

USGS estimates higher risk to Delta levees from quakes

Matt Weiser, Sacramento Bee, 1-29-11

The potential for earthquakes to cause massive levee failures in the Delta is probably greater than previously estimated, seismic experts reported Friday.

In a presentation to the Delta Stewardship Council, scientists from the U.S. Geological Survey said prior studies made "very, very unrealistic" assumptions about ground motion in the Delta.

Those studies assumed soils are relatively uniform across the region, said David Schwartz, USGS earthquake geologist. As a result, the ground shaking assumed in those studies was likely low.

Yet those earlier surveys still predicted dire effects: Dozens of levee breaks could occur simultaneously, flooding numerous islands.

"The reality is, we're going to experience higher than presently modeled ground motions, which will result in widespread levee failure," Schwartz said.

There are 1,100 miles of levees in the Sacramento-San Joaquin Delta, and almost none meet the 100-year-flood standard set by the federal government as minimum protection for urban areas. Delta levees, built to protect farms, are much smaller.

Islands in the Delta are actually like bowls. A century of farming has caused island peat soils to degrade and subside below sea level, creating giant voids ringed by levees.

The Delta quake threat is a statewide concern, because the estuary is a freshwater supply for 25 million Californians. If several islands flooded at once, salt water would rush in from San Francisco Bay to fill those voids.

State water officials previously estimated this scenario could cut off freshwater deliveries from the Delta for more than a year.

In part because of this threat, the Delta Stewardship Council was created by legislation in 2009 to streamline government functions in the estuary. By Jan. 1, 2012, it must complete a "Delta Plan" to address risks to the estuary.

"We have no earthquake standard for levees in the state," said Joe Grindstaff, the council's executive director. "It's not something we design a levee around yet."

Faults in the East Bay pose the greatest risk to the Delta, Schwartz said. These are the Hayward, Calaveras, Greenville, Concord-Green Valley and Mount Diablo faults.

There is a 40 percent chance of a 6.7 or greater magnitude quake on these faults within 30 years, he said, and a 96 percent chance in 100 years.

Schwartz suggests deciding which levees to strengthen to survive a quake. Such "backbone" levees could help protect water supplies and serve as a framework to rebuild others after a quake.

The USGS is conducting research on specific soil conditions and ground motions in the Delta, and should have more data in two years to prioritize such decisions. Others are skeptical, noting that levees withstood other quakes, such as the 1906 San Francisco temblor, which hit 7.9 on the Richter scale.

"Things have changed, yes," said Don Nottoli, a council member and Sacramento County supervisor. "But 100 years ago, they held."

Gilbert Cosio of MBK Engineers in Sacramento said Delta levees have slumped or collapsed from shaking, but never failed completely.

"These levees do move," said Cosio, an engineer whose firm represents 27 Delta levee maintenance districts. "Even though they're just big lumps of dirt, they don't let the water through. They take a lot of shaking."