How a Mt. Shasta eruption might occur

Mountain has potential to blast hot volcanic rock, seep lava, release debris

Ryan Sabalow, Redding Record Searchlight, 12-17-11

Geologists say there's a one in three or one in four chance Mt. Shasta might erupt in north state residents' lifetimes. Based on interviews with county disaster planners, volcanic experts and U.S. Geological Survey volcano documents, here's how an eruption might play out.

It's March and Mt. Shasta is loaded with a winter's worth of packed snow when geologists' instruments begin noticing rumbling from deep within the mountain. Steam begins rising from its vents.

As the weeks go by, residents in Mount Shasta, McCloud and Dunsmuir find themselves waking in the night to vibrating glasses on shelves and pictures falling off their walls.

As the quakes increase in frequency and severity, huge clouds of steam begin rising from the 14,179-foot peak.

One day a gout of ash and hot gasses bursts from the mountain's top, sending a mushroom-shaped cloud 10,000 feet in the air. As the ash falls back to Earth, it blankets downwind Siskiyou County towns under inches of ash, enough to clog cars' air filters and cause homes' roofs to buckle under the weight.

Even in Redding, car windshields are for days covered in a film of ashy dust.

As the weeks go by, the rumblings increase, and soon molten rocks, some the size of basketballs — others the size of engine blocks — blast from the mountain like popcorn kernels exploding off a hot pan. Some crash down miles away.

When Mt. Shasta, dormant for nearly 300 years, finally blows its top, the plume is seen as far away as Sacramento.

But it's near the mountain where nature's fury is truly on display.

Flows of superheated volcanic gasses, ash and rock fragments pour down the mountain at race-car speed, instantly melting glaciers, tearing down trees, covering highways and obliterating homes.

To the south, streams, thick with melted glacier water, gooey mud and ash, begin boiling downhill, heading toward Box Canyon Dam outside Mount Shasta. The Sacramento River below Box Canyon begins to rise, as do the McCloud and Pit rivers whose flows, too, are blocked by Shasta Dam.

Towns below the massive water barrier brace for floods.

'Very high-threat' volcanoes

Mt. Shasta and its smaller sister peak to the southeast, Mt. Lassen, are considered "very high threat volcanoes" by the U.S. Geological Survey, though the peaks are only ranked a Level 2 out of four threat-monitoring levels, according to north state emergency management officials.

Geologists say Mt. Shasta likely last erupted in 1786. Lassen Peak last erupted in a series of small explosions in

1915 followed the next year by destructive lava flows.

The Medicine Lake volcano in southern Siskiyou County between McCloud and Burney also has the potential to erupt. It's considered by the USGS to be a "high-threat" volcano.

It's erupted at least seven times in the past 4,000 years, although the most recent was about 900 years ago, according to the USGS.

Although it's considered the biggest of the volcanoes in the Cascade Range, Medicine Lake's volcanic eruptions have caused it to spread its mass outward instead of upward, unlike Shasta and Lassen.

In their disaster plans, local county officials say Mt. Shasta poses the biggest threat of the three north state volcanoes, because it's the mountain most surrounded by population centers. It also poses the biggest risk from flood runoff, threatening towns in the Sacramento Valley below Shasta Dam.

Bill Hirt, a geologist who teaches at College of the Siskiyous in Weed, said if Mt. Shasta ever does erupt, the risks depend largely on when the next eruption occurs, what part of the mountain blows and the type of material it produces.

Widespread effects

Mt. Shasta has the potential to blast hot volcanic rock called tephra, release huge debris flows and seep lava, Hirt said.

There are also landslide risks.

Geologists say a volcanic event on Mt. Shasta thousands of years ago created a landslide that stretches from Weed to Yreka. Motorists drive through the massive slide's remnants every day on Interstate 5 as they pass through miles of rock-crusted rolling hills.

The mountain may also vent vast boiling clouds of fast-moving debris and hot gasses in what geologists call pyroclastic flows. The towns of Weed and Mount Shasta are actually built on the remnants of such flows from an eruption that occurred around 9,500 years ago, according to the USGS.

Hirt said it's possible the mountain also could trigger debris flows on the southern or western flanks of the mountain, imperiling towns below, as well as McCloud on the mountain's southeast side.

"On the other hand, a vent that opens on the northern or eastern sides of the mountain would likely pose a much lesser threat to local towns, although it could still threaten Lake Shastina and lead to closures of highways and air-traffic corridors," he said.

What time of year the mountain erupts also will determine its severity.

Hirt said an eruption during the winter or spring when Mount Shasta is covered with snow is likely to produce larger debris flows and more flooding than one that occurs during the summer or fall when there's less snow on the mountain.

Hirt said it's also worth remembering once volcanoes erupt, they stay active for years.

"The last two active volcanoes in the high Cascades, Lassen and St. Helens, erupted intermittently for four and six years, respectively, after activity began," Hirt said. "If eruptions at Shasta or Lassen force people to evacuate, the surrounding areas (and) those areas might have to remain closed for years and that could have a major effect on the viability of the towns, regional transportation and the economy."