



# Seven million people live in regions with higher risk of human-caused earthquakes

By Jennifer Hiller and Brendan Gibbons | March 28, 2016 | Updated: March 28, 2016 10:21pm

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More than 7 million people in the U.S. live in regions with increased risk of earthquake damage tied to the oil and gas industry, according to a first-ever forecast by the U.S. Geological Survey of quakes linked to human activity.

Most live in the Oklahoma City and Dallas-Fort Worth areas, the USGS reported Monday.

Parts of Oklahoma and Kansas, where earthquakes were once rare, now face risks comparable to California's.

Dallas-Fort Worth in the Barnett Shale gas field has between a 1 percent and 5 percent chance of earthquake damage this year, the report states.

An advertisement for University Children's Health Stars. The top part has a blue background with the text "University Children's Health Stars" in yellow. Below this is a photo of a doctor examining a child. To the right of the photo, it says "Come be a part of a revolutionary endeavor to establish San Antonio as a landmark for excellence in pediatric care." The bottom section is white and contains logos for "Children's Health", "UT kids", "MAGNET RECOGNIZED", and "2014-15 RANKINGS U.S. News &amp; World Report #1 HOSPITAL IN SAN ANTONIO #6 IN TEXAS".

While seismic activity has struck South Texas in the past, the USGS did not predict any increased risk of earthquake damage in the region this year.

This is the first time the USGS created a one-year forecast for earthquake hazards and the first time its forecasts have considered human activity. The report builds on a **growing body of work** by scientists trying to understand how extracting oil, gas and brine or injecting wastewater can cause once-quiet geologic faults to slip and cause shaking on the surface.

“If we have increased rates of earthquakes, we expect those rates to continue in the short term,” said Michael Blanpied, associate coordinator of the USGS’s earthquake hazards program. “Regardless of the cause of those earthquakes, that means there is a seismic hazard and it needs to be addressed.”

The report lists the Fashing and Alice quakes in Texas among the largest human-induced ones in the country and also links to previous studies that tie those quakes with extraction in the Eagle Ford Shale region.

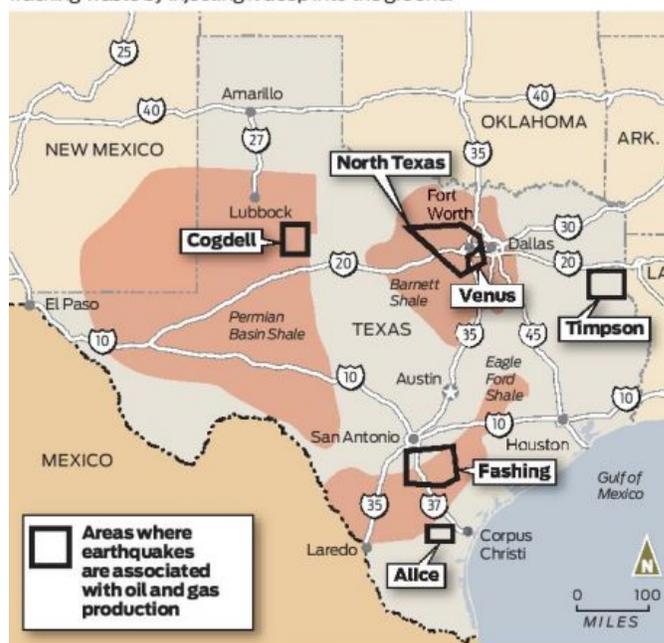
An area near Fashing in Atascosa

County saw an increase in earthquake activity since 1980, including a quake of 4.6 magnitude on the Richter scale in 2011. It experienced two quakes of 2.7 magnitude or higher in the past two years.

Another South Texas area near Alice in Jim Wells County saw an increase in earthquakes tied to human activity but did not have any quakes in the last two years. A 3.5-magnitude

### Earthquakes tied to oil and gas wells

A report by the U.S. Geological Survey linked recent earthquakes with human activity. In these areas, earthquakes are associated with oil and gas wells or disposal wells, where oil and gas producers dispose of brine and fracking waste by injecting it deep into the ground.



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one struck there in 2010.

Seismologist Cliff Frohlich, a senior research director at the University of Texas Austin whose work was cited by the USGS, said the forecast was based on 2014 and 2015 quakes.

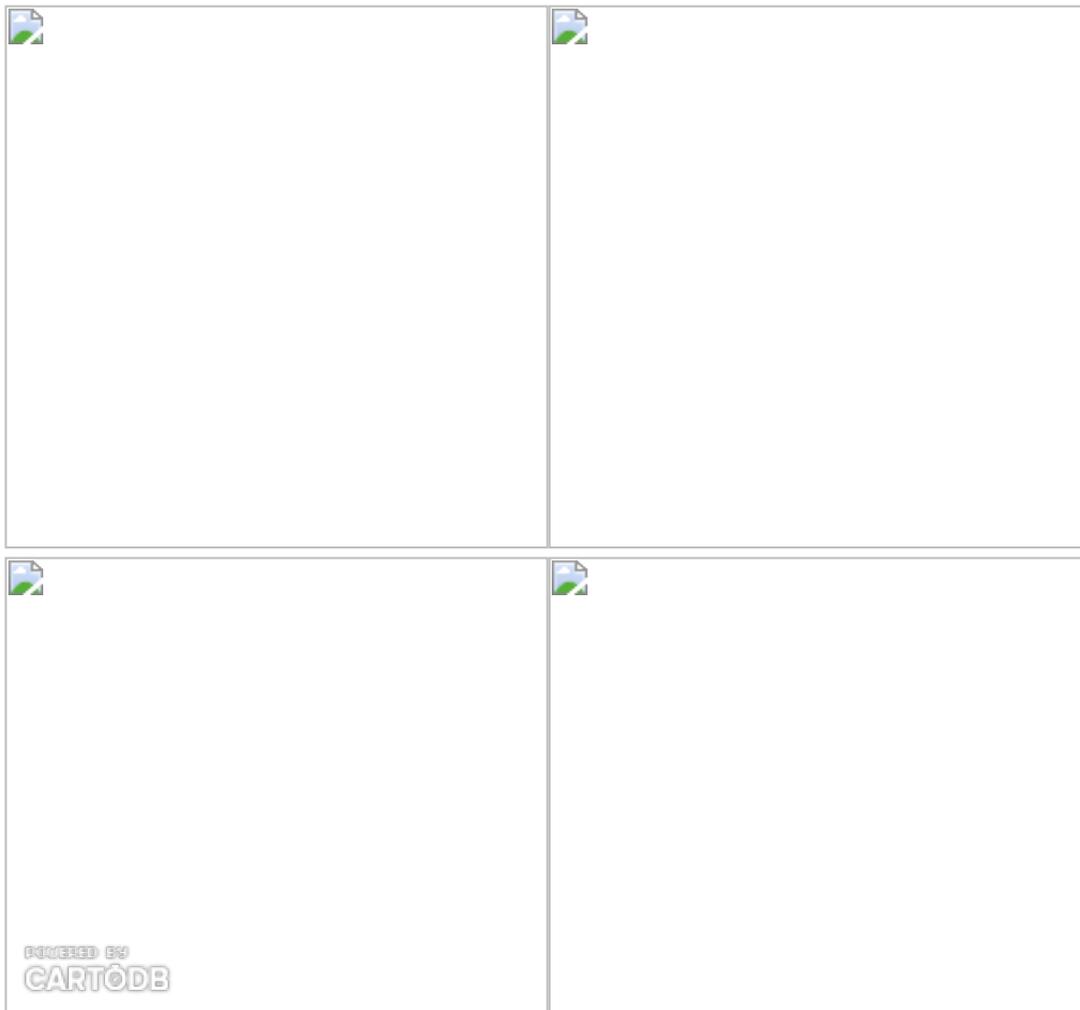
“The reason you’re not seeing South Texas is that South Texas hasn’t been that active in the past year,” Frohlich said.

That’s also why East Texas is not on the risk map for this year either, even though Timpson near Louisiana recorded what is considered to be the state’s largest human-caused quake, of 4.8 magnitude in 2012.

“It’s not like you inject some water and an earthquake occurs the same day,” Frohlich said.

“But if earthquakes were happening in 2015, you should pay attention to that in 2016.”

*What geologists have to say about Texas quakes linked to human activity*



Map created by  [fioannou](#)

A **2013 University of Texas research paper** linked small quakes in South Texas largely to the oil and brackish water leaving underground formations. Researchers concluded neither fracking itself nor disposal wells, where companies inject wastewater deep into the earth, appear to trigger most of the quakes in South Texas.

The most powerful South Texas quake was the **Oct. 20, 2011, event** centered at Fashing. People felt it throughout the San Antonio area, as far south as Kingsville and as far north as Burnet. In Atascosa County, it rattled windows, cracked masonry and knocked items out of cupboards.

The Fashing earthquake coincided with a significant increase in nearby oil and water extraction — something mirrored in previous quakes in Fashing in 1973 and 1984, other times when oil and gas production increased, according to the UT study.

Other areas where earthquakes have been felt include Karnes and Dimmit counties, two areas of heavy oil field activity.

Researchers have also said the Alice quake in April 2010 was likely linked to oil and gas extraction — not wastewater disposal.

More recently, on **Jan. 16, 2015**, Atascosa County was rattled by a 2.8 magnitude quake centered 2 miles west of Jourdanton, according to the USGS. No one reported damage, but emergency services had to respond to the area because people thought there might have been an explosion, and the sheriff's office fielded 40 to 50 phone calls.

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There are roughly 16 seismometers now in Texas, with another 36 to be used for research in particular areas, or to deploy to an active earthquake area. In 2015, the Texas Legislature approved \$4.47 million for more earthquake monitoring. The TexNet Seismic Monitoring Program, led by the University of Texas Bureau of Economic Geology, this spring will place 22 additional seismometers throughout the state.

The Texas Railroad Commission recently hired a seismologist, but did not make him available for interviews Monday. The agency, by email, said it has some of the most stringent seismicity rules in the nation regarding disposal wells. It has disputed the link between injection wells in North Texas and earthquakes.

Jim Casparie, vice president of Fortress Environmental, described how the Railroad Commission regulated his company in its drilling of a brine disposal well in 2014 off of Interstate 10 between San Antonio and Houston.

The agency did its own geologic studies and told his company where it could drill and at what depth, he said. He said he was unaware of any faults or earthquake risk in the Eagle Ford region and cited a USGS map that indicates a low risk of earthquakes across most of Texas.

That map predates the one released Monday that considers human causes.

“In this day and age, it is most certainly prudent to keep a watchful eye out,” Casparie said in an email. “If we did observe (or hear) of a concern it most certainly could impact our decision to drill a well,” he said. He added that his firm is looking into ways to cost-effectively recycle the water instead of injecting it.

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