

# Inland Empire quake conditions different from New Zealand

**Mark Muckenfuss, Riverside Press-Enterprise, 3-5-11**

An Inland scientist says the high water table and loose soil that caused so much damage during the recent earthquake in Christchurch, New Zealand, won't happen here, at least for now.

When the magnitude 6.3 quake hit New Zealand's second largest city Feb. 22, the degree of destruction surprised many. On Friday, officials reported the death toll had risen to 163. As many as one third of the city's downtown buildings may need to be razed.

Much of that damage is being attributed to the shallow depth of the quake and the loose soil upon which much of the city sits. That loose soil, in combination with a high water table, resulted in a substantial amount of liquefaction, a phenomenon that takes place when sideways shifting of sandy soils allows subsurface water to bubble up, creating a quicksand-like mixture. Without solid footing, many buildings fail.

Similar conditions in the San Bernardino area -- particularly downtown San Bernardino and along the Santa Ana River -- have been a long-standing concern.

The region historically has had a high water table. In the past, buildings in San Bernardino's downtown area have battled flooding basements, and water has bubbled from springs in the Inland Center area.

Cal State San Bernardino geology Professor Sally McGill studies earthquake faults. She said San Bernardino potentially could see the same kinds of damage as Christchurch, if the water table were to rise again from its current levels of 80 to 160 feet below the surface.

"They're describing it as a river plain," McGill said of Christchurch, "and that's kind of the way San Bernardino is. We have loose, young sediments. Anywhere where the water table is less than 30 feet, you can have liquefaction."

A recent study by PACE Advanced Water Engineering shows the current levels to be substantially lower than that.

Bruce Phillips is project manager for the Fountain Valley firm. The study, he said, was undertaken as part of a plan to deal with the high groundwater table.

"The groundwater's lowered from historic highs," Phillips said.

The depth in the downtown area is about 80 feet. In the Santa Ana River area, the level ranges between 80 to 160 feet.

Phillips couldn't think of any other areas of the Inland Empire that were as prone to liquefaction. But, he said, other Southern California regions are at risk.

"A good example would be in Huntington Beach," he said. "There are big areas that are liquefaction-prone. They're developed in old remnants of where the historic Santa Ana River flowed."

McGill said the San Bernardino area is probably safe from liquefaction. But if the water table does rise again, she said, a large enough quake on any nearby fault could result in liquefaction.

"The San Jacinto Fault goes right through the potential liquefaction area, so I suppose it could be more of a problem," she said. "But an earthquake on the San Andreas is probably going to be big enough to overcome the distance and create liquefaction."

At Caltech in Pasadena, geologist Kate Hutton said greater understanding about the liquefaction process may emerge as scientists study the Christchurch quake.

"It is a bit early to know what we're going to learn from New Zealand," Hutton said. "I don't expect a lot of surprises. The hazards we already know about are the ones that appeared. But we don't have a lot of details yet."