



ON THE LINE

TsunamiReady Communities No Overnight Solution

The December 26, 2004, Sumatra earthquake and tsunami served as a grim reminder to those of us in the Pacific Northwest that we will have to deal with a similar event originating from the Cascadia Subduction Zone in the future. The Pacific Rim states of Alaska, California, Hawaii, Oregon, and Washington have been preparing for both local and distant tsunami events since before the inception of the National Tsunami Hazard Mitigation Program (NTHMP) in 1997. This program created a consortium of federal and state partners that lend both scientific and emergency management expertise to develop products such as hazard assessments, inundation and evacuation maps, and warning systems for communities at-risk from tsunamis.

In 2001, the National Weather Service (NWS) began its TsunamiReady program to provide coastal communities with guidelines for hazard awareness, improved planning, and public education to help them survive in the event of a tsunami strike. A community that meets program criteria may be recognized as TsunamiReady by the NWS. However, the TsunamiReady program only lays a foundation upon which a vulnerable coastal community can build its tsunami awareness and preparedness infrastructure. Washington and other NTHMP states have also applied emergency management principles and scientific product development initiatives that encourage communities to take steps toward becoming “tsunami resilient.” This continuous process of mitigation and preparedness includes the following:

Hazard identification and risk assessment is the first step in the development of an understanding of a community’s vulnerability and serves as the foundation for public education. Scientists can develop a tsunami model and inundation map that provides information such as wave heights, inundation zones, water depths, and land deformation. By identifying the hazard, assessing the risk, and understanding the associated issues, local decision makers can develop preparedness and response plans based on actual risk and vulnerability. They can define and establish evacuation routes and install signs, designate assembly areas, and develop strategies to care for evacuees. The model and map can also be used for land use planning and for developing ordinances to protect the community’s infrastructure and economic base. To be eligible for federal

hazard mitigation grant funding, all these activities should be incorporated into a local hazard mitigation plan that is compliant with the Disaster Mitigation Act of 2000.

A good public education program directly addresses tsunami hazard issues and presents information about mitigation and preparedness simply and clearly. Such a program should use risk communication principles and tools to change public perception of the threat and to generate community buy-in for tsunami preparedness actions that will reduce vulnerability and loss of life and protect a community’s infrastructure and economic base. It will also improve the community’s ability to react correctly to evacuation orders and procedures and decrease the likelihood that individuals will take legal action against their local government after a disaster.

Good risk communication tools for tsunamis include the following:

- **Tsunami warning and evacuation signs** identify tsunami risk areas and evacuation routes and generate significant media attention locally and nationally. They educate communities at a broader level than any other mitigation tool, bring long-term mitigation issues to the table for discussion, and provide a cost effective way of disseminating a consistent message. In addition, tourists get the same message regardless of which tsunami-vulnerable state they are visiting.
- **Tsunami brochures with evacuation maps** provide information about tsunamis, warnings, evacuation procedures, 72-hour emergency survival kits, local NOAA (National Oceanic and Atmospheric Administration) Weather Radio (NWR) frequencies, and more. These brochures are placed throughout coastal communities in locations that people are most likely to frequent: visitor centers, hotels and motels, ferry terminals, medical offices, libraries, local businesses, and community centers.

To validate an education program’s goals and objectives, a tsunami-resilient community must use social science tools, such as surveys and focus groups. These tools help quantify public understanding of the tsunami hazard and warning and evacuation procedures and the degree to which individuals are prepared to deal with hazard consequences. The community can use this information to develop strategies that will guide preparation of future public education initiatives and materials. For example, small

business focus groups could assess the hospitality industry's preparedness efforts, which should include continuity planning, staff and customer awareness, and the capability to receive alert and notification messages as well as to evacuate guests out of the tsunami hazard zone. Lessons learned from the Sumatra event clearly indicate that the tourism industry should be an integral part of a community's preparedness and education program as well as its alert, notification, and evacuation processes.

Integrated on-shore communications must be in place to get the warning message to the public. The NTHMP works to ensure tsunami warning information is as accurate as possible. It uses real-time data provided by two systems: deep ocean detection tsunameters and an NTHMP seismic network. Real-time data provides the West Coast/Alaska and Pacific Tsunami Warning Centers with quick and reliable information to determine whether a seismic event has generated a tsunami in the Pacific Ocean. Having these two 24-hour warning points and an integrated on-shore communications infrastructure that supports alert and notification ensures effective and rapid notification to citizens and tourists in at-risk communities.

In Washington State, NWR supplements coastal communities' communication infrastructures and improves local access to emergency information. NWR receivers are installed at designated Emergency Information Centers, including visitor centers, hotels and motels, marinas, ports, gas stations, and grocery stores. NWR placards are visibly posted at sites with weather radio receivers.

The NWR is an effective and rapid alert and notification system than can warn listeners about a hazard before the mass media and the state or county alerting systems can do so. This gives people additional time to react before danger hits their area. Washington has designated September as NOAA Weather Radio Awareness Month. The goal is to have NWR receivers as common as smoke detectors in homes and businesses statewide to help protect lives and property from natural and technological hazards.

While these receivers are gaining popularity in coastal areas, most communities lack a notification system for remote beachheads and heavily trafficked areas. In the areas hit by the recent tsunami, lack of warning to the people on the beaches and in other highly vulnerable areas resulted in loss of life that otherwise could have been avoided.

In July 2003, to remedy the lack of such a warning system, Washington State deployed an All Hazard Alert Broadcasting (AHAB) radio system to provide all-hazard warnings to heavily trafficked tourist areas in Ocean Shores, Washington, one of the state's most at-risk tsunami communities. This system ties into the Emergency Alert System and the National Weather Wire Service, giving it the same capabilities as the NWR. AHAB is economical, reliable, voice and siren capable, and can use wind power, solar panels, or commercial electricity to charge its batteries. National authorities as well as state and local officials can trigger the system, which can also be used as a public address system by local emergency response vehicles with the correct communication protocols.

Regardless of the communication alert and notification systems used by an at-risk tsunami community, it must ensure that all affected individuals receive warning messages in a rapid and efficient manner to avoid the potential loss of life from a tsunami.

A community does not become tsunami resilient overnight. The NWS TsunamiReady program provides the foundation as well as recognition to those that have embraced the TsunamiReady process. This recognition can be achieved only as a community's culture is changed, its citizens become sensitive to the tsunami hazard, and they prepare for it. The community must develop a strong public education program with an emphasis on risk communication tools supported by hazard identification and risk assessment, preparedness and mitigation planning, public education tools, on-shore communications, training, and exercises. The NTHMP facilitates the development of such a program and is the key to the development of tsunami-resilient communities.

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Internet Resources

<http://www.stormready.noaa.gov/tsunamiready/>
TsunamiReady Program

<http://www.pmel.noaa.gov/tsunami-hazard/>
National Tsunami Hazard Mitigation Program

<http://emd.wa.gov/5-prep/PnP/prgms/eq-tsunami/tsunami-idx.htm>
Washington Coast Tsunami Preparedness Information

<http://www.nws.noaa.gov/nwr/>
NOAA Weather Radio

