Minidomes in Mount Diablo hills come with volcanic past

Dennis Cuff, Bay Area News Group, 9-17-11

Volcanoes near Clayton?

Members of a conservation group scouting land to buy were surprised to learn this year that dome-shaped hills on Mount Diablo's eastern flanks are volcanic -- the result of magma rushing through cracks and veins in the Earth's crust.

The discovery of the minivolcano caught even seasoned preservationists off guard and sheds new light on the East Bay's natural history from a time when magma blew, sputtered and burst through cracks in the Earth some 4 million to 26 million years ago.

"It turns out this volcanic past was right there under our noses all the time, and we've been protecting wild lands around the mountain for 40 years," said Ron Brown, executive director of Walnut Creek-based Save Mount Diablo.

In July, the group bought 7.4 acres of land that helps preserve from development part of Marsh Creek, habitat for rare plants and wildlife, and adds the first volcanic dome to its holdings.

"The volcanic extrusion was the icing on the cake," Brown said.

For more than 40 years, the conservation group has been telling people that the 3,849-foot-tall Mount Diablo -- a landmark reference point for airplane pilots and geological surveys -- is not a volcano.

Nothing has changed that.

The mountain was formed by geological pressures from plate movements that caused an enormous upthrust of earth layers that once laid on the ocean floor and in inland valleys.

Some 4 million to 26 million years before the mountain was formed, though, magma pushed up to near the surface east of what is now Clayton.

The result was a series of hilly domes shaped like mushroom caps in a 1-mile-by-4-mile area along sparsely populated Marsh Creek and Morgan Territory roads, between Clayton and Brentwood.

If you've driven by the hills and failed to identify the volcanic landscape, you're not alone.

These domelike structures are a few hundred feet tall at most. The dome outlines are difficult to distinguish from ordinary hills because they are mostly covered with brush and a dense canopy of oak and laurel trees.

Mount Diablo does have volcanic rock high up its slopes. But that rock stems from eruptions some 165 million to 190 million years ago far away in the Pacific Ocean. Then the rock rafted here by tectonic plate movement.

The minidomes east of Clayton come from younger, less powerful volcanic activity in the East Bay's backyard, geologists say.

Earth activity along such faults as the Morgan Territory and Greenville likely opened up cracks in the earth's crust, allowing the lava to bubble up.

"When these faults first formed, they acted like a leaky conduit, allowing magma to ooze up from deep underground," said Ken Lavin, a naturalist who leads hikes and talks on Mount Diablo's natural history. "The magma erupted from small vents and fissures, not big volcanoes."

Some lava flowed to the surface from what are called plug domes. Other lava made it part way to the surface and formed magma necks, and erosion of softer soil gradually exposed the formation.

"They are like little gopher islands in the sky," said Seth Adams, Save Mount Diablo's land programs manager.

Adams became curious about the geology of the area in May when he found a pinkish crystal rock on the lower section of a dome.

The pink rock high in silica seemed out of place. "Volcanic rock here?" Adams recalled thinking.

It wasn't a mystery to some scientists he consulted, though. Geological maps not widely known to the public list 18 sites in the Marsh Creek corridor as volcanic rock formations.

Jason Mayfield, a Diablo Valley College geology professor, visited the site and helped the group understand what it had.

He said it is unclear how much the domes retained their original shape and how much was changed by erosion.

Save Mount Diablo paid $125,000 for the 7.4-acre dome as part of an effort to protect and link together wild lands around the mountain.

The dome is not easy to access, though. During a recent visit to the rugged property, Adams and Brown gingerly struggled up the steep hill covered with poison oak and soil that shifts under the weight of footsteps.

Adams balanced himself carefully as he pointed to outcrops of the high-silica volcanic rock called rhyodacite.

He also pointed out manzanita plants on the dome that reach the unusual height of 28 to 30 feet, as high as the plant is known to grow. These rare plants are named after Mary Bowerman, the late botanist and co-founder of Save Mount Diablo.

Brown said his group has no plans to develop a trail up its dome. Access there is likely to be restricted to guided hikes or science class field trips.

Mt. Diablo State Park has a volcanic dome in nearby Perkins Canyon that is much easier to visit than the conservation group's new land. Perkins Canyon is the only one of the 18 volcanic rock sites that is accessible to the public.

Save Mount Diablo's dome is "incredibly steep and not easy for the average person to visit, so people might ask, 'Why are we buying this?'"‰" Brown said. "However, in the grand scheme, we are trying to buy pieces of land and reassemble an entire Diablo wilderness. Protecting this land allows us to tell a story of the area's past."