

NTHMP Panel Discussion - Social Justice and Environmental Hazards

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- Western Geographic Science Center, U.S. Geological Survey
- GIS analysis/modeling of societal vulnerability to hazards

What to do if everyone can't run for the hills?

Evacuation | A federal analysis looks at Oregon coastal cities' varying vulnerabilities

By **MICHAEL MILSTEIN**
THE OREGONIAN

The obvious thing to do if a tsunami comes is head for the hills — as quickly as your feet will take you.

But what about in Bandon, where almost half the people in the area likely to be underwater are older than 65 and may not find it so easy?

What about unincorporated Clatsop County, where two child day cares and two adult care facilities are in the inundation zone?

What about coastal state parks, where thousands of people camping and swimming on any summer day may know little about tsunamis, let alone where to run?

A new analysis by the U.S. Geological Survey examines such vulnerabilities of Oregon coastal cities. It considers how much of each community's area, population and facilities are within an inundation zone, and how large a toll damage may

take on each community as a whole.

It also identifies specific points that may be overlooked in standard disaster plans. Local officials say the assessment will help them design effective response plans and explain to residents why it's vital to prepare for a tsunami.

Seaside is identified as by far the most vulnerable city on the Oregon coast. That comes as no surprise to local planners who know that most residents and facilities, including popular hotels, sit on flats exposed to big tsunami waves.

Gearhart, Warrenton, Cannon Beach and Rockaway Beach come next on the list of vulnerable communities.

The makeup and exposure of such cities may have as much to do with how they weather tsunamis as the tsunami itself, said Nathan Wood, a USGS research geographer in Vancouver who completed the analysis.

For instance, many low-income families in New Orleans were exposed to the wrath of Hurricane Katrina in part because they did not have the means to escape. Evacuation plans must be tailored to local conditions, he said, so emergency crews know where and how to help people in long-

term care centers, for instance.

"It's not really fair that you'd expect them to react the same way as 20-year-olds who can run for the hills," Wood said.

In the Indian Ocean tsunami of 2004, the proportion of deaths was greatest among children and older adults.

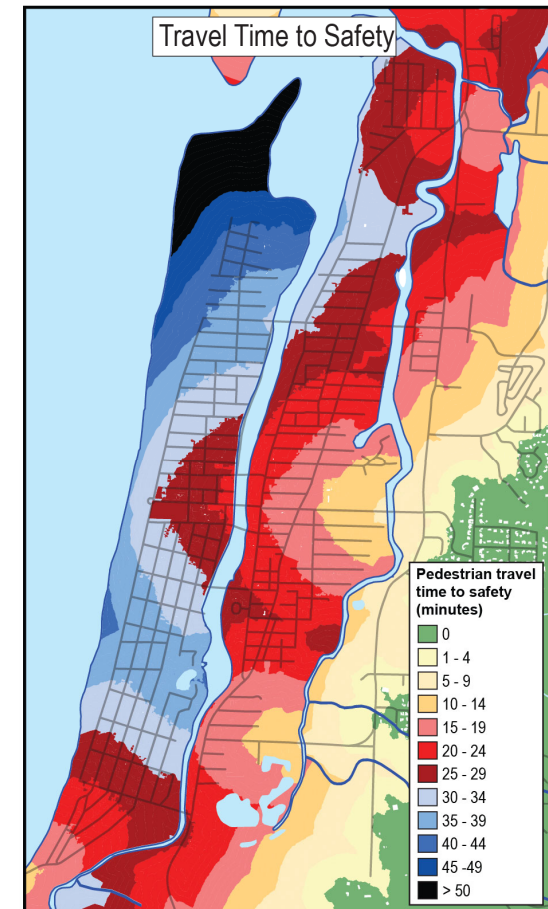
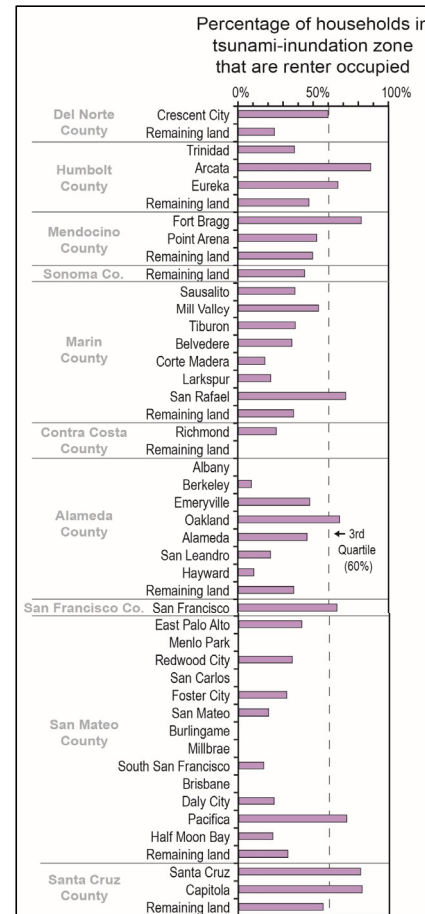
The analysis also hints at the potential economic impact of a tsunami hitting Oregon. More than 1,800 businesses with more than \$1.9 billion in sales lie in the likely inundation zone, and in Seaside, 90 percent of the city's total land value is likely to be submerged by a tsunami.

Such figures should help persuade local residents and business owners to prepare, especially because preparing now will allow for much faster recovery of what could otherwise be a battered economy, officials said.

"It's a matter of showing them the numbers so they know what's at stake," said Althea Turner, tsunami preparedness coordinator in Lincoln City. "This is why it's important — because to come back quickly, you have to prepare ahead of time."

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Preparing communities for tsunamis with equality or equity perspectives

Equality



Equality Perspective

- Everyone receives and understand information the same way so one type of tsunami outreach
- Everyone has equal resources and time for preparing for future tsunamis, so we assume that if we do outreach, then people are ready
- Everyone has same ability and situation to evacuate so same TsunamiReady criteria

Equity



Equity Perspective

- Tailor tsunami outreach to reflect the people whose lives you are trying to save and understand their constraints
- Provide outreach in multiple formats and outlets to reach at-risk individuals
- Actively determine who can prepare and if not, why not? Tailor outreach based on feedback
- Taking into account human and landscape conditions when discussing evacuation potential, options, and training needs

Graphic from #PromoteHealthEquity, Robert Wood Johnson Foundation,
<https://www.rwjf.org/en/library/infographics/visualizing-health-equity.html>

How USGS research on community vulnerability to tsunami supports an equity approach to mitigation, preparedness, response, recovery

Exposure

How many people and assets are in hazard zones?

- Reports/articles on the number of people, businesses, critical facilities, & infrastructure in tsunami zones

Sensitivity

What characteristics of people or assets influence vulnerability?

- Reports of demographic attributes of residents and business types in hazard zones
- Research on statistical analysis and mapping of socially vulnerable populations

Adaptive Capacity

Are people or systems currently able to reduce vulnerabilities or adapt to situation?

- GIS tool for estimating travel time to evacuate tsunami zones, including ability to identify population types
- Articles on evacuation potential for at-risk populations, including landscape and population factors

Risk Reduction

What new efforts can be done to reduce or manage risks?

- Articles on GIS-based decision frameworks for siting vertical evacuation refuges, including discussions of population types and societal trade-offs in choices
- Articles on societal implications of different evacuation policies and procedures