Revamped U.S. tsunami warning system unreliable, report finds

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WASHINGTON -- A detection system that was expanded following an Indian Ocean tsunami that killed 230,000 people has experienced significant outages and can no longer be relied on detect the giant waves as they approach the U.S. coastline, a new report finds.

The system, known as DART, or Deep-ocean Assessment and Reporting of Tsunamis, was expanded from six deep-ocean buoy stations to 39 in the months following the massive 2004 earthquake off Indonesia that spawned killer waves that washed ashore as far away as the east coast of Africa. Though there are DART buoys in the Atlantic and the Caribbean, most of them are located around the Pacific Ocean's "Ring of Fire" to give advance warning to Washington, Oregon, California and Alaska, where a tsunami landfall is thought more likely.

But at any given time, 30 percent or more of the buoys have been inoperable, according to a recent report from the National Research Council.

An alarming number of buoys have broken their moorings and drifted away. The buoy stations have also suffered failures in sensors that can detect a sea level rise of as little as one-third of an inch. Other systems on the sophisticated buoy stations have also had problems.

"As a consequence of the pervasive outages of DART stations, the Tsunami Warning Centers cannot depend on the DART network for tsunami forecasting," said the report, which was requested by Congress.

The DART buoys are designed to track the giant waves as they cross the ocean at the speed of a jetliner. But the report also warned that serious gaps in preparedness persist among coastal communities, coastal states and the federal government when it comes to tsunamis that could reach the shore minutes after being triggered by an earthquake or underwater landslide.

The most serious tsunami threat in the United States involves just such a scenario. The Cascade subduction zone where tectonic plates collide off the coast of Washington, Oregon and northern California is overdue for a mega-quake that could easily reach a magnitude of 9.0 on the Richter scale. The quake could trigger a tsunami that by some estimates could be 90 feet tall and arrive on the Northwest coast in minutes.

"There won't be time for warnings," said John Orcutt, a professor at the Scripps Institution of Oceanography who chaired the committee that wrote the report.

Although there have been improvements, the report said, more especially needs to be done in terms of educating coastal residents and tourists about the dangers of tsunamis and the need for immediate evacuation if they feel an earthquake. The education effort also needs to be sustained over the years to ensure people don't forget or become lax in preparing for a tsunami.

"People don't need to understand plate tectonics," said Nathan Wood, a research geographer with the U.S. Geological Survey in Vancouver, Wash., who served on the committee that wrote the report. "People need to know what to do when the ground starts shaking."

There also needs to be better coordination between the nation's two Tsunami Warning Centers, one in Alaska

and the other in Hawaii, the report said. The two centers, both part of the National Weather Service, use different technology, have different responsibilities and different management.

In one instance in 2005, the Alaska center issued a tsunami warning to coastal Oregon and California. Minutes later, the Hawaii center said the warning wasn't necessary. The conflicting advisories caused confusion for local emergency management agencies, the report said.

Further studies of "vertical evacuation," in which people flee to tsunami-proof structures when a giant wave approaches, are needed, the report said. Such structures have been built in Japan. The town of Cannon Beach, Ore., is considering building a new city hall that people could use in the event of tsunami, and some have proposed building giant berms on the flat Long Beach Peninsula in Washington State where people could gather in case a tsunami threatens.

"We are better off than we were," Orcutt said. "But tsunamis don't happen that often. Without an ongoing program, people will forget."

Although the largest threat is on the West Coast, the report said Puerto Rico, the Gulf of Mexico and the East Coast from the Carolinas to Maine could be hit by waves generated by earthquakes or underwater landslides in the Atlantic Ocean and the Caribbean. A tsunami generated by a 7.0 earthquake off the Grand Banks devastated parts of Newfoundland in 1929, Orcutt said.

The DART buoy stations use pressure detectors on the ocean floor to note any rise in sea level. The information is then transmitted by acoustic telemetry to the buoy, which beams it to an orbiting satellite; it's then downloaded at a shore station. In normal mode, pressure readings are taken every 15 minutes and the data transmitted to shore every six hours. In "event mode," the system can automatically switch itself on and within three minutes after detecting an unusual wave the information will be transmitted.

While the buoy stations were expected to last four years, many were lasting little more than a year, the report said.

The problems were not surprising for such a "large, new and admittedly hurriedly-deployed set of complex systems deployed in a very harsh environment," the report said.

Even so, the report said that since the buildup of the DART network it has "experienced significant outages that can have adverse impacts on the capability of the Tsunami Warning Centers to issue efficient warnings, to use near real-time forecasts, and to cancel warnings."

Officials of the National Data Buoy Center, a little known agency within the Commerce Department that builds, operates and maintains more than 200 federal weather, climate and other buoys, admitted it was a "strain" getting DART installed. But they say there have been improvements since the committee that wrote the report visited the agency's Mississippi headquarters.

"If they visited today they would come away with a different impression," said Craig Kohler, project manager for DART.

Kohler concedes, however, that funding remains tight. The agency has to rent time at $25,000 a day on commercial or research vessels to do maintenance on the DART stations.

Orcutt remains unconvinced.

"DART is in a lot better shape than in 2005, but reliability is poor and declining," he said. "There is still a question about whether they can be reliable."