



**CREATING SAFE ACCESS  
TO A TSUNAMI SAFE HAVEN  
ASSEMBLY AREA**

# Newport, Oregon



**FEMA**

**RiskMAP**  
Increasing Resilience Together

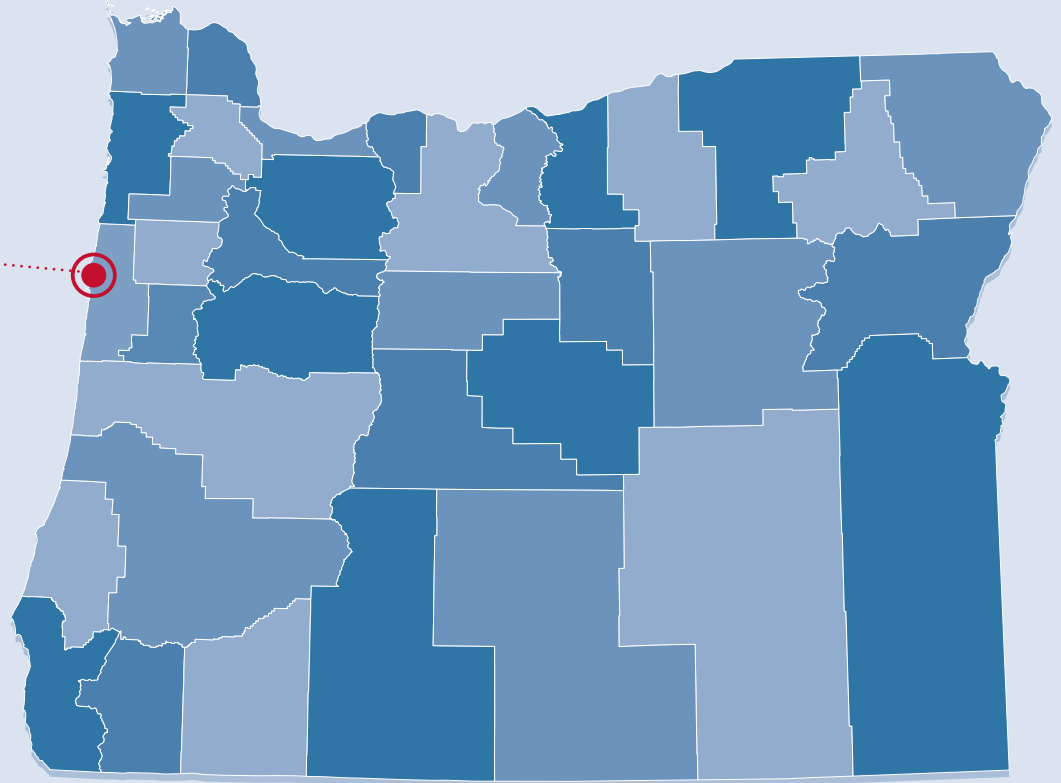
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# NEWPORT, OR

## The Place, Its History, and Life on the Coast

Since 2011, Newport, Oregon has worked to increase the safety of its residents and businesses against the threat of a tsunami. In partnership with other public and private entities, the city identified and retrofitted a tsunami assembly area, “Safe Haven Hill.” This effort ensured a stable, elevated tsunami evacuation area is accessible to surrounding communities and that these communities know how and where to evacuate in the event of a tsunami.

This guide highlights how the City of Newport achieved a successful tsunami mitigation project by coordinating key partnerships, leveraging and managing a FEMA Hazard Mitigation Assistance grant, and engaging and encouraging public outreach and awareness efforts. This information is intended to support other communities who are interested in pursuing similar projects.





## Goal of Showcase:

This booklet provides information how the City of Newport increased the public safety of its community by successfully completing a tsunami mitigation project. This booklet, telling Newport's story, is part of a collection, the FEMA Region X Mitigation Showcase, to illustrate different ways in which local communities have leveraged partnerships and collaborated with state and federal partners to complete mitigation projects that address vulnerabilities to earthquakes and/or tsunamis. These narratives describe how project partners worked together to effectively navigate FEMA Hazard Mitigation Assistance requirements, build political and public support, and describe what lessons were learned throughout the project process. Information provided in each booklet intends to inspire and support other communities that wish to pursue similar mitigation action.



## Mitigation Project:

In 2016, the City of Newport, Oregon increased the community's access to a safe assembly area through the Tsunami Safe Haven Hill mitigation project. This project improved an existing evacuation area, Safe Haven Hill, and leveraged additional resources to improve an existing evacuation route and provide interpretative signs estimating travel time to the assembly area. Success of the project can be attributed to robust public-private partnerships developed throughout the process and strategic collaboration with state. The Comprehensive Plan and Hazard Mitigation Planning processes were leveraged to engage the public. The process of completing the mitigation project increased public awareness by bringing the community together to make tsunami preparedness, such as evacuation drills, a part of regular life in Newport.



## Defining the Hazard:

The City of Newport's risk to a tsunami is approximately 100 times higher than the risk to a tornado anywhere in the United States. The Safe Haven Hill project addresses Newport's vulnerability of access to high ground in the event of a tsunami due to an earthquake. While tsunamis may result from other events, the paleoseismic study of the Cascadia Subduction Zone (CSZ) has documented at least 40 high magnitude (M8+ to M9.0+) earthquakes in the past 10,000 years, all with corresponding tsunamis. The last major earthquake occurred in January 1700—over 300 years ago.



PHOTO: Walking the evacuation route to Safe Haven Hill from Hatfield Marine Center.





PHOTO: Looking north from top of Safe Haven Hill.

## Risk to Community

The geography of Newport's South Beach community, a low-lying area at the base of steep hillsides, leaves it at risk to the impacts of a tsunami, especially a local tsunami generated by an earthquake along the Cascadia subduction zone. The risk of a tsunami striking South Beach is about 100 times greater than the risk of a tornado occurring anywhere in the United States. Therefore, an easily identifiable evacuation route and short-term (1 to 3 days) assembly area people can reach quickly are critical to ensuring the safety, economy, community identity, and overall resilience of the South Beach community.

The South Beach community is the area most vulnerable to tsunamis in Newport because: (1) Most of the community is situated at a very low elevation and is mapped within tsunami inundation zones; (2) Only one location is reachable in under 30 minutes that is also high enough to be safe from a tsunami (80 feet); (3) This high elevation area, which is owned by the Oregon Department of Transportation (DOT), was known for having poor access with steep and heavily forested slopes; and (4) More than 1,000 people in the South Beach community are at risk to the next major tsunami. The culmination of elevated public concern around seismic hazards, new data depicting tsunami inundation areas, public and political interest, and available financial assistance led to the creation of a project to improve the tsunami evacuation route and to designate and retrofit the high elevation area as an official tsunami assembly area.

➤ “This great project shows us what can be accomplished when stakeholders come together. Everyone just dug in and got to work on making the South Beach area safer.”

– Althea Rizzo, *Tsunami and Earthquake Program Manager*

## Project Timeline:

- 2005 ..... Hatfield Marine Science Center Begins Practicing Tsunami Evacuation Drills
- 2011 ..... Tohoku, Japanese Earthquake and Tsunami  
DOGAMI Finalized Oregon Coast Tsunami Inundation Data
- 2012 ..... DOGAMI Works with the City of Newport to Update Tsunami Evacuation Route Maps  
Debris from Japanese Tsunami Washes Ashore  
Hatfield Marine Science Center-led Tsunami Evacuation Drill
- 2013 ..... DOGAMI Updates Tsunami Inundation Maps for Newport  
Tsunami Readiness Rally  
Tsunami Interpretive Trail Signs Complete  
Project Phase 1: City Completed a Supplemental Geotechnical Assessment & Benefit-Cost Analysis to Meet FEMA Requirements for Release of HMGP Funds
- 2014 ..... HRA Archeological Survey of the Project Area  
Project Phase II: Approval for Project Construction
- 2015 ..... *The Really Big One*, by Kathryn Schulz, New Yorker Article Published
- 2016 ..... Follow-Up Archaeological Monitoring Report  
Completion of Evacuation Route and Safety Refuge Assembly Area
- 2017 ..... Project Closeout

## Timeline

In March 2011, Tohoku, Japan experienced a devastating magnitude 9.0 earthquake and a subsequent tsunami. The impacts of these events mobilized Newport public safety officials to ensure their community would be prepared if a similar event struck Oregon. The Oregon Department of Geology and Mineral Industries (DOGAMI) had also finalized data to begin improving tsunami inundation maps (TIMs) for the entire Oregon coast through the National Oceanic and Atmospheric Administration's (NOAA) National Tsunami Hazard Mitigation Program. Final TIMs were published in 2013. DOGAMI began working closely with the City of Newport in 2012 to improve tsunami evacuation maps by identifying assembly areas, ground-truthing recommended routes, and verifying base maps. These updated and improved evacuation and inundation maps confirmed that the proposed tsunami assembly area, Safe Haven Hill, would indeed be a safe assembly area during a tsunami event. The new data, followed by the updated maps, provided further purpose and encouraged momentum to continue with the allocation of city funds for tsunami mitigation efforts.

Other essential partners in the South Beach area that significantly contributed to the project's success were Rogue Brewery, the Oregon Museum of Science and Industry's Camp Gray, NOAA's Pacific Marine Operations Center, and the Oregon Coast Aquarium.

## Key Partnerships

Coordinating with partners and community representatives was key to these efforts. One primary partner was Oregon State University's Hatfield Marine Science Center. Hatfield is a critical facility located in the tsunami inundation zone with a historic presence and an engaged community. Hatfield was an essential partner in ongoing tsunami public outreach efforts and has been hosting evacuation drills regularly since 2005. A tsunami evacuation drill in 2012 complemented recent city efforts to pursue FEMA grant funding to enhance an evacuation and assembly area. The 2012 drill also helped foster partnerships that contributed to public and political support, securing success for the future of Safe Haven Hill. The drill included participation from the Newport Police and Fire Department, Lincoln County Emergency Management, local Community Emergency Response Team (CERT) members, the Oregon State Office of Emergency Management, and the Oregon DOT. Public safety officials participated by closing Highway 101 and escorting participants of the tsunami evacuation drill across to the base of the hill. Participants walked to the top of the hill; approximately a 20-minute walk from the Hatfield Marine Science Center. At the time of this drill in 2012, the proposed Safe Haven Hill had limited pedestrian access to the safe elevation, as terrain was steep, rough, and overgrown. With the city facilitating the process, community partners were motivated and engaged throughout the entire project.

“Those of us working in the inundation zone who rely on Safe Haven Hill's accessibility after an earthquake were grateful for the chance to provide input at every stage of the project. The result is increased confidence in our ability as individuals to get ourselves up and out of the danger zone. Knowing that the city cared about our safety and was willing to go the distance on this complex and difficult project inspired us to strengthen and grow a lasting culture of preparedness.”

– Maryann Bozza, Program Manager, Hatfield Marine Science Center



PHOTO: Disaster cache on the top of Safe Haven Hill. Partners continually monitor and contribute to growing emergency supplies.



## Grants Management

In 2012, the city's Community Development Department Director took the lead on leveraging the momentum of post-Tohoku public and political interest in tsunami risk reduction to pursue a project increasing the city's level of tsunami preparedness. Since the city had already identified Safe Haven Hill as a potential evacuation assembly area, and because of feedback from the Hatfield Marine Science Center's evacuation drills, a potential mitigation project to improve the accessibility and public awareness of this evacuation route was put forward. Around this same time, the Oregon State Tsunami and Earthquake Program Manager connected city officials with the State Hazard Mitigation Officer (SHMO) who had available FEMA Hazard Mitigation Assistance funds through the Hazard Mitigation Grant Program (HMGP). The State Earthquake Program Manager served as a matchmaker for the city's project and the available FEMA funding, administered by the State. This success highlights the importance of establishing strong relationships with partners, especially those who can be an advocate for critical projects.

The city Community Development Director and the SHMO worked together throughout 2013, in collaboration with other city, county, private, and public entities, to navigate options for the HMGP grant's required funding match

and management needs. In the end, the city provided \$221,091 through the South Beach Urban Renewal District and \$43,473 from other funds as the local match for \$680,478 in HMGP funds. The official purpose given on the HMGP application for this tsunami mitigation project was to "increase life safety and avoid deaths and injuries in future tsunami events by improving access and safety of trails to and on the Safe Haven Hill assembly area."

The city was awarded an HMGP grant with the condition that more information be provided to the SHMO and FEMA about the feasibility of the project, including a benefit-cost analysis and an archeological assessment. To help meet this requirement, the city leveraged an existing neighborhood refinement planning process to develop and seek public input on a low-cost (approximately \$2,000) concept plan using the city's Urban Renewal funds. This plan illustrated the site work that would be needed to retrofit Safe Haven Hill so that it could safely support 2,300 people for at least 24 hours. Incorporating this concept plan into the neighborhood refinement planning process allowed this mitigation project to be a part of a larger and ongoing neighborhood refinement planning process. This resulted in the integration of tsunami risk reduction conversations into larger community planning discussions around how and where to invest and develop in the city and neighborhood's future.

Retrofits to Safe Haven Hill included establishing a cleared safe area at the top of the hill for people to assemble, stabilizing and improving trails to the top of the hill from many directions, installing a disaster cache, and installing a retaining wall near the highway to prevent erosion of the hill onto the highway. Participation and input from partners continued throughout the entire design and construction process. The evacuation routes were designed with the entire community and surrounding neighborhoods in mind, ensuring the connection of new trails to the city's existing trail system. Before the Safe Haven Hill retrofits were

complete, a tsunami interpretive trail was completed through support from FEMA's National Earthquake Hazards Reduction Program, coordinated by the Oregon State Earthquake Program Coordinator. Educational and evacuation informational signs begin at the Hatfield Marine Science Center and continue along a pedestrian path, past the Rogue Brewery, up to the top of the hill. These signs illustrate the locations of the tsunami inundation zone, information on earthquake and tsunami safety, and an estimated walking time to reach a safe elevation.





## Lessons Learned

City, State, and public and private partnerships were strengthened over the course of this mitigation project through continued meetings, discussions, public outreach efforts, and collaborative funding. They continue today to support the maintenance of Safe Haven Hill and the emergency supply cache. As resources become available, partners—including the Oregon Museum of Science and Industry's Camp Gray, Hatfield Marine Science Center, and the city—take turns purchasing supplies for the cache, such as food, water, batteries, solar panels, tents, and supplies for survivors, and building latrines. Ongoing coordination ensures partners know the conditions of the trails and assembly area and can identify needs to ensure the cache will support up to 2,300 people in the event of a tsunami evacuation. Further, both Camp Gray, Hatfield and the south beach community regularly participate in evacuation drills to maintain public awareness of where the evacuation trails are, to provide expectations for the level of effort required to get to safe ground, and to increase the public's comfort in how to proceed after an earthquake. An evacuation drill and review of safety procedures are also now integrated into the onboarding process for new hires at the Hatfield Marine Science Center and for students new to camp at OMSI.

The Safe Haven Hill project not only resulted in a safe assembly area, but also included a comprehensive public outreach strategy and extensive collaboration among partners that has led to the integration of tsunami safety into daily activities.



“Community engagement and collaboration was a key to the success of the Safe Haven Hill tsunami evacuation assembly area retrofit project. Our partners in the area recognized the need and were generous with their time to assist the city, from conceptual design all the way through construction and now maintenance of the emergency supply cache. It was then, and continues to be, truly a team effort!”

– Derrick Tokos, *City of Newport Community Development Director*



PHOTO: Interpretive trail sign at the top of Safe Haven Hill providing tsunami information.

## Technical Grant Information

Hazard Mitigation Grant Program, DR-1964, HMGP-1964-5-R Newport  
Tsunami Safe Haven Hill Retrofit, Hardening and Access Improvements  
– Phase 1 (Feasibility Study) and Phase II (Construction)

### TOTAL COST OF PROJECT:

- › \$945,042
- › \$16,000+ overrun because ODOT required a change to the type of retaining wall materials and the height of the wall. The redesign and the material for these changes were costly.

### GRANT ORGANIZATION:

- › Two Grant Phases – (1) Feasibility Study, (2) Construction. The feasibility study in Phase I was completed to determine the Benefit-Cost Analysis (BCA) of the tsunami hill retrofit. This was a geotechnical evaluation and engineering analysis to determine if the hill retrofit would be both feasible and effective as high ground to protect people from tsunami inundation. In this phase, the project was considered an “outdoor tsunami safe area” similar to a tornado or hurricane safe area and subject to post-closeout operations and maintenance requirements

consistent with that eligible project type. The BCA was completed by a contractor using FEMA Version 4.8 Damage-Frequency Assessment BCA software. The only category of benefits counted in the BCA was deaths avoided. The project was found to be very cost-effective. With the conservative, lower-bound type estimates for the number of deaths under the as-is before mitigation condition of Safe Haven Hill, and for the effectiveness of the proposed improvements to facilitate access to the safe area, the results yielded a benefit-cost ratio of 26.40.

Approval for Phase II was granted after Phase I analysis was completed and clearly demonstrated the cost benefit to FEMA. Phase II included surveying, final engineering and design of the retrofit, Environmental Planning and Historic Preservation (EHP) requirements, construction, post-construction site stabilization, signage/lighting, and construction management costs.

### SCOPE OF WORK DETAIL:

- › Establish a clear and safe area at the top of Safe Haven Hill.
- › Improve existing crude trail on the north side and the existing gravel path on the southwest side of the hill and stabilize these pathways to prevent failure from slumping/sliding during strong earthquake ground shaking preceding tsunami arrival.
- › Add a stairway on the south side of the hill to expedite access to the safe area for people approaching the hill from the south.
- › Add a sidewalk on the east side of the hill (west edge of Highway 101) to ensure safe access for people coming from the east.
- › Improve access, visibility, and awareness of the tsunami safe area with path lighting and signage.
- › Install a disaster supply shed in the safe area.
- › Install a retaining wall near the highway to prevent erosion of the hill onto the highway.
- › **Permits were required by ODOT of the city to construct a necessary retaining wall. The city obtained permits and ODOT participated in a review of the retaining wall engineering and design plans.**

*[Note to highlight, lesson learned: ODOT required a late change to the design of the retaining wall above Highway 101 resulting in a change order with the contractor and engineer to redesign the wall. The result was a significant overrun in the cost of the project that the city absorbed.]*

### SAFE HAVEN HILL NUMBERS:

- › 80 feet above sea level
- › Above the FEMA recommended safe elevation for tsunami vertical evacuation as specified in FEMA P-646: Guidelines for Design of Structures for Vertical Evacuation from Tsunamis (Second Edition, 2012).
- › 23,000 square feet (about one-half acre)
- › Provides safe assembly area for 2,300 people (10 square feet per person)
- › Current state – can be accessed easily from all sides of the hill, with a paved path and two other stairways that access the hill. The area is open and lighted, and contains a large storage unit that houses supplies to last 48-72 hours, depending on the number of people that access the hill during a tsunami event.

For more information, contact: [Amanda.Siok@fema.dhs.gov](mailto:Amanda.Siok@fema.dhs.gov)





“The community of Newport and the Hatfield Marine Science Center would like to recognize the exceptional leadership of Maryann Bozza. Maryann was instrumental in the Safe Haven Hill project and her tireless efforts helped the community make great strides in emergency preparedness. She may be gone from us, but her vision and planning will live on in all our endeavors to build a more resilient and prepared coastal community.”

— Mark Farley, On Behalf of the Hatfield Marine Science Center and Newport Community