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Puente Hills fault system could set off a devastating quake

It is a broad, rectangular area 25 miles long and 15 miles wide that stretches from near Whittier to downtown L.A. Seismologists say it's capable of producing a magnitude 7.5 temblor.

By Rong-Gong Lin II

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This week's predawn earthquake in Pico Rivera woke up people around Southern California, but the magnitude 4.4 temblor didn't cause major damage.

But scientists said the quake should serve as a warning about a fault that runs through a large swath of densely populated Los Angeles County and is capable of producing a devastating, magnitude 7.5 quake.

The Puente Hills thrust fault is less well-known than other faults such as the [San Andreas](#) and [Newport-Inglewood](#).

But there is growing scientific evidence that it is particularly dangerous.

In part, that's because it runs under heavily populated areas. But another factor involves the shape and direction of the fault, which experts said would send the strongest shaking during a major temblor toward downtown Los Angeles.

It is a broad, rectangular area 25 miles long and 15 miles wide, stretching from the Puente Hills near Whittier through downtown L.A., USC and Dodger Stadium, before veering west toward Beverly Hills.

In the 1970s, seismologists had thought that the worst quake to hit downtown would be a magnitude 5. But that all changed in 1999 when they discovered the Puente Hills fault. Experts now believe the 1987 Whittier Narrows quake, which killed eight people, occurred along this fault.

The surface of the Puente Hills fault plane cuts through the buried rocks like an angled sheet of paper, with its highest edge slanting up to the west and its deepest to the east. It lies about 2 miles under Dodger Stadium and 4 miles below downtown L.A.'s high-rise district. Its lowest point is 9 miles underground, north of Whittier.

"Any place that's over the rupture is likely to get strong shaking," said Caltech

seismologist Kate Hutton.

Another problem is that the shape of the Puente Hills fault system funnels energy toward Los Angeles' densest neighborhoods. [Video simulations](#) show energy from a quake erupting, with the strongest waves rippling to the west and south across the Los Angeles Basin.

By contrast, the magnitude 6.7 Northridge earthquake in 1994 that killed 60 people channeled its strongest shaking north to sparsely populated mountains.

Another problem in a Puente Hills fault quake is that the soft sediment underneath the L.A. Basin amplifies the quake's energy.

Computer models developed in 2005 showed that [a 7.5 quake under downtown L.A. could kill as many as 18,000 people](#) and cause [billion in damage as much as \\$250](#) if it occurred on a weekday afternoon. Such a quake would be 15 times more powerful than [the Northridge earthquake](#). It is impossible to say when such a large quake could occur.

When the Puente Hills thrust fault shakes, one side of the fault moves up while the other side slips below it. This fault is entirely underground, and there is no visible scarring on the surface.

The Puente Hills fault system was previously unknown to scientists when it ruptured in 1987, causing the magnitude 5.9 Whittier Narrows earthquake that caused \$358 million in damage. Scientists discovered the fault [in 1999](#).

In recent years, experts have sounded the alarm about it. [“This is the fault that could eat L.A.”](#) seismologist Sue Hough told The Times in 2003.

Said geologist Edward Field of the Southern California Earthquake Center in 2005: [“It’s one of the worst disaster scenarios you could imagine for the United States.”](#)

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