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Not My Fault: A Look at the U.S. Temblors of 2025

Lori Dengler for the Times-Standard

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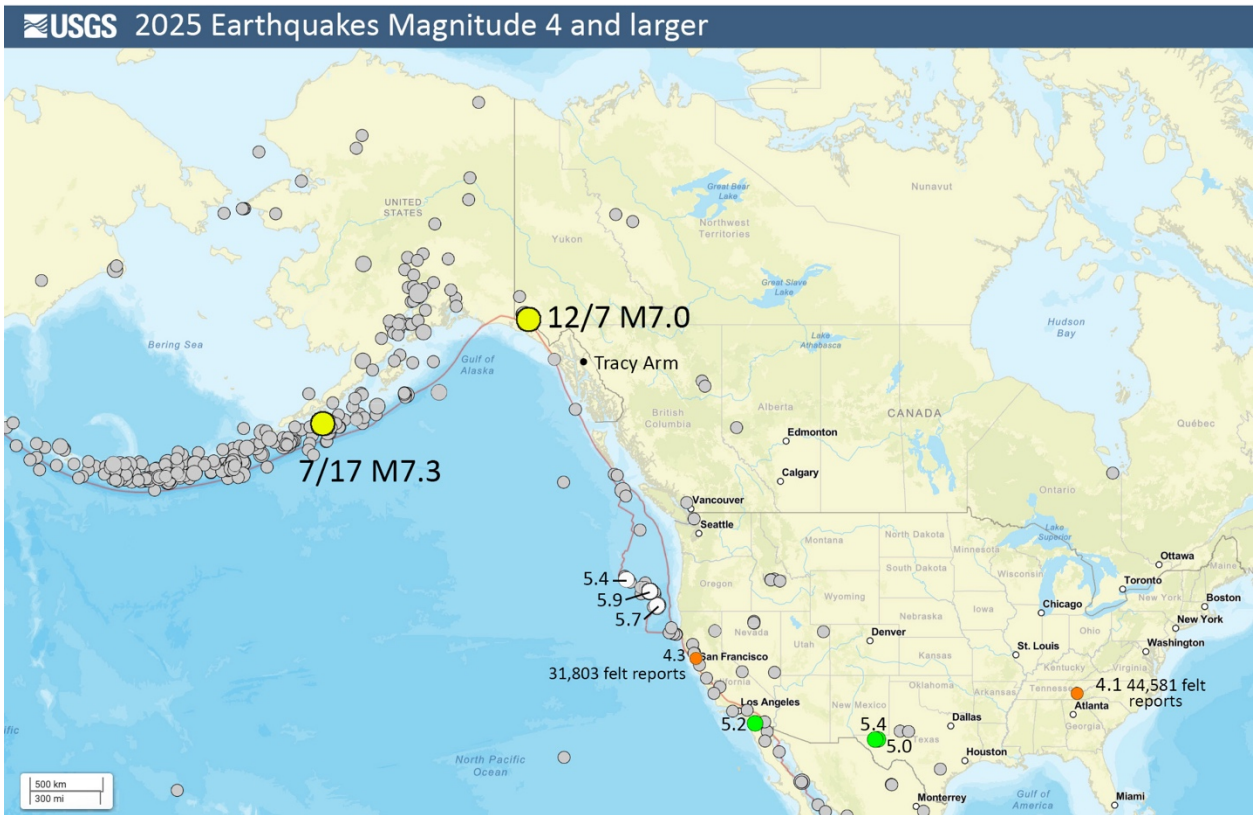

Earthquakes of magnitude 4 and larger reported by the USGS in 2025. Alaska recorded over 400 M4s, including the two largest U.S. earthquakes, a 7.3 and 7.0 (shown in yellow). The largest earthquakes near the lower 48 were a 5.9, 5.7, and 5.4 offshore of southern Oregon (white). The largest onshore were a 5.4 in west Texas and a 5.2 in Southern California (green). A M4.1 in Tennessee had the most "Did You Feel It?" reports with 44,581 and a 4.3 near Berkeley garnered over 30,000 (orange). Location of the Tracy Arm landslide in SE Alaska is also shown.

I don't need to look at any data to tell you what area of the U.S. shook the most in 2025. The answer is always Alaska. Alaska topped the charts with magnitude 7.3 and 7.0 quakes and 420 in the M4 and larger range, more than six times as many earthquakes as the entire lower 48 states. The good news for Alaska earthquakes is that most are located in remote areas far from populated areas and cause little or no damage.

The largest domestic quake of the year occurred on July 16 centered south of the Alaska Peninsula. 53 miles south of the island community of Sandpoint. It was felt as far as Anchorage nearly 600 miles from the epicenter but only 190 felt reports were filed on the USGS "Did You Feel It?" site, testimony to how few people live in the region. It caused no damage, and its

most newsworthy aspect was a tsunami warning issued by the National Tsunami Warning Center in Palmer, Alaska four minutes after the earthquake.

That first bulletin defined the warning area from Unimak Island to the Kenai Peninsula and all of Kodiak. Other areas of Alaska and the U.S./Canada west coast were considered 'under evaluation.' I always pay close attention to large Alaska earthquakes as it only takes four to five hours for tsunamis to travel our coastline, not a lot of time to coordinate evacuations if they are needed. The second tsunami bulletin said we were in the clear. A small tsunami was observed at both Sandpoint and King Cove, but it was only a few inches high.

The second big Alaska quake was magnitude 7.0 on December 7th. Called the Hubbard Glacier earthquake, it nearly straddled the border between Alaska and Canada's Yukon territory, about 50 miles north of Yakutat. It received 612 felt reports from the Kenai Peninsula to northern British Columbia, an area almost as large as the Sandpoint quake. It triggered landslides and avalanches but caused no damage. With an epicenter on land and a magnitude less than 7.1, it posed no tsunami threat.

One other Alaska event bears notice in this annual overview. On August 10th, the Alaska Earthquake Center in Fairbanks noticed small seismic signals. They weren't typical of earthquakes and quickly focused in on a landslide source in SE Alaska. Reports from recreational boaters described wave activity and subsequent field investigations confirmed that a massive landslide fell into Tracy Arm, a glacial fjord 55 miles away from Juneau. The tsunami that ensued swept away vegetation over 1500 feet above the fjord water level, making this arguably the second highest tsunami ever recorded. The highest was also caused by a landslide into an Alaska fjord when a surge exceeded 1700 feet in Lituya Bay in 1958.

The Tracy Arm tsunami poses challenges for our tsunami warning system. Landslide-generated tsunamis are much harder to monitor as they are not preceded by large seismic signals that can be detected from far away. Retreating glaciers have made the risk of such landslides higher as newly bared slopes are vulnerable to collapse. The biggest threat is to the recreation and tourist industries with boaters and campers exposed to large wave activity with little warning.

Moving south to the lower 48 states, not much seismic excitement in 2025. No earthquakes caused significant damage and no injuries were reported. The largest events were far offshore of southern Oregon coast. What constitutes U.S. territory? In 2023, the United States grew by nearly 400,000 square miles when the State Department expanded their definition of how far offshore the "continental shelf' extends. The addition was just enough to include the entire Juan de Fuca plate system so that the M5.9 and 5.4 on the Blanco fault and the 5.7 in the northern Gorda plate all clearly are in U.S. territory. These earthquakes were all more than 100 miles offshore, felt only lightly by coastal residents, and too small to cause a tsunami. The Blanco fault, like the Mendocino fault off our coast, is a transform plate boundary and produces frequent earthquakes in the magnitude 4 to 5 range and occasional earthquakes in the low 6s. The 5.7 is a little more unusual and is part of a cluster of quakes that started in 2024 and has continued into this year in the northern part of the Gorda plate.

The largest mainland U.S. quake of 2025 was a M5.4 in west Texas on May 3. I've written about Texas earthquakes frequently in this column. They are considered human-caused, the result of injecting drilling waste fluids into deep wells beneath the ground surface or other activities

related to hydrocarbon exploration and extraction. The west Texas seismic hotspot has been active since injection began over a decade ago and has produced 48 earthquake in the M4 to 5 range in the past 5 years and produced two M5s in 2025. The seismicity in this area may be exacerbated by similar waste injection happening just to the north in SE New Mexico. Geologists speculate that deep ground water flow may be carrying some of those fluids into Texas.

Seismic activity also continues in southern Texas near the town of Falls City where five M4s were reported last year. Unlike west Texas, this activity has not been clearly linked to waste fluid injection. Some scientists believe it may be related to "zipper fracking" with detonations occurring alternately on two closely spaced lines. The other Texas hot spot of recent years is near the town of Snyder in the west central part of the State. Only two M4s were noted in this area between Midland and Abilene, possibly the result of regulations put in place after 2024's seven events including two 5.1 earthquakes.

Only one other M5 earthquake occurred beneath the U.S. mainland in 2025. On April 14th, a 5.2 struck the Elsinore fault zone near the town of Julien in San Diego Couty. Over 40,000 people reported feeling the earthquake, most in the greater San Diego area but some as far away as Ensenada in Baja California, NW Arizona, SE Utah, and Visalia. It caused little damage other than toppling items off shelves and giving many people an adrenalin rush but did highlight the hazards of major fault systems of southern California that aren't called San Andreas.

The most widely reported U.S. earthquake of 2025 didn't make it into the M5 range. On April 10th a mighty magnitude 4.1 struck eastern Tennessee, 28 miles south of Knoxville and only 5 miles from the North Carolina border. This earthquake wasn't felt over an area as large as the major Alaska earthquakes, but many more people were affected by it. 44,581 felt reports were filed on the "Did You Feel It?" web site, a few as far away as central Florida, Chicago, and Boston nearly 500 miles away. Seismic waves travel much more efficiently in the older, colder crust of the eastern and central part of the country. Higher population density and less wave attenuation make for many more felt reports.

I can't leave out the SF Bay Area in my annual report. No major quakes but the September 22 M4.3 did get over 31,000 "Did You Feel It?" reports, the third highest felt response (after Tennessee and San Diego). A 4.3 releases much more energy than a 4.1 yet the Berkely quake was felt only as far away as Fresno and Reno, far less than the area felt by the Tennessee quake. The Berkeley earthquake was centered on the Hayward fault, a fault system that produced an earthquake of about magnitude 7 in 1868 and is considered high on the list of potentially catastrophic California quakes. There's nothing about the September earthquake suggesting it may be a foreshock. But the clock is ticking, and a major Hayward fault event will happen again.

Perhaps the most interesting Bay Area seismicity doesn't even make it onto my summary map. Between November 9 and the end of the year, 321 earthquakes in the magnitude 1 to 4 range were recorded in the east San Francisco Bay Area near the town of San Ramon. The largest was a 4.0 on December 19. These earthquakes are part of a swarm, a tightly clustered set of earthquakes with no clear mainshock – aftershock sequence. Swarms are no unusual in the east bay region and this wasn't the only swarm of 2025. There were bursts of activity in

northern Nevada and the Salton Sea region as well. There is no evidence such swarms lead to major quakes, but they are a useful reminder that our ground is always shifting.

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