

Coastal ecosystems and communities at risk

WHEN OREGON COAST residents talk about “coastal natural hazards,” chances are they mean more than winter storms, wave-dashed shores, and beach erosion. Living on the seismically active Pacific Rim, they’ve begun to think about the really big hazards: cataclysmic earthquakes and towering tsunamis with the potential to swamp entire communities.

Much of this changing awareness can be credited to more than a decade of research, collaboration, and public education by Oregon Sea Grant and its Extension coastal resources specialist, Jim Good.

Although no such devastating quakes have hit in modern times, there’s plenty of evidence that they have in the past, and could again, thanks to the 700-mile offshore fault known as the Cascadia Subduction Zone. Geologists know, for instance, that an offshore quake on January 26, 1700 sent tsunami waves crashing into Oregon’s coast within hours after similar waves hit Japan, wreaking deadly havoc. And there is evidence that similar quakes hit the region every 300 to 1,000 years.

When the last tsunami struck, Oregon’s coast was a relatively unpopulated wilderness. Today, that same area is home to thousands of people who are faced with a serious challenge: how to plan for a threat they have never experienced and cannot predict, but



Coastal Resources Specialist, Jim Good, instructs students in the popular Marine Resource Management program.

which, when it happens, could result in tragic losses of life and property.

Sea Grant’s Good has spent the past decade helping coastal residents and state policy makers meet that challenge. In 1991, Good brought state and local agencies together with scientists for a conference on natural hazards management. Out of that conference grew a policy working group that developed 79 separate recommendations for improving hazards research, information, and emergency preparedness.

The recommendations didn’t just end up on the shelf. They resulted in new state laws—one, for instance, requires that the entire coast be mapped for tsunami hazard

areas and that coastal communities take steps to locate hospital, fire departments, schools, and other critical services outside those areas. The initial mapping has been completed, and more detailed maps are being drafted for communities considered especially at risk. Another law requires coastal schools to educate students about tsunamis, and to conduct regular evacuation drills. Additional legislation to minimize landslides and other risks continues to make its way through the legislative process. Other recommendations—including Sea Grant-designed tsunami warning and evacuation signs—were implemented administratively and adapted for use in other Pacific Rim states.

Additional Sea Grant Hazards Contributions

A second Sea Grant-sponsored conference, in 1995, brought 120 coastal residents and local officials together to learn more about earthquakes and tsunamis and how their communities might reduce their risks. Out of that conference came further education and action programs by emergency managers, state agencies, and local governments along the coast.

The following are some of Oregon Sea Grant's additional coastal hazards contributions.

- ▶ Vicki Osis, Extension Sea Grant (ESG) marine education specialist, developed earthquake-tsunami preparedness training for more than 30 coastal public school teachers, each of whom also received curriculum materials to use in the classroom.
- ▶ Bill Hanshumaker, ESG public education specialist, developed interactive exhibits on tsunami and earthquake hazards for the public exhibition wing at OSU's

Hatfield Marine Science Center. Thousands of children and adults visit the popular exhibit center each year.

- ▶ Stephen E. Dickenson, an Oregon State University civil engineering professor, used Sea Grant funding to investigate the tsunami and earthquake vulnerability of different types of waterfront retaining structures in ports and harbors. His findings were published in *The Journal of Waterway, Port, Coastal, and Ocean Engineering*, November/December 1997.
- ▶ Two members of Good's original working policy group were appointed to the state's Seismic Safety Policy Advisory Commission. Others have gone on to lead local preparedness efforts in communities such as Lincoln City. Although its efforts focused public attention on the potential for large-scale disaster, the working policy group did not neglect more common coastal hazards, from

beach erosion to landslides. At the group's suggestion, the state has consolidated its shore-protection permit authority, once split between two agencies, decreasing public confusion and regulatory burdens. Sea Grant also helped develop a computer-based information system that beach management agencies, and eventually the public, can use to determine hazards associated with particular properties.

Projects now underway include

- ▶ Development of a Geographic Information System (GIS) to support regional littoral cell planning for beach, shore protection, and oceanfront development in the Tillamook County's Netarts-Oceanside area.
- ▶ An earthquake-tsunami mitigation program for Pacific Northwest ports and harbors, in partnership with Washington and California Sea Grant programs, NOAA, FEMA, USGS, and local ports.