

Earthquakes in states other than California more common than assumed

Javier Panzar, Los Angeles Times, 11-27-14

When the ground started to shake in Helena, Mont., on Oct. 3, 1935, stunned residents called the local newspaper to ask what had happened.

“‘Any report of an earthquake in San Francisco?’ an elderly voice queried, apparently believing that Frisco is the distributing point for all quakes in the country,” the Helena Independent reported.

Other Americans might be forgiven for believing the same thing. But quakes outside California in the Lower 48 are more common than many people probably assume, and in recent years there have been lots of shaking in states better known for blizzards and tornadoes than temblors.

Quakes have struck parts of Ohio, Oklahoma, Virginia, Kansas, Illinois and Montana (where that 1935 quake touched off a swarm that culminated with a magnitude 6.3 shaker).

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Meanwhile, the strongest swarm of earthquakes recorded in recent Nevada history continues to rattle a deserted corner of the state bordering Oregon and California. More than 1,400 quakes have struck about 40 miles south of Lakeview, Ore., since July — including 112 between magnitude 3 and 4. Twelve were magnitude 4.

This month, a magnitude 4.8 earthquake rocked Conway Springs, Kan., while a pair of earthquakes, magnitude 3.7 and 3.9, hit northwestern Montana the same week.

Is there something weird going on here? Yes. And no.

In some cases the increase really is a new phenomenon, related to the boom in the oil extraction technique known as hydraulic fracturing, or fracking. But in other cases, such as Virginia's 5.8 temblor in 2011, the news is surprising only to those who have forgotten the seismic history of the country outside the West Coast.

Other times the increase — or the perception of one — is the product of better technology that detects small quakes in sparsely populated areas that used to go ignored.

Sprinkle in the bullhorn effect social media provide and even a 2.0 temblor makes headlines.

When a magnitude 3.8 earthquake hit near Pingree Grove in northern Illinois in 2010, it was national news for days.

"I got phone calls, email, Facebook blew up. Everyone thought snowplows ran into a neighbor's house or

there was a natural gas explosion. There were a lot of theories going on," Pingree Grove Mayor Clint Carey told a local ABC station at the time. "It's the biggest thing this week."

Still, some of the recent quakes are surprising even seismologists.

From 2010 through 2013, nearly 100 earthquakes greater than magnitude 3 struck the central and eastern United States annually, compared with 20 a year between 1970 and 2000.

Studies by the U.S. Geological Survey and university researchers suggest that the increased number of temblors coincides with the injection of wastewater deep underground, which is part of the process in hydraulic fracturing.

"We didn't miss them, they just weren't there before," said Graham Kent, director of the Nevada Seismological Laboratory at the University of Nevada, Reno.

Other earthquakes are surprising only to those not used to thinking on a geological time scale.

The magnitude 5.8 earthquake that struck Mineral, Va., in 2011 stunned millions, damaged the Washington Monument and even caused the evacuation of a federal courthouse in Boston.

That temblor was an intraplate earthquake, occurring not where two tectonic plates meet but within a tectonic plate.

My cousins lived in Bozeman Montana in the 1950s when Hebgen Lake was created by a large earthquake. My mother remembers feeling a big one on her 16th Birthday in Texas which would have been in 1932. I remember a pretty good one in England in 2008. They happen all over the world.

They aren't as common as the quakes that occur at the boundaries of tectonic plates, but they can still do damage, said Charles Langston, director of the Center for Earthquake Research and Information at the University of Memphis in Tennessee.

"A lot of people don't realize that very large earthquakes have occurred in other parts of the country," he said. "Everyone expects California, not a lot expect Virginia or Missouri."

Langston researches the New Madrid Seismic Zone, which runs south from Illinois through Missouri and into Arkansas.

The New Madrid produced three earthquakes between magnitude 7.5 and 7.7 in a few months in the winter of 1811 and 1812.

A magnitude 7.3 earthquake, one of the largest in the continental U.S., hit Hebgen Lake, Mont., in 1959. The temblor killed 28 people and caused \$11 million in damage.

The quake was so large it triggered a massive landslide of rock, soil and trees that blocked the Madison River and formed a lake that still stands.

Every now and then Montana gets a light or moderate earthquake, like the pair this month, and rattled new residents start calling up Michael Stickney, director of the Earthquake Studies Office at the Montana Bureau of Mines & Geology. In 1995, a swarm of vigorous quakes rattled an area west of Kila, which is filled with newly constructed homes.

"A lot of people who haven't lived here for a while don't necessarily understand that this is earthquake

country in Montana," Stickney said. "If you talk to some of the old-timers that were around, they know we have had a history of large quakes in western Montana. It just so happens to be that none of them were in the last 55 years."

In Nevada, the written record of quakes dates to 1860, but it is only in the last 40 years that detailed data have been kept on smaller quakes that humans would sometimes miss, said Kent, director of the Nevada seismological lab.

Last week the lab deployed more real-time sensors near the center of the swarm, beneath an uninhabited part of the Nevada desert near the Sheldon National Wildlife Refuge.

Nobody is sure whether the swarm is building up to a bigger temblor or just letting off steam, but there is a small increase in the probability of a larger event, Kent said.

In the first 54 years of the 20th century, Nevada had seven earthquakes of magnitude 6.5 or greater, Kent said, but it hasn't had a magnitude 7 earthquake in 60 years.

"It doesn't take very much of an imagination to think, wow, maybe a lot of these larger earthquakes that are catastrophic may have started in swarms," he said. "That is always in the back of your mind."