Oregon Sea Grant helps coastal residents prepare for tsunamis

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Oregon Sea Grant Hazards Outreach Specialist Pat Corcoran is crafting realistic, positive messages for improving our tsunami preparedness.

With new research predicting a significant chance of a massive, tsunami-generating earthquake off the Oregon coast in the next 50 years, Pat Corcoran finds his services in more urgent demand than ever.

Corcoran, coastal hazards specialist for Oregon Sea Grant Extension, is a one-man roadshow, taking the message of tsunami and earthquake preparedness to community meetings and workshops up and down the coast.

Corcoran's message isn't complicated. He says lives can be saved if coastal residents and visitors are aware of just three things:

- what to do when you feel an earthquake on the coast
- where the high ground is wherever you are, and how to get there
- how to reconnect with loved ones once the event is over

Until recently, scientists thought the undersea faults off Oregon were subject to rupture every 500 years or so. But recent research by Chris Goldfinger of the Oregon State University marine geology and geophysics program suggests the cycle is more like every 240 years at the southern end of the fault. Given that the last tsunami-generating quake to hit the Oregon coast occurred in 1700, we're overdue. Goldfinger predicts that there is a 37 percent chance of a tsunami-generating quake within the next 50 years.

Megathrust earthquakes occur in subduction zones—like the one just off the Oregon coast—at the boundaries where one tectonic plate is forced under another. Such quakes are among the world's strongest, with magnitudes measuring up to magnitude 9. These earthquakes are identical to the quakes that rocked the Indian Ocean in 2004, Chile in 2010, and Japan in 2011. The resulting tsunamis killed a staggering 230,000 in the Indian Ocean region, hundreds in Chile, and thousands in Japan.

Corcoran has been working on coastal tsunami preparedness since 2005. With colleagues from the Department of Geology and Mineral Industries, the Oregon Office of Emergency Management, and the National Weather Service, he conducts "Tsunami Roadshows" along the Oregon coast, visiting dozens of communities each year.

Corcoran has different presentations and workshops for different audiences. He has tailored his talk to business owners in Nehalem, realtors in Manzanita, and a variety of public meetings in towns like Seaside, where residents pepper him with questions about what to expect and how to prepare for earthquakes and tsunamis. He has held more than 60 workshops in Clatsop County alone, attracting more than 1,000 business owners, emergency volunteers, and government employees.

In Warrenton, the manager of the local Fred Meyer store invited Corcoran to speak to the store's 135 employees about personal safety and how they can help customers in the event of a tsunami.

"Chain stores and casinos are underused venues for tsunami education," said Corcoran, who reviewed inundation maps and evacuation routes with the employees. "That's where the people are!"

Beyond explaining the dangers, Corcoran emphasize what people can do. "We want to craft realistic, positive messages for improving our preparedness," he said.

The point, said Corcoran, is to meet people where they are and talk about tsunamis in terms they can understand—and remember.

"This is not an expert issue," Corcoran said. "You don't need to talk to scientists or have a Ph.D. to become prepared."

For example, he said, everyone can understand the difference between a big local earthquake, which precedes the arrival of tsunamis by 15–30 minutes, and a siren or warning event which means a quake occurred somewhere else, generating waves that will take hours to reach Oregon beaches and will be much smaller than those generated locally. The problem, he said, is that people tend to think both events have the same consequences. "We tend to collapse these two distinct scenarios into one. This leads us to worry too much about the distant event and not enough about the local event," he said.

If you experience sustained ground shaking, he said, that's a local quake. People need to know if they're safe where they are, or how to reach higher ground if they're not. They also need to understand that local quakes will damage or destroy buildings, roads, bridges, and power lines, and disrupt communication networks and very likely injure thousands of people.

Distant quakes, by contrast, are not felt locally. But they are detected and tracked by a growing, international Tsunami Alert Network, which announces tsunami watches and warnings via TV, radio, or emergency sirens hours before the waves hit. That provides plenty of time for the orderly evacuation of beaches and waterways.

Some coastal communities already have detailed maps showing areas likely to be inundated when a tsunami strikes. The state Department of Geology and Mineral Industries has tsunami hazard maps for the entire coast, and is currently revising them under a grant from the National Tsunami Hazard Mitigation Program.

Watch the online video "The 3 Things You Need to Know" about tsunamis:
http://seagrant.oregonstate.edu/video/flash/three_things.html

Meanwhile, Corcoran encourages people to speak with their loved ones about what they need to do, where they need to go, and how they will reconnect afterward.

Despite his efforts, and the efforts of others, to increase tsunami awareness and preparedness among Oregonians, Corcoran sees a huge gap between what the scientists know and how the public behaves. "There is a huge disconnect," he said, "and it is understandable when you consider that this hazard is new to our experience." The first scientific papers on the likely impacts of a Cascadia subduction zone earthquake weren't published until the late 1980s. "Coastal residents are behind the curve on preparing for this greatest natural hazard that we knew nothing about," he added.

In fact, Native Americans had better community education about tsunamis than we do. Pacific Northwest tribes passed down stories of huge waves and earthquakes for centuries, but much knowledge of natural cues that it's time to head for higher ground was lost with the European settlement of the region—all of which occurred after the megathrust quake of 1700 inundated the coast.

So Corcoran works to improve people's chance of surviving. "I find that walking people through personal scenarios is the most effective approach," he said. People don't really "get it" until they put their finger on a map and ask themselves, "Where would I go if the quake hit while I was at church, or shopping, or clamming?" Many think they will be sitting together at the kitchen table when the next one strikes. It is far more likely that they will be off conducting their daily business far away from home and loved ones. We all need to prepare for that—not only physically but psychologically.

The basics are—well, basic. You don't need to be a geologist to be safe at the beach. "I use the drivers' education analogy," Corcoran said. "Driving vehicles is one of the most dangerous things we do. But we manage that risk by insisting on driver's licenses, establishing traffic laws that are enforced, requiring seat belts, etc. Tsunamis are a hazard for which we have little risk management at all. There's not that much you need to know. But you need to know it, and then tuck it away until that day when you need it."

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