

Not My Fault: In the earthquake race, it's good to be an also-ran

Lori Dengler/For the Times-Standard

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The results are in. And for the first time in the last four years, the North Coast did not win “largest quake in the contiguous 48 states” recognition for 2017. This year, we had to settle for second place, edged out by Montana.

2017 was a mix of the expected with a few surprises sprinkled in. The overall winner in the US earthquake race was a no-brainer – Alaska by a mile and then some. Over 1800 earthquakes of magnitude 3 or larger were recorded in Alaska. All the other states combined barely exceeded 1000. Alaska had the biggest quake too – M 6.8 last January 24. Over the past 50 years, Alaska always releases the most earthquake energy and has only lost out on the biggest quake nine times.

Second place in the state quake race depends upon your perspective. As measured by the total number of M3 and larger quakes, a good proxy for felt events, Oklahoma retained the number two spot for the fourth consecutive year. Evidence strongly supports Oklahoma's earthquakes as human-caused, related to the injection of waste fluids from drilling and hydrofracturing operations. In 2016, Oklahoma began regulating both the volume and rate of injected fluids and there has been a decrease in seismic activity. In 2017, Oklahomans experienced 267 quakes large enough to be felt, only about a third of what they experienced back in 2015 but still well above the pre-injection days before 2008 when annual totals were in the low single digits.

This year Idaho, with 229 earthquakes of M3 and larger, edged out California back at 213 for second place in the “likely to be felt” category. Almost all of the Idaho earthquake activity in 2017 was concentrated in the southeastern part of the state. It began with a M5.3 on September 2 and over the next four months, the area spit out a M5.0, 31 quakes in the magnitude 4 range, 190 M3s and at least 600 smaller quakes. The sequence is still active, with four small quakes recorded in 2018 so far. While this may seem ominous, this is typical for earthquakes sequences in the Basin and Range tectonic province.

Counting numbers of small quakes gives a limited picture of seismicity. The magnitude scale is logarithmic and each

unit increase in magnitude corresponds to an over 30-fold increase in energy released. That means one magnitude 5 produces 32 times more energy than a 4 and about 1000 times the energy of a 3. Oklahoma mainly has small quakes – only seven in the M4 range and the largest in 2017 was M4.3.

Comparing states by seismic energy released, California did beat out Oklahoma and Idaho, but only ranked third over all. The new number two was - drum roll - Montana! Montana has been well back in the pack for decades. But it is a tectonically active area. In 1959, an earthquake in the mid to upper 7s ripped a fault near the town of West Yellowstone. The shaking unleashed a massive landslide that blocked the Madison River and created a new lake – appropriately named Quake Lake. Unfortunately the slide also buried a campground killing 28 and earning a #9 ranking on the US list of fatal earthquakes.

This year's Montana earthquake occurred on July 6 with a magnitude of 5.8 and was far more benign. Centered 32 miles NW of State's capitol Helena, it was in the Lewis and Clark line, a recognized fault zone that has played an earthquake role on the North American continent for hundreds of millions of years. The quake was felt in Helena and in much of the western part of the state. It was strong enough to knock items off grocery shelves, produce a few cracks in plaster and cause some damage to brick chimneys, but no injuries and no significant damage was reported.

And what about 2017 on the North Coast? We did score the second largest quake in the lower 48 – a M5.7 on September 22. This earthquake was on the Mendocino fault far off the coast, about 128 miles west of Cape Mendocino but it was too far offshore to be felt by many. The other regional quake to reach the M5 level was a 5.1 on July 28, centered in the Gorda plate a little more than 50 miles west of Eureka. More than 500 people reported feeling that earthquake, but it was still far enough away from the coast to have no impacts. We were lucky this year. When compared to previous years, 2017 comes in as one of the most seismically quiet years on the North Coast in decades, logging the fewest number of M2 and larger quakes since 1980.

In the earthquake race, there is only one number that is important. Zero. No deaths, little damage. 2017 was a good year in that regard – both in the US and on the North Coast. It was a year where other natural disasters took the headlines. That doesn't mean letting your

earthquake guard down however – all could change in the blink of an eye.

Note: Earthquake statistics from the USGS <https://earthquake.usgs.gov/>. Please note the USGS continues to update earthquake data and the numbers quoted here may change slightly as more analysis is completed.

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