

Volcanic Vistas 2016



Look Inside!

- 2... Camping, Lodging, Food
- 3... Activities
- 4... Hiking Trails
- 5... Monument Map
- 6... Could It Erupt Again?
- 7... Caves, Bats, & Bears!
- 8... Support Your Monument!

Volcanic Wonders... Yours to Discover!

Visiting **Newberry National Volcanic Monument** allows you to explore Newberry Volcano, the largest volcano in the Cascade Range. There are extraordinary Volcanic Wonders within the Monument, making it a great place to learn about Central Oregon's fiery past. Newberry's eruptive history began 400,000 years ago and has created massive lava flows covering 1,200 square miles, producing lava tubes, and over 400 cinder cones and volcanic vents during its active periods. The last eruption—just 1,300 years ago—formed the youngest lava flow in Oregon.

Newberry's rich cultural history offers many ways for you to connect with those who came before. From the native communities who first crossed this land to the early European and American explorers, from the grassroots led Monument creators to casual visitors today, people have marveled at this rugged landscape for thousands of years.

The Volcanic Wonders of Newberry National Volcanic Monument offer boundless opportunities for exploration and recreation... yours to discover!

CELEBRATING
25
YEARS



Forest Service leadership unveils Newberry's new sign at the Monument dedication in 1991.

Welcome!

As we close our 25th anniversary celebration at **Newberry National Volcanic Monument**, I look forward to the future of this amazing place. From the grassroots beginnings to protect Newberry to your visit today, the Monument is a part of a larger story spanning decades of passionate appreciation, collaboration, and enjoyment.

The Forest Service is dedicated to enriching your exploration of Newberry National Volcanic Monument, home to the widest variety of volcanic features found in the U.S. Thank you for visiting and protecting your treasured public lands on the Deschutes National Forest.


Scott McBride
Monument Manager



Use the QR code to get the **NNVM Volcanic Wonders Mobile App!**

Lava Butte rises 500 feet above its 9 square-mile lava flow. It erupted 7,000 years ago and is one of Newberry's many cinder cones. (see page 6)



Lava Butte

photo: Heidi Walker

Lava Cast Forest formed when a lava flow overtook an old-growth forest and cooled to form casts of the trees that once stood there.



Lava Cast Forest

photo: K. Speer

Lava River Cave is a mile-long lava tube formed from one of Newberry Volcano's massive eruptions about 80,000 years ago. (see page 7)



Lava River Cave

photo: Heidi Walker

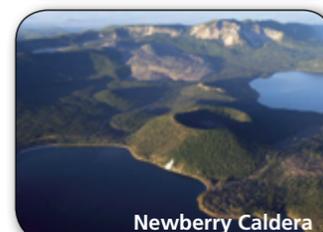
Newberry Caldera contains the crystal-clear East Lake and Paulina Lake, several lava flows, and lots of opportunity for adventure.



Big Obsidian Flow

photo: C. Rensch

Big Obsidian Flow formed just 1,300 years ago making it Oregon's youngest lava flow.



Newberry Caldera

photo: US Forest Service

Paulina Peak crowns Newberry Caldera at its highest point of 7,984 ft.



Paulina Falls

photo: Heidi Walker

Paulina Falls spills over the lowest point of Newberry Caldera, plummeting 80 ft. in a twin waterfall.



Paulina Peak

photo: C. McVally





photo: Tom Iraci - Mountain Images



photo: K. Sperl



photo: G. Frey



photo: J. Snavely



photo: S. McBride



photo: A. Jewell



photo: J. Elliott

Monument News

Lava River Cave Goes Solar

New higher capacity solar panels will be installed to supply more power at Lava River Cave. This remote site relies on the sun to power everything from the cash register to the lights. A recent conversion from propane lanterns to rechargeable LED flashlights requires more power for charging. These rechargeable lights create less waste than propane lanterns and are safer for visitors. Rent a solar powered flashlight at Lava River Cave today!

Learn More on the Trail!

Sun Lava paved path, Paulina Peak Trail, and Lava Cast Forest will have new interpretive panels for the 2016 season providing deeper insight into the Monument's volcanic wonders! Immerse yourself in the stories of these remarkable places!

Good to Know

Accessibility

Many locations on the Monument are accessible to individuals who have various ranges of mobility. The **Lava Lands Visitor Center** and **Chitwood Exhibit Hall** are wheelchair accessible and have large, accessible restrooms with running water. There are several accessible paths on the Monument including **Sun-Lava Path**, segments of the **Trail of the Molten Land**, **Paulina Lakeshore Loop**, **Lava Cast Forest Trail**, and **Paulina Falls Trail**. **Paulina Lake Campground** has a limited number of accessible sites. The Forest Service is working to improve accessible services for all visitors to the Monument.

Drinking Water

Water fountains are available at Lava Lands Visitor Center. Running water is available at most campgrounds on the Monument during peak season (June – September). Most day use sites DO NOT have running water. The Visitor Centers do not sell bottled water in an effort to reduce waste and impacts from plastic bottles. Reusable water bottles can be purchased at both Visitor Centers.

Restrooms

Restrooms with flush toilets and running water are located at both Visitor Centers and many campgrounds. Most day use areas have vault toilets.

Showers

East Lake Resort/ RV campground has coin-operated showers. Nearby La Pine State Park also has showers available for a fee.

Phones

Cell-phone service can be unreliable in the Newberry Caldera. Reception throughout the Monument varies depending on your location and service provider.

Facilities & Services

Visitor Centers

Two visitor centers on the Monument are both staffed by Rangers ready to answer your questions and provide information to enhance the quality of your visit. Each visitor center has interpretive displays and a **Discover Your Forest** store that sells maps, books, and gifts.

Lava Lands Visitor Center

May 1 – May 23: Open Thu—Mon 10:00 am to 4:00 pm

May 26 – September 5: Open Daily 9:00 am to 5:00 pm

Sept. 6 – Sept. 30: Open Daily 10:00 am to 4:00 pm

Oct. 1 – Oct. 30: Open Weekends 10:00 am to 4:00 pm

Paulina Visitor Center

May 28 – June 5: Weekends and Holiday 10:00 am to 4:00 pm

June 11 – Sept. 5: Open Daily 10:00 am to 5:00 pm

Sept. 6 – Sept. 30: Open Daily 10:00 am to 4:00 pm

Exhibits

Located in **Lava Lands Visitor Center**, the **Chitwood Exhibit Hall** interpretive displays feature geology, ecology, and cultural history along with information on the eruptive history of Newberry Volcano. A large 3-D topographic map provides an excellent overview of the Monument. The volcanic history continues in colorful interpretive panels along the **Trail of the Molten Land** behind the Visitor Center. New interpretive displays will be installed at **Sun-Lava Trailhead** and on the path for the 2016 season. **Lava Cast Forest** has panels along a 1-mile path. Interpretive panels along the **Big Obsidian Flow** trail explain the significance of the black volcanic glass. You can learn about disappearance of Whitebark Pine trees on **Paulina Peak**, and displays at **Paulina Visitor Center** show human history on the Monument.

Lodging & Dining

Two privately owned lodges in **Newberry Caldera** offer cabin rentals, casual dining, boat rentals, and a small general store.

For information or to make reservations at **Paulina Lake Lodge**, call 541-536-2240 or visit www.paulinalakelodge.com

For information about **East Lake Resort** or to make reservations, call 541-536-2230 or visit www.eastlakeresort.com

Additional accommodations and a variety of restaurants are located in the nearby communities of Sunriver and La Pine. Services, a major hospital, and many lodging and dining options are also available in Bend to the north of the Monument.

Camping

Campgrounds are located in Newberry Caldera along Paulina Lake Road (FS Road 21) at the southern end of the Monument. Please see the table below for details. Campgrounds are managed and operated by **Hoodoo Recreation**, contact them directly for reservations:

Information (M-F): 541-338-7869
Reservations (Daily): 877-444-6777
www.hoodoorecreation.com

Camp only in designated campgrounds within Newberry Caldera. Dispersed camping is allowed outside of Newberry Caldera in some locations. Stop by one of the Visitor Centers for detailed information and to receive a map identifying dispersed camping locations.

Guide Services

Permitted guide services operate within the Monument providing volcano tours, canoe/kayak excursions, fishing trips, snowmobile rentals, and mountain bike adventures. Inquire at one of the Visitor Centers for more information.

Activities

Hiking

Over 110 miles of summer trails and 130 miles of winter trails can be explored within and extending from the Monument. Trails vary widely in difficulty from short walks on paved paths to long hikes on steep terrain. Use the table on page 4 to find a trail that suits your interests and abilities. Many spectacular sights can be seen from these trails!

Be prepared before going for a hike to protect yourself and the Monument. Bring water, especially on hot days. There is not much shade on the lava flows. Dress appropriately for the conditions, including proper footwear. Stay on the trails for your own safety and to protect important habitat and fragile vegetation. Know the leash laws and where pets can or cannot go. Review the Leave No Trace principles on page 6. Talk to a Ranger if you have additional questions.

Biking

The Monument is an excellent place to ride whether you seek a challenging road, single-track trail, or an enjoyable paved path. Not all trails are open to bicycles so please check the table on page 4 before deciding on your next ride. If you bike to the Monument, recreation fees do not apply. Consider making a donation to Discover Your Forest in lieu of your fee or donating your time as a volunteer!

Please use the bike racks provided to keep pathways, sitting areas, and doorways clear. Walk bikes on the sidewalk and patio at Lava Lands Visitor Center. Helmets are required for persons under 16 and are strongly recommended for all cyclists.

Popular rides:

- Mountain bike the 21-mile Crater Rim Trail that circles Newberry Caldera with single-track and sweeping views. For a shorter loop start from Cinder Hill TH link the Parallel Trail, Crater Rim and Newberry Crater Trail.

- Climb almost 14 miles on asphalt up Paulina Lake Road (Road 21) from Highway 97. Recover on the shore of Paulina Lake at an elevation of 6,331 feet. Then enjoy gravity's pull all the way back down!

- Cyclists of any age or ability will enjoy the Sun-Lava paved path. Wind your way through the forest from Lava Lands Visitor Center to the Deschutes River at the Benham Falls East Trailhead. Go for a short side trip to see Benham Falls (not paved).

Wildlife Viewing

Newberry Caldera is an Oregon State Wildlife Refuge in addition to being a National Monument. Many animals live on the Monument but they can be difficult to see. The most common wildlife sightings are golden-mantled ground squirrels, yellow pine chipmunks and mule deer. Patient observers may see coyote, black bear, pika, pine martens, fishers, eagles, and osprey. Mountain lion may be in the area but are rarely seen. The Monument has an abundant diversity of bird species as well. Birders may check off species in various ecosystems from the high desert to the alpine.

Always keep a safe distance and respect wildlife. Never feed them, it can be dangerous for people and it is unhealthy for them if they become habituated to human food sources. Encountering an animal in the wild can be an exhilarating and captivating experience. Take care to ensure that both you and the wildlife part ways safely and unharmed.

Boating

East and Paulina Lakes are both exceptional locations to take your boat out during the warm summer months. Several boat launches are maintained by the Forest Service as well as one at each resort. Fees apply for boat launch facilities and services. Boats of all sizes from canoes, kayaks, and stand up paddle boards to motorboats can be rented at either resort as well. The crystal clear waters, forested shores, incredible fishing and Paulina Peak views make the trip quite worthwhile.



photo: K. Gentry

Kids, you can be a Junior Forest Ranger!

Help take care of Newberry National Volcanic Monument and learn cool information while you visit! If you are between the ages of 7 and 12, you can earn your **Junior Forest Ranger Badge!**

Pick up a booklet at Lava Lands Visitor Center or Paulina Visitor Center. Complete the activities while you explore the monument and then return it to a Ranger at either Visitor Center to earn your badge! Kids 6 and under can earn a Smokey Bear pin by completing the **Smokey's Helper Booklet!**

Additional hands-on activities are offered at **Lava Lands Visitor Center**. For schedules and more information, inquire at the Visitor Center or visit DiscoverYourForest.org



There is a 10 mph speed limit for all boats. Help protect these pristine lakes from aquatic invaders. Stop aquatic hitchhikers by cleaning, draining and drying your boat and all equipment.

Fishing

The first trout were stocked in East Lake in 1912. Since then, both East and Paulina Lake have become known as some of the best fishing in the State of Oregon. Rainbow, Kokanee, brown trout, and chub are lurking in the lakes.

Fishing licenses are required and can be purchased online or at either resort. All Oregon State Fishing Regulations apply. Pick up a copy of the 2015 regulations or read them online to learn about daily catch limits and advisories.

Swimming

Many visitors enjoy swimming and wading in East and Paulina Lakes to cool off. Look for signs posted about warnings. Occasional blue-green algae blooms can affect water quality and swimmer's safety—even pets. Do not swim at boat launch facilities. Hot springs at the lakes are undeveloped and shallow. Please, do not dig around the hot springs.

Learning

There are many opportunities to learn about the natural and cultural history of Newberry National Volcanic Monument. While exploring on your own, visit any of the interpretive exhibits or hike an interpretive trail. Pick up one of the guidebooks or historical books at the Discover Your Forest Bookstores.

To discover even more, join a Ranger-led activity or patio talk. Stop by the Visitor Center or look for posted signs with program schedules. Special Ranger-led tours can be scheduled for large groups as resources allow. Call the Lava Lands Visitor Center for more information.

Lava Butte Shuttle

Discover Your Forest and Deschutes National Forest are excited to announce our continued partnership with Cascades East Transit (CET). For the second year, visitors can utilize a convenient shuttle service to access the summit of Lava Butte from mid-June through Labor Day Weekend during the 2016 season.



photo: CET

Why a shuttle?

- Reduce wait times and allow more people access the Lava Butte summit.
- Reduce emissions from individual vehicles driving up the road.
- Increase the safety of visitors hiking or biking up Lava Butte.

The shuttle will depart from Lava Lands Visitor Center and Lava Butte every 20 minutes from 10 am to 4 pm. Fares are \$2 per rider (children 2 and under ride free). Fares are cash-only with exact change required. Shuttles are wheelchair accessible and can transport multiple bicycles. No other motor vehicles are allowed on Lava Butte road when the shuttle is operating.

Proceeds from the shuttle service are donated to Discover Your Forest for education and interpretation. Last year, the shuttle raised nearly 5,000 dollars toward supporting visitor experiences and educational programs at Newberry National Volcanic Monument. On the Lava Butte Shuttle, visitors can sit back and enjoy the ride while supporting a great cause!

Monument Profile

Newberry National Volcanic Monument encompasses 54,822 acres within the Deschutes National Forest. This tract of land was included in the National Forest System for nearly a century before being designated as a National Monument in 1990 by President George H. W. Bush.

National Monuments enjoy similar protections as National Parks but they are not the same. A Monument can be established by Executive Order while a National Park must be congressionally designated. Another difference is that a National Monument can be managed by any the following federal agencies – the National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, or the U.S. Forest Service. Newberry National Volcanic Monument is one of the few Monuments managed by the U.S. Forest Service.

Newberry National Volcanic Monument was established to preserve and protect the extraordinary volcanic landforms as well as the natural and cultural resources that exist within its boundaries. It also provides outstanding opportunities for recreation, scientific research, and education. Newberry Caldera, at the southern extent of the Monument, contains two majestic lakes surrounded by mixed conifer forest and is crowned by Paulina Peak. Lava Butte and its lava flow mark the northern end. Throughout the entire Monument, sweeping views, a diversity of life, miles of trails, and many adventures await within it's Volcanic Wonders.

- Highest Elevation: 7,984 feet (Paulina Peak)
- Lowest Elevation: 3,960 feet (Deschutes River)
- Oldest Lava Flow: 400,000 years old (McKay Butte rhyolite dome on Newberry's west flank)
- Youngest Lava Flow: 1,300 years old (Big Obsidian Flow)
- Paulina Lake Depth: 249 feet
- East Lake Depth: 185 feet

Trails to Volcanic Wonders!

A trail can lead to rare plant species or a clear mind; to a symphony of song-birds or an awe inspiring view of Volcanic Wonders. It can lead to satisfying lessons and challenging situations. You cannot know what you might find when you begin down a trail. For these reasons, keep stewardship and safety in mind. Review the Leave No Trace Principles listed on page 6 to learn how to protect yourself and the Monument's resources. A few steps ahead or around the next switchback, the unknown is Yours to Discover!



photo: C. McNally



photo: K. Sperl

TRAIL NAME	MILEAGE	ELEV. GAIN	USE	MAP	DESCRIPTION
Deschutes River #2.1 to Benham Falls	0.5 mile	0 ft.		1	Cross the footbridge and follow a wide trail to the Benham Falls overlook.
Lava Butte Rim #3918	0.25 mile	150 ft.		1	Circles the rim of Lava Butte, a cinder cone volcano. Provides views of the Cascades and Newberry Caldera.
Lava Cast Forest #3960	1 mile loop	150 ft.		2	Paved path with many tree casts and sweeping views of the area. A designated National Recreation Trail.
Old Mill Interpretive Trail #3984	0.3 mile loop	0 ft.		1	Provides a glimpse of the Deschutes River's historic uses and it's ecology.
Paulina Falls #3957	0.25 mile / 2 miles	200 ft. / 400 ft.		3	Forested trail leads to the falls plunging 80 ft. with upper and lower viewing areas.
Silica #3958.5	0.8 mile	50 ft.		3	Hike through a mixed conifer forest from the Little Crater Campground to the Big Obsidian Flow.
Trail of the Molten Land #3922	1 mile loop	150 ft.		1	A must-see National Recreation Trail. Paved interpretive path meanders across a basalt lava flow to a viewpoint.
Trail of the Whispering Pines #3930	0.3 mile	0 ft.		1	Paved path wanders through a Ponderosa pine forest.

TRAIL NAME	MILEAGE	ELEV. GAIN	USE	MAP	DESCRIPTION
Big Obsidian Flow #3958.1	1 mile loop	500 ft.		3	Ascend the stairs to be surrounded by black volcanic glass, catch views of surrounding peaks.
Black Rock #3935	4 miles	300 ft.		1	A popular single-track mountain bike route that parallels the edge of Lava Butte's lava flow.
Deschutes River Trail - #2.1	10 miles	300 ft.		1	Choose where to start and how long to go for a custom hike, trail follows the river past several falls.
Hoffman Island #3959	1 mile	200 ft.		2	Get a great view of a kipuka, an island of trees surrounded by lava on this less traveled trail.
Lava River Cave	1 mile	300 ft.		1	Descend to the underground world of the longest lava tube in Oregon. See page 7 for more info.
Little Crater #3953	1.8 miles	500 ft.		3	Offers unique views of the Big Obsidian Flow, Paulina Peak and Paulina Lake.
Newberry Crater #3958	3.5 miles	800 ft.		3	Head up the trail from Cinder Hill Trailhead to the viewpoint on the Northeast rim of the Caldera.
Parallel #3958.3	2 miles	550 ft.		3	Parallels Rd. 21 on the east side of the Caldera and can be used to access the Crater Rim Trail.
Sun-Lava #3940	5.5 miles	300 ft.		1	Paved path, stop at the Deschutes River after 4 miles or continue to Sunriver before turning back.

TRAIL NAME	MILEAGE	ELEV. GAIN	USE	MAP	DESCRIPTION
Crater Rim #3957	21 mile loop	1,600 ft.		3	A great mountain bike ride. Shorten the loop by using a connector trail. No water along the way.
Lost Lake #3958.2	3.8 miles	300 ft.		3	Parallels Rd. 21 then climbs to the Caldera Rim with unique views of the Big Obsidian Flow.
Paulina Lakeshore Loop #3955	7.5 mile loop	200 ft.		3	Go counter-clockwise for the best views. Don't miss the the peak views on the north shore.
Paulina Peak #3951	2 miles	1,400 ft.		3	A steep hike with huge views waiting on the peak. Trailhead is located on the road to Paulina Peak.
Peter Skene Ogden #3956	8.5 miles	2,000 ft.		3	A designated National Recreation Trail, it follows Paulina Creek passing many waterfalls.



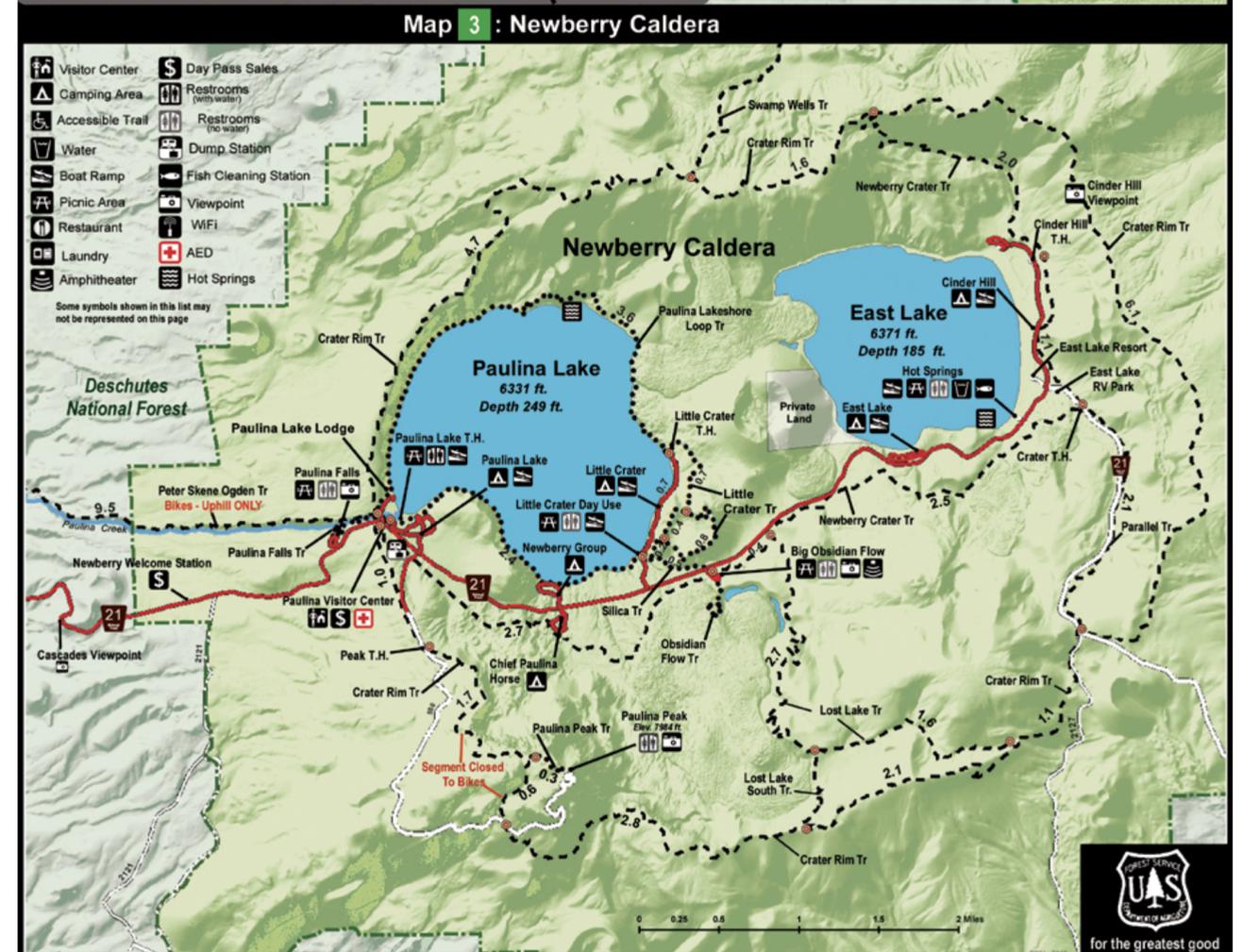
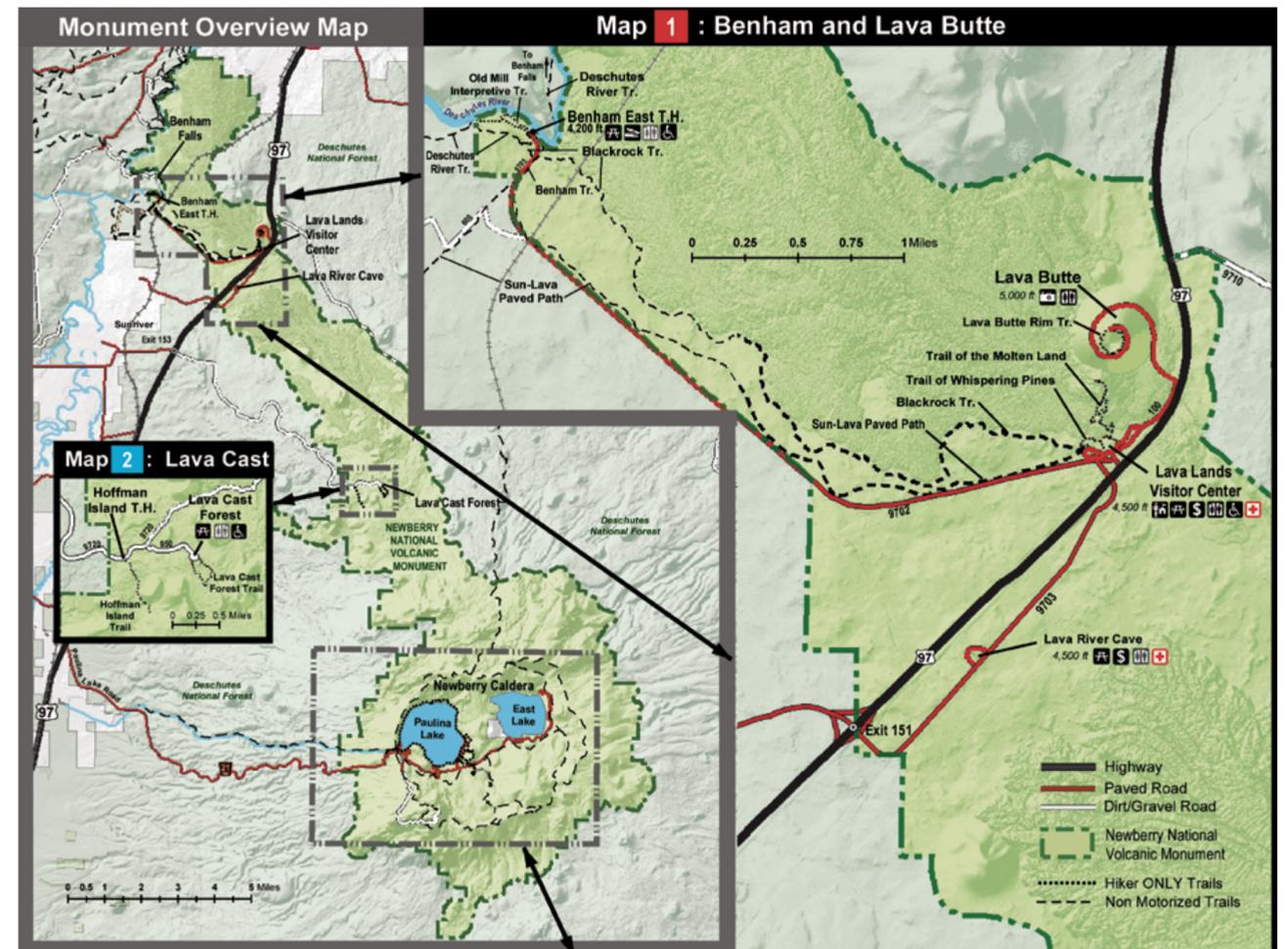
photo: Heidi Walker - HiWalker Photography

Lava Butte Lookout

If you travel to the top of Lava Butte you will see the Lava Butte Lookout. This is both the name of the building and the person that staffs it. Lava Butte was first used as a fire lookout in 1913. The lookout is on the National Historic Lookout Register and is still staffed today. Please, do not disturb the person who is working as the fire lookout. They have an important job to do: scan huge swaths of land for columns of smoke. The early detection provided by the Lookouts may prevent those small wisps of smoke from becoming massive forest fires. The Lava Butte Lookout also scans the City of Bend and surrounding properties, helping to protect many people's homes and livelihoods.

When there is a wildfire in the area, the Lookout becomes essential to the safety of firefighters on the ground. As crews approach a blaze on foot it can be difficult to see because of steep terrain, dense forests, and heavy smoke. The Lookout provides an extra set of eyes and relays information to the firefighters by radio. From an elevated perspective, the Lookout informs crews on changing variables in fire behavior, wind, and other weather patterns.

In addition to the person staffing the lookout, a volunteer Ranger is present on the summit of Lava Butte on most afternoons during the summer months. This uniformed Ranger will gladly answer questions about the Fire Lookout, the surrounding area and can help orient you to the Monument.



Help Protect Monument Resources

Every visitor shares the responsibility of protecting our National Monument. Please take a moment to read these regulations so you can explore safely and help protect Monument resources.

Pets

Control and clean-up after your pets. Pets are allowed on leash in picnic areas, campgrounds, parking areas and on most Monument trails. Pets are not allowed in Lava River Cave or in federal government buildings including the Visitor Centers. It is not recommended to take pets on the Big Obsidian Flow because the rock is very sharp.

Wildlife

Keep wildlife wild. Do not feed or approach wildlife. It is unsafe and harms the ecosystem. Store food in closed, hard-sided vehicles, suspended at least 10 feet in the air or in other bear-proof containers. Always keep a clean camp to avoid attracting any animals into the Monument campgrounds. Keep your pets leashed and under control to avoid conflicts or disturbance with wildlife.

Camping

Camp only in designated sites within Newberry Caldera. There is a 14-day stay limit on the Deschutes National Forest, this includes within Newberry Caldera.

Fires & Firewood

Campfires are allowed only in established fire rings within designated campgrounds in the Caldera. Campfires may be further limited during fire season. Check campground postings or ask a Ranger for more information. Limit firewood collection to 'dead and down' wood for camping purposes only. Chainsaw use is not permitted within campgrounds. Do not carve, chop or otherwise damage vegetation.

Hunting and Firearms

Hunting and the use of firearms is not permitted within Newberry Caldera. Firearms are not permitted in federal buildings including Visitor Centers.

Off Highway Vehicles

Off highway vehicles are not permitted on Newberry National Volcanic Monument.

Other Monument Resources

Leave what you find, including wildflowers, rocks, artifacts, and even pinecones. All natural resources are part of a fragile ecosystem, many species rely on these resources to survive.

Leave No Trace

The best way to minimize your impact on both the Monument's resources and on other visitors' experience is to follow the Leave No Trace Principles. These seven principles have been developed to help people enjoy their time outdoors responsibly. For more information visit www.LNT.org or talk to a Ranger!

- Plan Ahead and Prepare
- Travel and Camp on Durable Surfaces
- Dispose of Waste Properly
- Leave What You Find
- Minimize Campfire Impacts
- Respect Wildlife
- Be Considerate of Other Visitors



photo: J. Parsons

Could Newberry Volcano erupt again?

by Daniele McKay, OSU-Cascades Volcanologist

Yes, Newberry could erupt again. In fact, it's very likely that it will! The last eruption was about 1,300 years ago. It sounds like ancient history, but geologically it's very recent. That eruption produced **Big Obsidian Flow**, the youngest lava flow in Oregon. In addition to erupting recently, there's evidence that magma still exists beneath Newberry. Hot springs, gas emissions, small earthquakes, and Newberry's location near other Cascade volcanoes all suggest magma lies beneath the volcano.

What if Newberry erupted today?

The best way to figure out what a volcano might do is to look at its history. Volcanic eruptions are often classified by eruption styles, which range from explosive to effusive. **Explosive eruptions** are just like they sound: powerful explosions of ash and gas blown high into the atmosphere. **Effusive eruptions** are characterized by lava oozing out of the volcano. Newberry's numerous eruptions have spanned the full range of explosive and effusive. This diversity makes Newberry National Volcanic Monument a unique place to see recent examples of nearly every type of volcanic activity.

Chemical composition of the magma is an important aspect of eruptions. One of the main compounds in magma is silica, (it's also a main ingredient in glass). Magmas, lavas, and volcanic rocks high in silica are described as silicic. **Obsidian** is an example of a silicic volcanic rock. Volcanic products low in silica are described as mafic. **Basalt** is an example of a mafic volcanic rock. Volcanic rocks with intermediate silica content are called **andesite**. High-silica magma tends to trap more gas than low-silica magmas. Both types erupt explosively or effusively, but silicic magmas tend to erupt much more explosively. Newberry Volcano has produced both silicic and mafic rocks, making it a unique place to see a wide variety of volcanic products.

Silicic eruptions at Newberry Volcano:

Newberry Volcano has produced several explosive silicic eruptions in the past. When you visit **Paulina Lake** and **East**



Obsidian is a natural volcanic glass, remarkably similar to the glass in your windows. Unlike most rocks, obsidian is formed with minimum crystal growth and has a disordered internal structure similar to liquid.

of the cones. Hundreds of these cinder cones are scattered across the flanks of Newberry Volcano.

Lava Butte has excellent places to see examples of this type of eruption. It's a large cinder cone created by explosive activity about 7,000 years ago. Effusive activity produced the spectacular black lava visible from Hwy. 97 (accessible by trails from the Visitor Center). You can reach the top of Lava Butte on a paved road from Lava Lands Visitor Center for breathtaking views of Newberry and the Three Sisters.

Lava flows like these are similar to those erupting in Hawaii. They slowly cover the landscape, burying everything in their path. The Lava Butte flow eventually made its way to the Deschutes River and dammed it, creating a large lake. The river eventually carved a new path through the flow establishing the channel we see today. Hundreds of eruptions similar to Lava Butte have occurred at Newberry over the past 400,000 years, creating effusive lava flows, some extending up to 40 miles from their source vents covering much of the Bend and Redmond areas. Many of these flows channeled into sections of the Deschutes and Crooked Rivers, sometimes filling deep canyons with molten lava.

Volcanic hazards and monitoring:

Since it is located near populated areas, Newberry is considered a high-threat volcano. Eruptions could significantly impact central Oregon. Volcanic ash can cause respiratory problems, crop failure, roof collapse, water contamination, and mechanical or electrical failure of car and jet engines. Pyroclastic flows travel very quickly and are deadly to everything in their path. Effusive lava flows move slowly, and bury everything in their path under solid rock. If renewed activity occurred, lava flows may bury roads, railroads, power lines, gas lines, and other important infrastructure. Lava flows can also dam rivers, causing floods and contamination of drinking water, and they can ignite forest fires.

Picturesque Paulina Lake and East Lake hold their own threat. Eruptions occurring through water are especially hazardous because they are more explosive and can cause flooding. An eruption in the caldera could send pyroclastic flows or landslides into the lakes. Displaced water would then cause sudden flooding of roads, campgrounds, and resorts, and large floods could be sent roaring down tributaries.

Newberry Volcano poses many hazards to people nearby and it's closely monitored. U.S. Geological Survey (USGS) is the government agency responsible for evaluating volcanic hazards and warning the public of threats. USGS has a network of seismometers on Newberry measuring earthquakes. Small quakes are common at Newberry, but a sudden increase in activity might be a precursor to an eruption.

USGS scientists are conducting detailed studies of Newberry's past. By learning as much as possible about Newberry's history, scientists can make better predictions about future activity and warn the public if an eruption is likely to occur. For more information, visit the USGS website at: <http://volcanoes.usgs.gov/volcanoes/newberry/>

DON'T BE A ROCK RAIDER!

Why can't I take a piece home?

Newberry National Volcanic Monument was established by the U.S. Congress on Nov. 5, 1990. As stated in legislation, its purpose is to "preserve and protect for present and future generations Newberry's remarkable geologic landforms." Each of us plays a vital role in caring for our National Monument. Damaging or removing even a small sample of rock degrades the resource and it's illegal (36 CFR 261.9 a and b). Please report any violations to a Forest Service ranger.

How can I see obsidian and learn more?

Travel to **Newberry Caldera** and hike the **Big Obsidian Flow** trail to see this unique volcanic rock. To learn more or to obtain a legally sourced sample of obsidian, visit **Paulina Visitor Center** or **Lava Lands Visitor Center**.



LAVA RIVER CAVE

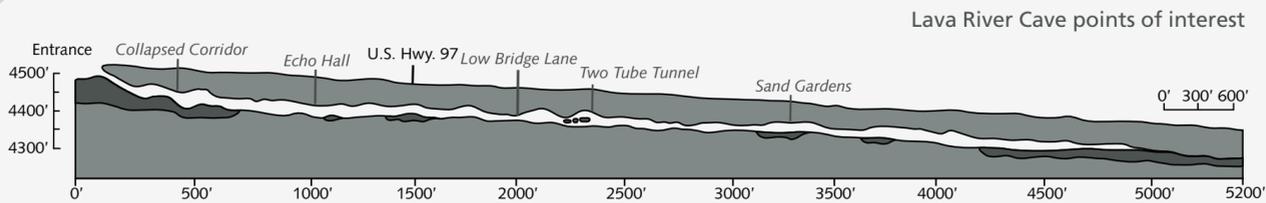
Discover another world below ground in Oregon's longest lava tube (almost 1 mile). You'll walk down 55 stairs as you slowly descend into the darkness, discovering unique cave features formed by a massive lava flow long ago. A National Forest Recreation Pass or other valid recreation pass is required to enter, you can purchase a pass on site.

Cave Hours

May 1 – May 23: Thu–Mon 10:00AM - 5:00PM

May 26 – Sept. 5: Daily 9:00AM - 5:00PM

Gate Closes at 4:00PM



Be Bear Aware!

Newberry Caldera is not only part of a National Monument but is also a wildlife refuge. Leave no trace and always keep a clean camp to prevent wild animals from obtaining human food and garbage.

- Store all food and food-related items in a closed, hard-sided vehicle or suspended at least 10 ft. off of the ground and 4 ft. from any supporting tree or pole.
- Ice chests, coolers, boxes, cans, tents and soft-sided campers are not bear-resistant!
- Store pet food and livestock feed the same as human food, out of reach from bears and other animals.
- Deposit all garbage in wildlife-resistant trash containers.
- Remove all food and garbage from your campsite before you leave.
- Never approach or feed any wildlife.

Don't be careless with food or garbage when camping. Wild animals, especially bears, may wander through at any time, day or night. Wild animals near a campground are more likely to lose their fear of humans. These animals can often become increasingly aggressive in their attempts to obtain human, pet, and livestock food.



Cave Tours at 3:00 PM Daily

Join a ranger guided one-hour tour of Lava River Cave to learn more about cave geology and ecology. Tours are limited to groups of 15 people, reservations are accepted day of tour.

Comfort and Safety:

- Carry 2 light sources with you into the cave. No liquid gas lanterns please. There is no lighting in the cave, various light sources are available for rent or sale at cave entrance.
- Wear warm clothing: cave temp. averages 42 °F.
- Wear sturdy closed-toe shoes or boots as cave access requires walking on steep stairs and slippery, uneven surfaces.
- Watch your head. Child carrier backpacks are not recommended. Ceiling height in the cave is variable with some rock outcroppings.
- Please use restrooms before entering the cave. There are **NO TOILETS** in the cave. It is 2 miles round-trip, average time underground is 2 hours.
- Only certified service dogs are allowed in the cave but they are **not recommended** due to the abrasive metal on stairs and walkways. There is not enough shade in the parking lot to safely leave pets in vehicles.

Cave Access:

- **PLEASE park in designated spaces only. If parking lot is full, the cave is at capacity, please come back to visit another time.**
- The crawl space near the end of the cave is closed to visitors for safety and to prevent the potential spread of spores that cause white-nose syndrome (WNS).
- The cave is closed after normal hours, and is closed from Sept 6 until opening in May.

Cave Bat Health:

- Visit the Bat Conservation Station at Lava River Cave to learn more about WNS and get a bat stamp of approval to enter the cave.
- If you have ever been in any cave or mine other than Lava River Cave, no item worn or used in that cave or mine is allowed in Lava River Cave (including clothing, boots, headlamp, cameras, backpack, etc.).
- It is critical to decontaminate your clothing, boots, and gear after you leave Lava River Cave before entering any other cave. Visit whitenosesyndrome.org for protocols and how-to information.
- It is unlikely that you will see a bat in Lava River Cave. However, if you do see a bat, don't touch or harass it and notify staff of the location where you encountered it.

Protecting Bats at Lava River Cave From White-nose Syndrome

by Julie York, USFS Wildlife Biologist

White-nose syndrome (WNS) has killed almost 7 million hibernating bats in the U.S. and Canada since 2006.

The disease is caused by a cold-loving fungus that thrives in hibernation sites including caves and mines. Named for the white powdery appearance around bats' noses, the fungus may also occur on ears, wings, and forearms or may not be visible at all. The fungus agitates bats, awakening them during their winter hibernation. Bats use their water and fat reserves too quickly, reducing their chance for surviving winter. The fungus primarily spreads from bat-to-bat contact but may also be spread by bringing contaminated human clothing or equipment from one contaminated site to another.

There is no known health risk to humans from WNS. However, the impacts to humans from the loss of bats is devastating. Bats play a crucial role in the health of our ecosystem by consuming many insects, including pest species.

White-nose syndrome was recently detected in March 2016 near Seattle, Washington. Help stop it's spread, please visit whitenosesyndrome.org for protocols for decontamination of clothing, boots, and gear used in caves and mines.

If you see unusual bat behavior, do not touch any bat. Call the Oregon Department of Fish and Wildlife wildlife health hotline at 966-968-2600 or report online at:

dfw.state.or.us/wildlife/health_program

Unusual bat behavior includes: dying or sick bats on the ground or unable to fly, flying during the day-time, during freezing weather, or bats that have a white fungus on their face or wings.



WNS infected tricolored bat. Photo: By Marvin Moriarty/USFWS

Did you know...

- Bats are the only mammals capable of true flight. Their wing membrane stretches between extremely elongated fingers, resembling a human hand.
- Bats are the primary predators of night-flying insects, including forest and agricultural pests.
- Lessons learned from bats' echolocation have produced navigational aids for the blind.
- Bat droppings in caves are called guano and can be used as fertilizers.
- Research on bat biology has led to advancements in sonar, vaccine development, and blood anti-coagulation for humans.
- Vampire bat saliva may help stroke victims dissolve the blood clots that cause a stroke.



U.S. Forest Service
U.S. Department
of Agriculture

This is the official visitor's guide and informational newspaper for **Newberry National Volcanic Monument**. This publication was produced by **Discover Your Forest**, (a 501c3 nonprofit) in collaboration with **Deschutes National Forest**.



Monument Hotline:
541-383-5700

Lava Lands Visitor Center:
541-593-2421

Deschutes National Forest:
541-383-4000

Monument Address:
58201 S. Highway 97
Bend, OR 97702

Mailing Address:
63095 Deschutes Market Road
Bend, OR 97701

Website: www.fs.usda.gov/deschutes

Facebook: www.facebook.com/deschutesnationalforest

Twitter: @DesNatlForest

Hashtag: #NNVM25

Emergency: 911

Oregon Road Conditions: 511

Crater Lake National Park:
541-594-3000



photo: J. Whelan

Volunteer With Us!

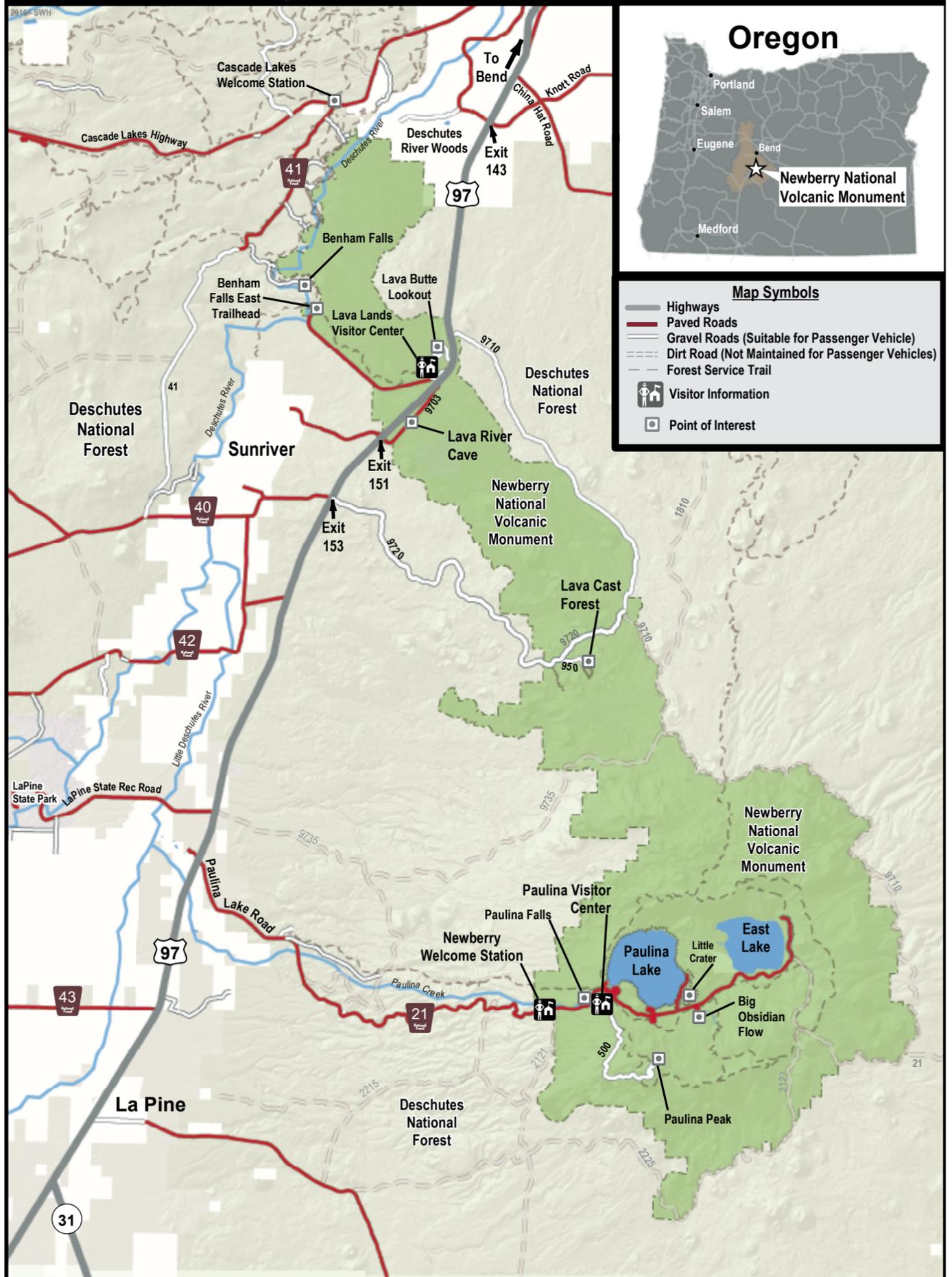
Newberry National Volcanic Monument is home to a wonderful group of Volunteers. They are the men, women, and youth with passionate interest in volcanoes, science, and the rich cultural and geological history surrounding Central Oregon's National treasure. These dedicated individuals help the Forest Service in immeasurable ways to protect this amazing place and make your experience at Newberry the best it can be.

We're proud of and grateful for our volunteers who, for decades, have logged thousands of hours helping at Newberry National Volcanic Monument. Newberry volunteers guide school groups, lead hikes and cave tours, keep our trails clean and safe, assist campers, and share information with the public at the Monument's visitor centers and signature volcanic wonders sites. Our Volunteers are one of Newberry's best resources. Along with information about the Monument, our Volunteers enhance the visitor's experience by educating the public about Leave No Trace ethics and how to be good Stewards of our public lands.

Newberry volunteers are part of a forest-wide volunteer program that hosts 3,000 volunteers each year. Together they contribute nearly 250,000 hours of service comprising \$1.2 million in donated labor.

If you would like to learn more about how to become a Volunteer and experience the wonders of Newberry National Volcanic Monument, visit discoveryyourforest.org or call Discover Your Forest at 541-383-5530.

Newberry National Volcanic Monument



Support Your Monument!

Newberry National Volcanic Monument is managed through a partnership between **Deschutes National Forest** and **Discover Your Forest**. Discover Your Forest is a local nonprofit organization dedicated to promoting the discovery of Deschutes and Ochoco National Forests and Crooked River National Grassland through enriching the experiences of visitors and building community stewardship of these special places today for generations to come.

You can support Discover Your Forest in many ways during your visit, including purchasing items from our stores. Proceeds from your purchases support field trips, educational and interpretive programs, exhibits, publications and, other visitor services. We offer high quality items for kids and adults that highlight the plants, animals, and geology of Central Oregon and the Pacific Northwest.

You can also support Discover Your Forest by becoming a member. Members get great discounts and access to exclusive benefits. Visit one of our **Discover Your Forest** locations at **Lava Lands Visitor Center**, **Paulina Visitor Center**, or **Lava River Cave** for more information.

Your donations make a difference, during the past year, we have been able to:

- Welcome over 250,000 visitors at Newberry National Volcanic Monument.
- Train 25 Certified Interpretive Rangers who made over 30,000 visitor contacts.
- Issue Jr. Ranger badges to 2,500 children
- Produced and distributed visitor publications reaching over 210,000 visitors
- Provide free field trips for 5,400 K-12 students

To donate, visit one of our locations, go to discoveryyourforest.org, or call 541-383-5572. Discover Your Forest and Deschutes National Forest are committed to making your visit to Newberry truly monumental! Thank you for your support!



photo: Discover Your Forest



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