

# Wallowa County is home to the earth's greatest volcanic eruption

By Ellen Morris Bishop  
Wallowa County Chieftain

Wallowa County is a land of superlatives. Le Gore Lake is the highest in Oregon. Hells Canyon is North America's deepest gorge.

And there is another, and more global feather in our cap.

We are the place that unleashed the Earth's greatest known, mapped, lava flow. Ever. This volcanic eruption, 16.3 million years ago, produced 9,500 cubic MILES of basalt—enough to build a wall a mile high and a mile wide around the entire continental United States. What's more, our County Courthouse — and a lot of other places in Wallowa County — are built from the ashy, glassy products of this eruption. We know them as Bowlby Stone.

The basalt lavas of this greatest of all lava flows known on Earth is called the Wapshilla Ridge Flow, named for its excellent exposures on the massive ridge between the Snake and Salmon Rivers on the Idaho side of Hells Canyon. This huge flow was part of the Columbia River basalts—lavas that form much of our landscape.

The explosive, ashy tuff that would become Bowlby Stone, erupted at the same time from the same batch of magma. The link between the Bowlby Stone tuff and the huge Wapshilla Ridge lava flows was first recognized last year by a team of geologists Klarissa Davis, John Wolff, and Owen Neill of Washington State University, along with a colleague from the University of Auckland in New Zealand.

About 16.3 million years ago what is now the Wallowa Mountains and Zumwalt Prairie were a lowland of marshes, lakes, and rivers. There were no Wallowa Mountains, no Hells Can-



Ellen Morris Bishop

**Large holes left in the solidified Wapshilla Ridge basalt exposed in a road cut along the Imnaha Highway attest to the huge amount of carbon dioxide and sulfur-rich gas brought to the surface by this greatest of all known lava flows. Hot water and steam interacting with the iron-rich tuff produced the red and yellow oxidized iron minerals in the soil above the basalt.**

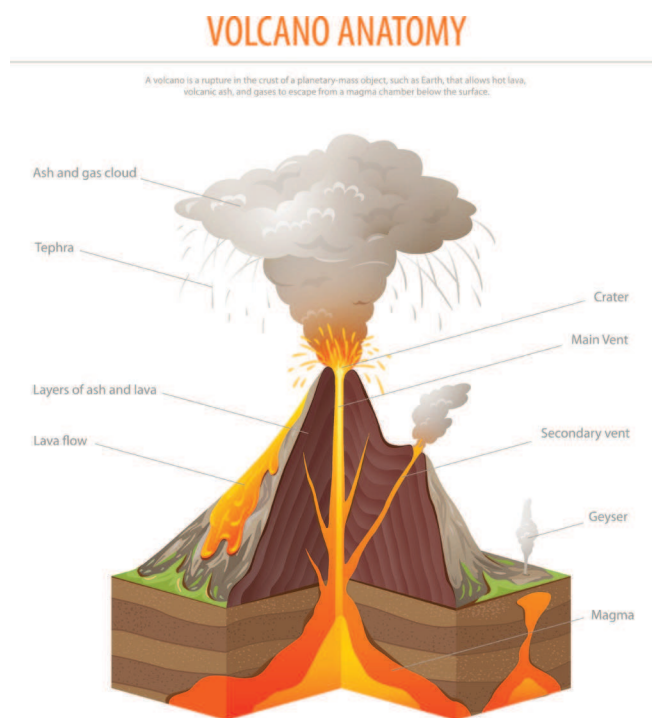
yon. Things looked more like a soggy version of Kansas.

The Wapshilla Ridge basalt flow was really a continuous series of flows and eruptions. The volcanic vent system was more than 60 miles long. Lava-gushing fissures extended through today's Wallowas to Hells Canyon and beyond. Intense eruptions lasted more than 300 years (perhaps as long as 1000 years) and slathered 60,000 square miles of Oregon, Washington, and Idaho in lavas averaging more than 100 yards thick. Additional eruptions may have continued for at least another 90,000 years. It was the greatest of all the Columbia River basalt flows, and the

most voluminous eruption yet documented and mapped on Earth.

One vent — or “dike” for the Wapshilla Ridge Flow — a 30-foot wide swath of basalt that cuts through the much older granites — is exposed in the Wallowas just east of Maxwell Lake. Studies by Oregon State University's Heather L. Petcovic determined that this one vent alone gushed almost a cubic mile of basalt per day for 10 years.

But now we've learned that the Wapshilla eruptions were much more than just basalt flows. WSU geologists Klarissa Davis, John Wolfe, and colleagues found that much of Zumwalt Prairie, from Crow Creek to



Camp Creek, was also a site of major eruptions.

The Zumwalt Prairie eruptions were very, very explosive.

If you stick a red-hot poker into water you get an instant burst of steam and boiling water. The same thing happens on a much larger scale when red-hot lava rising from deep in the earth encounters lakes and saturated ground near the surface. Water boils. Steam explodes. Hell breaks loose. Geologists call this a “hydro-volcanic eruption.”

When Wapshilla eruptions began on Zumwalt, steam and churning, boiling water literally tore the rising lava into fragments and flung the whole mess skyward. Some lava chilled so quickly that it literally became glass rather than basalt. Much of the fragmented lava erupted at Zumwalt reacted with water to become an oxidized red-yellow clay-rich ash.

This seething mixture of gooey volcanic ash, shards of volcanic glass, and roiling steam, was so hot that when it finally landed the particles welded together into a solid mass of soft, porous

rock. Geologists call this kind of rock tuff. In Wallowa County it's known as Bowlby Stone.

The volcanic hysterics that produced the Bowlby Stone occurred multiple times throughout centuries. Consequently, there are multiple Bowlby Stone-type deposits that vary in colors, textures, and composition. You can find the welded tuff of Wapshilla Ridge eruptions along Crow Creek, the Imnaha Highway, and near Marr Flat. Ashy deposits on Ruby Peak, and a long-lost quarry site up the Lostine River, where the stones that compose the Lostine Tavern, Lostine School and Coleman and Chrisman bank building in Wallowa originated, may be remnants of those eruptions.

Not only did the Wapshilla Ridge flow change the landscape. It also probably changed the Earth's climate.

The global climate of about 17-15 million years ago, known as the Miocene Climatic Optimum, was somewhat warmer than today. It coincides closely with the entire period, 16.7 to 14 million years ago when

most of the carbon-dioxide-rich Columbia River basalts erupted.

But at precisely the time of the Wapshilla Ridge eruptions, the global climate cooled by a degree or two. The gases in Wapshilla Ridge lavas were especially rich in sulfur. Davis and Wolff determined this by analyzing the gas trapped in tiny bubbles within mineral grains in the Bowlby Stone tuffs. They calculated that the Wapshilla Ridge Flow eruptions released about 300 billion tons of sulfur dioxide into the atmosphere, along with particulates. “This would have been devastating regionally because of the acid-rain effect from the eruption,” Wolff said.

When a large quantity of sulfur is injected into the atmosphere, it blocks sunlight, producing cooler global temperatures. And so, the eruption of the globe's mightiest lava flow here in what would become Wallowa County, not only changed the landscape, but likely cooled the planet for a brief time as well. “It had a global effect on temperatures, but not drastic enough to start killing things, or if it did, it did not kill enough of them to affect the fossil record,” Wolff noted.

The next time you are at the Wallowa County Courthouse, or any of the many other grayish stone buildings here, take time to look, really look, at a block of the Bowlby Stone. Look at its textures — elongated blobs of bark basaltic glass encased in a fabric of welded gray ash. In most blocks you can see a subtle pattern that tells you which way the wind was blowing as the ash cloud came to rest. The greatest known, mapped and analyzed basalt eruption of all time is right there in front of your nose and at your fingertips. No wonder Wallowa County is such a powerfully special place!

## Enterprise Elks Lodge

# CRAB & PRIME RIB FEED



**Saturday, February 23, 2019**  
**5 pm to 8 pm ~ Cloverleaf Hall**

**Casino Night 8:00 pm**

Donate a Dessert for the  
**Dessert Live Auction 6:30 pm**  
(Proceeds benefit the Casey Eye Clinic)

**No Host Bar** provided by  
La Laguna Restaurant  
5:00 pm till closing

**Tickets at the Door**

**All-You-Can-Eat Crab - \$37.00**

**Prime Rib & Cup-of-Crab - \$37.00**

**Prime Rib Only - \$25.00**

**Children 11 & under - \$27.00**  
(All-you-can-eat crab)

**All include: Cole Slaw, Baked Beans & Garlic Bread**

BPOE1829NEWS@gmail.com • Like Us On **facebook**

Ad sponsored by NAPA Thompson Auto Supply