "We're sitting in a good position, at the crest of the Cascades," says park botanist Jen Beck. "We have high elevation and a short growing season on our side. Our blanket of snow offers some protection. It helps ward off non-natives." Unfortunately, climate change will likely bring warmer temperatures, less snow, longer summers, and, consequently, more invasive species to the park. So, how can we fight back?

In 1998, the park began a concerted effort to remove non-native plants, with annual work starting in 2003. Beck, the park's first full-time botanist, arrived in 2011. "We've had some success," she reports, as in the case of spotted knapweed *(see box at right)*, which the park has greatly reduced through persistent weeding by hand. Hand-pulling is not effective, however, for many other species, such as St. John's wort and Canada thistle, which can resprout from their tangle of underground roots. For these invaders, chemical control is often the best method. With assistance from the Oregon Department of Agriculture's Noxious Weed Control Program, the park has been reducing roadside populations of St. John's wort with an approved herbicide since 2007, with plans to attack other species in the future.

Still, experts like Beck agree that the most effective and economical way of controlling non-native species is to prevent their introduction in the first place. You can help! Before visiting a national park, clean your car of mud. Before hiking a trail, make sure your boots aren't dirty. Inspect your tent, backpack, bicycle tires, and other recreational gear for seeds. And if you're traveling with a pet, keep its fur clean. If we can limit the dispersion of non-native plants—and if we can identify and eradicate small patches of weeds before they become firmly established—we can keep them at bay. We may never win the war on weeds, but if we are vigilant, we can limit the damage they do to our native ecosystems. In doing so, we'll ensure that future generations of park visitors will be able to experience the rich biodiversity we see today.



Success! Spotted knapweed once grew in abundance along the park's south entrance road. After several years of persistent weeding, the population has been reduced to near zero. Even so, vigilance will be required to make sure it doesn't rebound.

Don't let this flower's beauty deceive you. It's not welcome here! Spotted knapweed *(Centaurea stoebe ssp. micranthos)* is native to eastern Europe. It reached North America in the 1880s, probably in a shipment of alfalfa seed. It invades dry fields, where it replaces native grasses favored by elk and other grazers.

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St. John's wort *(Hypericum perforatum)*, also known as Klamath weed, was introduced to the U.S. in the 18th century as an ornamental and medicinal herb. Ingesting it can be toxic to livestock and wildlife. Each plant can produce up to 100,000 seeds annually; each seed can remain dormant for up to 20 years in the soil. The plant also propagates via creeping stems and underground roots. It's hard to control!

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The park's most tenacious invader is Canada thistle *(Cirsium arvense)*. A native of Eurasia (not Canada), it was introduced to North America in the 17th century, likely by accident. It travels by windborne seeds and underground roots, which can be up to 20 feet (6 meters) long. Pulling this weed by hand is futile. A root fragment only a quarter-inch (0.6 cm) long can generate a new plant if left in the ground.

25 Years Ago Today. . . .

Submarine Explores the Floor of Crater Lake

Visitors to Crater Lake often wonder if anyone has explored its depths. The answer is yes! In the summers of 1988 and 1989, a one-person submarine made 47 separate dives to the bottom. They were not sightseeing trips—their purpose was to collect data on the lake's hydrology, biology, and geology and to resolve a controversy over geothermal energy development that was brewing on the borders of the national park. Today, the journeys of Deep Rover stand as a milestone in our understanding of the lake's ecology and our efforts to protect it. This August marks the 25th anniversary of the deepest dives and seems a fitting time to revisit the discoveries and examine the legacy of this fascinating and important expedition.

Mark Buktenica, the park's aquatic ecologist, has worked at Crater Lake since 1985. Seen here at the controls of Deep Rover, he remembers the expedition as the experience of a lifetime: "What we found was not only scientifically interesting, it was spectacular—as spectacular as the scenery above the lake's surface."

Beneath Crater Lake National Park lies a reservoir of restless magma. In the mid-1980s, a company from California announced its desire to build a power plant on public lands adjacent to the park. The plan was to use geothermal heat (in the form of steam) to spin turbines to produce electricity for San Francisco. They drilled an exploratory well, half a mile outside the park's eastern boundary, and reported temperatures above the boiling point of water just 1,350 feet (410 meters) below ground. The project aroused widespread concern. Might it adversely affect the plumbing of Crater Lake? Congress stepped in, authorizing the Department of the Interior to suspend all drilling while the park investigated two unknowns: Are there any hydrothermal inputs into Crater Lake? And if so, are they significant in any way to the lake's ecology?

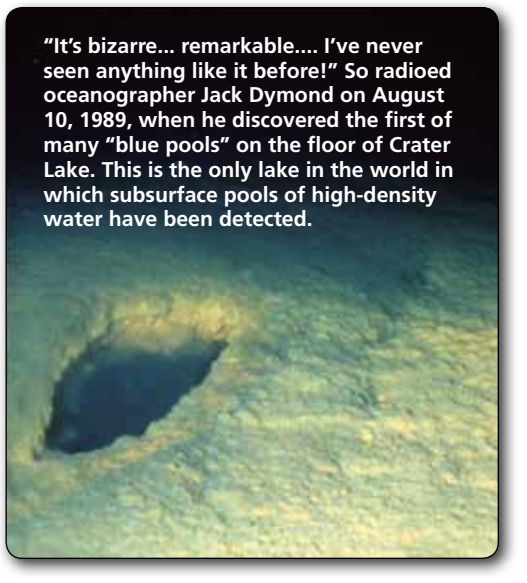
The National Park Service, U.S. Geological Survey, and National Geographic Society teamed up to lease a submarine, called Deep Rover, from a company in Vancouver, Canada. Flown by helicopter onto the lake, it was powered by batteries and could stay underwater for six hours at a time. Its hollow, plastic hull had room for only one occupant, who served both as pilot and scientist. Three men—two oceanographers from Oregon State University and Mark Buktenica, the park's aquatic ecologist—alternated dives. "As I slowly sank into the depths of the lake, I was engulfed in blue that eventually turned to darkness," recalls Buktenica of his half-hour commutes to the lake floor. "The only sounds in the submarine were the creaking and popping of the hull as it adjusted to the increasing water pressure and the persistent hum of the carbon dioxide scrubbers cleaning the air."

A quarter-century after it explored Crater Lake, the submarine named Deep Rover still captures our imagination. The pilot sat alone inside a clear acrylic sphere and collected samples using two robotic arms.

Fortunately, a radio allowed the men to communicate with the surface, and headlights on the sub allowed them to see. What they found was surprising—and spectacular. Colonies of yellow-gold bacteria grew in vast, puffy mats, often around pools of aqua-blue water *(see below right)*. Probes inserted into the bacteria mats registered temperatures as high as 66°F (18.9°C), much warmer than the surrounding 38°F (3.5°C) lake water. The bacteria were surviving in the darkness by oxidizing iron for energy—iron introduced to the lake in warm, hydrothermal fluids from below. Some of the fluids then trickled into the aqua-colored pools, where, laden with minerals, they could not mix freely with the waters above them. The fluids were greatly enriched in elements such as manganese, radon, lithium, and helium-3, indicating that they had once been in contact with hot, subterranean rock. Elsewhere in the lake, the team found 30-foot-tall (9-meter) rock spires, chimneys made of silica that had precipitated out of other upwelling fluids at some point in the past.

Bacteria were not the only life forms found to be thriving at great depths in Crater Lake. A variety of worms, insects, and tiny crustaceans were spotted as well. Although not dependent on the hydrothermal vents, they were remarkable for their ability to tolerate the extreme water pressures found in the lake's deepest basin, 1,943 feet (592 meters) below the surface. Some were also notable for their life history. Adult flies of the genus *Heterotrissocladius*, for example, drop their eggs into the lake. The eggs sink slowly to the bottom, hatch into larvae, feed on lake floor sediments for perhaps two to three years, swim back up to the surface (pupating along the way), then emerge as winged adults. Two to three days later, the adults lay eggs and die, and the cycle starts again.

The discoveries of Deep Rover allowed Crater Lake to join a list 15 other National Park Service units deemed to have "significant thermal features" worthy of protection under the Geothermal Steam Act, a law passed by Congress in 1970. Any future drilling or geothermal development on nearby public lands won't be permitted if it's likely to adversely affect those features. Deep Rover also furthered, by leaps and bounds, our understanding of the lake's evolution and ecology. Even so, the sub visited only 2% of the lake floor. Many secrets surely remain in the dark, watery depths of this collapsed volcano. Hopefully, someday, humans will return to explore the rest of the bottom of our nation's deepest lake.



"It's bizarre... remarkable.... I've never seen anything like it before!" So radioed oceanographer Jack Dymond on August 10, 1989, when he discovered the first of many "blue pools" on the floor of Crater Lake. This is the only lake in the world in which subsurface pools of high-density water have been detected.

Support Your Park–

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 $20, you can outfit your car with these beautiful plates while supporting park projects. You can purchase Crater Lake plates at any time, not just when buying a new vehicle or renewing your registration. Visit any Oregon DMV office or www.oregon.gov/odot/dmv for details.

Money from plate sales goes into an endowment that funds the operation of the park's Science and Learning Center. The center opened in 2006 and consists of two renovated historic structures near Park Headquarters: the original Superintendent's Residence and Chief Naturalist's Residence. These buildings 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 about the Science and Learning Center and its programs, visit www.nps.gov/crla/slc.htm.

Science and Learning Center

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 throughout the year to help staff visitor centers, present interpretive programs, and assist with research and monitoring projects. Opportunities are advertised at www.volunteer.gov. Volunteers are provided free housing in exchange for 3 months or more of service.

To assist with special projects or volunteer periodically, join The Friends of Crater Lake, a non-profit organization founded in 1993. Members remove non-native plants, build and maintain trails, contact visitors, and much more. For more information, visit www.friendsofcraterlake.org.

The Crater Lake Ski Patrol has been assisting winter visitors and maintaining the park's cross-country ski trails since 1983. Members, identifiable by their bright red parkas, receive training in wilderness first aid, survival skills, search and rescue, map and compass use, and avalanche safety in exchange for at least 6 days of service each winter. To learn more, visit www.craterlakeskipatrol.weebly.com.

Volunteer Ski Patrollers

Contribute to the Crater Lake Trust

The Crater Lake National Park Trust is a non-profit organization that raises private funds to support park projects and connect the park with surrounding communities. It helps support, for example, field trips to the park for more than 5,000 grade-school students each year. In a program called "Classroom at Crater Lake," kids engage in hands-on science and learn about wildlife, old-growth forests, and winter ecology. For more than half these kids, it's their first visit to Crater Lake. To learn more about the Trust and its activities, visit www.craterlaketrust.org or write to PO Box 62, Crater Lake, OR 97604. Share your love of the park by making a tax-deductible gift.

CRATER LAKE NATIONAL PARK TRUST

"Classroom at Crater Lake"

Shop in the Visitor Center Bookstores

When you shop in the Steel Visitor Center or Rim Visitor Center, all proceeds from your purchase are invested back into the park. The visitor center bookstores are operated by the Crater Lake Natural History Association, a non-profit organization established in 1942 to support the park's educational and scientific programs. Money generated from bookstore sales goes to fund a variety of important projects, including the printing of this newspaper! Some of the bookstores' offerings are described to the right. For a complete list of merchandise and to buy items online, visit www.craterlakeoregon.org. Items can also be purchased by phone by calling 541-594-3111.

CRATER LAKE NATURAL HISTORY ASSOCIATION

Share Your Comments

Whether you have a compliment, concern, or suggestion, we'd like to hear from you! This is your national park, and we value your input on how best to manage it. You can provide feedback in several ways. Ask for a comment form at a visitor center, send an email to craterlake@nps.gov, or write to: Superintendent, Crater Lake National Park, PO Box 7, Crater Lake, OR 97604.

–Thank You!

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

Crater Lake National Park
P.O. Box 7
Crater Lake, OR 97604

EXPERIENCE YOUR AMERICA™

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 handy guide as you drive the park's roads for a deeper understanding of the sights along the way. 48 pages, $5.95.

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

Plants & Animals of Crater Lake Nat'l Park
Folding, waterproof pocket guide to 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, $6.95.

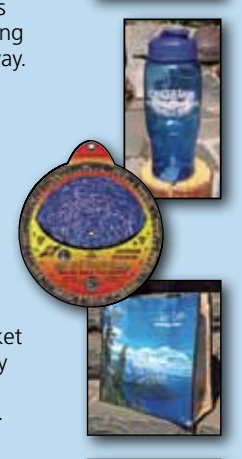
Trees To Know in Oregon
Tree identification is easy and enjoyable with this photo-packed, fact-filled guide. 153 pages, $18.00.

Other Useful Items

The Mountain That Became a Lake CD
Listen to this CD as you drive the park's roads. Park rangers and American Indians share facts, stories, and insight about Crater Lake. 60 minutes, $16.99.

Crater Lake Topo Map
Waterproof and tearproof. 1:55,000 scale. $11.95.

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, $19.99.



Crater Lake Water Bottle
This plastic bottle's flip-top lid makes it easy to quench your thirst. $2.99.

Star & Planet Guide
Rotating "planisphere" for locating stars, planets, and constellations. $11.99.

Crater Lake Reusable Shopping Bag
Earth-friendly and great for groceries. Made from recycled materials. $2.99.

Moisture-Wicking Cap
Synthetic cap with Crater Lake logo. Designed to keep your head dry during athletic activity. $19.99.

Clark's Nutcracker T-Shirt
100% cotton. Bird on front, lake on back. $19.99.

Climate Chart

Summers at Crater Lake are short but warm and sunny. Even so, there are days when the lake is shrouded in clouds. July, August, and early September are your best bets for warm, dry weather. In May, early June, late September, 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 43.5 feet (13.2 meters) of snow at Park Headquarters. The tremendous snowfall is a result of our position at the crest of the Cascade Mountains.

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	28	34	41	41	37	31	23	19
Avg. Snowfall (inches)	102	83	85	46	20	4	0.2	0.1	3	21	63	94
Avg. Snow Depth (inches)	80	102	117	113	78	24	1	0	0	2	17	48
Avg. Lake Surface Temp. (°F)	39	38	38	38	40	45	54	59	56	51	45	41

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
Avg. Snowfall (cm)	259	211	215	117	51	10	0.5	0.3	6	54	159	239
Avg. Snow Depth (cm)	203	260	297	286	198	62	3	0	0	6	43	121
Avg. Lake Surface Temp. (°C)	4	3	3	3	4	7	12	15	13	10	7	5