

## Hayward Fault is our deadliest - a 'tectonic time bomb'

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The last time a major earthquake ripped along the Hayward Fault, San Leandro and Hayward were nearly leveled, but, in a shock to seismologists, the most populated stretch of the East Bay was relatively unscathed, according to a new map released Wednesday.

The "shake map" of the devastating 1868 quake, which scientists now believe was about 7 in magnitude, provides a dramatic glimpse at the damage and size of the nation's 12th-deadliest earthquake.

But it offers few clues to what a major temblor on the Hayward Fault would look like today because predicting when and where quakes will occur is still beyond scientists' reach.

"The earth doesn't exactly repeat itself," said Jack Boatwright, a geophysicist with the U.S. Geological Survey who compiled the map.

"Next time the patch under Piedmont could be triggered. We just don't know."

Scientists do know, however, that the fault, which stretches about 60 miles from San Pablo Bay to Warm Springs in Fremont, is poised for another major rupture, one that would dwarf the damage of 1868, seismologists said.

"The Hayward Fault is a tectonic time bomb," said U.S. Geological Survey senior seismologist Tom Brocher. "(It's) the single most dangerous fault in the entire Bay Area, because it is ready to pop and because nearly 2 million people live directly on top of it."

Major quakes along the Hayward Fault occur about every 140 years, and a magnitude 7 quake on the fault today would likely leave about 100,000 people homeless and cause more than \$1 trillion in damage, according to the Association of Bay Area Governments and the U.S. Geological Survey.

Unveiled four days shy of the 139th anniversary of the 1868 quake, the new map will help scientists understand how the fault behaved during its last major upheaval.

"This map gives us real observations about a real earthquake, which until now had been theoretical," said Brocher. "It's a very useful tool to help us understand this fault and what may happen in the future."

At 7:53 a.m. on Oct. 21, 1868, the Hayward Fault let out a roar, and the western side of the fault lurched six feet north between San Leandro and Hayward. The shaking toppled buildings in San Francisco, crumbled chimneys in Stockton, sent a 10-foot wave up the Sacramento River and flipped a Hayward grain warehouse nearly upside down.

A steamer skipper named Capt. Petersen, who was walking on the road to Robert's Landing near San Lorenzo, described seeing a great wave rolling across the fields from San Leandro. The quake, he wrote, upended his six-mule team, knocking them flat on the ground.

In San Leandro, a county clerk named J.W. Josselyn panicked and darted outside the courthouse, where he was crushed by a collapsing

column. He was one of about 30 who died in the quake, but the only one in the East Bay, according to the Hayward Area Historical Society.

In 1868, only about 265,000 people lived in the Bay Area, most of them in San Francisco, Oakland, San Jose and Berkeley. Hayward was a bustling farm town of about 1,000 failed gold miners, Portuguese and Dutch immigrants, and other pioneers. It was the biggest settlement between Oakland and San Jose. Most of the town's residents had never experienced an earthquake before, but they quickly rebuilt their community and never looked back, said Hayward Area Historical Society curator Diane Curry.

The northern part of the fault, from Oakland to Richmond, escaped with relatively moderate damage, probably because the fault did not slip as much there and structures were built on more solid ground, Boatwright said. The areas of San Francisco that were most affected were on landfill east of Montgomery Street.

"Every other model we have for that quake shows more damage to Oakland," Boatwright said. "But this shows us the rupture process was fairly weak on the northern extent. That was a big surprise for me."

Boatwright based his map on damage reports and eyewitness accounts in newspapers, letters, journals, diaries and photos. He also looked at cemeteries, counting the broken headstones that predate 1868. At the Lafayette cemetery, nearly half the pre-1868 headstones were damaged, he said.

In all, Boatwright found 30 more descriptions of what happened that day than the 120 previously known accounts, allowing him to create a clearer picture of the quake, which for decades was somewhat of a mystery. Little was known about seismology in general until the seismograph was invented in 1880.

"In 1868, nobody mapped it," Boatwright said. "It wasn't until 40 years later, after 1906, that we started getting our first detailed look."

For years, the most comprehensive account of the 1868 quake was from a 1908 report by A.C. Lawson, chair of the geology department at UC Berkeley.