



## Reflections Visitor Guide Summer/Fall 2022



View from  
Mount Scott  
at Sunrise

## Welcome to Crater Lake!

We are looking forward to an exciting summer in the park.

Although we are not completely past the pandemic and its effects, we are returning to more normal operations. Trolley tours and other activities will once again be available to help you explore the wonders to be discovered here. While we are more fully staffed than last year, we are still limited in the services and facilities that we can provide, so we ask you to exercise good planning, judgment, and patience while exploring the park and nearby areas.

Please review the rules on page 2 to protect yourself from harm and park resources from damage. Be prepared with proper clothing and footwear, food, water, and sunscreen. And pack plenty of consideration and courtesy. Report problems to a ranger and offer help to people you observe who may need assistance. It will make the park a better place for everyone, and you will be rewarded in knowing that you contributed to the protection and enhancement of one of the most special places on Earth.



Craig Ackerman  
Superintendent

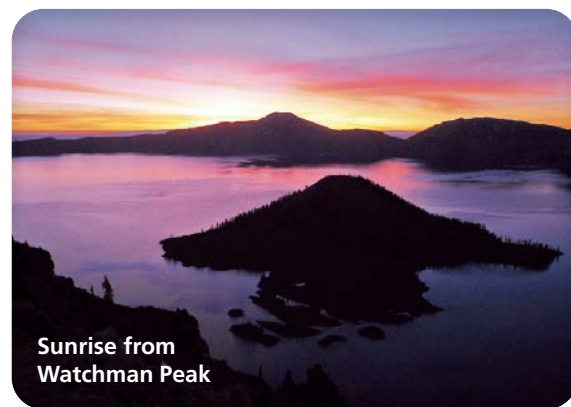
## Catch a Rising Star

### Plus 10 Other Ways to Enjoy Your Park

Watching the sun rise (or set) in the park can be an unforgettable experience. The overlooks on the Rim Drive, with their unobstructed views, are great places to observe the sun's daily rituals, as well as other celestial events. For many travelers, spending dawn or dusk on the rim of Crater Lake is a highlight of their park visit. When the winds are calm, the lake becomes a perfect mirror of the sky.



Opinions differ, though, as to the best vantage points. At dawn, some people head to the West Rim—to Discovery Point, Watchman Overlook, or the top of Watchman Peak. From these outposts, the waters of the lake sometimes glow in shades of orange, pink, and purple. As soon as the sun breaks the horizon, however, seeing the lake from these places means staring into the light, and opportunities for photographs diminish. That's why other people prefer to station themselves along the East Rim Drive (or even hike to the summit of Mount Scott) at sunrise, in order to have the sun at their back when viewing the lake.



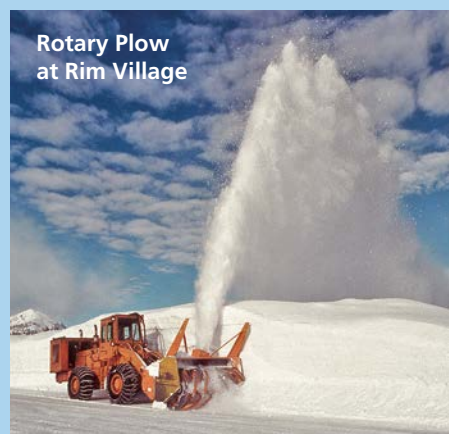
Sunrise from  
Watchman Peak

That's also why the most popular spots for sunset are Watchman Overlook and Watchman Peak, where you can enjoy the last rays of light on the lake and then watch the sun descend over a dozen ridgetops between the park and the Pacific Ocean.

If sunrises and sunsets don't fit into your schedule, there are many other ways to make your Crater Lake visit memorable, meaningful, and fun. Here are 10 suggestions:

## Hours & Seasons

No reservations are needed to enter the park. It is open year-round, 24 hours a day. Some roads, however, are closed seasonally due to snow. The park's North Entrance 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 between mid-June and late July. Highway 62 and the road to Rim Village are plowed year-round.



Rotary Plow  
at Rim Village

### Circle the Lake

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

### Photograph the Pinnacles

Formed by 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*).

### Visit the Sinnott Overlook

Perched on a cliff at Rim Village, this historic overlook features a dramatic view of the caldera and exhibits that explain its geologic features (*see page 3*).

### Climb a Peak

The summits of Garfield Peak, Watchman Peak, and Mount Scott each offer spectacular—and very different—views of Crater Lake (*see page 4*).

### Watch for Wildflowers

From late June to mid-August, flowers line many of the park's roads and trails. Take a short stroll on the Castle Crest Trail to view the park's premier display (*see page 4*).

### Find the Phantom Ship

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

### Have a Picnic

The pullouts and picnic areas on the Rim Drive are perfect for outdoor eating. Stop by the Rim Village Café or Mazama Village Store for grab-and-go sandwiches.

### Touch the Water

The trail to the lake shore is steep and can be crowded, but the water at the bottom is some of the world's purest. Swim, fish, or simply dangle your toes (*see page 2*).

### Take a Trolley Tour

See the park with those who know it best. Ranger-narrated, 2-hour tours depart daily from Rim Village, stopping at overlooks as they loop around the lake (*see page 3*).

### View the Milky Way

On moonless nights, the park offers some of the darkest night skies in America. Look up to see meteors, satellites, planets, and the starry arms of our galaxy.

- 2... Activities, Park Rules
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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 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 blanket the volcano's slopes, harboring more than 700 native plant species and at least 72 types of mammals. The park is central to the cultural traditions of local American Indian tribes, whose ancestors witnessed the lake's formation.

- Park established: 1902
- Size: 183,224 acres (74,148 hectares)
- Number of visitors last year: 648,000
- Lake depth: 1,943 feet (592 meters)
- Lake width: 4.5 to 6 miles (7 to 10 km)
- Highest point: Mount Scott, elevation 8,929 feet (2,721 meters)



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



Bicycling Around the Lake



Summer Sunset



Junior Rangers



Sightseeing on the East Rim Drive



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

### Crater Lake Visitor Guide Summer/Fall 2022

This is the official 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 Phone:** 541-594-3000

**Website:** [www.nps.gov/crla](http://www.nps.gov/crla)

**Mail:** PO Box 7, Crater Lake, OR 97604

**Email:** [craterlake@nps.gov](mailto:craterlake@nps.gov)



National parks belong to everyone. We all share responsibility in protecting them. Please take a moment to become familiar with these important regulations. For a full list of park rules, visit [www.nps.gov/crla](http://www.nps.gov/crla).

#### Drones

Operating remote-controlled aircraft in the park is prohibited.

#### Guns

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

#### 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 hotels, and for backpackers (permit required).

#### 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 in a campground food locker. Backcountry campers should hang their food or use a bearproof canister.



Golden-Mantled  
Ground Squirrel

**Help keep wildlife wild.  
Please do not feed!**

#### Hiking and Climbing

Stay on trails. This prevents erosion, protects vegetation, and protects other hikers. The Cleetwood Cove Trail is the only legal access to the lake shore. Hiking and climbing inside the caldera is otherwise prohibited. The walls consist of unstable rocks and loose soil.

#### 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.

## Activities

### 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 a trail register as they enter the park.) Backcountry permits are free of charge and are available between 8 am and 4:30 pm daily. They are not available after hours or over the phone.

### Bicycling

Bicycles are allowed on paved roads and the unpaved Grayback Road. 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 be taking place on September 10 and September 17 this year. The East Rim Drive will be closed to automobiles, giving bicyclists and pedestrians a chance to enjoy 24 miles (39 km) of scenic roadway without vehicle noise and traffic. Visit [www.ridetherimoregon.com](http://www.ridetherimoregon.com) to learn more.

### Enjoying the Park with Your Pet

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 Road, and Pacific Crest Trail (see page 4). Leashes must not exceed 6 feet, 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, on paved surfaces, and up to 50 feet (15 meters) away from paved surfaces. 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 preced-



Best Friends at Rim Village

ing 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.

### Junior Ranger Program

Are you between 6 and 12 years old, or a kid at heart? Pick up a free Junior Ranger activity book! They are available 24 hours a day from dispensers in front of the Rim Village Visitor Center and Mazama Village Visitor Center.



To become a Junior Ranger and earn an official badge, complete at least 7 pages as you explore the park. Then show your book to a ranger at either visitor center (see hours on next page).

If we are closed, you can deposit your book in the after-hours drop box outside the visitor center, and we will send you a badge through the mail. Alternately, you can send your finished book to the address on its front cover, or ask an adult to scan or photograph the pages and email them to [craterlake@nps.gov](mailto:craterlake@nps.gov).

More activities are available online. Visit [www.nps.gov/crla](http://www.nps.gov/crla) to watch engaging videos about Crater Lake and earn virtual badges.

### Wildlife Viewing

The park is home to a variety of animals, but they can be difficult to spot. Many are active primarily at night or shy away from humans. The most commonly seen animals are squirrels, chipmunks, marmots, ravens, jays, and deer. Lucky observers might spot a pika, porcupine, fox, coyote, wolf, marten (a type of weasel), bald eagle, owl, 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 (from mid-June through July) and yellowjacket wasps (in August and September).

### 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). Many pullouts on the 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.



Black Bear Crossing the Pinnacles Road

### 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.

### Fishing

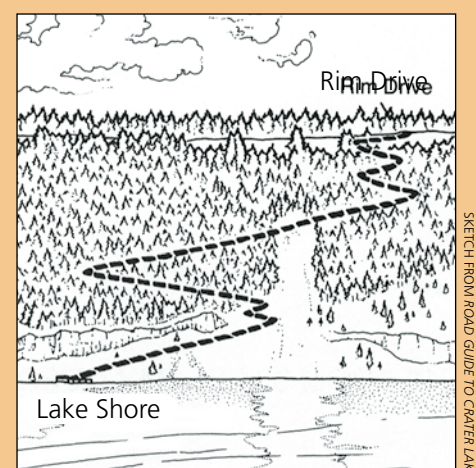
Crater Lake is home to rainbow trout and kokanee salmon. Neither is native to the lake. Fishing is allowed at the bottom of the Cleetwood Cove Trail, where you'll find a short stretch of rocky shoreline. Fishing licenses are not necessary. There are no restrictions on the size, number, or type of fish 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.

### 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. Long-distance swimming is prohibited. To prevent the introduction of non-native organisms, the use of equipment other than standard swimsuits is forbidden. Wetsuits, snorkels, fins, goggles, life jackets, and other flotation aids are not allowed, as well as other gear—such as rafts, canoes, kayaks, and paddleboards—that could serve as potential vectors for invasive species.

## 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 footwear and carry water. Vault toilets are located in the parking lot at the top of the trail. Depending on snow conditions, the trail is usually open from mid-June to late October.



The strenuous trail to Cleetwood Cove drops 700 feet (213 meters) in elevation.

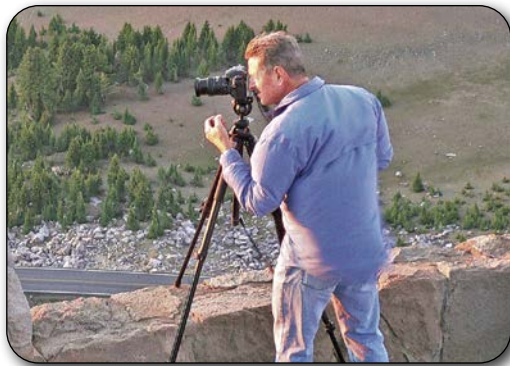
SKETCH FROM ROAD GUIDE TO CRATER LAKE



Sinnott Overlook



Trolley Tour



Photographer on Watchman Peak



Bird-Banding Program

# Services & Facilities

*This information was accurate at the time of publication but is subject to change. To find out the current status of park facilities and hours of operation, check one of the information boards located around the park.*

## Emergencies

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

## Restrooms

Restrooms with flush toilets and running water are open 24 hours a day at Rim Village and Mazama Campground. Vault toilets are located near all three park entrances (West, South, and North) and at 6 other places around the park (see map on page 5).

## Drinking Water

Water fountains can be found outside the Rim Village Visitor Center and Mazama Village Store. You can buy bottled water at the Rim Village Gift Shop, Annie Creek Gift Shop, and Mazama Village Store (see hours below).

## Food & Dining

The **Rim Village Café** serves grab-and-go sandwiches, salads, and snacks.

May 13–Sept. 25 ..... 9 am–6 pm  
 Sept. 26–Oct. 26 ..... 10 am–5 pm  
 Oct. 27–Dec. 31 ..... 10 am–4 pm\*  
 \*closed Tuesdays & Wednesdays

The **Annie Creek Restaurant** in Mazama Village serves pizza, burgers, and more.

May 20–June 30 ..... 11 am–8 pm  
 July 1–Sept. 24 ..... 11 am–9 pm

The **Mazama Village Store** sells groceries, snacks, grab-and-go sandwiches and salads, camping supplies, firewood, and gasoline.

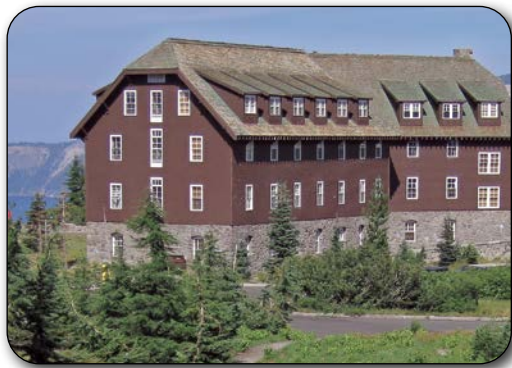
May 20–June 9 ..... 10 am–6 pm  
 June 10–30 ..... 10 am–7 pm  
 July 1–Sept. 4 ..... 9 am–9 pm  
 Sept. 5–Sept. 25 ..... 10 am–7 pm  
 Sept. 26–Oct. 9 ..... 10 am–6 pm\*  
 \*gas pumps only; store closed

**Crater Lake Lodge** also serves meals. During times of high community Covid transmission, however, food will be available only to overnight guests of the Lodge and the Mazama Village cabins.

May 13–Oct. 8:  
 Breakfast ..... 7:30 am–10 am  
 Lunch ..... Box lunches for overnight guests  
 Dinner ..... 5–6 pm (everyone)  
 6–10 pm (guests only)  
 Appetizers, drinks, and desserts are also available, 3–10 pm, in the Great Hall and on the back patio.



Fishing at Cleetwood Cove



Crater Lake Lodge

## Visitor Centers

At the park's two visitor centers, rangers are available to answer questions and help plan your visit. The **Mazama Village Visitor Center** is open 9 am–5 pm daily. The **Rim Village Visitor Center** is open 9:30 am–5 pm daily from late May to late September. Junior Ranger activity books are available from an outdoor dispenser. The park's souvenir passport stamp is available during business hours (it's the same design at each location). The nonprofit Crater Lake Natural History Association sells books, maps, postcards, and souvenirs. The **Steel Visitor Center** at Park Headquarters, normally open year-round, is currently closed for rehabilitation. It should reopen by the end of 2022.

## Exhibits

Perched on a rock ledge behind the Rim Village Visitor Center, the **Sinnott Overlook** has geology exhibits, a relief model, and a spectacular lake view. It's open 9:30 am–5 pm daily from mid-June through September and 10 am–4 pm in October (weather permitting). The overlook is located down a steep, historic walkway with stairs and, unfortunately, is not accessible to people with limited mobility. At **Crater Lake Lodge**, exhibits on tourism and the history and renovation of the Lodge can be found on the ground floor, west of the lobby. They are available around-the-clock, May 13–October 8.

## Gifts & Books

The Crater Lake Natural History Association sells books, maps, postcards, and souvenirs inside the **Rim Village Visitor Center** and **Mazama Village Visitor Center** (see hours above). Park concessioner Crater Lake Hospitality also offers a range of merchandise at the **Rim Village Gift Shop** (same hours as the Rim Village Café, see left), the **Annie Creek Gift Shop** in Mazama Village (same hours as the Annie Creek Restaurant, see left), and the **Mazama Village Store** (see hours at left).

## Post Office

A US Post Office is open 9 am–12 pm and 1–3 pm (except Sundays and holidays) inside the Mazama Village Visitor Center.

## Lost & Found

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

## Phone & Internet

Cell reception in the park is spotty. You may have luck at overlooks on the Rim Drive. An emergency landline can be found outside the "snow tunnel" entrance to the Administration Building at Park Headquarters. WiFi with limited bandwidth may be available at the park's concession-run facilities.

## Campgrounds

**Mazama Campground** has a total of 214 sites for tents and RVs. It is operated by Crater Lake Hospitality and will be open this year July 1–September 24. Senior Pass and Access Pass holders are entitled to a 50% discount on campsites. All sites are reservable in advance ([www.travelcraterlake.com](http://www.travelcraterlake.com) or 866-292-6720), with any remaining sites available on a first-come, first-served basis starting at 12 pm each day at the Mazama Village Store. If needed, you can reach the campground directly at 541-594-2255, extension 3. The campground has flush toilets, drinking water, and a dump station. Each campsite has a picnic table, fire ring, and food locker. Black bears tend to avoid the campground, but all food should be stored in a food locker or a vehicle. The park's other campground, **Lost Creek Campground**, is closed this year. For a list of campgrounds outside the park, visit [www.nps.gov/crla](http://www.nps.gov/crla).



## Trolley Tours

Rim Drive is one of America's most scenic roads, but it's hard to appreciate the views with your eyes on the asphalt. Fortunately, you can leave the driving to someone else—while learning about the park at the same time!

Ranger-narrated trolley tours circle Crater Lake daily. Tours begin and end at Rim Village, spend 2 hours traveling clockwise around the lake, and stop at 5 to 10 scenic overlooks, where passengers can disembark for a few minutes to enjoy the view. Tours depart hourly from 10 am to 3 pm, July through September (weather permitting).

Tickets may be purchased between 9 am and 3 pm by calling 541-882-1896 or aboard the trolley parked in the middle of Rim Village. Tickets may also be reserved online at [www.craterlaketrolley.net](http://www.craterlaketrolley.net).

The trolleys are wheelchair accessible and seat about 20 passengers. They resemble old streetcars, but they run on modern technology: most are powered by compressed natural gas and emit 30-40% less pollution than gasoline-powered vehicles. They are owned and operated by The Shuttle Inc. of Klamath Falls.

## Lodges

The park has two hotels, both operated by Crater Lake Hospitality. Historic **Crater Lake Lodge**, which first opened in 1915, overlooks the lake at Rim Village. It has 71 rooms and is open May 13–October 8. The **Cabins at Mazama Village** consist of 40 units and are open May 20–September 24. For both facilities, advance reservations are highly recommended: call 866-292-6720 or book online at [www.travelcraterlake.com](http://www.travelcraterlake.com). For a list of options outside the park, visit [www.nps.gov/crla](http://www.nps.gov/crla).

## Gasoline & EV

Self-serve, unleaded gasoline is available at the **Mazama Village Store** during business hours from May 20–October 9 (see hours, below left). A charging station for electric vehicles is located in front of the **Annie Creek Gift Shop** in Mazama Village. It has one standard connector and one Tesla connector.

## Bird-Banding Demonstrations

Have you ever seen a bird up close? Join a ranger to learn about the park's birds while watching scientists from the Klamath Bird Observatory mark them with identifying bands.

Programs are held most Tuesday mornings through October 4. They are free of charge, last 1 hour, involve a short walk, and take place in the vicinity of Park Headquarters. Advance registration is required, and space is limited. Register online (and learn more) at [www.nps.gov/crla/planyourvisit/bird-banding.htm](http://www.nps.gov/crla/planyourvisit/bird-banding.htm).

## Other Ranger Programs

Additional activities will likely be offered this summer, but they have not been confirmed at the time of publication. For the latest schedule, stop by a visitor center, see flyers posted in the campground, or check one of the information boards located around the park.

## Climate Chart

Most days in July, August, and September are warm and sunny. In May, June, and October, clear days alternate with periods of rain and snow. Winters are long. 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.

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	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

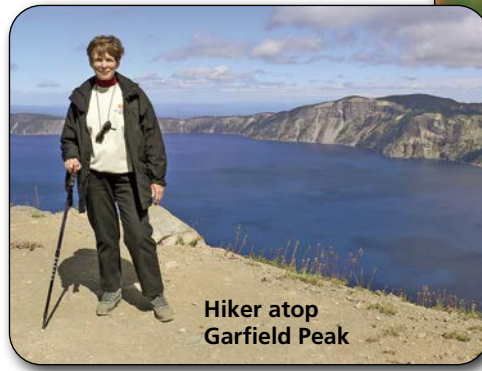
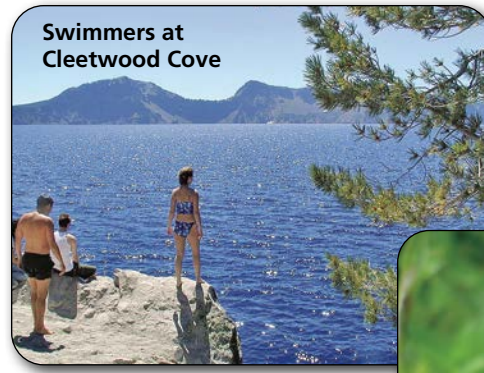
Air temperature and snowfall averages are from Park Headquarters, 1931-2019. Water temperatures are from 1965-2019.



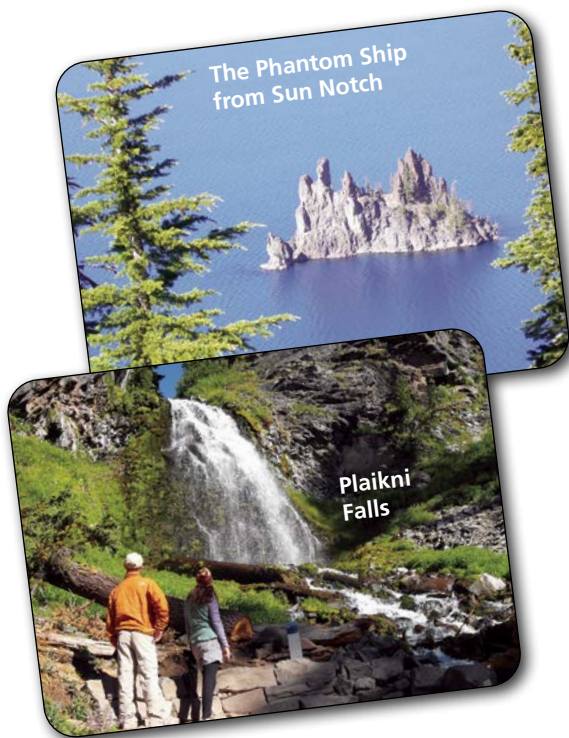
# Let's Go for a Hike!

Hi, I'm Ranger Stephanie. 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 the Ranger Station at Park Headquarters between 8 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, Grayback Road, and Pacific Crest Trail. Pets must be leashed; only one pet per hiker is allowed (*see page 2*).
- To protect vegetation and prevent erosion, please stay on the trails.

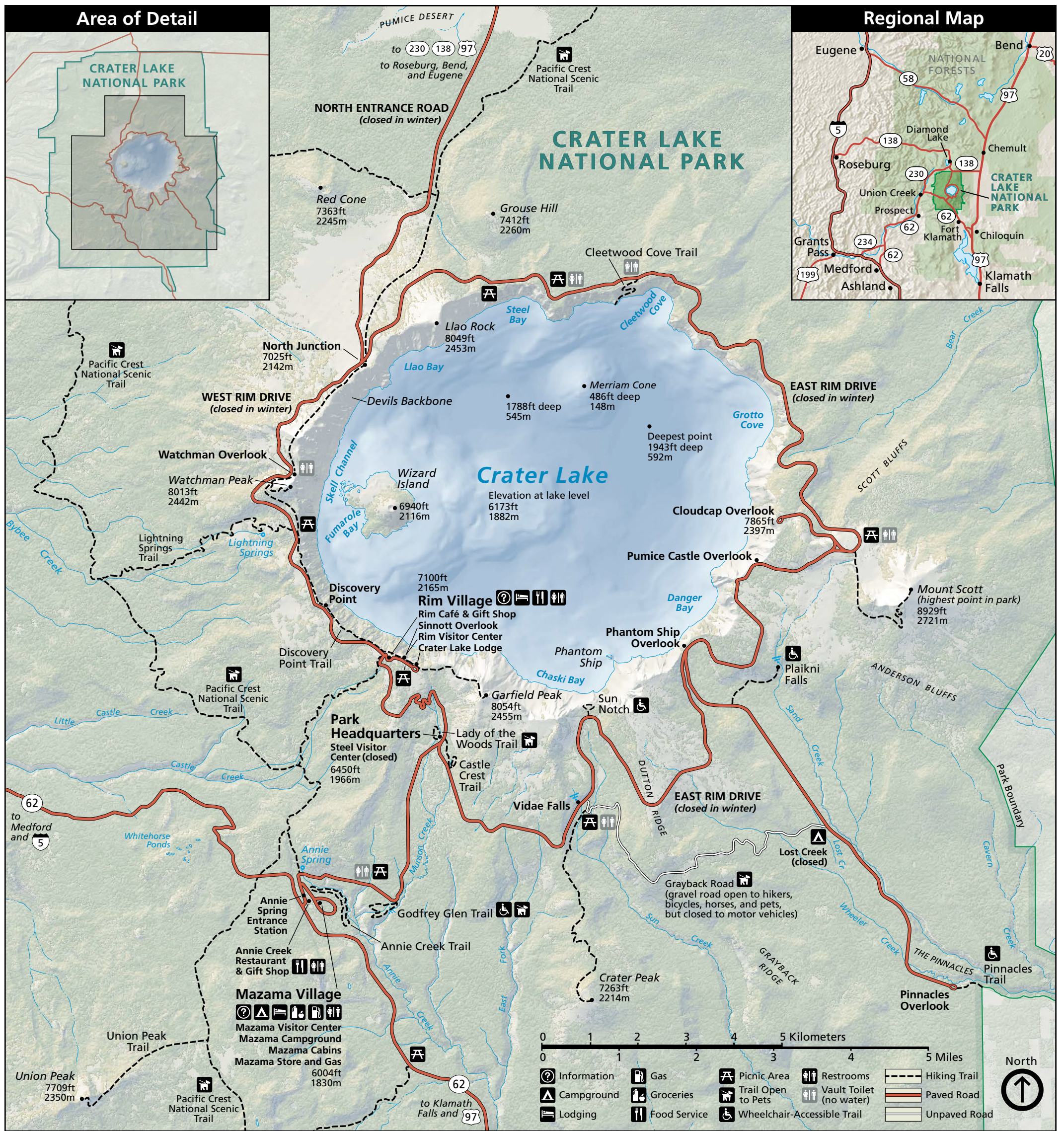


Castle Crest	Lady of the Woods	Sun Notch	Trail	The Pinnacles	Godfrey Glen	Plaikni Falls
0.5 miles (0.8 km) loop trail	0.7 miles (1.1 km) loop trail	0.8 miles (1.3 km) loop trail	<i>Roundtrip</i>	0.8 miles (1.3 km)	1.1 miles (1.8 km) loop trail	2.0 miles (3.2 km)
100 feet (30 meters)	120 feet (37 meters)	150 feet (46 meters)	<i>Elevation Gain</i>	10 feet (3 meters)	50 feet (15 meters)	100 feet (30 meters)
<b>20 minutes</b>	<b>30 minutes</b>	<b>30 minutes</b>	<i>Time</i>	<b>30 minutes</b>	<b>30 minutes</b>	<b>1 hour</b>
<b>Flowers, Meadow, Creek</b>	<b>Historic Architecture</b>	<b>Views of Phantom Ship</b>	<i>Highlight</i>	<b>Volcanic Spires</b>	<b>Peaceful Forest</b>	<b>Waterfall, Flowers</b>
Loop trail through a lush meadow. Abundant wildflowers from mid-July to mid-August. 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, with some canyon views. 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 mid-summer flowers. The first $\frac{3}{4}$ is accessible to all-terrain wheelchair users with assistance, but the final $\frac{1}{4}$ might be too steep.
East Rim Drive, 0.5 miles (0.8 km) east of Park Headquarters. Can also walk there from Park Headquarters.	Next to the Ranger Station at Park Headquarters, south of the Steel Visitor Center.	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.
<b>Easy</b>			<b>Easy</b>			



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)
<b>1 hour</b>	<i>Time</i>	<b>1 hour</b>	<b>1½ hours</b>	<b>3 hours</b>
<b>Lake Views</b>	<i>Highlight</i>	<b>Panoramic Views</b>	<b>Creek, Canyon, Flowers</b>	<b>Springs, Stream, Flowers</b>
The first mile of a 6-mile (9.7-km) trail along the West Rim of Crater Lake, through a pretty, old-growth forest. 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 late 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 large springs that represent the headwaters of the Rogue River. 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.
<b>Moderate</b>				

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)
<b>1½ hours</b>	<b>2 to 3 hours</b>	<b>3 hours</b>	<i>Time</i>	<b>3½ hours</b>	<b>5 to 6 hours</b>	<b>5 months</b>
<b>Swimming, Fishing</b>	<b>Panoramic Views</b>	<b>Panoramic Views</b>	<i>Highlight</i>	<b>Forest, Views, Solitude</b>	<b>Panoramic Views</b>	<b>Adventure, Achievement</b>
The only legal access to the shore of Crater Lake. Strenuous trail with a steep grade, leading to a rocky shoreline. See page 2 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 early 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.
<b>Strenuous</b>			<b>Strenuous</b>			



## 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 full loop is typically open from early July to late October. It can be driven, without stopping, in about an hour, but plan to spend at least 2 to 3 hours to enjoy the varied sights. The road is narrow, so buses and RVs should use caution. Also, please be alert for bicyclists, pedestrians, and wildlife. 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, \$7.95) at either visitor center.

### Discovery Point

Imagine seeing Crater Lake by accident. Near this spot, on the back of a mule in 1853, 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 road junction and 2.4 miles (3.9 km) east of the Phantom Ship Overlook.

### Phantom Ship Overlook

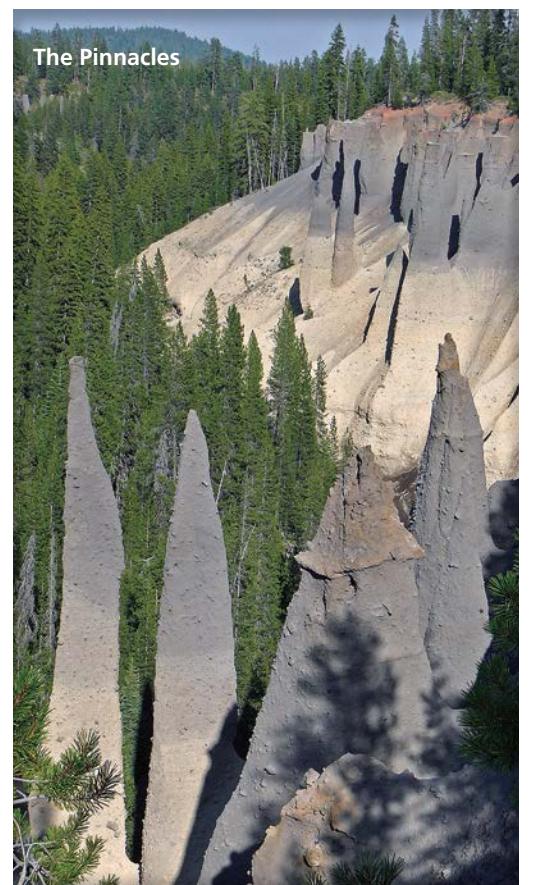
Nestled against the shore, Crater Lake's "other island" escapes detection by many park visitors. Though it resembles a small sailboat, the island is as tall as a 16-story building. It's made of erosion-resistant lava, 400,000 years old—the oldest exposed rock within the caldera.

### 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. These "fossil fumaroles" are the result of volcanic gases that rose up through a cooling ash deposit from the eruption that formed Crater Lake.

### Vidae Falls

This spring-fed, roadside waterfall 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.

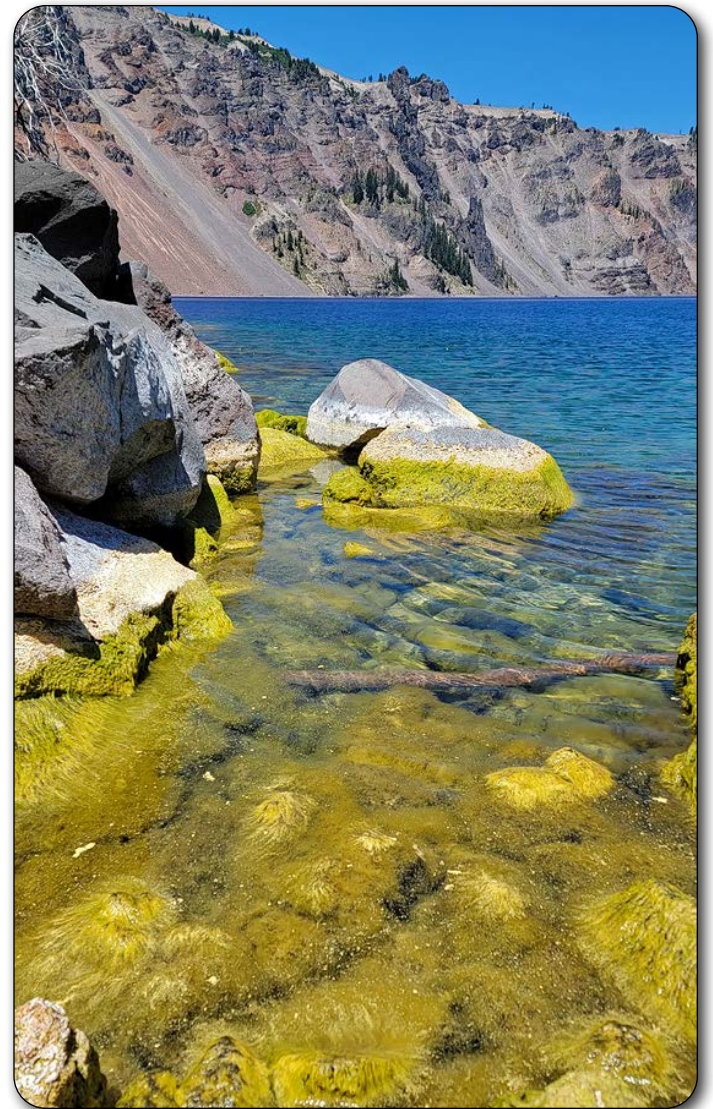




On July 12, 2021, researchers noticed a conspicuous display of algae along the shore of Wizard Island. While this type of algae is not uncommon in Crater Lake, it is rarely this prominent.



When researchers returned to the island on July 21, they were stunned. In a little more than a week, the algae had experienced explosive growth, producing long, hair-like filaments.



A survey conducted on July 29 found filamentous algae to be present, with varying degrees of coverage, along 70% of the lake's shoreline. Wizard Island was almost entirely surrounded.

# Algae Bloom Erupts along the Shore of Crater Lake

## Climate Change is Likely to Blame; Crayfish May Have Contributed

Crater Lake is one of the most pristine large lakes in the world, celebrated for its clear water and beautiful blue color. Part of the pristine experience that visitors have enjoyed, for generations, is a shoreline free of excessive algae growth—thanks, mainly, to the lake's cold water and limited supply of nutrients. In July of 2021, however—for the first time in recorded history—a dense cover of “filamentous” algae enveloped many of the rocks along the shore, turning them bright yellow. “It was shocking,” says Scott Girdner, the park's lead lake researcher. “It looked like someone had colored the shoreline with a giant yellow highlighter.” What triggered this unprecedented event, and what does it portend for the ecology of the lake?

The first hint of trouble came on July 12, when researchers noticed a greater-than-usual smattering of algae along the shore of Wizard Island (see photo, top left). While this type of algae—from the genus *Cladophora*—is native to the lake, it had long existed as an inconspicuous component of the ecosystem. “We'd see it occasionally, in random places,” recalls Girdner. “It would sometimes appear as little tufts on the rocks.” When Girdner returned to the island on July 21, he was greeted by a form of the algae that looked altogether different. In the span of just 9 days, the algae had experienced a period of exponential growth, producing long filaments (see photos, top right) that engulfed the rocks to which they were attached.

The bloom was not confined to Wizard Island. On July 29, Girdner and his two seasonal assistants performed a survey of the lake's 21-mile (33-km) shoreline. They found filamentous growths of *Cladophora* algae at 34 of the 48 sites that they sampled. The coverage was especially dense along the eastern shore. Back at Wizard Island, which was also thickly blanketed, the average length of the algal filaments exceeded 8 inches (20 cm). “This is nuts,” Girdner remembers thinking. “How could this be happening?”

Other scientists have been wondering the same thing. Over the past few decades, abnormal proliferations of filamentous algae have been popping up in many cold, clear lakes around the world. At Lake Tahoe and Lake Baikal, blooms have been linked to an increase in nutrients arriving through groundwater. In the Great Lakes, non-native zebra and quagga mussels have been blamed. (The mussels increase light availability for attached algae by removing floating algae from the water column; they deliver nutrients to the algae via their fecal material; and they produce hard shells on which the algae can grow.) Elsewhere, at remote lakes in the mountains of New Zealand, China, and the western United States—lakes mostly free from direct human impact—the blooms have been harder to explain. The main driver might be climate change.

When Girdner analyzed the variables that could have provoked Crater Lake's bloom, one stood out. Since 1965, the park has monitored the temperature of the lake near its surface (see graph below). A sensor is suspended at a depth of 1 meter from a weather buoy anchored above the lake's deepest point. In July of 2021, the mean water temperature measured by the sensor was the highest of any month on record: 63.3° Fahrenheit (17.4° C). The balmy water was a consequence of record-high air temperatures—the hottest July at Park Headquarters since record-keeping began in 1931. Was it merely a coincidence that the explosive growth of *Cladophora* algae in mid-to-late July corresponded with the warmest waters ever observed in Crater Lake? Girdner doesn't think so, although additional factors may have been involved.

It's possible, for example, that non-native crayfish helped create the conditions for the bloom to occur. Crayfish, while indigenous to Oregon, did not exist in Crater Lake until 1915, when they were stocked as food for the trout and salmon that were similarly introduced. This century—spurred by warming water temperatures—the crayfish population has suddenly ballooned. Crayfish now patrol more than 90% of the lake's shoreline, preying on the cornucopia of snails, insects, worms, and amphibians that live just below the surface. Some of these organisms—snails and caddisfly larvae, in particular—are algae eaters. They graze on the algae attached to submerged rocks, controlling the algae's growth. Studies conducted by Girdner have shown that when crayfish move into an area, the biomass of these organisms decreases by an average of 95%—and the biomass of the attached algae multiplies by a factor of 15.

With crayfish now permanently ensconced in Crater Lake, and with our planet continuing to warm, will filamentous algae blooms become a regular occurrence here? If so, what effect might they have on the health of the lake? “It's prime to happen again,” says Girdner. “But the potential impacts are unknown. Right now, we have many questions but few answers.” Fortunately, *Cladophora* species do not produce toxins, so waders and swimmers at Cleetwood Cove have nothing to fear, except for a more slippery shoreline—and one that is perhaps less photogenic. If nothing else, the “greening” of Crater Lake is a visually disturbing warning that transformative changes to the lake's ecology might be on the horizon.



The lake's non-native crayfish may have exacerbated the algae bloom: crayfish prey on snails and insects that graze on algae and control its growth.

## The Floating Algae Bloom of 2016

For a few days in September of 2016, one of Crater Lake's coves turned the color of pea soup. A proliferation of floating algae clouded the normally clear waters along the lake's north shore. The bloom, although shorter-lived and not nearly as widespread as the filamentous algae bloom of 2021, was a landmark event and an indicator that the lake may be on the cusp of profound ecologic change.

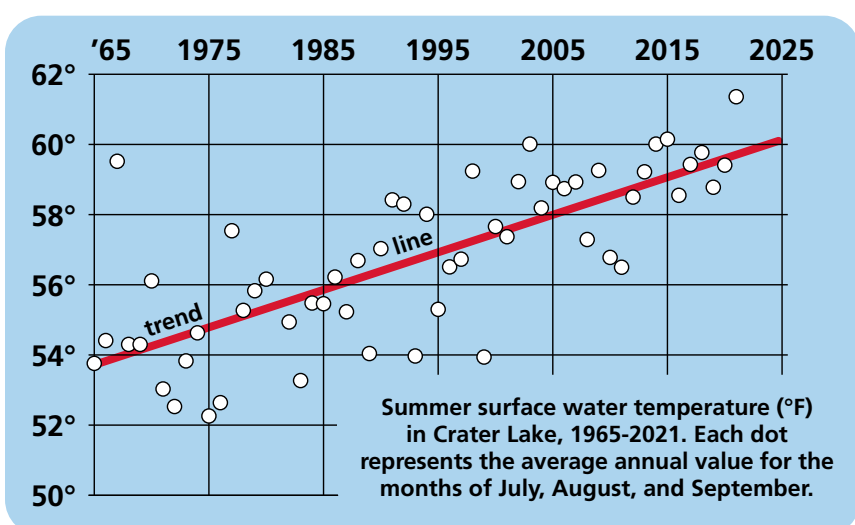
Researchers noticed the discolored water on the morning of September 27, near the Cleetwood Cove boat docks. They collected a water sample, which turned out to be teeming with dinoflagellates—tiny algae that have the ability to swim. Dinoflagellates are numerous in Crater Lake, especially toward the end of the summer. They use their mobility to migrate toward warm surface waters when the weather is calm. (When the wind blows, they get mixed into the water column, not being strong enough swimmers to fight against the waves.)

Although it's not clear what triggered the Cleetwood Cove bloom, the conditions in late September were certainly ripe for dinoflagellates to gather and multiply there. The weather was sunny, and the winds had been calm for several days. Still, park scientists were stunned to see microscopic algae present in concentrations high enough to alter the color of the water.

If there's a silver lining, it's that the algae living in Crater Lake are not toxic. In saltwater environments, some species of dinoflagellates are known to produce harmful “red tides” that can kill fish, birds, and even mammals. Another positive is that since 2016, no further blooms of floating algae have been seen or detected. In 2018, Girdner and his team installed dissolved oxygen sensors, capable of monitoring algal productivity, at 5 shallow-water sites around the lake. If—or more likely, when—future blooms occur, we should be able to discern them, even if no one is there to take a photo.



In 2016, Crater Lake experienced its first recorded algae bloom. The water along the lake's north shore turned green. A water sample revealed that the cloudiness was caused by a proliferation of dinoflagellates, a type of floating algae known to thrive in warm water.



Crater Lake is getting warmer. Since 1965, when scientists began keeping track, the water at the lake's surface has warmed by nearly 6° Fahrenheit (3.3° Celsius). The algae bloom of 2021 coincided with the warmest July water temperatures on record.

Scott Girdner, a native of Yreka, California, has been employed as a biologist at Crater Lake since 1995. You can learn more about his work and the park's long-term lake monitoring program at [www.nps.gov/crla](http://www.nps.gov/crla).

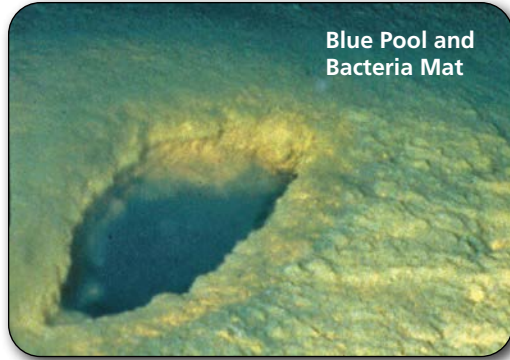




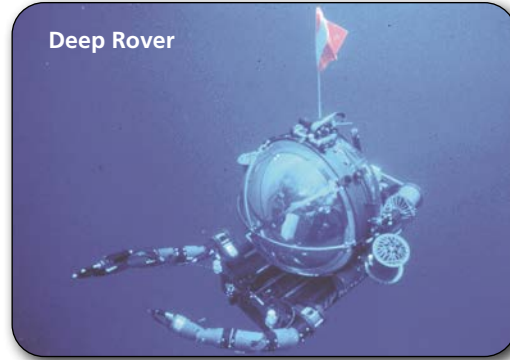
Rough-Skinned Newt



Moss



Blue Pool and Bacteria Mat



Deep Rover



# Ask the Ranger

## How deep is Crater Lake?

Crater Lake is 1,943 feet deep. It's the deepest lake in the USA (300 feet deeper than Lake Tahoe, which ranks 2nd). It's the 9th deepest lake in the world and the deepest 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 surface. The rest is runoff from precipitation landing on the slopes above the lake.

## How clean & clear is the lake?

Since there are no inlets carrying sediment or pollution into Crater Lake, its water is



very clean: cleaner than the water that comes out of your faucet at home!

When an 8-inch-wide instrument called a Secchi disk is lowered into the lake, the average depth at which it disappears is 103 feet. Some days, clarity readings surpass 130 feet.

## Why is the water blue?

The lake appears blue because it is very deep and clean. When sunlight enters the lake, the red, orange, yellow, and green light waves are absorbed by the lake and converted into heat. Blue light waves are not absorbed; they are scattered by the water molecules in all directions. Some are sent out of the lake and into our eyes. If Crater Lake was dirtier, other colors would be returned to our eyes, too. They would be scattered by particles before being absorbed.

## Does the water level vary?

The level of Crater Lake fluctuates just a few feet each year. Winter storms make it rise a little; dry summers cause it to fall. The lake experiences about twice as much precipitation as evaporation, but the surface remains far below the rim because water continuously seeps out through a porous layer of rock along the north shore. Crater Lake is just like your bathtub—halfway up the side, there's a drain! Water leaks from the lake at a rate of 2 million gallons every hour. It goes deep underground and is not believed to feed any nearby rivers or springs.

## How did Crater Lake form?

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

## How do we know the eruption 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 top 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 of the surface 4,800 years ago.

## Could Mt. Mazama erupt again?

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

## Does anything live in the lake?

Crater Lake is home to a variety of insects, worms, snails, crustaceans, and amphibians, including a type of salamander found

nowhere else in the world (the Mazama newt, a proposed subspecies of the rough-skinned newt). Most of the lake's biomass, however, is plant-based: aquatic moss carpets the floor at depths of 80 to 460 feet. Nowhere else in the world does moss grow so deep underwater, a testament to Crater Lake's clarity and transparency to sunlight.

## Are there fish in the lake?

Crater Lake had no fish until it was stocked for 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: crayfish now dominate 90% of the shoreline, and they've been found living at depths of up to 800 feet. Like miniature vacuum cleaners, they eat everything in their path, reducing the abundance and diversity of native organisms. Sadly, crayfish are swiftly pushing the lake's native newts toward extinction.

## Has the lake floor been explored?

In the 1980s, a one-person submarine called Deep Rover made 47 trips to the bottom of Crater Lake. There, researchers discovered hydrothermal springs and three types of surprising features: 30-foot-tall chimneys of rock precipitated from the upwelling fluids; blue-colored pools of high-density, mineral-rich water; and huge mats of yellow bacteria that survive in the dark by oxidizing iron for energy.

# Rare Foxes Persist in Park

## Presence Confirmed by Remote Cameras

If you happen to spot a fox this summer near the rim of Crater Lake, you'll be seeing one of the rarest mammals in North America. The red foxes of Crater Lake National Park are members of the Sierra Nevada subspecies, a type found only in the highest mountain ranges of Oregon and California. Although sightings in the park have declined over the past decade, motion-sensitive cameras have recently confirmed that these elusive animals continue to call the park home.



Red foxes are slender, dog-like carnivores with long snouts and pointed ears. Despite their name, they are not always red—most at Crater Lake range from silver to black.

The red fox (*Vulpes vulpes*) is the most widely distributed terrestrial carnivore on Earth. Yet, while it can be found across North America, Europe, northern Africa, and Asia, several of its subspecies are in peril. Of the 10 subspecies that occur in North America, three are found only at high elevations, in the Rocky Mountains, Cascade Range, and Sierra Nevada. These "mountain foxes" were derived, it's believed, from a single population that was widespread in the western United States

during the last Ice Age. Warming temperatures after the Ice Age pushed the foxes uphill, where they evolved into genetically distinct subspecies. Oregon's mountain foxes, despite living in the Cascades, are genetically part of the Sierra Nevada clan, the rarest subspecies in North America.

In their namesake mountain range, it's thought that only 20 to 40 of these foxes still exist, mostly in the vicinity of Yosemite National Park. In September of 2021, the US Fish and Wildlife Service listed this population as endangered under the Endangered Species Act. Another community of perhaps several dozen foxes survives in and around Lassen National Park, at the southern end of the Cascade Range in northern California. Both of these populations show worrying signs of genetic isolation and inbreeding, including low reproductive success. Among the Lassen-area foxes, all known breeding over the past 10 years has occurred between close relatives. Climate change poses another threat to the existence of these populations, in the form of large wildfires, drought-related decreases in prey availability, and increased competition from coyotes, which are expanding their range upward as a result of dwindling snowpack. (Sierra Nevada red foxes are well-adapted to snowy terrain, having thick winter coats and relatively large feet.)

In Oregon, not enough is known about the state's mountain foxes to determine whether or not they warrant federal protection. The number of foxes and the extent to which various populations are connected (or isolated) have not been fully established. To that end, in the summer of

2020 researchers set up cameras at 51 high-elevation sites in Crater Lake National Park. At each location, they strapped a camera to a tree. On a nearby tree, they hung a metal box containing a strong scent. The cameras operated 24 hours a day, all summer long, projecting invisible, infrared beams and taking photographs whenever their beams were tripped. This happened a total of more than 140,000 times, providing the park with visual documentation of 42 different animal species—including black bears, bobcats, coyotes, elk, porcupines, northern flying squirrels, and 17 kinds of birds. On seven occasions, a Sierra Nevada red fox was seen. Scientists were relieved to learn that red foxes are still present in the area. The next step will be to derive a population estimate, a task best done through the genetic analysis of scat collected in the park.

You can help! If you see a fox, snap a photo, make a note of the location, and contact a park employee as soon as possible. Do not approach the animal or attempt to feed it. Foxes are quickly acclimated to human handouts, which leads them to patrol developed areas and increases the risk they will be struck by an automobile. In July of 2013, a Sierra Nevada red fox was killed by a car near Park Headquarters. The victim was a breeding female, which might explain why the park's red fox population has suffered an apparent decline in recent years. If you are a pet owner, please keep your dog on



If you see a fox, let us know! Park visitor Tim Drahnak spotted this Sierra Nevada red fox trotting along the West Rim Drive.

approved trails only, and be sure to pick up after it. Disease transmission from domestic dogs and their feces is an additional threat to the survival of wild foxes. You are most likely to see a fox at dawn or dusk, in an open meadow or along a ridgetop. They are nocturnal hunters, skilled at catching mice, pocket gophers, voles, and ground squirrels. In the spring, females give birth to several pups, typically in a natural cavity at the base of a cliff or rocky slope. At three months, the pups begin exploring their parents' home range, often in daylight. By October or November, they are fully grown and disperse to establish their own territories.

The example of the Sierra Nevada red fox illustrates how much we have yet to learn about the wildlife that inhabits Crater Lake National Park. Few species in the park have been fully surveyed or intensively studied. Remote camera surveys provide a good starting point for assessing the abundance and distribution of certain species and helping to decide which ones should be afforded greater scrutiny and protection. If Oregon's mountain foxes are eventually placed on the Endangered Species List, it will indicate that prospects for the subspecies are bleak. On the other hand, listing would bring welcome funding to aid in the recovery of this interesting animal.



Park staff use motion-triggered cameras to survey for nocturnal wildlife. This animal's white-tipped tail identified it as a red fox.

# Support Your Park—



## 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 to help staff visitor centers and present interpretive programs. Opportunities are advertised several times each year at [www.volunteer.gov](http://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 whose members help with special events and operate a winter information desk at Rim Village. Learn more at [www.friendsofcraterlake.org](http://www.friendsofcraterlake.org). Or join the Crater Lake Ski Patrol, whose members assist winter visitors and maintain the park's ski and snowshoe trails. For more information, visit [www.craterlakeskipatrol.com](http://www.craterlakeskipatrol.com).

## 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. Species reported recently include the northern saw-whet owl, police-car moth, pine marten, mountain lion, and gray wolf. To share your sighting, email [craterlake@nps.gov](mailto: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](http://www.oregon.gov/odot/dmv) for details. Proceeds go into an endowment that funds the operation of the park's Science and Learning Center, which provides living and working space for visiting scientists, teachers, and artists. The Center draws researchers and educators to Crater Lake from around the world, encouraging them to use the park as an outdoor laboratory and classroom. To learn more, visit [www.nps.gov/rlc/craterlake](http://www.nps.gov/rlc/craterlake).

## Contribute to the Crater Lake Trust

The nonprofit Crater Lake National Park Trust 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 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](http://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, send an email or letter to the park's superintendent (*see addresses on page 2*).



Park visitor Kari Bertram spotted this Sierra Nevada red fox in Mazama Village. See page 7 to learn about the plight of these rare carnivores.



## In Case You Missed It....

# Black Bears Tracked by GPS

Crater Lake National Park is home to around 50 black bears. Until a decade ago, little was known about their movements. In the summer of 2011, 10 bears were outfitted with GPS collars. The collars recorded each bear's position once every two hours. In 2013, biologists retrieved the collars (which had been programmed to drop off after two years) and downloaded the data.

One goal of the study was to understand the size of each bear's home range (the area where it spent the majority of its time). The females had an average home range of 21 square miles (55 km<sup>2</sup>) and tended to stay in or near the park. The males, on the other hand, had home ranges averaging 466 square miles (1,206 km<sup>2</sup>)—more than 20 times as large! Each fall, the males traveled to lower-elevation areas outside the park, presumably to gorge on acorns and fatten

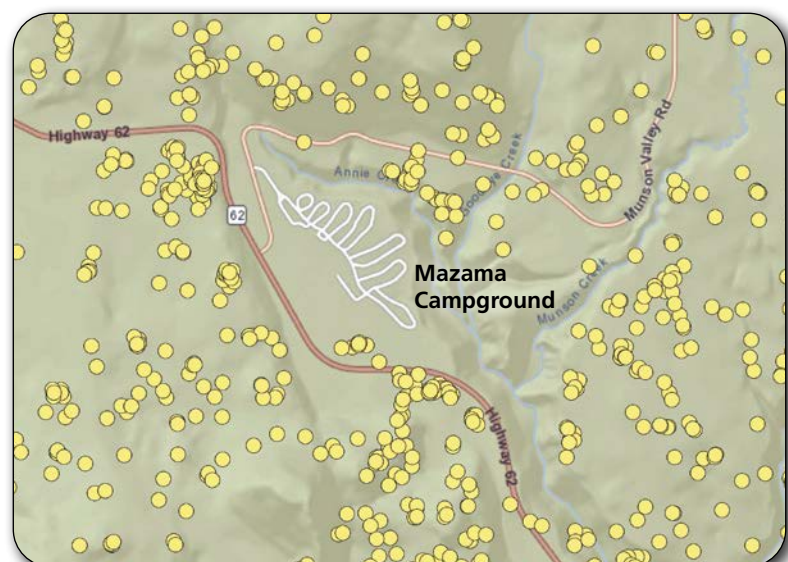
themselves up for the winter. They left the park in late summer and returned by the onset of winter (*see map, below right*).

Another project goal was to learn when and where the bears hibernated. No matter how far they roamed, all of the bears returned to the park to den. The GPS data was not precise enough to pinpoint the dens, but biologists did manage to find two of them—both in giant ponderosa pines hollowed out by fire (but still alive). The amount of time spent in hibernation averaged 5 months. The majority of the bears entered their dens in November and emerged in April.

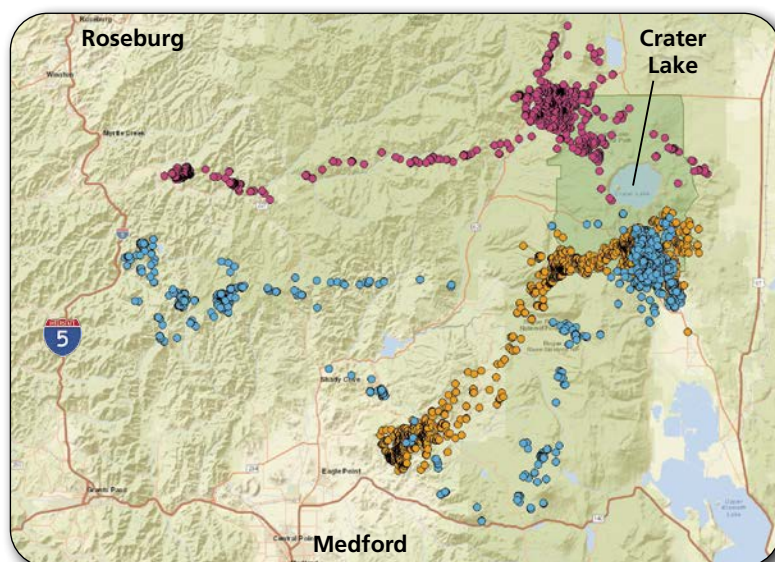
Overall, the park's black bears seem to be doing well. With so many species across the globe under threat or in decline, it is reassuring to know that some wild animals are still thriving in our modern world.



7 females and 3 males were trapped, tranquilized, fitted with GPS collars, and weighed. This female was the smallest, at 120 pounds (54 kg). The heaviest was a 285-pound (129-kg) male. To keep them relaxed and comfortable, they were blindfolded and given oxygen.



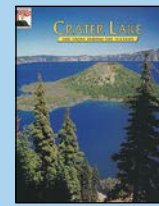
The bears avoided places frequented by people. This female's home range encompassed the campground, but she never entered it. The circles represent her GPS positions from July & August of 2012 & 2013.



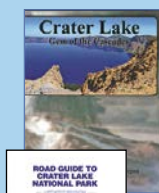
In the fall, the 3 male bears ventured far outside the park, presumably to feed on acorns. One traveled nearly all the way to Interstate 5 and made a loop of more than 200 miles (322 km).

## Shop in the Visitor Center Bookstores

When you shop at the park's two visitor centers, all proceeds from your purchase are invested back into the park. The stores are operated by the Crater Lake Natural History Association, a nonprofit established in 1942 to support the park's educational and scientific programs. Many important projects are funded by the Crater Lake NHA, including the printing of this visitor guide! Some of the stores' offerings are described below. For a complete list of merchandise and to shop online, visit [www.craterlakeoregon.org](http://www.craterlakeoregon.org). You can also order by calling 541-594-1109.



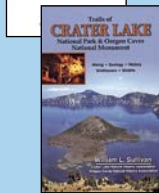
**Crater Lake: The Story Behind the Scenery**  
Large photos with detailed captions accompany the text of this popular book. 48 pages, \$11.95.



**Crater Lake: Gem of the Cascades**  
A comprehensive guide to the park's geology, 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.



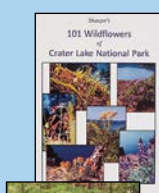
**Crater Lake Topo Map**  
Great for backpacking. Waterproof and tearproof. 1:55,000 scale. \$14.95.



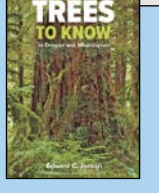
**Plants & Animals of Crater Lake Nat'l Park**  
This folding guide will help you identify the park's most visible species. 11 pages, \$6.95.



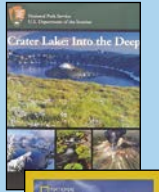
**Volcanoes**  
Folding, waterproof guide to volcanoes, lava rocks, and plate tectonics. 11 pages, \$7.95.



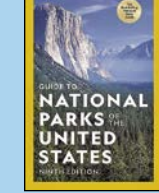
**Star & Planet Guide**  
Rotating "planisphere" for locating stars, planets, and constellations in the night sky. \$10 small, \$15 large.



**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 & Washington**  
Tree identification is easy and enjoyable with this photo-packed, fact-filled guide. 172 pages, \$20.



**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, \$10.



**Guide to the Nat'l Parks of the United States**  
This best-selling book from National Geographic features 300 stunning photos and 80 color maps. 528 pages, \$28.

