

## Scientists forecasting major state quake by '37

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LOS ANGELES – California is virtually assured of experiencing one or more potentially damaging earthquakes by 2037, scientists said yesterday in the first statewide temblor forecast.

New estimates show there is a 99.7 percent chance a magnitude 6.7 quake or larger will strike the nation's most populous state in the next 30 years. The odds of such an event are higher in Southern California than Northern California, 97 percent versus 93 percent.

"It basically guarantees it's going to happen," said Ned Field, a geophysicist with the U.S. Geological Survey in Pasadena and lead author of the report.

The news for San Diego County was mixed. Scientists don't have enough data about the Rose Canyon fault in San Diego to predict its chances for a major quake in the next three decades, said Chris Wills of the California Geological Survey, a co-author of yesterday's report.

The Elsinore fault, which runs southeast through San Diego County from near Rainbow toward Jacumba, is far less likely to produce a quake the size of Northridge's in 1994 than scientists used to believe.

But the projections about frequency aren't the same as predictions about magnitude. "The new model includes the possibility that larger earthquakes occur than were allowed for in the previous model," Wills said.

The Northridge earthquake under the San Fernando Valley was magnitude 6.7. It killed 72 people, injured more than 9,000 and caused \$25 billion in damage in the Los Angeles metropolitan area.

Despite the new probabilities, scientists cannot predict exactly where in the state such a quake will occur or when. The uncertainty could make a difference in loss of lives and damage. The far-stronger 7.1 Hector quake that struck the Mojave Desert 130 miles east of Los Angeles in 1999 derailed a passenger train, but caused no deaths and few injuries.

Nonetheless, scientists say the analysis should be a wake-up call for residents to prepare for a natural disaster in earthquake country.

"Earthquake dangers are high throughout California," said Tom Jordan, director of the Southern California Earthquake Center headquartered at the University of Southern California. Jordan took part in the research.

California is one of the most seismically active regions in the world. More than 300 faults crisscross the state, which sits atop two of Earth's major tectonic plates, the Pacific and North American plates. About 10,000 quakes each year rattle Southern California, although most are too small to be felt.

Knowing the likelihood of a strong earthquake is the first step in allowing scientists to draw up hazard maps that show the potential severity of ground shaking in an area. The information can also help with updating building codes and emergency plans and setting earthquake insurance rates.

The latest analysis is the first comprehensive effort by the Southern California Earthquake Center, U.S. Geological Survey and California Geological Survey to calculate earthquake probabilities statewide using newly available data. Previous quake probabilities focused on specific regions and used various methodologies that made it difficult to compare.

In the study, researchers computed the likelihood of a fault rupture using new information about prehistoric earthquakes, location of hard-to-spot faults and their slip rates as well as satellite-based global positioning system data of the Earth's crustal movement.

Scientists determined a Northridge-size shock occurs on average once every five years. The chance of a temblor that size striking the Los Angeles basin is 67 percent compared with 63 percent for the San Francisco Bay Area. The San Francisco figure is similar to a 2003 analysis that put the probability at 62 percent. There is no past comparison that exists for Los Angeles.

Given California's seismic history, the new results should come as no surprise, said David Schwartz, a USGS geologist in Menlo Park who wasn't part of the study.

Researchers also calculated the statewide probabilities for larger temblors over the same time period. Among their findings: There is a 94 percent chance of a magnitude 7 shock or larger; a 46 percent chance of a magnitude 7.5 and a 4.5 percent chance of a magnitude 8.

The odds are higher that a magnitude 7.5 quake will hit Southern California than Northern California – 37 percent versus 15 percent.

Of all the faults in the state, the southern San Andreas, which runs from Parkfield in Monterey County southeast to the Salton Sea, appears most primed to break, scientists found. There is a 59 percent chance in the next three decades that a Northridge-size quake will occur on the fault compared with 21 percent for the northern section.

The northern San Andreas produced the 1906 San Francisco earthquake, a recent disaster in geologic time compared with the southernmost segment, which hasn't erupted in more than three centuries.

Scientists are also concerned about the Hayward and San Jacinto faults, which have a 31 percent chance of producing a Northridge-size temblor in the next 30 years. The Hayward fault runs through densely populated cities in the San Francisco Bay Area. The San Jacinto fault bisects the fast-growing city of San Bernardino.

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■ Staff writer Mike Lee contributed to this report.

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