COULD NEWBERRY ERUPT AGAIN?

In Celebration of Newberry National Volcanic Monument



Photo Courtesy of USFS

Spotlighting Central Oregon's Sleeping Giant

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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 gasblown into high the atmosphere. Effusive eruptions are characterized by lava oozing out of the volcano. Newberry's eruptions have numerous spanned the full range of effusive. explosive and This diversity Newberry makes National Volcanic Monument a unique place to see recent examples of nearly every type of volcanic activity.



ago that destroyed ancient "Mount Mazama" and formed Crater Lake, an event that deposited a thick volcanic ash layer over Newberry Volcano; and after deposition of Mazama ash. The Deschutes River, which lies on the volcano's western flank, has at times been shifted to the west by Newberry lavas. At other times, eruptions from volcanoes on the Cascades crest to the west have shifted the river channel eastward.

Map and Description Courtesy of USGS

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 Lake, you are standing on the floor of a large caldera: a collapsed basin created during a violent, highly explosive eruption. This event occurred about 75,000 years ago, so much material was ejected that the volcano collapsed into itself. Large amounts of ash were produced, along with another very dangerous volcanic product called pyroclastic flows. These are super hot, fast-moving currents of gas, ash, and rock that burn and bury everything in their path.

Deposits from these flows cover the flanks of Newberry Volcano, and ash from this eruption has been found as far away as San Francisco. Based on deposits found at Newberry, it's possible that the volcano has produced as many as three large caldera-forming events in Newberry it's past. also produced explosive eruptions that did not create calderas. The eruption that produced the Big Obsidian Flow began as an explosive one. Although not a large caldera-forming eruption, it was violent enough to send ash as far as Idaho. After most of the gas escaped from the magma chamber, it continued



Paulina Falls spills over welded pyroclastic fall and flow deposits that were emplaced as sheets of hot ash and pumice that record pulses of activity during the explosive caldera-forming eruptions about 75,000 years ago. Photo by Dannika White

as a slow, effusive eruption of high-silica obsidian. There are several obsidian flows in Newberry Caldera older than Big Obsidian Flow, indicating that effusive eruptions of silicic lava following explosive events are common at Newberry.

Mafic eruptions at Newberry Volcano

Most of Newberry Volcano is composed of overlapping mafic lava flows that erupted from the flanks, or sides, of the volcano. Though not as tall as peaks like Mt. Hood and Mt. Rainier, the volume of material erupted from Newberry makes it among the largest volcanoes in the Cascades. Mafic eruptions at Newberry didn't have as much gas as the caldera-forming eruptions described above, but they had enough to hurl molten fragments like fire-fountains of lava. Most of these fragments cooled in the air and formed frothy vesicular rock called scoria, or cinder, which piled up in a cone around the vent. As gas escaped from the magma feeding these eruptions, effusive lava flows emerged from the base 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 vears. creating effusive lava flows, some extendingup to 40 miles their from 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



Monitoring Enclosure. Photo Courtesy of USGS

contamination of drinking water, and they canignite 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/

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