ABSTRACT

Project Safe Haven: Integration of man-made tsunami vertical evacuation refuges along the Washington coast

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A magnitude 9+ Cascadia Subduction Zone earthquake and tsunami — last experienced in 1700 AD — will endanger the low-lying communities along the Pacific Ocean coast. Within Washington State, the outer coastal counties of Pacific, Grays Harbor, Jefferson, and Clallam as well as outer coastal Native American Tribes are extraordinarily vulnerable to a Cascadia fault tsunami combined with the difficulty of traditional horizontal evacuation within a thirty-minute post-earthquake environment. The lack of natural geographic features with an elevation greater than the modeled tsunami runup combined with minimal time in which to reach safety spurred interest in the exploration of alternative evacuation strategies.

A multi-agency planning team that included county, tribal and state emergency management officials, University of Washington researchers and graduate students, Washington State Emergency Management, Washington Department of Natural Resources, the University of Washington, National Oceanic and Atmospheric Administration (NOAA), Federal Emergency Management Agency (FEMA), United States Geological Survey, and other key stakeholders created a community-driven process to identify potential locations for vertical evacuation in these at-risk areas.

To improve the survivability of these coastal populations, the planning team provided a way for residents to suggest a new risk reducing strategy – that of integrating man-made tsunami safe havens in the form of berms, viewing platforms and traditionally taller buildings, such as structured parking lots, into the existing natural and built environments. The impetus for this effort was the recent publication of joint FEMA/NOAA guidance document entitled "*Guidelines for Design of Structures for Vertical Evacuation.*" (FEMA P646). Funding for this first of its kind community-based planning effort was directly provided through the National Tsunami Hazard Mitigation Program (NTHMP), which is administered by NOAA's National Weather Service.

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Coastal residents in the at-risk communities participated workshop techniques known as “World Cafés” and design charrettes to not only provide preferred options for implementation of tsunami safe havens for evacuation but also features to enhance communities. Berms, viewing platforms, and more traditional structures have been proposed for integration into community life by providing opportunities for vertical evacuation, and places for such activities as viewing nature, picnicking, kite flying, watching sporting events…. And these structures are proving to be affordable.