



VOLCANIC VISTAS

Deschutes National Forest Recreation and Information Guide 1993-94

What is an Ecosystem?

A popular buzzword in vogue now is the term "ecosystem." What is an ecosystem really? We are all part of one or more; we live our lives in them.

Paulina Peak Site Of Early Lookout

Did you know that Paulina Peak was the site of one of the first four fire lookouts on the Deschutes National Forest? Lookouts on Maiden Peak, Black Butte, Walker Mountain, and Paulina Peak comprised the original system of detecting forest fires here. Fire detection, prevention, and suppression may have been the major mission of the United States Forest Service after its establishment in 1907.

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The definition of an ecosystem is deceptively simple: an ecosystem is all the organisms in a given place in interaction with their nonliving environment. The challenge comes when we try to understand how the components of an ecosystem work; when we try to interpret the delicate balance, the intricate links. "Organisms" include vegetation, animals, diseases, fungi, and parasites. The "nonliving environment" includes climate, soils, landforms, inorganic elements and weather.

There are many different kinds of ecosystems. Alpine lakes, deserts, oases within deserts, villages and marshes are all examples of ecosystems.

How big is an ecosystem? From the definition above, one could say the whole planet is an

ecosystem, or on the other hand so is a drop of water. Usually ecologists find some middle ground between these two extremes by studying areas that are relatively uniform, such as an old growth ecosystem on the west side of the Cascades.

Picture a hawk swooping down on a snake. This snake had just eaten a mouse, which fed on grasses and other green plants. This is an example of a food chain. Food chains help to show us the interconnections of any ecosystem. In this example, the hawk depends on the snake or the mouse for food; it cannot eat the grass that the mouse lives on. The mouse depends on the grass, which in turn depends on the sun.

All ecosystems are driven by solar energy. This energy is captured by green plants.

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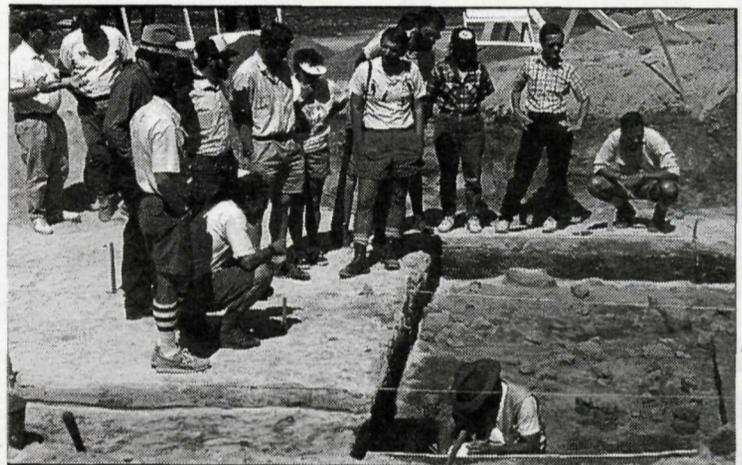


PHOTO: SHERRI LEE

Archaeologist searches for clues from the past.

Pushing Back Time – The Newberry Story

The study of history in Newberry National Volcanic Monument could help us understand how we can better manage and interact with our environment today. To move into the future with vision and clarity, we first need to acknowledge and understand the past. In the Monument, a complex relationship between a dramatic volcanic environment and native peoples spanned thousands of years and influenced cultures hundreds of miles away. Eruptions within Newberry Volcano and Mount Mazama, which formed Crater Lake, periodically buried the landscape under volcanic deposits, including the native encampments. It's these ancient buried sites that are now bringing insight about the lives and cultures of humans who visited the caldera for

thousands of years. Archaeology is the study of physical remains left by the people who lived before us. The rich history and its unusually clear archaeological record, make the Monument a living lab.

The earliest people in central Oregon lived here approximately 13,000 years ago. They hunted now extinct animals such as mammoths and mastodons with spears. By about 10,000 years ago, ancient Native Americans were hunting with a spear thrower and collecting many of the same plants we find today. The bow and arrow didn't show up for another 8,000 years. The first known Euro-Americans in the caldera, members of a Hudson's Bay trapping party, arrived 167 years ago.

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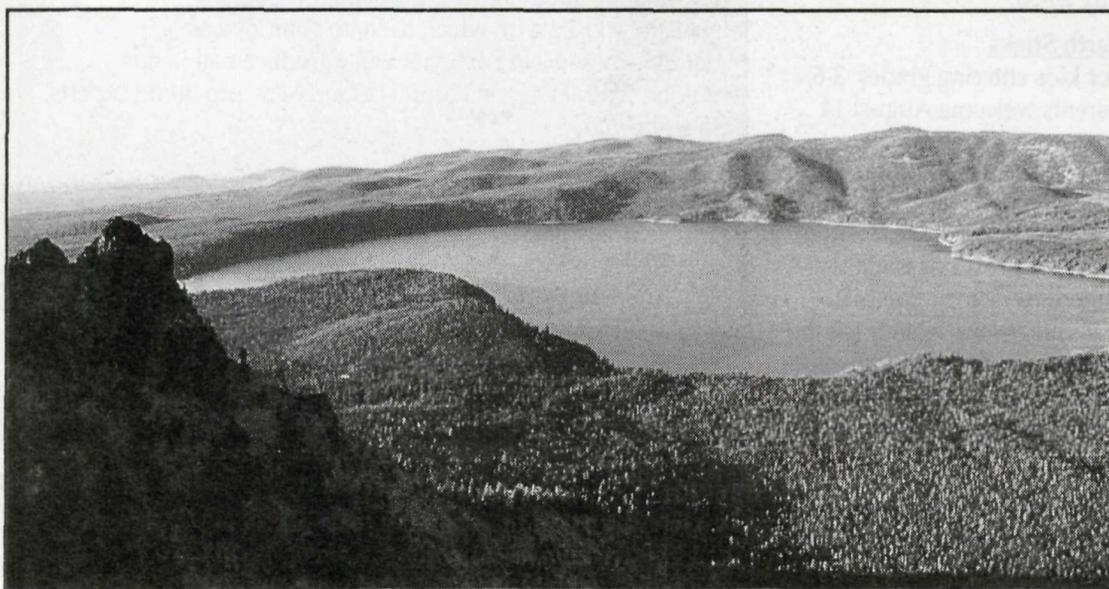


PHOTO: SHERRI LEE

Paulina Lake

IT'S A FACT

In 1903 when Dr. I.C. Russel visited Newberry Crater, there were no fish in either lake but there

were crayfish in Paulina Lake. Fish could migrate up Paulina Creek but were stopped by Paulina Creek Falls. Crayfish could climb past the falls.

ALSO IN THIS ISSUE:

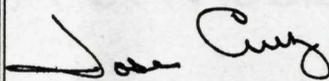
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Welcome to the Deschutes

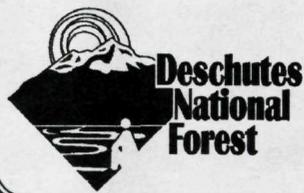
A wide variety of recreational opportunities, diverse landscapes, breathtaking scenery, and abundant wildlife awaits you. Take advantage of Forest Service offices and visitor centers for current information about places to see, what to do, and how to get there. Volcanic Vistas is your fingertip guide to points of interest, recreation destinations, and Forest issues.

Enjoy your stay in central Oregon. We look forward to caring for the land and serving you during your stay in the Deschutes National Forest, "A Changing Forest."

Thanks for joining us.



JOSE CRUZ
Forest Supervisor



Ecosystem Management

Ecology is the study of how organisms and their environment interrelate. Ecosystem management uses an ecological approach to achieve multiple-use management of the national forests. The needs of people are blended with environmental values to sustain diverse, healthy, and productive ecosystems. This philosophical shift takes into account the interactions of all the components of ecosystems instead of focusing on individual elements. Although this approach includes the recognition that our understanding of ecosystems is still developing, today we understand better the consequences of past and current actions upon our forests. Making informed decisions today is dependent upon this knowledge.



PHOTO: SHERRI LEE

There are many ways to enjoy your National Forest

"Green Team" Campers To Help Preserve National Forest

Tall tales around the campfire, long hikes through towering pines-vacationers make lasting memories when they camp in Oregon's Deschutes National Forest. Now, through an innovative program called The National Forest Green Team, they have a chance to help enhance the forest for future generations.

The first program of its kind, the National Forest Green Team encourages campers, outdoor enthusiasts and local civic organizations to volunteer a few hours to handle simple maintenance jobs around a National Forest campground. Volunteers roll up their sleeves to sand pic-

nic tables, repair stream banks, repaint signs or any of dozens of important jobs.

The program is being launched at six campgrounds this year: Mallard Marsh, South, Little Crater, Link Creek, South Shore and Blue Bay. For each task completed, participants receive a Green Team memento.

Our forests are a legacy, and through the National Forest Green Team, every visitor to the Deschutes national Forest has an opportunity to pass on the gift.

Contact your local Ranger District or Greg McClarren (503) 383-5561 or Terry Virgin (503) 383-5579

The Museum At Warm Springs.

Completed in early 1993, The Museum at Warm Springs was created by the Confederated Tribes of the Warm Springs Reservation of Oregon to preserve their traditions and to keep their legacy alive. Exhibitions, programs, and lectures by prominent Native American

scholars, artists, and poets are presented in the exhibition gallery.

The Museum at Warm Springs is located on Highway 26 in Warm Springs about an hour north of Bend.

Telephone: (503) 553-3331
HOURS: 10 to 5 Daily

High Desert Museum Changing Exhibits

Strength and Diversity:

Japanese American Women 1885-1990

An exhibit on the experiences of Japanese American women and their attempts to integrate their Japanese ancestry with American culture. Through July 18

Wondering Wagons: Meek's Lost Emigrants of 1845

An exhibit recounting Meek's perilous journey through the high desert in his effort to forge a shorter trail west. Through June 1994

The following is a sampling of the varied classes and seminars offered this summer:

Land of Abundance:

Archaeology in the Northern Great Basin

Three-day field course
July 7, 8, 9

Native American Fiber Arts:

A Workshop

July 19-23

Down to Earth

One week summer camp for kids entering grades 3-5
July 26-30

Earth Sticks

For kids entering grades 3-6, parents welcome August 14



PHOTO: SHERRI LEE

Volunteers learn about the Deschutes River

Easy! Fun! Learn! Volunteer!

Where can you have fun, increase your knowledge of Central Oregon, and meet people from the area, the country, the world? Be a Deschutes National Forest volunteer. Opportunities exist at Newberry National Volcanic Monument, and the Ft. Rock, Bend, Sisters and Crescent Districts.

No experience necessary! Training for volunteers is available in geology, botany, biology, history, anthropology, and archaeology, and it's FREE. You can learn to lead nature walks or give campfire talks, be a camp-

ground host, help in an office or with maintenance. You can work in your area of expertise or learn something new.

Want to volunteer but won't be in the area too long? There are special one-time projects that require help on a short-term basis. Something for everyone and everyone is needed! Volunteering with the Forest Service is a wonderful experience that you can share.

HOURS: Flexible
DAYS: Flexible
Contact: Barbara Merlin
383-5578

For more information:

(503) 382-4754

The High Desert Museum is located 5 miles south of Bend on Highway 97

HOURS: Open Daily 9-5

Pacific NW Field Seminars

New to the area? Just want some new information about familiar places? How about some new faces with which to share your love of nature? These Field Seminars will introduce you to our unique central Oregon natural resources by providing experts to guide you.

June 19-22

CLOSE ENCOUNTERS WITH DESERT WILDERNESS

A four-day guided tour including geology, astronomy, flora and fauna. Includes Glass Buttes, Malheur Field Station, Diamond Crater, Hart Mountain Antelope Refuge, Warner Wetlands, Fort Rock and much, much more! Interpreter - Alice Elshoff. Starts and ends in Bend, Oregon.

August 8

ASTRONOMY AT PINE MOUNTAIN

Held at Pine Mountain Observatory, this introduction to general astronomy includes the mythology of constellations, a discussion on the use of telescopes and a chance to actually use the telescopes. Interpreter - Mr. Lynn Carroll

SPONSORED BY NW INTERPRETIVE ASSOCIATION

Classes are limited in size so REGISTER EARLY! Registration and payment must be received two weeks prior to first day of class. Send registrations and inquiries to: Jean Tobin, Pacific NW Field Seminars, 83 S King St., Suite 212, Seattle, WA 98104; (206) 553-2636.





Pandora moth

PHOTO: PAUL FINDLEY

QUESTIONS ABOUT FOREST HEALTH

IS SOMETHING WRONG WITH THE TREES ON SANTIAM PASS?

Motorists crossing Santiam Pass have noticed that many of the trees are dying. Often they have dead tops and are heavily defoliated, but are still alive. The western spruce budworm is the cause.

The western spruce budworm is native to the U.S., and lives where true firs and Douglas-fir live. In its larval form, the insect feeds on the new needles of its host trees. This often leads to complete stripping of the current year's needles. Several successive years of defoliation may lead to top-kill or even death of the entire tree.

ARE SPRUCE BUDWORM OUTBREAKS INCREASING?

Yes, they are more frequent and widespread than at the turn of the century.

WHY IS THE BUDWORM DAMAGE SO COMMON?

The most important regulator of budworm populations is the food source. Outbreaks occur when food is readily available for the insects. We have many acres of forest which are over-crowded and dominated by true firs and Douglas-firs.

HOW DO WE DEAL WITH THESE SPRUCE BUDWORM OUTBREAKS?

Two primary approaches exist for dealing with the budworm. A short-term approach involves spraying large areas with insecticides. In the long-term, stands are managed to change their susceptibility to the budworm.

WHAT ARE THESE HUGE MOTHS AND ARE THEY GOING TO KILL MY TREE?

The moths you see are "Pandora moths." The larval stage feeds on older needles of ponderosa pine and lodgepole. The larval stage feeds every other year and allows the trees to recover lost foliage. This is the year for the moths, next year we will see larvae again.

WHAT HAPPENED TO THE MOUNTAIN PINE BEETLE EPIDEMIC?

In the lodgepole pine, the beetles have killed most of the trees and a major outbreak is not expected in this area again for another 60 years. Mountain pine beetle epidemics start in dense stands. Thinning is the only effective way to prevent epidemics. You can see a stand of ponderosa pine that was thinned to prevent bark beetle attack as you drive along Hwy. 97 from Bend to Sunriver.

—Andris Eglitis

What is an Ecosystem? (Continued)

During photosynthesis it is turned into food for plant eaters, such as the mouse in the example. These animals may be consumed by other animals (the snake), and in turn be eaten by others (the hawk). Each of the steps in this food chain is called a trophic level. At each trophic level, when organisms die, their bodies are decomposed by bacteria and fungi. Then the energy within their bodies is released as heat to the atmosphere, and basic molecules such as carbon dioxide are made available again.

The organisms in any ecosystem are connected to their nonliving components. An example in central Oregon are the myriads of tubes and caves formed from lava, which provide important habitat for bats. On top of the lava, special plants and shrubs have found habitat as well.

Another component of an ecosystem is the concept of disturbance or change. In central Oregon ponderosa pine ecosystem, an important role is played by fire. Although fire has been suppressed for many years in this ecosystem, it used

to occur about every 10 years, which kept the forest free of brush and small trees. Insects native to this ecosystem, such as the mountain pine beetle and spruce budworm (which now occur at epidemic levels), were kept at normal levels. This is one of the ways in which the periodic disturbance of low-intensity fire maintained a healthy, functioning ecosystem.

Big or small, cold or hot, few animals or many, ecosystems present us a varied, endlessly interesting challenge from which to learn.

—Charmane Campbell



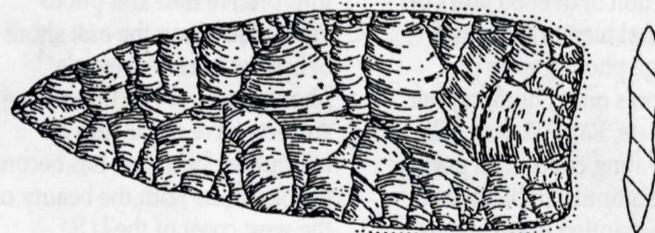
Pine forest

PHOTO: TOM IRACI

The Newberry Story (Continued)

The archaeological evidence reveals that the 1,300-year old Big Obsidian Flow was a major quarry and collection site until the arrival of Europeans. Newberry obsidian can be found throughout the Pacific Northwest. This quarry site has left a rich record of evolving obsidian technology and the more technical aspects of reducing a large core to a finished point.

Most of the sites within the Monument are quarries, obsidian workshops, food-processing locations and camps. An exception to this is the Paulina Lake site, which shows fairly permanent habitation from around 10,000 to 6,700 years ago. It was first occupied 9,920 years ago which makes it not only the oldest prehistoric site on the Deschutes National Forest but one of the oldest recorded sites in North America. The latest research has exposed the remains of one of the oldest domestic structures in the western hemisphere.



We know much more today than we did three to four years ago. The people who inhabited this site are one of the earliest and yet least understood cultures in North America. There are few places in the world which have the potential to educate us so well about the 10,000 year interaction between people and volcanoes!

—Laurie Halloran

Artifacts In The Forest

Finders keepers, right? WRONG! The Archaeological Resources Protection Act protects artifacts from disturbance or private collection. Once re-disturbed, the information is lost forever. Each piece of our past is a key element to a much greater story. The United States Forest Service asks for your help in reporting theft or disturbance of artifacts by contacting: Deschutes National Forest Law Enforcement at 383-5510 or by calling 1-800-782-7463, an anonymous 24-hour hotline for tips on crimes on public lands.

IT'S A FACT

Hope, Faith and Charity are the early names of the Three Sisters.

In central Oregon, the next volcanic eruptions will most likely be near South Sister or Newberry Crater.

Surgical blades made from obsidian are sharper than those made from steel.

East Lake has no surface outlet and acts like a giant rain gauge. Within the 20th century, the level of East Lake has fluctuated over a range of about 16 feet.

Interpretive Programs At Lava Lands and Newberry

The staff at Lava Lands Visitor Center and Newberry National Volcanic Monument offer fun and educational programs to help acquaint you with the Monument's unique treasures. The events are FREE and include talks, guided walks, flintknapping demonstrations, children's programs and evening campfires.

Programs feature the rich and fascinating human history of the region, the creatures that inhabit the area, the volcanic history of central Oregon and the stars that light up the night sky.

Events are scheduled Fridays, Saturdays and Sundays, Memorial Day through Labor Day. Most events are held at Lava Lands Visitor Center, the summits of Lava Butte and Paulina Peak, and the Big Obsidian Flow. Campfire programs are held at the Big Obsidian Flow Amphitheater.

Schedules are posted at Lava Lands Visitor Center, campgrounds and recreation sites in the National Monument. For more information call the Lava Lands Visitor Center: (503) 593-2421.



Interpreter Julie Rich leads nature hike at Paulina Lake PHOTO: SHERRI LEE

Ray Atkeson Memorial Exhibit and Trail

The Ray Atkeson Memorial Exhibit will be open for viewing at Lava Lands Visitor Center from early July. The exhibit is a collection of over 60 years of personal memorabilia and vintage photography of Oregon's only Photographer Laureate, Ray Atkeson. His captivating collections portray lofty summits, unblemished snow-mantled trees, winter wonderland scenes, and panoramic vistas. Lava Lands Visitor Center is located on Highway 97, 11 miles south of Bend.

A memorial to the late Ray Atkeson will feature a photo wayside on the Cascade Lakes National Scenic Byway and an interpretive trail and photo viewpoint along the east shore of Sparks Lake. Atkeson's photographs of Northwest subjects have made him an institution; his name has become synonymous with the beauty of the west coast of the U.S. earning him a reputation as one of the foremost pictorial photographers in the country. He was a master of light and shadow and a pioneer in the art of color photography. The tribute is dedicated to continuing Atkeson's philosophy of teaching about nature through the medium of photography. Construction began in 1992 and completion is planned for the fall of 1993.

Both projects are made possible by a partnership between the Oregon Parks Foundation and the U.S. Forest Service. We hope you enjoy these tributes to a man whose legacy continues to personify the Oregon Spirit.

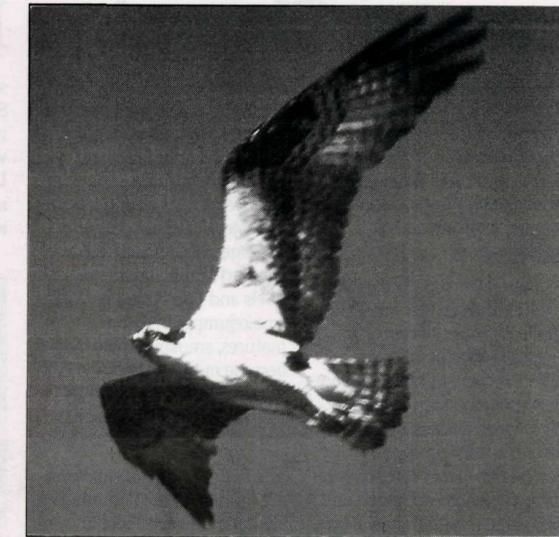
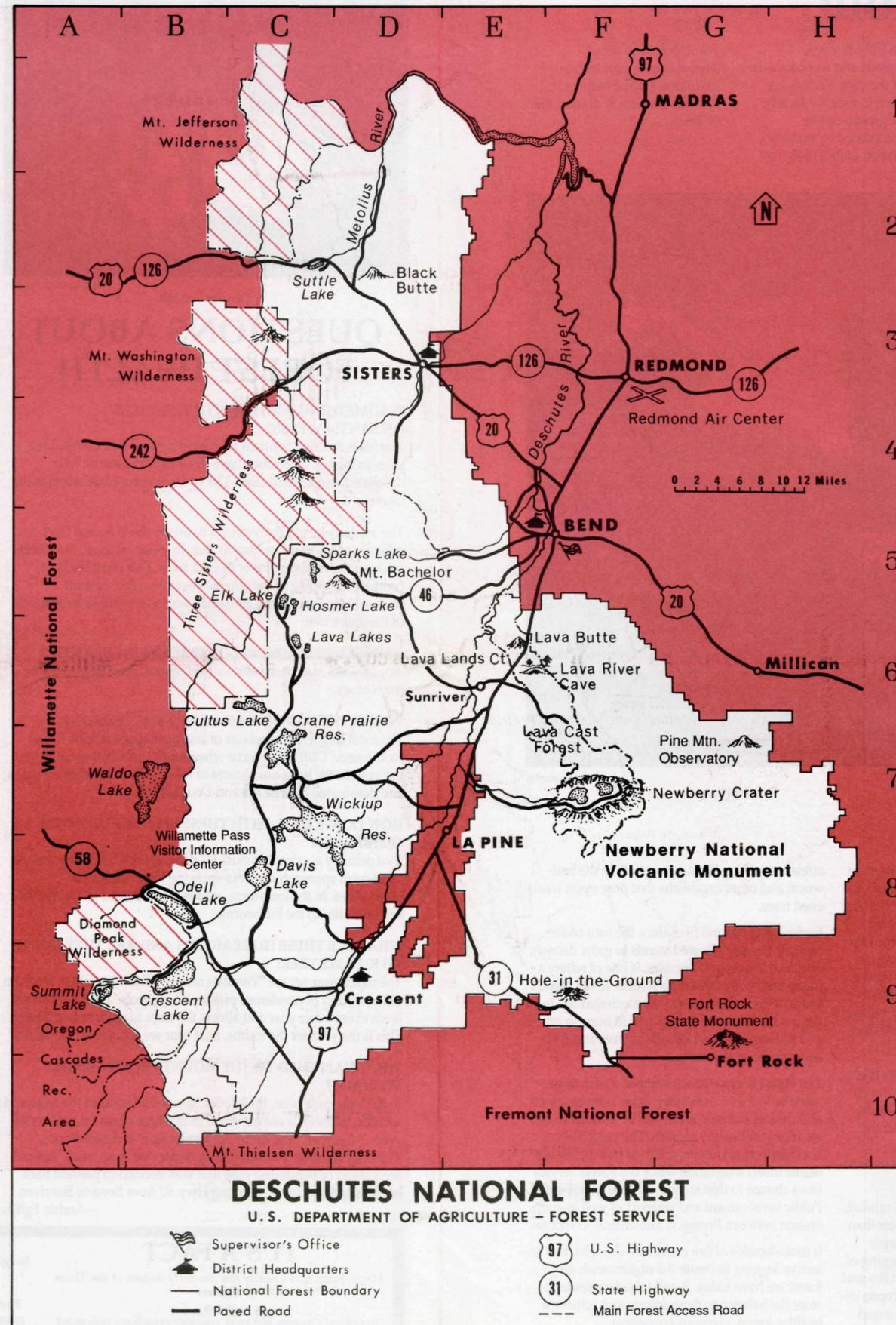
Thank you to the High Desert Museum for offering their volunteers the opportunity to help design and install the exhibit at Lava Lands Visitor Center: Virginia Fuller, Linda Moore-Durston of Interior Planning and Design, Lloyd Zehr, Jack Harris, Sue Frewing, and Ruth Schassberger. Thanks also to

- Redmond Greenhouse & Nursery
 - Parr Lumber of Bend,
 - Bend Lumber Inc. and
 - Coast to Coast
- for their support.

Willamette Pass Visitor Information Center

The Willamette Pass Visitor's Information Center provides an entertaining look into the history and recreational opportunities of the southern end of the Deschutes National Forest. Situated in the lodge at Willamette Pass Ski Area, the center has information valuable to visitors interested in extending their stay or making plans for future visits. It is staffed by Forest Service volunteers who welcome questions about the area. The local business community organization, Klamath County, and Willamette Pass Ski Area operate the center in partnership with the Forest Service. Willamette Pass Visitor's Information Center is located at Willamette Pass on Highway 58.

HOURS: Fridays 11 to 5
Saturdays and Sundays 10 to 5
OPEN MEMORIAL DAY TO LABOR DAY



Osprey

FILE PHOTO

Osprey Observation Point

Crane Prairie Reservoir was constructed in 1929 to retain water for irrigation. Since then it has become an outstanding fishing lake and breeding ground for the osprey or fish hawk, identified as a potentially endangered species in 1969. Ospreys are active at Crane Prairie and surrounding lakes and streams during their migratory stay from May to October. From the parking lot on the west side of the reservoir, a short walk takes visitors to an observation area where snags and artificial nesting poles inhabited by the birds can be viewed. Ospreys can be seen diving for fish from more than a hundred feet above the water. Also likely to be present are cormorants, terns, a variety of ducks and bald eagles.

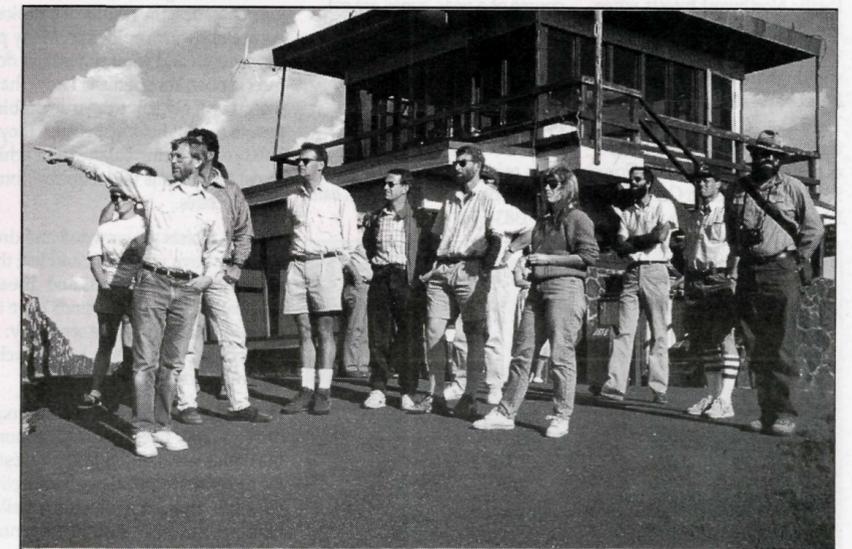
IT'S A FACT

The toilet on Paulina Peak is the highest public toilet in Oregon

Bend District Interpretive Programs

Learn and have fun in the forests! The Bend District offers eight scheduled interpretive events each weekend from July 2 to September 6. There are talks on the summit of Mt. Bachelor every day at 11:30 and 2:30. Friday and Saturday night, naturalists present talks in some of the campgrounds. Bring your canoe for the serene Hosmer Lake canoe tour every Saturday morning at 9 am; we leave from the boat ramp. The popular Sunday morning Lava Lake nature walk to the Blue Lagoon leaves at 10 am and meets at the entrance to Lava Lake Campground. Details are posted in all the campgrounds and at Forest Service offices. Let us help you enjoy your National Forest!

For more information call (503) 388-5664



Geologist/Interpreter Larry Chitwood on Lava Butte

PHOTO: SHERRI LEE

Smokejumpers Changing Role

Smokejumpers are highly trained fire fighters who parachute into remote fires. Smokejumping developed just prior to World War II as a response to costly forest fires in the Northern Rockies and Pacific Northwest, and the emerging reliability of aircraft and parachutes. In the postwar period, a surplus of aircraft, better parachute technology, and a massive demand for wood products combined to propel the program through a period of growth and success. At its peak in the early 70s there were 13 bases in eight states. Using fire as a management tool was on the rise in the 60s and 70s, and the

role of smokejumpers diminished as more emphasis was put on fuels management rather than fire suppression. Bases closed, but the smaller smokejumper organization became more efficient and highly trained.

As the cost of suppressing large wildfires has grown, small and efficient groups of centrally located smokejumpers are called upon to fight fires before they grow too large. Large, high-speed aircraft can now deliver a fully equipped 20-person crew from core bases to a fire anywhere in Oregon and Washington within three hours. Smokejumpers are also filling a variety of supervisory roles on

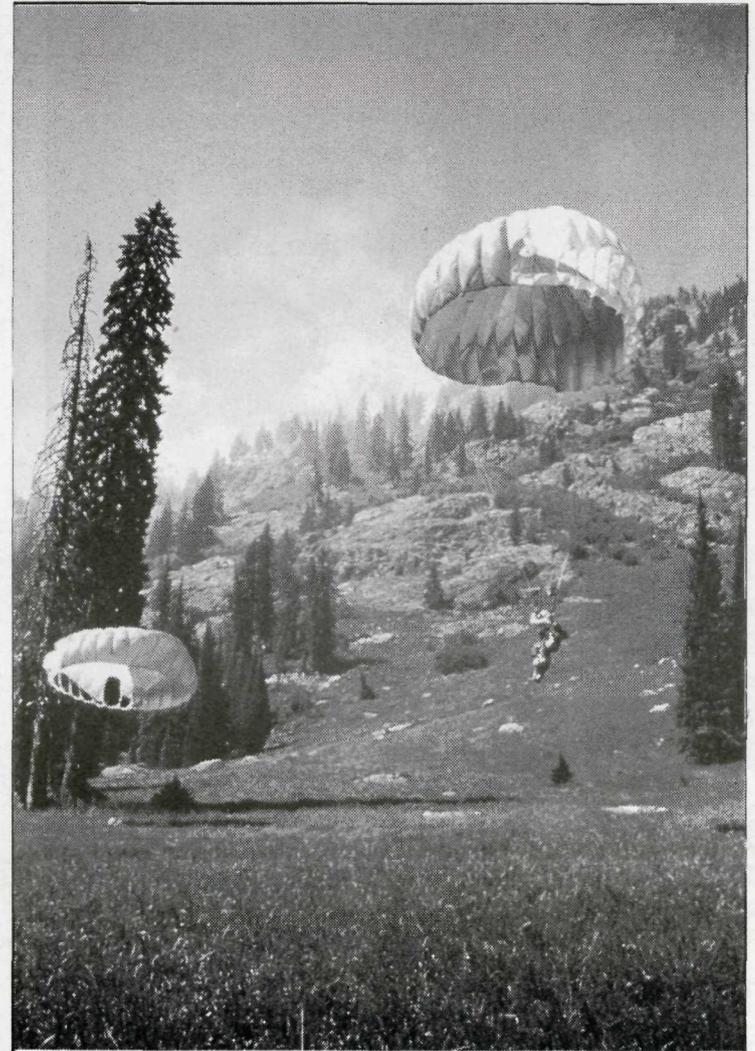
large fires and assisting "fire teams" in managing large, complex fires. These highly trained fire specialists are sharing their diverse knowledge by offering training in subjects such as: Aircraft Management, Crosscut Saw Use and Maintenance, and Fuels and Fire Planning. As the smokejumper program matures, smokejumpers may become monitors and managers of "prescribed" natural fire in the wilderness.

—Mike Fitzpatrick

The Redmond Smokejumpers are located at the Redmond Air Center at Roberts Field in Redmond, Oregon. The base is open daily through the fire

season (July through September) and weekdays the rest of the year. Visitors are welcome to tour the facility. Larger groups can be accommodated by making a reservation at (503) 548-8774.

For information about smokejumping, contact the Redmond Smokejumpers at 1740 SE Ochoco, Redmond, OR 97756.



FILE PHOTO

Smokejumpers

Paulina Peak Site Of Early Lookout *(Continued)*

In the early days when as few as two people were responsible for the lands that presently make up Deschutes National Forest, rangers often performed detection duties while patrolling, climbing peaks on horseback for a "look out."

Assistant Forest Supervisor Vern Harpham built the first lookout cabin on Paulina Peak in 1917. Timbers were hauled by wagon to the outlet of Paulina Lake and then dragged in bundles up the three-mile trail to the site. To save time and effort on the Walker Mountain lookout, he decided to build a stone cabin from rock found at the top of the mountain. But he was forced to haul sand and water as well as cement up to the summit by pack train. For all his trouble, the cabin at Paulina is gone today while the one at Walker is still standing.

Today, lookout detection is still important on the Deschutes National Forest. Presently, there are eleven lookout facilities, seven of which are continuously staffed throughout fire season. These women and men watch over the forest during the summer, looking for smokes and performing their duties as stewards over public lands.

To reach the site of the former Paulina Peak lookout buildings, take Forest Service road 500 from road 21, just east of Paulina Falls. Or, to hike up part of the trail fire watchers used to reach the lookout before the early 1960s, drive south on road 500. At 1/2 mile from road 21, stop at a parking area where the trail starts. It is 2.5 miles to the top.

—Liz Sinclair

Bend Pine Nursery

Bend Pine Nursery produces quality seedlings to replenish Pacific Northwest forests when fire, disease, insects or extreme weather destroy trees. The seedlings are also used to reforest harvested areas. The 213-acre nursery is located three miles northeast of Bend and is one of three USDA Forest Service nurseries in Oregon and Washington. Between five and

eight million seedlings are produced each year. During the course of a year, cones are collected from identified superior trees. Seeds are then extracted, cleaned and sown. Seedlings are cultivated, lifted, graded, sorted and shipped when requested by forests for use in their reforestation programs. To tour Bend Pine Nursery, call: (503)383-5640

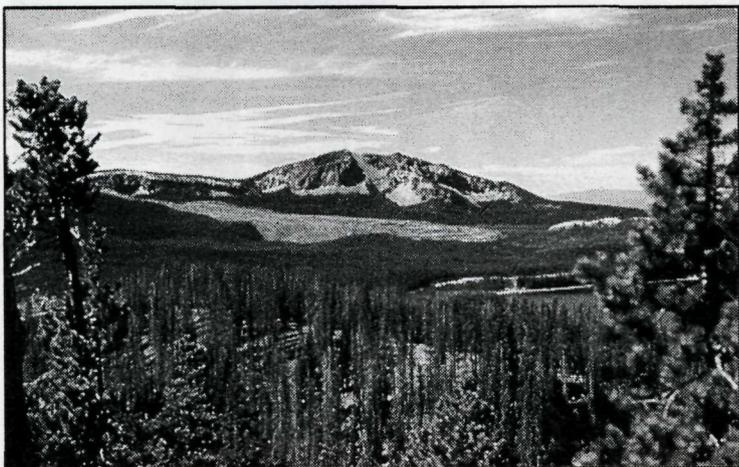


PHOTO: BOB JENSEN

Paulina Peak and Big Obsidian Flow

Out Of Balance

Thousands of acres of grey and dying trees meet travelers along the Santiam Pass and central Oregon Cascades, the results of a prolonged western spruce budworm epidemic. Many people see this devastation and want something done about the insects now. Yet scientists know that killing the insects will not solve the true problem — our forests are not healthy because they are out of balance. Restoring balance and achieving healthy forest ecosystems will require a concerted effort over decades.

Today's forests are crowded and drought-stricken. They have weakened and lost their natural ability to ward off insects and diseases. During the past century, three trends have created the out-of-balance forest we see today: major changes in precipitation levels, exclusion of natural fires, and selective logging.

During several decades of above normal rainfall, firs and other trees that require more water than the native ponderosa pine and western larch took hold and grew densely. Selective logging of valuable ponderosa pine further allowed firs and other species less suited to the central Oregon climate to take hold. In recent years, a prolonged drought has left these firs extremely thirsty and

stressed, making them susceptible to the budworm and other organisms that prey upon weakened trees.

Exclusion of natural fires since the turn of the century has also allowed stands to grow densely. Fire, like insects and diseases, is one of nature's many methods of thinning stands. Today, after years of fire exclusion, any uncontrolled fire in the insect-defoliated stands would burn so hot and so long, it would kill all the trees and damage soil and watersheds.

The Forest Service has developed a plan to return the forests to a healthy state. Trees in insect- and disease-infested areas will be thinned to create room for healthy growth. The possibility of a short-term spraying program, to hold off an epidemic insect infestation while the Forest Service has a chance to thin stands, is being investigated. Public involvement and support as well as cooperation between Forests is also critical to success.

It took decades of fire exclusion, drought, and selective logging to create the nightmarish grey forest we have today. It will take decades to restore the balance to these forests and achieve a healthy, green, vigorous ecosystem.

WHAT IS GEOTHERMAL ENERGY?

While the surface of the earth is cool enough to walk on, its red-hot liquid core is a searing 8000 degrees Fahrenheit. These enormous energy reserves can be used for heating or drying or converted into electricity in geothermal power plants if unique conditions exist. As water percolates downward towards the heat, its temperature rises. This causes it to circulate upward and sideways where it may form an underground geothermal reservoir. Wells tap this energy resource by drawing the hot liquids and steam to the surface. The fluids are then piped to a power plant where they are harnessed in a turbine generator to produce electricity. Once energy has been extracted, the cooled liquids are reinjected into the earth where they can once again be heated.

Talking About The Weather

The Deschutes National Forest encompasses several life and climate zones. Weather can vary from sunny and mild to snowy on the same day depending on elevation and the type of slope you are on. For the forest visitor this means you should be prepared for all types of weather — even during the summer.

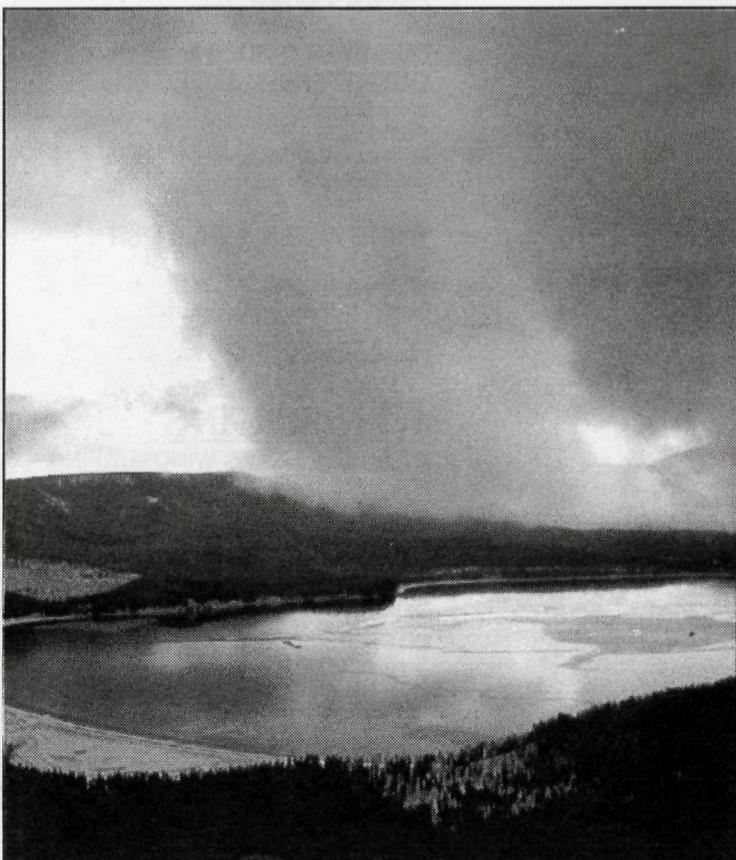
Most of the rain and snow that falls on central Oregon comes from winter storms that move off the Pacific Ocean. The bulk of the rain and snow falls from November through April. Snow depths can approach twenty feet on the highest mountain peaks, while snow in the lowest valleys may never be more than two feet deep. Winter temperatures can vary from about 45 below zero to 60 degrees above.

Summertime brings much more pleasant weather with cool

nights and sunny, mild days. Temperatures occasionally fall below freezing even during July and August. Extremely hot weather is unusual with temperatures rarely exceeding 100 degrees at the lower elevations and rarely hitting 90 above 6,000 feet. Low humidity makes even hot weather comfortable, but visitors should be aware that dehydration can be a problem — so carry and drink plenty of fluids.

Summer thunderstorms are not uncommon. Some include heavy rain or small hail. Others produce "dry lightning" and can start forest fires. The diverse landscape creates variable weather conditions which can change with little warning. Enjoy your visit to central Oregon and be prepared for a fantastic experience.

—John Fischer, meteorologist



Stormy sunset on East Lake

FILE PHOTO

Earthquakes In Central Oregon?

An earthquake centered 35 miles south of Portland, Oregon, shook the Pacific Northwest on March 25 this year. Most people in central Oregon were still sleeping when it hit, but those who were awake felt a mild jolt. What about earthquakes in central Oregon?

Earthquakes are what we feel when a part of the earth's crust breaks and slips. The place where the slippage occurs is called a fault. Sometimes the movement happens at the surface making small cliffs, cracks, or offsets. Frequent, little shifts make small earthquakes; but when movement ceases for a long time, tremendous stress builds up. Then when the ground breaks, enormous ener-

gy is released in great, destructive waves.

Oregon is active with earthquakes and volcanoes and they have a common cause. In the Pacific Northwest, two great pieces of the earth's crust push toward each other at about the rate your fingernails grow. The Juan de Fuca plate out in the Pacific Ocean is diving under the North American plate that carries Oregon.

Faults in central Oregon slip much less frequently than in western Oregon. Earthquakes centered in central Oregon happen every 1,000 to 10,000 years. Evidence that geologists look for to identify faults includes fault scarps, long lines usually

seen only from an airplane, and offset rock layers. One example of a fault scarp visible today is in Bend between Pilot Butte Junior High and St. Charles Medical Center. The first drop in the road as you head east is the edge of a lava flow, but the second drop is a fault scarp.

Central Oregon is a lively spot for plate interactions which have made hundreds of earthquakes and volcanic eruptions. But our lives are like the blink of an eye in geologic time. Earthquakes can and do shake central Oregon. The question is whether the next one will be in our lifetime.

—Larry Chitwood
and Annie Fischer

Geothermal Projects At Newberry Volcano

Newberry Volcano has long been recognized by geologists as a potential source of geothermal energy. The 500 square mile volcano ranks as one of the five top geothermal prospects in the nation. Geothermal exploration first began in 1974, and in the 1970s and 1980s, 34 test holes were drilled. One U.S. Geological Survey hole drilled near the center of Newberry Caldera in 1981 reached a temperature of 509 degrees F at a depth of 3,060 feet, and steam poured out for 20 hours during a test. Projections of temperatures suggest that sufficient heat exists under the volcano's flanks at depths of 5,000 to 10,000 feet, making this geothermal area a potential "hot spot" for production of electrical energy.

No geothermal development is allowed within Newberry Volcanic National Monument. However, two proposed geothermal projects are being considered on the west flank of Newberry Volcano, outside of the National Monument boundary. One proposal includes development of a 30-megawatt power plant, which would use geothermal steam and liquid supplied from about 10 production wells. Several exploratory wells would also be drilled to better define the underground reservoir. Development will include access roads, pipelines, and a 115-kilovolt transmission line. The second proposal for geothermal exploration would involve drilling up to five exploratory test wells. Environmental analysis is underway for each of these pro-

posals.

Newberry has the potential to be a major geothermal energy source for the local area as well as for the western states. As the energy picture in the nation shifts, emphasis will continue to be put on development of alternative and renewable energy sources, which could mean even more interest at Newberry.

For more information, please contact Alice Doremus at the Fort Rock Ranger District. (503) 383-4703



PHOTO: SHERRI LEE

Testing the waters at the hot spring on Paulina Lake

IT'S A FACT

Many of the buttes in the forest are named with Chinook jargon words: Kawak - to fly, Ikt - one, Mokst - two, and Klone - three.

Windy Point on the McKenzie Pass Hwy. was the scene of a gold rush in 1927 which was based on fake assays.

Astronaut R. Walter Cunningham tested the mobility of a moon-suit on the Big Obsidian Flow in 1964.

The first fish were carried in a bucket and planted in East and Paulina Lakes about 1912.

Paulina Lake turns over periodically. There is an upwelling which pushes water from the bottom of the lake to the surface. Only a few lakes in North America do this.

Every August the Big Obsidian Flow crawls with thousands of frogs. At times it's hard to walk without stepping on one. They migrate up the flow from Lost Lake.

FOREST SERVICE OFFICES



Deschutes National Forest

Supervisor's Office
1645 Highway 20 E
Bend, OR 97701
(503) 388-2715

Bend & Fort Rock District

1230 NE 3rd St. Suite A 262
Bend, OR 97701
(503) 388-5664

Sisters Ranger District

P.O. Box 249
Sisters, OR 97759
(503) 549-2111

Crescent Ranger District

P.O. Box 208
Crescent, OR 97733
(503) 433-2234

Lava Lands Visitor Center

58201 Hwy. 97
Bend, OR 97707
(503) 593-2421

Bend Pine Nursery

63095 Deschutes Market Rd.
Bend, OR 97701
(503) 383-5640

Redmond Air Center

1740 SE Ochoco Way
Redmond, OR 97756
(503) 548-5071

EMERGENCY

Deschutes County dial 911
Gilchrist area 433-2279
Crescent area 433-2400

FIRES

Dial 911

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Deschutes National Forest 100 Years Old

The original forest land now included in the Deschutes National Forest was first withdrawn from the public domain for forest purposes by President Grover Cleveland on September 28, 1893. It was known as the Cascade Range Forest Reserve. The balance of the original land now in the Deschutes National Forest was withdrawn by President Theodore Roosevelt on July 31, 1903.

Cy J. Bingham was the first forest ranger in the area. Cy got his appointment around 1900 when all the public domain land was administered by the General Land Office. His district included practically all the Cascade portion of the Deschutes as well as the upper Willamette immediately to the west.

The Deschutes National Forest will turn 100 years old this September. Festivities celebrating the event will be announced locally.

OUTFITTERS/GUIDES/RESORTS Directory

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