

FORMED BY LAVA

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

By ELLEN MORRIS BISHOP
EO Media Group

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 its cap.

It is 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, the 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 Canyon. 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 1,000 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



Ellen Morris Bishop/Wallowa County Chieftain

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.

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. Petecovic 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 gooeey 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 15-17 million years ago, known as the Miocene Climatic Optimum, was somewhat warmer than today. It coincides closely with the entire period, 14 to 16.7 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!

Snow day for a fisherman

By LUKE OVGARD
For the East Oregonian

Oregon is as beautiful and varied as any state — perhaps more than any other state. From the salt marshes of the Tillamook Bay to the rugged mountains and canyonlands of the Wallowas; from waterfalls in Silverton to dense rainforest in Roseburg; from the high desert hot springs of the Oregon Outback to the rapidly growing urbanity of the Willamette Valley, we truly have something for everyone.

While us Eastern Oregonians miss out on the coast, smog and long commutes, we do get something the valley dwellers don't: snow.

The powdery white stuff comes in buckets out east, and we have a love-hate relationship with it. Sure, it provides much needed snowpack to keep the rolling hills and sage flats green — OK, vaguely yellowish — during the heat of summer, but it can be dangerous in and of its

own right.

It can cause unsafe road conditions, collapsing roofs and flooding when it finally melts off.

An inch of powder might bring glimpses of the apocalypse in Portland, but in places like Klamath Falls, Lakeview, Pendleton, Burns and Baker City, it takes a lot of snow to interrupt daily life.

For that reason, we don't mind it. We may not love it, but we understand its value.

Still, most high desert residents don't go around begging for the crystalline flakes, either. Only one group of people prays almost nightly for a frigid blanket: students.

Snow problem

What began as sitting in front of the radio or television at six o'clock in the morning has become checking the school district Facebook page or waiting for automated calls or text messages, but the average Oregon

kid still holds his or her breath every morning he or she can see it in the air outside the front door. That same kid chants “Please” over and over again, maybe as a quiet prayer, maybe just for the heck of it. Regardless, the child sits there hoping for those two words that bring children as much joy as almost anything else not containing sugar: “snow day.”

As a teacher, everyone expects me to carry out the same ritual, hoping and praying Jack Frost leaves a present too large for plows to unwrap before morning light.

But in all honesty, I don't.

I love my job. Yes, some of you other teachers out there may roll your eyes a little, but I do.

I don't always love every single day of my job, but more days than not, I feel fulfilled.

What doesn't make me feel fulfilled is a snow day. What am I going to do on a snow day?

My hobbies are limited to fishing and writing about fishing.

If I'm feeling especially unimpressive, I might add “reading,” “traveling,” and “food” to my list of hobbies, but that's only when I'm trying to sound sophisticated on an online dating profile.

In reality, if I can't fish, and I don't currently have a Prison Break: Season One-caliber show to binge watch on Netflix while I eat my feelings, I'd rather be working.

Don't say ice fishing is an option because in most of Oregon, it really isn't. Rarely does it stay cold enough for long enough to hit the hard water, at least within an hour or so of any population center.

Roads

We do get snow days from time to time.

I don't hate them, but fellow teachers worn thin by the ins and outs of teaching: don't hate me for saying that.

The odd snow day isn't all bad, especially given that I only had four days off in February,

so the added boost in relaxation time was nice — until I got bored out of my mind.

The two places I considered fishing that weren't frozen solid were both several hours away, but one has a steep boat ramp that I've learned my lesson about going down in heavy snow, and the other happens to be right where the plows decide to pile snow when freakish, overnight storms hit.

So here I sit, looking into the whitewash and wistfully longing for warmer days where I can get off work, put on boots or waders and head to the water.

As teachers, we have to sacrifice for our students' success and happiness, and if that means sitting at home, bored out of my gourd, then I'll make the sacrifice and take a day off work. For the kids.

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