

# California receives U.S. funding for earthquake early-warning system



A home in Napa, damaged by a 6.0-magnitude earthquake in August. (Alvin Jornada / European Pressphoto Agency)

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**C**alifornia has received congressional funding to begin rolling out an earthquake early-warning system next year, capping nearly a decade of planning, setbacks and technological breakthroughs, officials said Sunday.

Scientists have long planned to make such a system available to some schools, fire stations, and more private businesses in 2015, but their effort hinged on Congress providing \$5 million. The system would give as much as a minute's warning before shaking is felt in metropolitan areas, a margin that experts say would increase survival.

The U.S. Senate approved the allocation this weekend as part of the \$1.1-trillion spending package, passed by the House of Representatives on Thursday, that will fund most of the U.S. government through the rest of the fiscal year. Officials plan to announce the funding at a news conference at Caltech on Monday.

The early-warning system is considered a major advance in seismic safety because it can give the public crucial seconds to prepare for the effects of shaking. Scientists eventually want to make alerts available to a wider public via phones, computers and special devices, such as modified weather radios, once the network is refined.

To the consternation of some, California is well behind Japan as well as Mexico, Taiwan, Turkey and other countries in using early-warning technology.

California's effort was hampered by funding problems, which slowed the installation and upgrades of hundreds of sensors that instantaneously measure ground movement. Scientists also have been working to build a robust computer system that relays warnings faster than the speed of seismic earthquake waves traveling through Earth's surface.

So far, only academics, select government agencies and a few private firms have received alerts from the prototype system. But by next year, access will expand considerably, providing real-time tests that officials hope will identify glitches and help them improve the system.

Officials plan to hook up the alerts to a public announcement system at a select number of schools to warn students and teachers to drop and cover. Others would be routed to fire stations, enabling garage doors to be opened before the power goes out or structural distortions jam the doors. Eventually, the alerts also could give time for private businesses to shut off heavy equipment and for hospitals to suspend surgeries.

The system is already being used by the BART commuter rail system in the Bay Area to slow down trains before a quake hits, reducing the risk of derailment.

Early warnings were successfully generated this year in Southern California after several moderate earthquakes. Officials testing the system in San Francisco got eight seconds of warning before strong shaking arrived from the 6.0 Napa earthquake in August.

Enough sensors are in the ground in the Los Angeles and San Francisco areas to expand the number of testers, but there have been problems elsewhere. The system struggled during the recent swarm of earthquakes in the Mammoth Lakes area.

The early-warning system works on a simple principle: The shaking from an earthquake travels slower than the speed of today's telecommunications system. For example, it would take more than a minute for a 7.8 earthquake near the Salton Sea to shake up Los Angeles, 150 miles away.

Seismic sensors stationed at the Salton Sea could detect the first waves in as little as 5 seconds, and transmit a warning throughout Southern California. In this scenario, Palm Springs would have 20 seconds of warning; San Bernardino, 45 seconds; and the Los Angeles area, more than a minute.

Scientists with the U.S. Geological Survey say they need \$16.1 million a year to build and maintain such a network for California, Oregon and Washington state.

They said they need to more than double the existing network of 400 sensor stations, mostly by adding equipment in areas outside of Southern California. An additional 275 stations are needed in Oregon and Washington, said Doug Given, earthquake early-warning coordinator for the USGS.

Sen. Dianne Feinstein (D-Calif.) called the \$5 million in funding "a down payment," but said "more funding is necessary to complete the system."

"We must get it done before the next major earthquake strikes," Feinstein said in a statement.

U.S. Rep. Adam Schiff (D-Burbank) on Sunday urged state governments and private companies to pitch in for the cost.

"I only hope we can get this done before we have a major earthquake," Schiff said. "We've been derelict, even though the technology is being pioneered here. It's something we really need to put into effect."

The California Office of Emergency Services has been looking for private entities to help further fund the California system.

"There are certainly private firms out there that would want a stable and reliable earthquake early-warning system in California," said agency spokesman Brad Alexander.

One private firm has been using a proprietary system to provide early-warning systems to some public agencies, particularly those near the San Andreas fault. Other firms are looking toward the USGS's system to develop mobile applications and devices similar to emergency weather radios that would provide the alerts to consumers.

At the earliest, it is probably going to take several years for early alerts to be available on smartphones. San Francisco officials have discussed relaying warnings via text messages and phone calls to residents, and possibly activating 112 sirens located across the city.

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