Crater Lake National Park — Volume 17 • Summer 1989

Published by the National Park Service and the Crater Lake Natural History Association

Crater Lake REFLECTIONS

Contents
SEE BACK PAGE!

Welcome to Crater Lake National Park

These are exciting times at the park. A manned submarine will descend to the bottom of Crater Lake again this August, hoping to uncover some of the mysteries surrounding this deepest of American lakes. Planning and preliminary designs for the redevelopment of Rim Village have already begun. When this project is completed, visitors will have modern, up-to-date facilities in a rustic style and in a more natural setting. Recent investments in road repairs have allowed us to reopen the East Rim Drive to two-way traffic. This makes the east side of the lake more accessible for all visitors. Please take the time to drive all the way around the lake.

Robert E. Benton
Superintendent

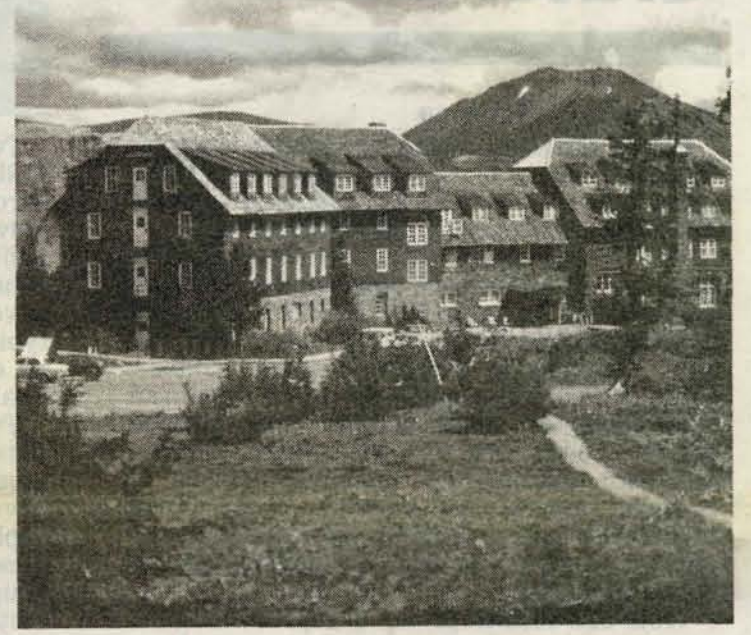
Crater Lake Lodge Will Not Open This Summer

Crater Lake Lodge will not open this year because it is not deemed safe for occupancy. Problems with the Crater Lake Lodge include an overloaded electrical system and corroding fire sprinkler system. But, the overwhelming problem that cannot readily be solved is the building's increasing structural instability.

The building was not designed effectively to handle the extreme stress of the mountain-top environment at the rim of Crater Lake. Battered by over 70 winters with as much as 20 feet of snow, the lodge has weakened to the point that the Great Hall could collapse in high winds, because of soil movement, or even just under its own weight.

The National Park Service contracted with an Oregon engineering firm to undertake the annual building safety inspection. A team of National Park Service architects and engineers reviewed and concurred with the engineering firm's report citing the extensive structural problems.

The National Park Service is currently in the midst of renovating the visitor facil-



Continued on Page 9

Tune 1610
On Your Car Radio

Just tune your car radio to 1610 AM for information about weather and road conditions, operating hours of park facilities and various interpretive information.

Watch for roadsigns, which indicate the 1610 AM station, along Highway 62 as you approach the intersection. We hope that our little radio station will help you plan your visit, and provide you with information that will make your visit safer.

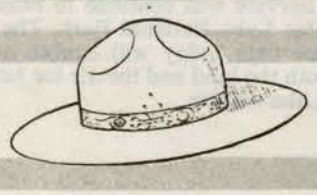
Information

Pour les visiteur au parc qui ne connaitraient pas l'anglais, une brochure imprimee en francais est disponible au Centre des Visituers. Nous espersons qu'elle contribuera a rendre votre sejour dans le parc plus interssant et nous vous souhaitons une visite agreable et sans accident a Crater Lake.

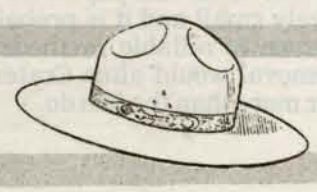
Weather, road conditions, snow amounts, visitor activities and services: call (503) 594-2211 from 8:00 AM to 4:30 PM daily on Nov. 1st thru Feb. 28th; 8:00 AM to 5:00 PM daily on March 1st thru Oct. 31st. For reporting emergencies from inside the park, dial 911. To report emergencies from outside the park dial (800) 452-5021.

Fur Besucher aus Deutshland, die nicht englisch sprechen, ist eine Broschure, in deutsch, im Besucherzentrum erhaltlich. Wir hoffen, dass dieses Informationsblatt ihnen su einem interssanten, sicheren and angenehmen Besuch verhelfen wird.

EMERGENCY DIAL 911



NATURALIST PROGRAM SCHEDULE ON PAGE 12



Crater Lake REFLECTIONS

Park Resources

The Fish of Crater Lake

By Mark Buktenica

Every summer, scores of visitors head for the blue waters of Crater Lake with fishing poles in hand and dreams of pulling a monster catch from the depths of this mystical lake.

And, even though Crater Lake was originally barren of fish, there are opportunities to catch a fish or two thanks to the 1.8 million trout and salmon stocked in the lake between 1888 and 1941. The species stocked included rainbow trout, brown trout, cutthroat trout, steelhead trout, coho or silver salmon, and kokanee salmon. Today, only a couple species survive - kokanee salmon, the landlocked form of sockeye salmon, and rainbow trout. These populations sustain their numbers through natural reproduction as no stocking has occurred since 1941.

Trout and salmon prefer to reproduce in the running waters of streams and rivers to keep the developing eggs bathed in fresh, well-oxygenated water. Rainbow trout and kokanee salmon have been reproducing successfully in Crater Lake's still water because it is also very clean, cold, and rich in oxygen.

The great clarity and pristine conditions of Crater Lake have led to the common misbelief that the fish are starving. But, the results of the park's on-going fisheries research indicate that Crater Lake fish growth rates are comparable to rates of the same species in other high mountain lakes in the southern Cascade Range. Rainbow trout reach 17 to 24 inches in length and feed primarily on large-bodied insects that live in the lake or fall onto the lake surface. Kokanee salmon reach 10-14 inches in length and feed on small-bodied insects and zooplankton. Zooplankton are minute animals (ten fit on the head of a pin) that live in open water. Kokanee do not filter feed on the zooplankton as whales do on krill, but visually seek and pursue their tiny prey.

The introduction of fish as top predator in the Crater Lake food chain has undoubtedly changed the ecology of the lake from its natural pre-fish condition. Fish can alter the kinds and numbers of other animals and plants that live in the lake through new food web interactions. The magnitude of these changes is affected by the number of fish in the lake. The Crater Lake fish population is considered relatively small and it is probably here to stay. All currently reliable methods of large scale fish removal would alter Crater Lake's ecosystem far more than the fish do.

Winter Research

Two inches of ice cover the boat's deck. Rolling waves toss the packed research boat across the lake surface as bundled figures move about, manipulating instruments and pulling in lines. The frozen spray and howling winds make for numb hands and frozen faces. A voyage somewhere in the Arctic? No, just a typical day for the Crater Lake research team on one of their winter trips to the surface of Crater Lake.

Twice each winter, park rangers and scientists fly by helicopter down to Crater Lake to study the lake in the season of cold and snow. Two research boats are loaded with sophisticated instruments, fish nets, cables, generators, and thermos bottles full of coffee, soup, and hot chocolate. Clothed in survival suits and mittens, the researchers work until dark collecting data from as far down as the bottom of Crater Lake, 1,932 feet beneath the surface. Water is actually collected at various depths by lowering long, plastic bottles along a 2,000-foot steel cable. The team also collects samples of zooplankton, phytoplankton, fish, and measurements of water temperature and lake clarity.

After a long day, the researchers return to the small survival cabin at the rear of the boat house on Wizard Island. But, there is more work to finish before bedtime, specifically the processing and filtering of the samples collected that day. After three days of intense work, the team awaits a break in the weather and the return of the helicopter for the trip back to park headquarters. The scientists spend several weeks following the lake trip to complete the processing of samples and the analysis of the data.

The winter trip provides an important contrast with data collected during similar summer expeditions. According to Dr. Gary Larson of the National Park Service, "visiting the lake during the shortest and coldest days of the winter season makes for good comparison with the summer when days are longer and warmer." Scientists have found the lake to be very productive in the winter, with thriving populations of phytoplankton and zooplankton. Even the kokanee salmon are busy spawning in January.

During your stay at Crater Lake you may have the opportunity to see park researchers out on the lake, continuing the process of data collection. It's a glorious job on a warm, sunny summer day; but, remember them this winter when it is cold and dark and icy ...

On A Clear Day, You Can See...

On a clear day, you can see ... well, maybe not forever. But, you can expect to see geographic features over 125 miles away! Crater Lake National Park is one of the cleanest airsheds in the United States and the clean air allows us spectacular views of the surrounding Cascades and Klamath Basin. Climb Mt. Scott, the highest peak in the park (8,926 ft.), and you will be able to see Mt. Shasta to the south and the Three Sisters to the north near Bend, Oregon ... both over 100 miles away!

Researchers who analyze the air quality at Crater Lake have compared it with the high standard found at Antarctica. But, like the growing hole in the ozone layer above Antarctica, the pristine airshed at Crater Lake also faces serious threats. A major concern of the National Park Service are the pollutants from industrial areas introduced at Crater Lake in the form of acid rain and snow. These pollutants threaten both land and water resources, particularly the incomparable lake clarity.

Resource managers at Crater Lake monitor the air quality using sophisticated instruments and cameras. Air samples are collected and analyzed for particulate and chemical composition. Photographs of distant geographic features are especially revealing when taken over time; they provide a dramatic record of the changes in air quality at Crater Lake. Snow analysis is another tool used to monitor air quality in the park during the long winter season.

Air quality can be degraded by other sources. Smoke from lightning-caused fires can temporarily lower the air quality. This type of pollution is considered acceptable in a national park because it is a natural part of the forest ecology. On the other hand, man-caused fires and other pollution sources bring in nutrients that may change lake clarity, stunt vegetation, or even kill trees, as we see happening in the Black Forest of West Germany.

The National Park Service will continue to monitor the air quality at Crater Lake National Park. The development of base line data today will enable us to manage and protect both the land and the air for future generations of Crater Lake visitors.

Biological Diversity

By Mark Wagner

African buffalo. Honeybees. Albatross. Elk. Orchids. Grizzly bears. Robins. Glacier lilies. Brown trout. Lichens. Norway Spruce. Gibbons.

All of these plants and animals have something in common — each is an important part of the Earth's biological diversity. Each of these species is linked to the vast and complex web of life that makes up the living part of our world.

Anyone who has ever visited a park or zoo immediately appreciates the great variety of living things that inhabit our planet. This variety is what we call biological diversity. Biological diversity is a major concern today because it is decreasing at an alarming pace. We are losing species at the rate of 500 to 1000 per year. That compares to a "normal" rate over the past 600 million years of only one species per year. In fact, even the dinosaurs only became extinct at a rate of one species every 10,000 years!

The questions we must ask are: Why are so many species disappearing so rapidly? How can we prevent this from happening? And, why should we be so concerned?

Extinction has been a "fact of life" since the emergence of species almost 4 billion years ago. Of all species that have ever existed, probably half a billion or more, there now remain only a few million. But, past extinctions have occurred through natural processes, whereas today the almost singular cause is one species — us! In the twinkling of an evolutionary eye we eliminate entire habitats and complete communities of species. The destruction of tropical rain forests where perhaps 50 percent of all life forms exist is the most catastrophic example of this wholesale destruction of life.

A common response to species extinction is "why should I care?" There are some very good reasons:

1. Other organisms have a right to existence — compassion calls for preservation.
2. Species should be preserved because of their beauty, their symbolic value, or their intrinsic interest.
3. Species should be preserved for their actual or potential economic uses. Other species provide direct benefits to humans.
4. Species are living components of the ecosystems in which they live.

The first two reasons are obvious. Let's look at the other two in a little more detail...

There are many economic or utilitarian reasons for preserving species. For example, only 20 different plants provide 90% of the world's food. Any major disease or pest affecting the major crops could have a devastating effect on the human population. Wild plants provide gene resources to improve the strains of food plants on which we depend.

Medicinal uses of plant and animal species are abundant. Species contribute to drugs and pharmaceuticals. About one-half of all prescription drugs in the U.S. each year contain a drug of natural origin. The cure for AIDS or cancer may be found in a wild plant or other organism. As advances in medicine continue, a species which appears to be of little value today may be essential in the future.

Lastly, but just as important, is the preservation of species for "ecosystem services" — the maintenance of the Earth by ecosystems and their organisms. Examples include: production of oxygen by tropical rain forests, prevention of soil erosion and floods by grasses and trees, and decomposition by insects and fungi.

Current superficial knowledge of our environment reinforces the need to preserve as many species as possible. To label a species insignificant when its importance is simply not known could be damaging to future generations. The creation of natural areas where healthy and diverse populations can be maintained may be a solution. That is where national parks play a valuable role in preserving biological diversity.

FIRE... a friend of Crater Lake National Park

By Doug Raeburn, District Ranger

Wildland fire! The very mention of it conjures up images of forestlands charred beyond recognition, of wildlife populations ravaged by heat and flames, and of destruction of valuable range and timberlands. Our feelings about wildfire were formed centuries ago. But, those views have been challenged and changed as our understanding of natural processes has improved and advanced.

It was not until the late 1960s that the stewards of our Nation's wildlands began to recognize fire as a viable part of the environment. In fact, fire was now seen as a necessary element in the development of a healthy ecosystem, on par with good soil, moisture, and light. Studies revealed that many tree and plant species are actually dependent on the effects of fire for their successful reproduction and rejuvenation.

The suppression of fire can change things dramatically. Stands of timber denied the purging effects of fire may accumulate excessive quantities of dead and down plant material, creating an unnatural build up of "litter" on the forest floor. These accumulations hinder the growth of grasses and other vegetation so necessary for use by wildlife. They also provide ready-made "jack pots" of flammable material, actually increasing the potential for disastrous wildfire activity. Periodic burning reduces the litter and recycles nutrients back into the soil where they are again available for renewed, vigorous ecosystem growth.

Today, techniques have been developed which use fire to reduce hazardous accumulations of fuel. The National Park Service collectively calls these techniques "prescribed fire." The use of prescribed fire draws upon elements of fire behavior and fire science; but its implementation is really more art than science. As such, there are not always textbook solutions to many of the problems associated with this management tool.

The early land management philosophy that viewed total fire suppression as its "golden rule" has left for us an inheritance that includes forests and parklands with massive fuel build ups. Park managers now face potentially explosive fire conditions because prior policy did not include fire as a natural element in forest management.

Crater Lake National Park first instituted a prescribed fire management program in 1976. The primary aim of this program was to restore sections of the park to their "original" state as found prior to the total fire supression policies instituted at the turn of the century. As you enter the park from the south along Highway 62, you will see evidence of recent prescribed fire activity along the road.

This portion of the park was historically forested with magnificent stands of ponderosa pine, a species dependent on fire for its survival. The total fire suppression policies of early Crater Lake managers allowed species normally retarded by fire to spread unchecked. The ponderosa pines were "shaded out" by these species, especially the white and grand fir. The reintroduction of fire enables this portion of the Crater Lake ecosystem to remain a ponderosa pine forest.

These same fires enrich the soil through the recycling of nutrients, thus providing an ideal seedbed and an enhanced opportunity for ponderosa pine reproduction. Already, ponderosa pine seedlings are surviving at near their normal levels. Plants and grasses have also reappeared among the pines, providing a natural food source for deer, elk, and other park wildlife.

The careful application of prescribed fire is just beginning to show results at Crater Lake National Park. The end result is expected to be a healthy, viable ecosystem...a true testimonial to the "friendly" role of fire in a natural environment.

Crater Lake REFLECTIONS

Camping

Backcountry

More than 100 miles of maintained trails provide access to Crater Lake National Park's backcountry. Free backcountry use permits are required for all backcountry overnight stays. Permits are available at the Steel Center or the Visitor Center at Rim Village.

Horses, mules, and llamas can only be used on the Pacific Crest Trail and the Bybee Creek Trail. All other park trails are closed to stock. All stock users must carry sufficient pelletized feed for their entire stay in the park. Hay and seed type feeds are not permitted. A free brochure on stock regulations at Crater Lake is available. Dogs are allowed on the Pacific Crest Trail but not on any other backcountry trail.

Park rangers can offer many suggestions to help you enjoy your experience whether a short walk, day hike, or extensive overnight trip. Please remember that the preservation of Crater Lake's backcountry depends upon your careful and considerate use.

Topographic maps are available for sale at the Steel Center or the Visitor Center.

The Bear Facts

Crater Lake National Park is home to a thriving population of black bears *(Ursus americanus)*. Occasionally, these bears wander into the developed campgrounds, attracted by the scent of food or just out of curiosity.

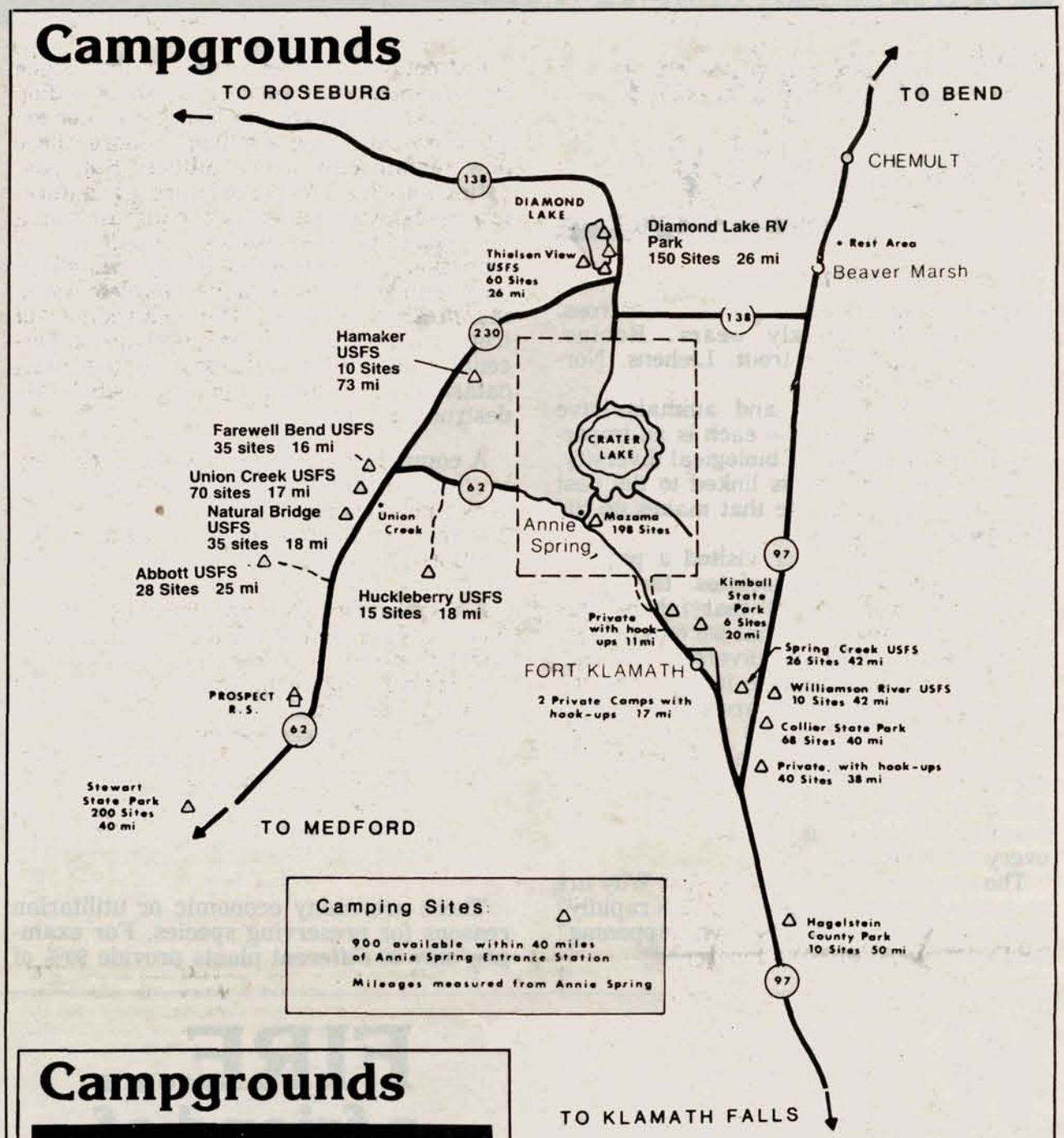
Campers have a responsibility to prevent bears from becoming a problem. That means keeping human foods away from them. Once a bear associates humans and campgrounds with food, it is likely that the bear will become "spoiled." Spoiled bears frequent roadside turnouts and campgrounds where human food can be found, rather than foraging for natural foods. Bears should eat things like cow parsnip and berries; but, the lure of your hamburgers and potato chips is too big a temptation to resist. Spoiled bears can become quite aggressive, smashing open ice chests and even removing car windows to get to food. These dangerous bears have to be removed or destroyed.

To protect yourself, your property, and the bears, follow these rules:

- store all food in a vehicle trunk. If no trunk is available, keep food and food containers covered and out of sight inside the vehicle. Do not leave vehicles unattended with windows open.
- clean dishes and utensils immediately after use. Do not leave food, food containers, cooking utensils, or table scraps in the open.
- do not store food in tents.
- deposit all garbage in the nearest refuse container.

Bears are a natural part of the Crater Lake ecosystem. You can help to keep them that way. Thank you for your help.

Campgrounds



There are two developed campgrounds at Crater Lake. Mazama Campground, with 198 sites is near the Annie Springs Entrance Station. Lost Creek Campground is on the pinnacles spur road from east Rim Drive.

Mazama Campground. Mazama is operated by the Crater Lake Lodge Company. Rates are $7.00 per site. Sites are available on a first come, first served basis. Reservations are not taken. There are no utility hookups, but fresh water, flush toilets, a dump station, and telephones are available. Firewood is available for purchase at Mazama. Campers are allowed to collect dead and down wood. Fires are permitted only in fireplaces.

Lost Creek Campground. Lost Creek is a 12 site campground for tents only. It usually opens in late July after Rim Drive is plowed free of snow. A $5.00 fee is charged by the National Park Service. The sites fill up in early afternoon, so campers should select sites soon after arriving in the park.

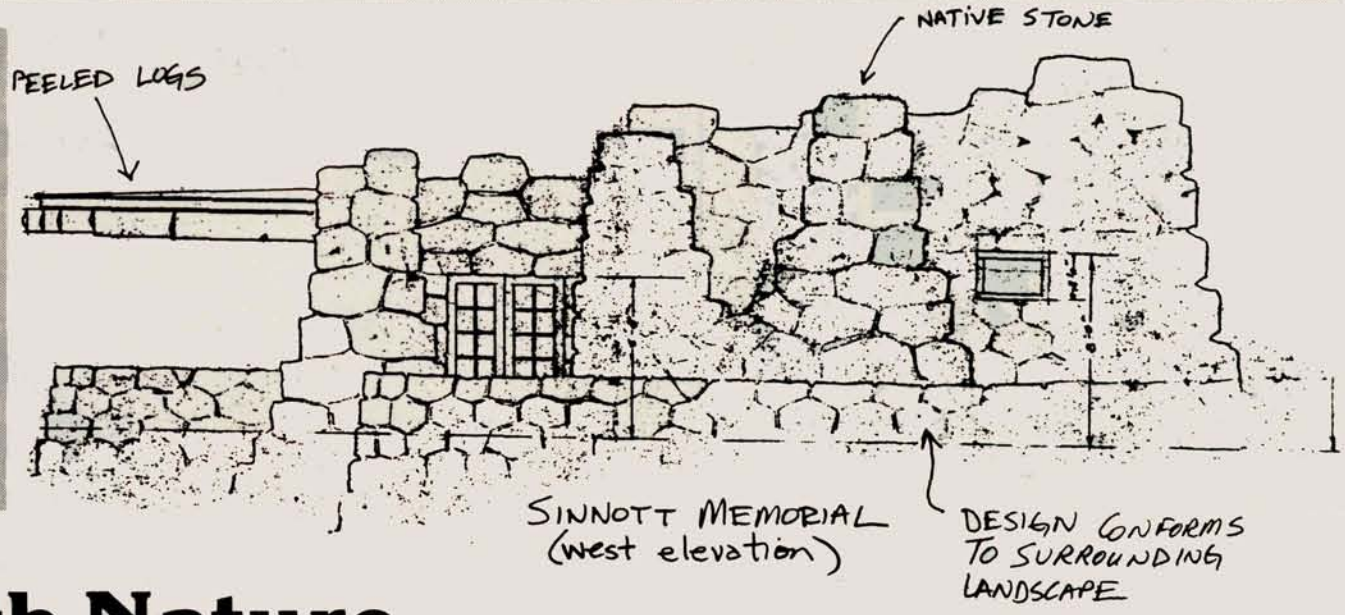
Camping opportunities are also available and more numerous outside the park at Diamond Lake, Union Creek and Fort Klamath. Check the map above for locations.

Please Remember:

- Quiet hours are 10 P.M. to 6 A.M.
- Pets must be kept on leashes at all times when outside of vehicles. Pets are not allowed on trails or at ranger-led activities.
- Waste water must be collected in closed containers and disposed of at the comfort station or sanitary dump in Loop C of Mazama Campground. No trenching for any purpose allowed.
- Roadside camping is not allowed.
- There is a 14-day restriction on camping. Sites are limited to six people or one family unit.
- Do not store food in tents; do not leave food, food containers, cooking utensils or table scraps in the open.
- Store all food in a vehicle trunk. If no trunk is available keep food and food containers covered and out of sight inside vehicle.
- Clean dishes and utensils immediately after use.
- Deposit all garbage in the nearest refuse container.

Crater Lake REFLECTIONS

Cultural Resources



Designing with Nature

By Steve Mark, Park Historian

Drinking fountain near Sinnott Memorial — a miniature Crater Lake cut from a single piece of stone in 1931 by B. J. Mancini.

The recently designated National Historic District at Crater Lake National Park demonstrates how architecture and landscaping were affected by the idea that man's intrusions should fit into the surrounding landscape. It may be the most coherent and comprehensive American expression of rustic architecture.

Although the historic district centers on the buildings constructed before 1940, rustic architecture's purpose was to subtly convince visitors they were in a special place like a national park. Components of the rustic architecture program at Crater Lake included concession and government buildings, retaining walls, landscaping, road alignments, campground layout, culverts and drainage treatments, trail steps, curbs, signs, walkways, and drinking fountains.

Stonework was a distinguishing feature of the construction program at Crater Lake until World War II, and was used so as not to distract the visitor's attention from the park's scenery. It is prevalent in two areas of the park — Munson Valley (park headquarters) and at the rim of Crater Lake.

At Munson Valley, large boulders are incorporated into the two most prominent structures, the Administration Building and the Ranger Dormitory (now called the Steel Center). Adjacent to them is a maintenance area and a residential complex that contain many rustic structures, of which the most notable are the Mess Hall (now the resource management and visitor protection division offices) and the Superintendent's Residence, designated a National Historic Landmark in 1987.

Two of the park's most interesting rustic structures serve as observatories. Located about three miles west of Rim Village, the Watchman serves as both a fire lookout and an interpretive facility. In summer, it can be reached by a relatively short trail that starts from Rim Drive.

No visitor should miss the Sinnott Memorial at the Rim Village, where rangers have interpreted Crater Lake's geology since 1931. Located near the Sinnott Memorial is the Kiser Studio, which now serves as a summer visitor center. Fred Kiser not only knew the value of making his photography studio "fit" into the landscape, but was the originator of the slogan "See American First." This travel campaign was instrumental in promoting the national parks as better places to visit rather than the more typical European vacation destinations of the time.

Not far from the Kiser Studio is the Crater Lake Lodge, which opened its doors in 1915. Its renovation is part of a 35 million dollar effort to redevelop Rim Village. Also part of the redevelopment is a proposed hotel/visitor center facility. Its appearance will harmonize with the existing historic landscape of Rim Village. It will also be a fitting testimony to the earlier builders whose tradition of design with nature the National Park Service has pledged to continue.

No Longer Islands

The establishment of the first national park system is a unique American gift to the world. As a symbol of the American identity, national parks have become enormously popular both here and abroad. Over 100 countries have subsequently adopted this idea which encompasses a variety of reserves with natural and cultural significance.

The National Park Service was established by Congress in 1916 to help in the protection of the fledgling national park system. In that Act of 1916, the agency was charged to "conserve the scenery and the natural and historic objects therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Today, the national parks face much larger numbers of visitors, and environmental pressures from outside park boundaries. National Parks can no longer be viewed as islands far removed from "civilization" of encroachment. As unique capsules of American culture and history, and as refuges for the preservation of biological diversity, they must have complete protection. Anything less could mean the loss of both irreplaceable resources and the most significant symbols of our Nation's heritage.

Reflections and the C.C.C.

The name of this newspaper, "Crater Lake Reflections," was first suggested in 1936 by John Olson, a Civilian Conservation Corps enrollee at the park's Camp Annie Springs. The name was used for the camp's newspaper and was later adopted by the National Park Service. Olson's idea won him a $1 prize and release from KP duty for three months.

An event to recognize all of the CCC work done in Klamath, Lake, Siskiyou, and Modoc counties will be held in the summer of 1990 at Tulelake, California. All CCC alumni and interested people are invited to this event which will be a joint effort among five federal agencies and the cities located in the four counties. For more information contact: Superintendent, Lava Beds National Monument, PO Box 867, Tulelake, CA 96134.

Crater Lake REFLECTIONS

Lake Research

Hydrothermal Research

Legislation designed to protect and monitor significant thermal features within National Parks was passed by Congress and signed into law by President Reagan in 1988. Crater Lake National Park is included in the list of 16 parks to be protected, and the Act directs the Secretary of the Interior to submit to Congress a report on the presence or absence of significant thermal features within Crater Lake National Park. The need for documentation of hypothesized thermal features has resulted in the current intensified research activities within the Lake.

Readings taken in the lake as early as 1896 indicated a slightly higher temperature near the bottom. However, instruments used at the time were not considered sensitive or sophisticated enough to get accurate readings at great depths. In the 1970s and 1980s, researchers obtained more accurate measurements confirming slightly elevated water temperatures in several areas at the bottom of the lake. Some researchers concluded that the chemicals found in water samples obtained near the bottom of the lake also indicate hydrothermal inflows. These findings renewed interest in identifying possible hydrothermal resources on the bottom of the lake.

In March 1987, the National Park Service contracted with Oregon State University to conduct a three year research study. The goals of the research are to:

—determine if hydrothermal venting is occurring within Crater Lake, and if so, to define its location, nature, and magnitude

—define the chemical composition and temperature of exiting fluids if hydrothermal venting is occurring, and determine the rates and means of vent fluids dispersal within the lake

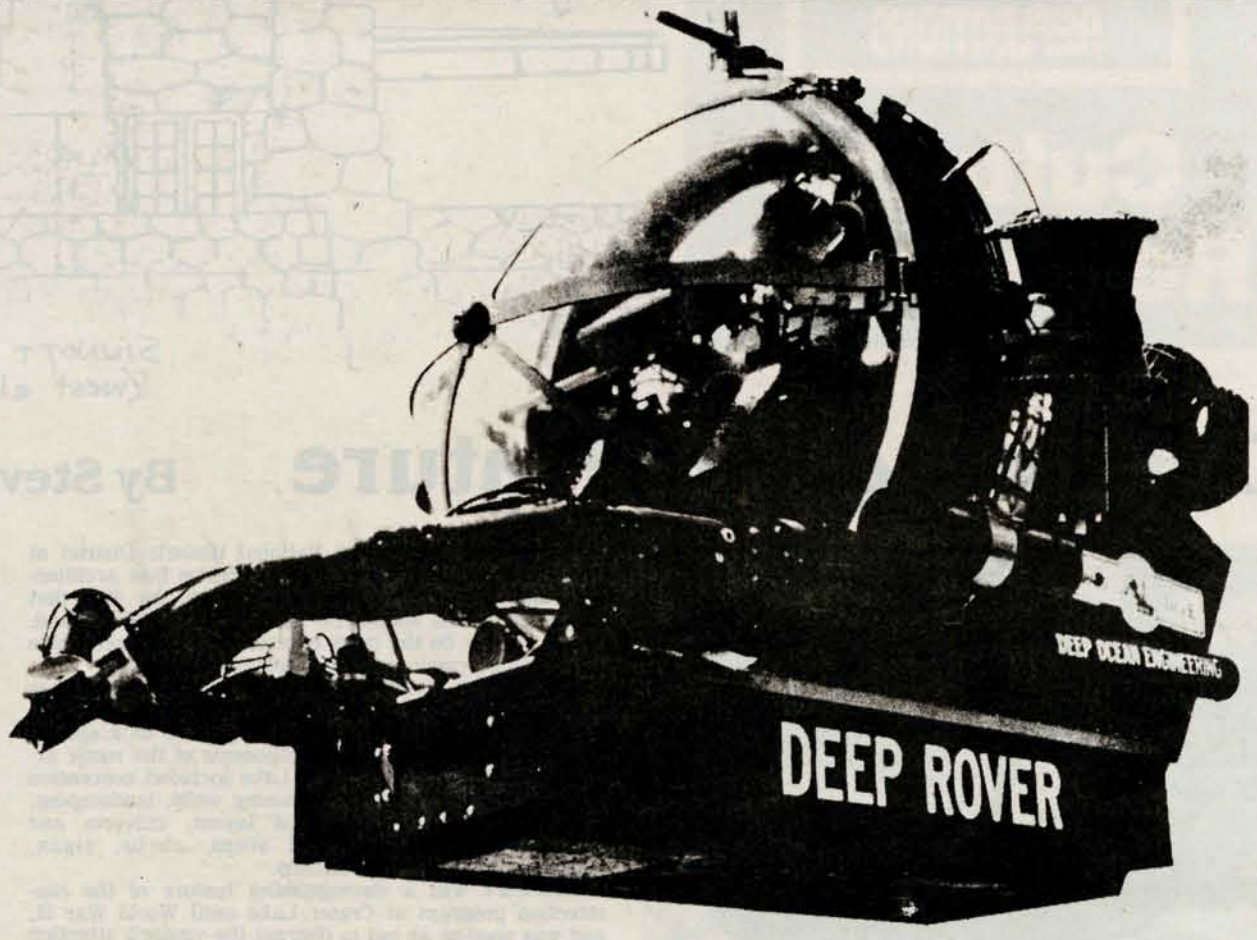
—understand the biological consequences of thermal and cold springs inputs to Crater Lake

—define the evolution of Crater Lake's hydrothermal system, if present, from its volcanic origins to the present, and

—explore the nature of biological activities and limnological processes in those portions of the lake that lie beyond depths reachable by free divers.

The research project has been incorporated into the ten year Lake Research Study mandated by Congress. The study's purpose is to assess an alleged loss of lake clarity and to determine if the cause is manmade pollutants or natural ecological fluctuations in the lake.

"Deep Rover" Vital Statistics



Deep Rover was built by Deep Ocean Engineering and designed to combine the features of a pressurized submarine with the maneuverability and control typical of scuba diving.

Deep Rover is large enough to comfortably accommodate even sizeable pilots (250+ lbs) with back-up power and life support for a week. Yet it is highly transportable. It weighs 6,500 pounds and can be shipped by air, sea, or land in an 8x8x10 foot container.

Deep Rover also has the following features:

- a clear, acrylic pressure hull that provides 360 degree visibility
- two sensory manipulators or arms, each capable of lifting more than 200 pounds; movement can be controlled to within .03 mm
- a depth rating of 3,300 feet
- emergency location acoustic beacon
- high resolution, wide angle TV camera mounted on the manipulator arm for close-up observation
- 35 mm still photography and color video capabilities.

During the summer of 1987, Drs. Jack Dymond and Bob Collier of Oregon State University used a remote controlled submarine called "Watchdog" to survey, through remote video and instrumentation, the south basin of the lake. Elevated bottom water temperatures had been previously measured there. While no hydrothermal vents were identified, additional chemical and temperature measurements were obtained.

This exploratory effort contained during the summer of 1988. The scientists used the manned submarine "Deep Rover" to directly examine the physical, chemical, and biological resources at the bottom of the lake. After two weeks of exploration in the Detailed Study Area (see map on page 7), the researchers found the first of fifteen iron oxidizing bacterial colonies termed "mats". Located 1,450 feet beneath the surface of the lake, these mats measure up to 8 feet by 10 feet and are commonly associated with groundwater mineral seeps. Temperature measurements taken within the bacterial mats were as much as 11.2 degrees Fahrenheit warmer than the surrounding lake water, but no definite hydrothermal inflows were identified or measured.

Scientists are continuing to analyze the data. Further manned submarine exploration of Crater Lake is planned for the summer of 1989. A Peer Review Panel has been formed to assist in the interpretation and presentation of the research findings. A final report on the hydrothermal project will be completed in 1990.

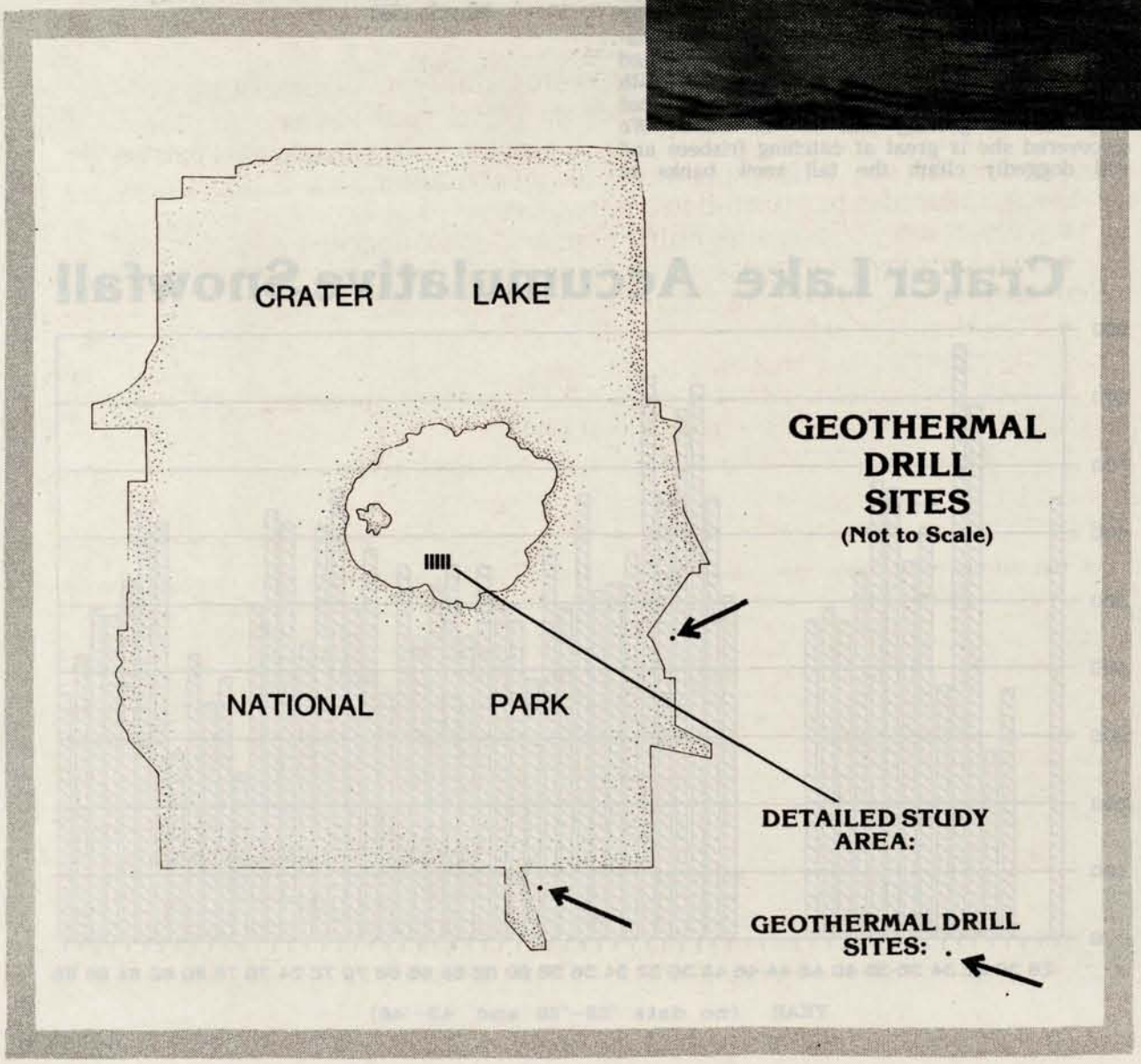
Geothermal Exploration

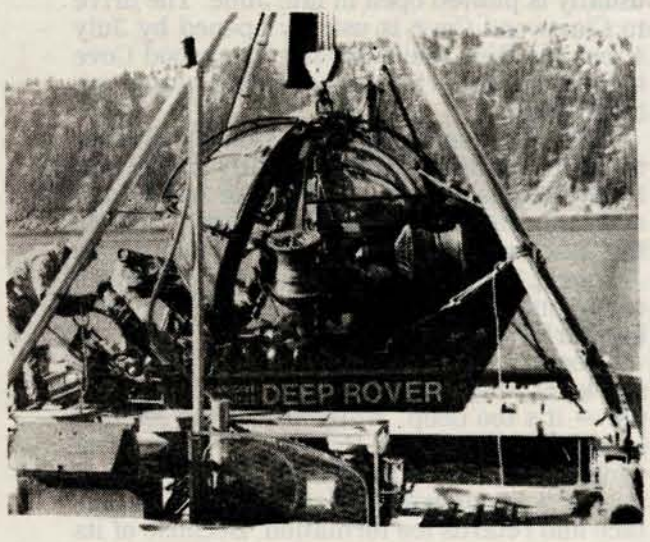
Geothermal heat is a valuable alternative energy source that can be used to produce electricity. In 1983 a private energy company began geothermal exploration on the Winema National Forest at a location adjacent to Crater Lake National Park and 4 miles from Crater Lake proper. If a viable geothermal resource is discovered, commercial development leading to electrical production could follow.

Crater Lake National Park was established in 1902 to preserve the scenic beauty of the lake and the surrouding forest. The lake's intense color and surrounding geological features make it a unique natural resource. Indeed, it is often called the eighth wonder of the world.

The National Park Service, responsible for stewardship of Crater Lake, must look beyond park boundaries when trying to provide a full measure of protection of a park. Outside influences and pressures can affect resources within park boundaries. Air pollution, pesticide use, and acid rain are a few obvious examples. The National Park Service is following the geothermal exploration with great interest to help ensure that park values are protected.

The United States Forest Service and the Bureau of Land Management, managers of the geothermal leasing on the Winema National Forest, have prepared an environmental assessment of the geothermal exploration activities and have issued permits to the private energy company. Environmental groups have challenged this decision and requested that the drilling be delayed until a full environmental impact statement can be prepared. If sufficiently high temperatures are encountered in the core holes, then exploratory drilling for a high temperature steam source could be the next phase proposed by the company. This would require additional environmental analysis.





Crater Lake
REFLECTIONS

Winter

The Nine Month Winter...A Resident's Impressions

By Susie Marvin, Park Ranger

Most people can't comprehend living in deep snow for 9 months of the year, especially when it is 60 miles to the nearest city. My husband and I have discovered we are very well suited to it. The scenery is breathtaking and the skiing is plentiful. Besides, we have great people to live and work with, our roads are almost always plowed out, and we have satellite and cable TV. We get excited every time it snows, even in May. Everything is crisp, bright, and clean when it is sunny, and the house feels especially cozy when it's not.

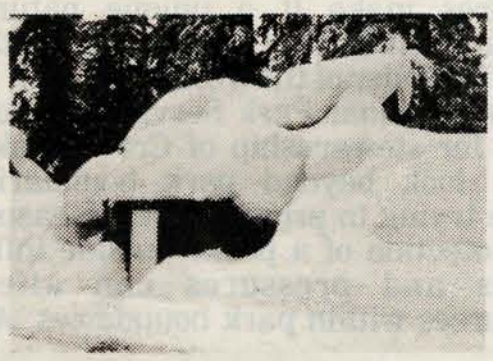
Our house is definitely cozy. It is one of the 700-square-foot stone houses built 60 years ago as summer residences. The stone is our only insulation until the snow gets deep. We heat the house with a wood pellet stove, but the door to the upstairs bedroom is kept closed to conserve energy. An electric blanket is now considered a necessity. It started snowing on November 6 this winter and by the end of the month we decided to keep two of our downstairs windows unshuttered and dug out. The thought of living in a cave all winter was too depressing. By New Year's, the first story was buried. The upstairs windows were almost completely "gone" when the snow reached its maximum depth of 13' 2" in April.

Grocery shopping is our main reason for leaving the park every 2 or 3 weeks. Our enclosed front porch, which is colder than a refrigerator most of the year, gives us extra food storage space. We have lived most of our lives in the mountains and are familiar with waiting to get things we want and having strange meals the last few days before we go shopping. It is nice to get out and see the grass, flowers, and dry ground at market places like Klamath Falls and Medford, but it also feels good to come back to the beauty that is unique to Crater Lake. I must also add that many of the people who live here do get out every week or two just to have some contact with the outside world.

I keep myself busy in the winter by reading, writing letters, baking bread, baking and decorating our monthly park birthday cakes, visiting other residents, cross-country skiing, and volunteering at the Steel Center Information Desk. As a last resort, there is always TV.

We don't have children, but we do have a dog named Molly. It's tough for dogs to live in national parks because they have to be inside or tied up. They can run around the park residences with close supervision. Molly loves fetching balls, but they started getting lost in the snow. We discovered she is great at catching frisbees and will doggedly climb the tall snow banks to retrieve one.

We feel very fortunate to live here at Crater Lake National Park. We are surrounded with beauty and, especially in the winter, it seems that we have stepped back in time to a slower, quieter era.



Snow cover on the Marvin's house in March, 1989.

Let It Snow!

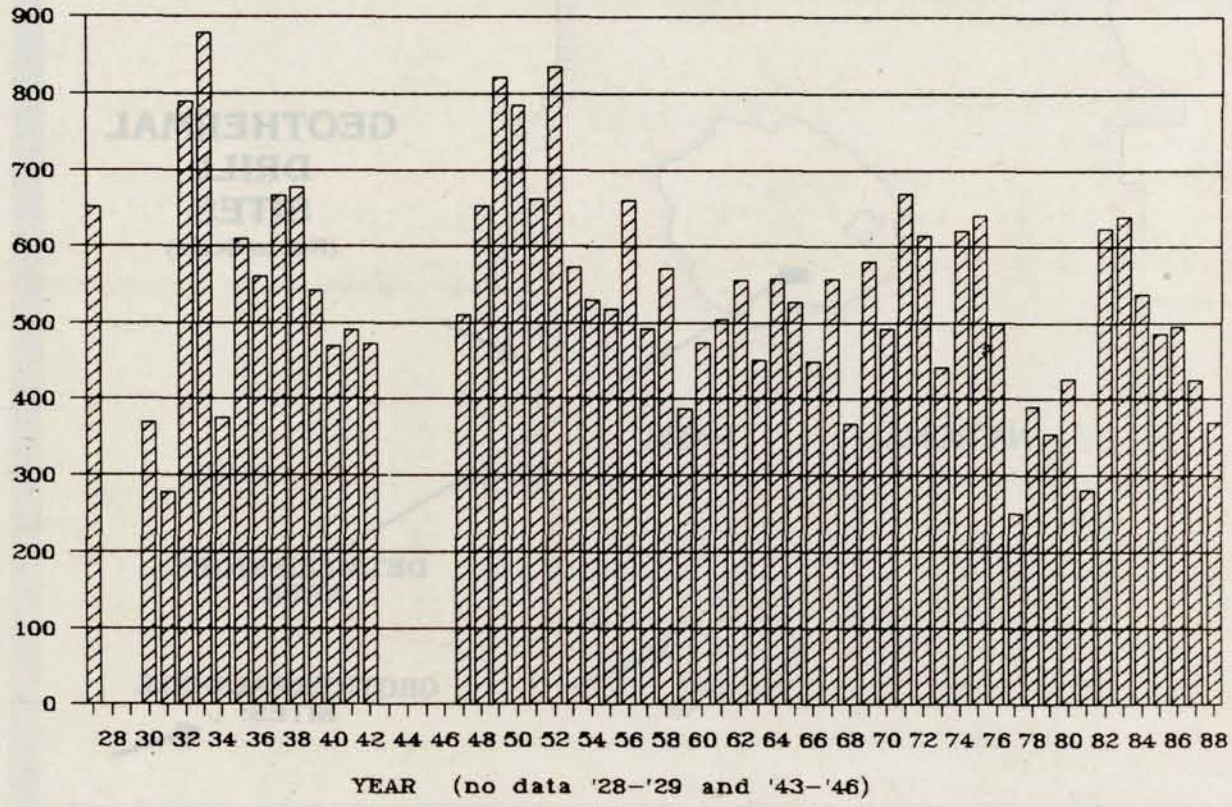
Records of snowfall have been kept since 1926, when the first ranger spent the winter in the park. The winter of 1932/1933 provided 878 inches of snowfall, far above the historic average of 550 inches. Snow on the ground of 14 feet is common by late winter.

Many park visitors are surprised to find so much snow remaining at the park, even in mid-summer. It's not really surprising because the park annually receives about 45 feet of snowfall. Late spring storms often bring many feet of snow delaying road and facility openings. For example, Rim Drive from park headquarters to North Entrance usually is plowed open in late June. The drive to Cleetwood Cove is usually opened by July 4, but the Rim Drive beyond Cleetwood Cove to park headquarters may remain closed until late July.

With all the snow, you may wonder whether the lake freezes in winter. Usually it does not. Park records show that the lake has frozen over only four times in this century. In 1949, the lake was frozen for over 3 months. In January, 1985, the lake surface had a skim ice cover and remained about 90% frozen over into early February.

Even at this high elevation, 6176 feet above sea level, why the lake doesn't freeze is simple — it's too deep. Water below the 328 foot level is a constant 38° F., which is warmer in winter than the surface water. Heat, given off by the warmer water, rises toward the surface and retards ice formation. Because of its 1500 ft. average depth, Crater Lake stores a great amount of heat.

Crater Lake Accumulative Snowfall



Continued from page 1

CRATER LAKE LODGE

ities at Crater Lake. Design and preliminary construction of a new hotel and visitor center are underway. It was hoped that the new hotel would be opened before the old lodge had to close for rehabilitation. However, increased problems and accelerated structural instability have caused the Park Service to make this difficult decision.

The cafeteria and gift shop at the rim are open this year. In addition, there are new motel type cabins at Mazama Campground, lots of camp sites, and hundreds of lodge and motel rooms nearby. A list of nearby accommodations is available at the Steel Center and Rim Visitor Center or by contacting the Crater Lake Lodge Company at (503)594-2511.

REFLECTIONS

The Crater Lake Reflections is published for park visitors by the Crater Lake Natural History Association in cooperation with the National Park Service. The Crater Lake Natural History Association is a non-profit organization working with the National Park Service to provide programs of interpretation, education and research in Crater Lake National Park.

To help Crater Lake visitors to better understand, appreciate and protect the park, Association sales outlets at the visitor center and park headquarters offer selected publications and maps. To become a member write to: Crater Lake Natural History Association, P.O. Box 157, Crater Lake, OR 97604.

TAKE PRIDE IN AMERICA

TAKE PRIDE IN AMERICA

The National Park System includes most of the unique natural and cultural resources of America which this generation will pass on to the next. These lands should and must be protected. Together we can insure their continued protection and availability for future public use if we care for them today. Let's take pride in our public lands and TAKE PRIDE IN AMERICA! PLEASE RECYCLE THIS PAPER!

JOIN: CRATER LAKE NATURAL HISTORY ASSOCIATION

☐ $ 5 Individual
☐$ 10 Family
☐$ 25 Sustaining
☐$ 50 Contributing
☐$100 Supporting
☐ $250 Benefactor
☐$500 Life
☐$500+ Corporate
☐$___ Contribution

All memberships entitle holder to a 15% discount on publications.

Name_____

Address_____

City_____State_____Zip_____

(Memberships run one calendar year Jan. 1 to Dec. 31)

Mail to: Crater Lake Natural History Association
P.O. Box 157
Crater Lake, OR 97604

Publications

Crater Lake Natural History Association

A GUIDE TO CRATER LAKE - THE MOUNTAIN THAT USED TO BE **4.95**
Filled with beautiful color photography, this book introduces the geologic, natural and human history at Crater Lake. A guide to Rim Drive and popular hikes makes this a useful tool to help organize, enjoy and remember a visit to Crater Lake. 48 pp. Warfield

CRATER LAKE-GEM OF THE CASCADES **5.95**
The in-depth geological story of Crater Lake National Park. 2nd edition. 111 pp. Cranson

CRATER LAKE, THE STORY BEHIND THE SCENERY **4.50**
Gives a story of Mount Mazama, formation of Crater Lake, natural and human history of this scenic wonder. Filled with superb color photographs! 48 pp. Warfield, Juillerat & Smith

DISCOVERING NORTHWEST VOLCANOES **3.50**
A fun and informative book for young readers. Field & Machlis.

DISCOVERING CRATER LAKE **3.50**
New in 1989. An activity book to help our younger visitors learn about and remember Crater Lake. Field & Machlis.

USGS TOPOGRAPHIC MAP OF CRATER LAKE NATIONAL PARK **4.00**
Scale 1:62,500

CRATER LAKE WINTER POSTER **7.95**
Beautiful color print 22x28 inches. View of Crater Lake with Wizard Island and Llao Rock covered with snow. Includes sturdy mailing tube.

CRATER LAKE STORY **17.95**
This 18-minute videotape tells the story of the creation of Crater Lake using Indian legends and intriguing photography. Same as film shown at Steel Center.

35mm Slides **1.50 per set**
Five in a set: Geology, Summer Flowers, Summer Scenes, Winter Scenes.

ORDER FORM

Items **Quantity** **Amount**

_____

_____

_____

Total purchase_____
Postage/Handling 1-3 items 2.00_____
4 or more .75 each_____
TOTAL_____

Mailing Address:
Name_____
Address_____
City_____State_____Zip_____

Make Checks Payable to:
Crater Lake Natural History Association
P.O. Box 157, Crater Lake, OR 97604
(U.S. Funds only)

Or, on orders of 8.00 or more,
charge my ☐Mastercard ☐VISA

#_____

Expiration date:_____

Signature (necessary for MC/VISA)_____

Telephone number_____

Please allow 4-5 weeks for delivery.

(Listing and Prices subject to change)

Crater Lake REFLECTIONS

VISITOR SERVICES

For Your Safety

Dogs
Pets frighten wildlife, disturb other people, and occasionally are lost. Keep pets on a leash, out of all buildings, and only on pavement.

Altitude
Rim Village is 7100 feet above sea level. High altitude puts extra strain on your heart and lungs. Limit your activities to your personal condition.

Animal Bites
Feeding wild animals is illegal and is also an invitation to be bitten. Rodents are potential sources of several diseases that can be transmitted to pets and humans. Avoid close contact with rodents (especially ground squirrels) and their burrows.

Volcanic Rock
Crater Lake rock is unstable and poorly suited for rock climbing. Travel within the Crater Lake rim is forbidden except on the Cleetwood Cove Trail.

Traffic Safety
During 1988 thirty-one traffic accidents took place in the park. Help us reduce accidents by observing posted speed limits, using headlights after sunset and during fog or rainstorms, and by watching for deer on park roads. Please use the main pullouts and avoid stopping in traffic lanes.

Water
Use caution when drinking water in the backcountry. An intestinal parasite found in surface water can cause diarrhea in humans. Chemical treatment is not reliable. Boil water for at least one minute to prevent water disease.

Ticks
Ticks can be carriers of disease including Rocky Mountain Spotted Fever and Lyme Disease. While ticks are not abundant at Crater Lake, you should always check for them after hiking in the backcountry.

On Your Own

In addition to the ranger-led programs, you may want to explore the wonders of Crater Lake National Park on your own.

The lake, with its incredibly blue water, is the most spectacular sight awaiting visitors along Rim Drive. A grander sense of the lake's immensity and its environs can be gained from Rim Drive and the many day hiking trails located around the rim. Stay on the trails and take your time. The elevations range from 6,000 to 9,000 feet. Carry water and snacks with you.

Rim Drive is the 33.4 mile loop that encircles Crater Lake.

One may proceed in either a clockwise or counter-clockwise direction around the lake.

Excellent viewpoints are established in several areas along rim drive. The view from Kerr Notch is one of the best for seeing the Phantom Ship.

Also in Kerr Notch is a 7-mile spur road to the unusual spire-like formations known as the Pinnacles. Whichever direction you proceed, please drive within the posted speed limits. The road is narrow and has many sharp curves. Drivers are often distracted by views and wildlife. Again, PLEASE DRIVE WITH CARE!

Watchman Peak Trail-.8 mile (one way). One hour. Trailhead: Watchman Overlook. Moderately steep. After the snows melt hike to Watchman Peak, topped by a fire lookout. Wizard Island dominates the view from the Watchman.

Cleetwood Cove Trail-1 mile (one way). Half-hour to 1 hour. Trailhead: parking area on Rim Drive. Steep. Descend to the surface of Crater Lake for fishing, boat tours and access to Wizard Island.

Mount Scott Trail-2.5 miles (one way) 2½ to 3 hours. Trailhead: parking area on Rim Drive. Moderately steep to steep. Many small animals and birds can be seen while hiking to the peak. A fire lookout sits on the summit. Spectacular 360 degree view. Gnarled whitebark pines. Avoid snowbanks.

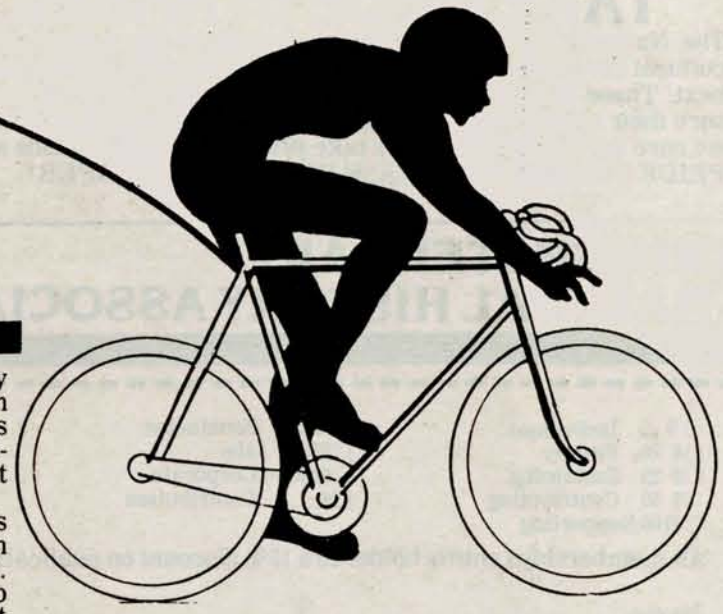
Garfield Peak Trail-1.7 miles (one way). One hour. Trailhead: Caldera rim east of Crater Lake Lodge. Moderately steep. Hike past beautiful wildflower displays and spectacular lake views to the summit. The panorama of Crater Lake from 1,888 feet above its waters is impressive. Watch for eagles and hawks. Usually open by mid-July. Avoid snowbanks.

Castle Crest Wildflower Trail-.4 mile (loop). Half-hour to hour. Trailhead: half-mile from Park Headquarters. Easy to moderate. A self-guiding trail booklet is available. Spectacular wildflower displays usually begin in mid-July.

Godfrey Glen Trail-One mile (loop). Half-hour to hour. Trailhead: parking area south park road. Easy. Self-guiding trail booklet available. Walk through a forest of mountain hemlocks and Shasta red firs to a steep-sided canyon with pinnacle formations.

Annie Creek Trail-1.7 miles (loop). 1 to ½ hours. Trailhead: Mazama Campground amphitheater. Easy to moderately steep. Descend to the bottom of Annie Creek Canyon.

Bicycles and Cars



Cyclists and drivers share in the joy of travelling around Crater Lake on Rim Drive. But, since cars and bikes are very different vehicles, their operators need to understand what to expect from each other.

Bikes are slow on those steep uphills (4-5 miles an hour), but pretty fast on the downhills (35 miles per hour). Bicyclists need maneuvering space to avoid rocks and other hazards — about three feet on either side. Cyclists need to be visible and predictable in their movements.

Car drivers don't want to travel consistently at only 5 miles an hour. They want to be able to pass slow-moving vehicles safely. They don't like unexpected surprises on the road, especially on tight curves.

Bicyclists SHOULD ride single file. Ride on the right, but not so far that you disappear from the motorists sight line. If you're with a large group, leave a large gap every six bikes to allow a car to merge when passing. And, pull off the road at a turn-out when the following car driver is hesitant to pass.

Car drivers SHOULD pass with caution, carefully assessing the speed of the bicyclist and the oncoming traffic. Leave a good three feet when passing a cyclist. Honking the horn is not needed; that can startle a cyclist.

Mountain Bikes. Mountain bikes are welcome on all paved roads and the unpaved Grayback Nature Trail. Other trails are closed to all bicycles. Indeed, mountain bikes are not allowed anywhere in the backcountry.

VISITOR SERVICES

Gifts and Souvenirs

The Crater Lake Gift Shop, located in the Cafeteria/Gift Shop Building adjacent to the main Rim Village parking lot, is open year-round. Summer hours are from 8 am to 8 pm daily through September 10th.

In addition to a wide selection of Crater Lake souvenirs, the Gift Shop also features Northwest and American handcrafts, Oregon myrtlewood jewelry and tableware, toys, jewelry, stationery, posters, and clothing. The Gift Shop has a book department with extensive selections on Northwest Americana, travel guides, Native American history, Oregon and western American natural history, Northwest cookbooks, and children's books.

Food and Beverage

The Cafeteria is adjacent to the Gift Shop at Rim Village, serving breakfast, lunch, and dinner. Breakfast is traditional; lunch and dinner offer cook-to-order entrees, a salad bar, desserts, and deli sandwiches. The Cafeteria is open daily from 7 am to 8 pm; after September 10, hours are 8 a.m. to 6 p.m.

The Watchman Deli Lounge is above the Cafeteria and is open from noon to 11 pm. The menu includes hamburgers, deli sandwiches, pizza, snacks, beer, wine, and spirits. Families are welcome. The Watchman is open from June 12 to September 4.

The Mountain Fountain is adjacent to the Gift Shop and is open from 11 am to 7 pm. After August 21 the Fountain is open until 5 pm. The Fountain serves hamburgers, hot dogs, french fries, soft drinks, coffee, and ice cream.

Telephones

Public telephones are available at the Steel Center, Cafeteria, Rim Village restrooms, Mazama Campground, and at the Annie Springs Entrance Station.

Accessibility

Most viewpoints are accessible for persons in wheelchairs. Ramps are in place at the Visitor Center and Rim Village Cafeteria/Gift Shop. Mazama Campground Amphitheater has paved walkways. Restrooms at Mazama Campground, Steel Center, and Rim Village are also accessible.

Gasoline

The Crater Lake Service Station is located near park headquarters. Gasoline, oil, and limited automotive needs are available from late May through mid-September. Diesel fuel is NOT available.

Lodging

The only accommodations in the park are located next to the Mazama Campground, near the Annie Springs entrance station. Each room features two queen beds and bath. Two units are designed for persons in wheelchairs. These rooms are available from May 19 to October 15, weather permitting. Reservations are suggested, (503) 594-2511.

Mazama Campground

The 198-site Mazama Campground is located near the Annie Springs entrance station, just off Highway 62. The campground features wooded sites, flush toilets, and potable water; firewood is available for a fee. Sites are $7.00 and are allotted on a first come, first-served basis.

Lost & Found

Contact a park ranger at the Visitor Center or Steel Center.

Groceries

The Crater Lake Camper Store is adjacent to the Fountain in the Cafeteria/Gift Shop building. Convenience store type items such as ice, pop, beer, wine, bakery and dairy items, picnic needs, candy, traveler's needs, and a selection of first aid and over-the-counter medicines are offered.

First Aid

First aid stations are located at Steel Center and Rim Village Visitor Center. Or, contact any patrol ranger in a marked vehicle. To report emergencies or fires, please call 9-1-1 at any public phone or call 9-9-1-1 at any concession phone.

Worship Services

Check bulletin boards for information on interdenominational services and Catholic Masses.

Post Office

Located in the Steel Center lobby. Window service June through September, Monday-Friday, 10 am to 1 pm and 2 pm to 4 pm; Saturdays 10 am to 2 pm. Mail drop available 7 days a week from 8 am to 5 pm.

Crater Lake REFLECTIONS

Naturalist Programs

Visitor Center
Rim Village, 8:00 am to 7:00 pm daily

- information
- book sales
- exhibits
- backcountry permits

Steel Center
Munson Valley (HQ), 8:00 am to 5:00 pm daily

- information
- book sales
- restrooms
- post office
- exhibits
- backcountry permits
- Crater Lake movie (see below)

Crater Lake Movie
This 17 minute video film looks at our interactions with this mystical lake from its beginning to today.

Shown at the Steel Center every half-hour 8:00 am to 4:30 pm.

Campfire Program
Join a park ranger for an evening of traditional national park fun at the Mazama Campground Amphitheater. Programs last 45 minutes to 1 hour. Topics will be posted on bulletin boards at visitor centers and campgrounds.

9:00 pm daily (June 24 through July 31)
8:30 pm daily (August 1 through September 4)

"Geo-Logic" at the Sinnott Memorial
Locked within the spectacular Crater Lake scene are clues to the origin and formation of this eighth wonder of the world. Improve your "geo-logic" by joining a park ranger for a 15-minute program at the Sinnott Memorial.

Talks are given daily at 1 pm, 2 pm, 3 pm, 4 pm.

Boat Tours
Explore the wonders of Crater Lake by boat on a 2-hour ranger narrated tour.

*WHEN: 9 am, 10 am, 11 am, 12 noon, 1 pm, 2 pm, 3 pm

*WHERE: Cleetwood Cove boat dock. (Allow at least 1 hour to drive from Rim Village to the Cleetwood Cove parking area and hike down the 1 mile trail).

*COST: $10.00 adults
$ 5.50 children under 12
FREE children under 18 months
(All fees charged by the Crater Lake Lodge Co.)

*BRING: Jacket, water, snacks, sunglasses, camera, sun screen, sturdy shoes. No pets allowed.

*NOTE: Restrooms are available at the dock. The ONLY trail back to your car from the boat dock is very strenuous. You must hike 700 feet up along a 1 mile trail. It is recommended for those in good physical condition. There is no alternative transportation.

The boats stop at Wizard Island. You may get off and take a later boat back (space permitting).

Guided Tours and Hikes
Munson Valley History Tour

Learn about efforts to blend in with nature at Crater Lake as we explore the rustic architecture of Munson Valley. Meet by the flagpole in front of the Steel Center. Meets 11:00 am daily (lasts about 45 minutes).

High Country Hikes
Head for the high country of Crater Lake National Park for some spectacular views. Your destination will be one of the following: the Watchman, Garfield Peak, Mount Scott, and others.

Inquire at the Rim Village Visitor Center before 1:30 pm for the location and subject of walk. Walks begin at 2:30 pm at the designated trailhead.

Remember to bring good shoes, a jacket, sunglasses, water, snacks, etc. No pets are allowed.

Junior Ranger Program
If you are age 6 to 12, you are invited to become a Junior Ranger. Junior Rangers meet at 9:00 am daily at the Mazama Campground Amphitheater and at 2:30 pm daily at the Rim Village Visitor Center. Each program meets for 45 minutes of fun and discovery. Join us and learn how to earn a special certificate. All parents must be accompanied by a child!

TABLE OF CONTENTS