

**Mitigating Oregon's Tsunami Risk:
Accelerating Tsunami Inundation Mapping and Promoting Preparedness through
Community-Based Outreach**

August 1, 2011

Project Progress Report
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BACKGROUND

Oregon's coastal residents and visitors have a crucial need for effective educational information and mitigation tools to help them prepare for the next Cascadia earthquake and tsunami. Here we submit our second progress report on accomplishments achieved during the second half of FY 2010, the second phase of a proposed four-year program supported by the National Tsunami Hazards Mitigation Program (NTHMP) to mitigate tsunami risk in Oregon. Through collaboration with Oregon Emergency Management (OEM), local National Weather Service offices, NOAA, and public schools and universities, our focus covers three broad areas that address priorities specified in the NTHMP Strategic Plan. The Oregon Department of Geology and Mineral Industries (DOGAMI) and OEM have established key performance measures¹ aligned with the NTHMP Strategic Plan to track state goals related to tsunami hazard mitigation in Oregon. About half of the effort focuses on new modeling and mapping that will completely redelineate tsunami inundation along the state's entire 362-mile-long Pacific coastline (Figure 1). About 15% of support is dedicated to the development of new mitigation products that promote preparedness, targeting an audience that includes both residents and visitors to the Oregon coast. The remainder of the funding (~35%) is being used to promote and support sustainable volunteer-driven education and outreach programs in coastal communities to enhance the National Weather Service's *TsunamiReady* program. The primary goal of the proposed activities is to reduce loss of life and property damage from tsunamis. This goal will be accomplished by tasks that address the following three objectives:

¹ DOGAMI performance measures available at: <http://www.oregongeology.org/sub/portoff/DOGAMIAnnReport2009.pdf>;
OEM performance measures available at: http://oregon.gov/OMD/docs/2008_APPR.pdf.

Objective 1: Mapping and Modeling – Complete a new generation of tsunami inundation maps for Oregon.

Objective 2: Mitigation and Education – Empower people in Oregon to prepare for tsunamis and build communities that are resilient to a broad spectrum of coastal hazards.

Objective 3: *TsunamiReady* Support – Build a sustainable, community-based outreach and education program.

ACCOMPLISHMENTS

The following tables summarize the status of accomplishments for objectives and related tasks funded under this grant award for FY 09 and FY10. Brief summary descriptions of accomplishments are organized by fiscal year and the relevant NTHMP sub-committees:

FY09 Objective 1. Mapping and Modeling – Complete a new generation of tsunami inundation maps along the southern Oregon coast.

Task #	Project	Strategic Plan Measure(s)	NTHMP Subcommittee*	Accomplishment
1.1.1	Complete final 10 Bandon simulations	Complete inundation maps for all threatened communities in Oregon...by 2013. New NTHMP-funded maps will meet established guidelines by 2012. All NTHMP-funded models will meet established standards by 2012.	MMS	Completed March 2010.
1.1.2	Compile geological and historical tsunami evidence at Bandon			Complete. Geological and historical evidence of past tsunami inundation at Bandon, Oregon has been compiled.
1.1.3	Preparation of Bandon inundation map, GIS database and technical report			Complete: The Bandon inundation map, GIS database and final technical report are published (Table 1).
1.2.1	Compile geologic data on tsunami inundation in southwestern Oregon			Complete. Tsunami deposits data have been compiled for the southern Oregon project area.
1.2.2	Conduct reconnaissance field investigations			Complete. Reconnaissance included aerial over flights with the Civil Air Patrol and the U.S. Coast Guard in August 2010. Field reconnaissance in Bandon, October 2010.

*NTHMP subcommittees include: MMS, Mapping and Modeling subcommittee; MES, Mitigation and Education subcommittee; and WCS, Warning Coordination subcommittee.

Task #	Project	Strategic Plan Measure(s)	NTHMP Subcommittee*	Accomplishment
1.2.3	Support NGDC's Global Tsunami Deposit database	Complete inundation maps for all threatened communities in Oregon...by 2013.	MMS	Complete. We continue to support NGDC and California toward the development of a useful tsunami deposits database to validate tsunami simulations.
1.3.1	Develop computer grids for southern Oregon tsunami simulations	New NTHMP-funded maps will meet established		Complete. The southern Oregon project area has been divided into 3 grids: Bandon (complete), Gold Beach (complete) and Coos Bay (complete). DEMs incorporate

		guidelines by 2012. All NTHMP-funded models will meet established standards by 2012.		data from NGDC's Port Orford DEM, 2008 LiDAR, and available nearshore bathymetry data.
1.3.2	Run 5 or more tsunami simulations for the southern Oregon project area			Complete. All tsunami simulations for the Gold Beach and Coos Bay project areas were completed by October 2010.
1.3.3	Preparation of final tsunami inundation map, GIS database and technical report for southern Oregon			Complete. The Bandon inundation map, GIS database and final report are published. Similar product for Gold Beach is in the final stage of preparation; for Coos Bay completion is expected in the fall of 2011 (Table 1).
Addn'l tasks	Co-chair NTHMP MMS subcommittee			With co-chair Sue McLean, coordinated annual MMS meetings, planned 2011 Model Benchmarking Workshop in Galveston, TX; led development of MMS guidelines for non-mapped areas; now resigned as co-chair.

*NTHMP subcommittees include: MMS, Mapping and Modeling subcommittee; MES, Mitigation and Education subcommittee; and WCS, Warning Coordination subcommittee.

FY10 Objective 1. Mapping and Modeling– Complete a new generation of tsunami inundation maps for Tillamook County, Oregon.

Task #	Project	Strategic Plan Measure(s)	NTHMP Subcommittee*	Accomplishment
1.1	Compile tsunami deposits data for southern Tillamook Co.	Complete inundation maps for all threatened communities in Oregon...by 2013.	MMS	In progress. Tsunami deposits data will be compiled for southern Tillamook County in Fall of 2011
1.2.1	Prepare DEM and computer grids for Tillamook project area			Complete. The Tillamook County DEM incorporates data from NGDC's Garibaldi DEM, Army Corps of Engineers channel surveys and 2009 LiDAR. Grid.
1.2.2	Tsunami modeling for Tillamook County	New NTHMP-funded maps will meet established guidelines by 2012.	MMS	In progress: Summer-fall 2011.
1.2.3	Preparation of Tillamook inundation map, GIS database and technical report	All NTHMP-funded models will meet established standards by 2012.		Planned. December 2011.

*NTHMP subcommittees include: MMS, Mapping and Modeling subcommittee; MES, Mitigation and Education subcommittee; and WCS, Warning Coordination subcommittee.

FY09 Objective 2: Mitigation and Education – Empower people in Oregon to prepare for tsunamis and build communities that are resilient to a broad spectrum of coastal hazards.

Task #	Project	Strategic Plan Measure	NTHMP Subcommittee*	Accomplishment
2.1 and all sub-tasks	Produce tsunami evacuation maps for 7 coastal communities in southern Oregon	Increase the number of tsunami evacuation maps by 10% annually	MES	In progress. We have completed 6 tsunami evacuation maps in southern Oregon (Figure 2). Three additional evacuation maps for North Bend, Coos Bay, and Charleston will be completed in the fall of 2011.
2.2 and all sub-tasks	Maintain and improve online, interactive tsunami evacuation maps	Increase the percentage of NTHMP products available on the web to 90% by 2012	MES	Ongoing: DOGAMI’s online tsunami evacuation zone viewer has been updated with new evacuation zones for communities in southern Oregon: see http://www.oregontsunami.org
2.3 and all sub-tasks	Develop online Oregon Tsunami Information Clearinghouse	Post 100% of tsunami evacuation maps to the NTHMP web repository by 2012		Complete. The new Oregon Tsunami Clearinghouse website was launched in August 2010. The site includes links to evacuation map brochures, online interactive maps, tsunami animations, reports, and information on how to prepare for and survive a tsunami. Visit the new site at: http://www.oregontsunami.org .
Addn'l tasks	Represent Oregon as a member of the NTHMP Coordination Committee	None	None	Complete: Participated in NTHMP annual meeting and CC meeting. Participated when available on conference calls and reviews via email correspondence as necessary.

*NTHMP subcommittees include: MMS, Mapping and Modeling subcommittee; MES, Mitigation and Education subcommittee; and WCS, Warning Coordination subcommittee.

FY10 Objective 2: Mitigation and Education – Empower people in Oregon to prepare for tsunamis and build communities that are resilient to a broad spectrum of coastal hazards.

Task #	Project	Strategic Plan Measure	NTHMP Subcommittee*	Accomplishment
2.1 and all sub-tasks	Produce tsunami evacuation maps for 11 coastal communities in Tillamook County	Increase the number of tsunami evacuation maps by 10% annually	MES	Planned: Winter 2011-2012.
2.2 and all sub-tasks	Maintain and improve online, interactive tsunami evacuation maps	Increase the percentage of NTHMP products available on the web to 90% by 2012	MES	Ongoing: DOGAMI’s online tsunami evacuation zone viewer has been updated with new evacuation zones for communities in southern Oregon: see (http://www.oregontsunami.org)
2.3 and all sub-tasks	Release Oregon Tsunami Information Clearinghouse	Post 100% of tsunami evacuation maps to the NTHMP web repository by 2012		Complete. The new Oregon Tsunami Clearinghouse website was launched in August 2010. The site includes links to evacuation map brochures, online interactive maps, tsunami animations, reports, and information on how to prepare for and survive a tsunami. Visit the new site at: http://www.oregontsunami.org . Ongoing efforts are focused on uploading new evacuation maps as they are produced, updating educational information, and soliciting feedback from stakeholders on the effectiveness of the website’s content.
Addn’l tasks	Represent Oregon as a member of the NTHMP Coordination Committee	None	None	Complete: Participated in NTHMP annual meeting and CC meeting. Participated when available on conference calls and reviews via email correspondence as necessary.

*NTHMP subcommittees include: MMS, Mapping and Modeling subcommittee; MES, Mitigation and Education subcommittee; and WCS, Warning Coordination subcommittee.

FY09 Objective 3: *TsunamiReady* Support – Build a sustainable, community-based outreach and education program.

Task #	Project	Strategic Plan Measure	NTHMP Subcommittee*	Accomplishment
3.1	Identify and support a regional Tsunami Outreach Coordinator		MES	Complete. DOGAMI is coordinating community outreach and has implemented Oregon’s “ TsunamiReady, TsunamiPrepared ” four-year outreach program.
3.1.1	Empower community organizers	Establish more tsunami resilient communities Promote a culture of tsunami preparedness and response		Complete. DOGAMI continues to support community organizers who are leading volunteer-driven outreach groups in Manzanita, Rockaway, Seal Rock, Waldport, Yachats and Bandon. DOGAMI printed 10,000 <i>Map Your Neighborhood</i> brochures, provided support for CERT training supplies and other outreach materials.
3.1.2	Facilitate communication	Explore the feasibility of integrating tsunami information into K-12 education	MES	Ongoing. DOGAMI continues to work with D.T. Sterling, OEM, County EMs, ARC, and the NWS to facilitate community-based outreach and education activities. In particular, OEM designed an <i>Emergency Go-Kit Passport</i> , updated Oregon’s Tsunami Media Binder, and revised the Tsunami Sign guidelines.
3.1.3	Promote outreach activities in coastal communities			Complete and ongoing. We have promoted numerous outreach events in over 8 coastal communities.
3.2.1	Increase the number of TsunamiReady communities by providing guidance on program requirements	Increase the number TsunamiReady communities to 105 in 2013 Annually increase local warning reception capabilities by 10%, based on the baseline established by 2010	MES	Florence, Oregon earned its designation as a TsunamiReady community on August 11, 2010. Clatsop County is now TsunamiReady. Seaside is developing a TsunamiReady application. We are also promoting TsunamiReady in Bay City, Yachats, Bandon, Port Orford and Gold Beach.
3.2.2	Help communities identify warning communication needs		MES	Complete. With NTHMP funding, DOGAMI procured a number of communications needs for the Nehalem Bay communities, including 10 HAM radios, 1 HAM base station, 30 NOAA weather radios, and 20 FRS radios.

*NTHMP subcommittees include: MMS, Mapping and Modeling subcommittee; MES, Mitigation and Education subcommittee; and WCS, Warning Coordination subcommittee.

Task #	Project	Strategic Plan Measure	NTHMP Subcommittee*	Accomplishment
3.2.3	Coordinate with NWS weather forecast officers in Portland and Medford to promote the <i>TsunamiReady</i> program	Increase the number TsunamiReady communities to 105 in 2013	MES	Ongoing. We have participated in meetings and calls with NWS forecast officers to identify community needs and facilitate the application process for TsunamiReady communities. Next meeting is Sept. 23, 2010. A. Rizzo is revising standards for TsunamiReady designation and distant tsunami warning response, and adapting the “On Shaky Ground” booklet for Oregon.
3.3 (3.3.1 and 3.3.2)	Disseminate tsunami educational information and assist with Oregon Tsunami Information Clearinghouse	Promote a culture of tsunami preparedness and response Facilitate educational events	MES	Ongoing. DOGAMI works with local stakeholders to review content on Oregon’s Tsunami Information Clearinghouse and recommend appropriate information to include on new tsunami evacuation maps for southern Oregon. Users also contact the webmaster with useful advice and review.
3.3.3	Explore means of integrating tsunami outreach into K-12 schools			Complete. DOGAMI supported a program to raise tsunami preparedness in the Neah-Kah-Nie School District and Bandon schools. Also, DOGAMI staff collaborated with Kay Wyatt of the Oregon Shakes Program to develop earthquake and tsunami lessons for middle school students in Lincoln County.
3.4.1 and all sub-tasks	Identify and support 3 community organizers	Establish more tsunami resilient communities Promote a culture of tsunami preparedness and response Facilitate educational events	MES	Complete. DOGAMI established contracts or agreements with four community organizers in Nehalem Bay, Rockaway Beach, southern Lincoln County, and Bandon. <u>Cost sharing by the Cities of Bandon, Rockaway Beach and the three Nehalem Bay</u> communities greatly enhanced tsunami outreach, highlighting our approach to promote a sustainable, place-based, volunteer-driven program. Warrenton/Astoria, Pacific City/Neskowin, Port Orford/Gold Beach.
3.5	Coordinate the annual Oregon Tsunami Road Show			Complete. In April 2010 the Tsunami Road Show involved training community organizers to promote outreach in Nehalem Bay, Rockaway Beach, Seal Rock, Waldport, Yachats, and Bandon.

*NTHMP subcommittees include: MMS, Mapping and Modeling subcommittee; MES, Mitigation and Education subcommittee; and WCS, Warning Coordination subcommittee.

FY10 Objective 3: *TsunamiReady* Support – Build a sustainable, community-based outreach and education program.

Task #	Project	Strategic Plan Measure	NTHMP Subcommittee*	Accomplishment
3.1	Identify and support a regional Tsunami Outreach Coordinator	Establish more tsunami resilient communities Promote a culture of tsunami preparedness and response Explore the feasibility of integrating tsunami information into K-12 education	MES	Ongoing. DOGAMI is coordinating community outreach and has implemented Oregon’s” Tsunami Outreach Oregon ” four-year outreach program in three new areas in 2010-11: Astoria-Warrenton, Pacific City-Neskowin, and Port Orford-Gold Beach.
3.1.1	Empower community organizers		MES	Ongoing. In September, 2010, DOGAMI and OEM trained 3 community organizers who are leading volunteer-driven outreach groups in Astoria-Warrenton, Pacific City-Neskowin, and Port Orford-Gold Beach. These organizers have now completed their outreach activities and are summarizing results and lessons learned in final reports.
3.1.2	Facilitate communication			Ongoing. DOGAMI continues to work with D.T. Sterling, OEM, County EMs, ARC, and the NWS to facilitate community-based outreach and education activities. OEM and DOGAMI adapted California’s brochure, Living on Shaky Ground, for Oregon.
3.1.3	Promote outreach activities in coastal communities			Ongoing. DOGAMI has promoted tsunami preparedness in 8 new coastal communities. Tsunami evacuation map workshops were held in Port Orford, Gold Beach and Brookings; (see Appendix A for detailed list of additional accomplishments).
3.2.1	Increase the number of TsunamiReady communities by providing guidance on program requirements	Increase the number TsunamiReady communities to 105 in 2013 Annually increase local warning reception capabilities by 10%, based on the baseline establish-ed by 2010	MES	Ongoing. Clatsop County is now TsunamiReady, joining Coos, Douglas, and Tillamook counties. Cannon Beach, Florence, Lincoln City, Manzanita, Nehalem, Rockaway Beach, and Wheeler are TsunamiReady. Seaside is developing a TsunamiReady application. We continue to promote TsunamiReady in Bay City, Yachats, Bandon, Port Orford and Gold Beach. Pacific City/Neskowin/Nestucca Valley Fire District is pursuing TsunamiReady supporter status. TsunamiReady status summary: http://www.weather.gov/stormready/tsunamiready/ts-com/or-ts.htm
3.2.2	Help communities identify warning communication needs			Ongoing. DOGAMI has asked Community Organizers to make a list of warning communication needs for each area.
3.2.3	Coordinate with NWS weather forecast officers in Portland and Medford			Ongoing. We have participated in meetings and calls with NWS forecast officers to identify community needs and facilitate

	to promote <i>TsunamiReady</i>			TsunamiReady applications.
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Task #	Project	Strategic Plan Measure	NTHMP Subcommittee*	Accomplishment
3.3 (3.3.1 and 3.3.2)	Disseminate tsunami educational information and assist with Oregon Tsunami Information Clearinghouse	Promote a culture of tsunami preparedness and response Facilitate educational events	MES	Ongoing. DOGAMI works with local stakeholders to review content on Oregon’s Tsunami Information Clearinghouse and recommend appropriate information to include on new tsunami evacuation maps for southern Oregon.
3.3.3	Explore means of integrating tsunami outreach into K-12 schools	Establish more tsunami resilient communities Promote a culture of tsunami preparedness and response	MES	Ongoing. DOGAMI staff collaborated with Kay Wyatt of the Oregon Shakes Program to develop earthquake and tsunami lessons for middle school students in Lincoln County. Neah-Kah-Nie High School is engaged in tsunami preparedness activities. Production of Public Service Announcements involving local high school video departments is being explored. School assemblies in Warrenton, Port Orford & Gold Beach have sparked interest in education programs. Nestucca Valley School District officials are exploring options for integration of tsunami education in their schools.
3.4.1 and all sub-tasks	Identify and support 3 community organizers	Facilitate educational events		Complete. DOGAMI established contracts or agreements with three community organizers in Astoria-Warrenton, Pacific City-Neskowin, and Port Orford-Gold Beach; their work is complete except for final reports.
3.5	Coordinate the annual Oregon Tsunami Road Show			Complete. In September 2010 the Tsunami Road Show involved training community organizers to promote outreach in Astoria-Warrenton, Pacific City-Neskowin, and Port Orford-Gold Beach.

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PROBLEMS ENCOUNTERED

The following issues led to moderate setbacks in the original project schedule for FY10. These issues have been resolved.

- Contracting issues initially delayed the Tillamook modeling component. Contract negotiations with the modeling institution have resolved these issues.
- Hiring community organizers is time consuming and it has been difficult to identify partner agencies / organizations willing to sponsor part time employees. To resolve this issue, DOGAMI hired the current three community organizers as temporary employees; this will be the procedure going forward.
- Production and purchase of outreach materials has not been as timely as planned. New procedures are being implemented to streamline the process.

RELATED EFFORTS

Several related efforts present opportunities that contribute toward advancing the goal and completing the objectives of Oregon's tsunami hazard mitigation program, including:

- DOGAMI continues to incorporate high resolution topographic data for the Oregon coast, acquired by the Oregon LiDAR Consortium (<http://www.oregongeology.com/sub/projects/olc/default.htm>), into digital elevation models used in tsunami simulations.
- DOGAMI collaborated with researchers at University of Pennsylvania, Oregon State University, Humboldt State University and the USGS scientists on National Science Foundation research on Cascadia subduction zone paleogeodesy. The lead scientist on this work at DOGAMI (Dr. Rob Witter) has moved to USGS and where he will have additional opportunities to continue these research efforts.
- OEM has been awarded a FEMA grant that will focus on raising earthquake awareness through a variety of educational activities and conducting inventories and seismic safety inspections of critical structures and lifelines.
- Althea Rizzo (OEM) is developing a book in collaboration with the Cascadia Region Earthquake Workgroup entitled, "Cascadia: A New Normal."
- DOGAMI staff plan on participating in August 2011 aerial over flights with the Civil Air Patrol and the U.S. Coast Guard for the purposes of obtaining reconnaissance oblique photographs of the coast and to simulate post-event response.
- OEM coordinated ShakeOut Oregon, a drop, cover and hold earthquake drill held on January 26, 2011.
- OEM contributed to a publication by the Oregon Fire Marshall entitled, "Do the Drill" that documents evacuation drill procedures.
- OEM staff are supporting the seismic grant program through Benefit-Cost Analysis case studies and tool refinements.

ANTICIPATED OUTCOMES

Oregon's FY2009 NOAA NTHMP grant is supporting a critical reevaluation of Cascadia tsunami hazards facing Oregon coastal communities based on the best available geologic data, leading earthquake deformation models and lessons learned from the 2004 Indian Ocean and 2010 Chile tsunamis. The chosen approach relies heavily on the 10,000-year geologic record for estimation of the size of local Cascadia earthquakes and tsunamis. The geologic record revealed extreme events not resolvable by the historical record. The March 11, 2011 Tohoku tsunami, its large size unanticipated from the historical record in Japan, underscores the efficacy of this approach. Accelerated tsunami inundation modeling and mapping along the southern Oregon coast will result in the development of 9 new evacuation maps, advancing Oregon's long-term goal to remap evacuation zones for the entire 362-mile-long coastline by 2013. We are modernizing the way tsunami evacuation information and educational materials are disseminated to the public via an online interactive map interface and through a centralized Tsunami Information Clearinghouse. We continue to foster dialogue and critical feedback from local stakeholders regarding the effectiveness of tsunami mitigation products (e.g., tsunami evacuation maps) through the Tsunami Advisory Council. Oregon's new outreach program, "TsunamiReady, TsunamiPrepared," promotes sustainable, volunteer-driven community organizations to spearhead tsunami outreach, promoting a culture of tsunami preparedness along the length of Oregon's coast. In FY2009, the first year of this new program, we focused on 8 communities, including Manzanita, Nehalem, Wheeler, Rockaway, Seal Rock, Waldport, Yachats, and Bandon. In FY2010 we focused on Warrenton, unincorporated communities in southern Tillamook County (Tierra del Mar, Pacific City, and Neskowin), Port Orford, and Gold Beach. Finally, DOGAMI and OEM continue to work with the NWS to facilitate the procurement of tsunami warning signs, communications infrastructure and other mitigation tools to help communities meet TsunamiReady guidelines.

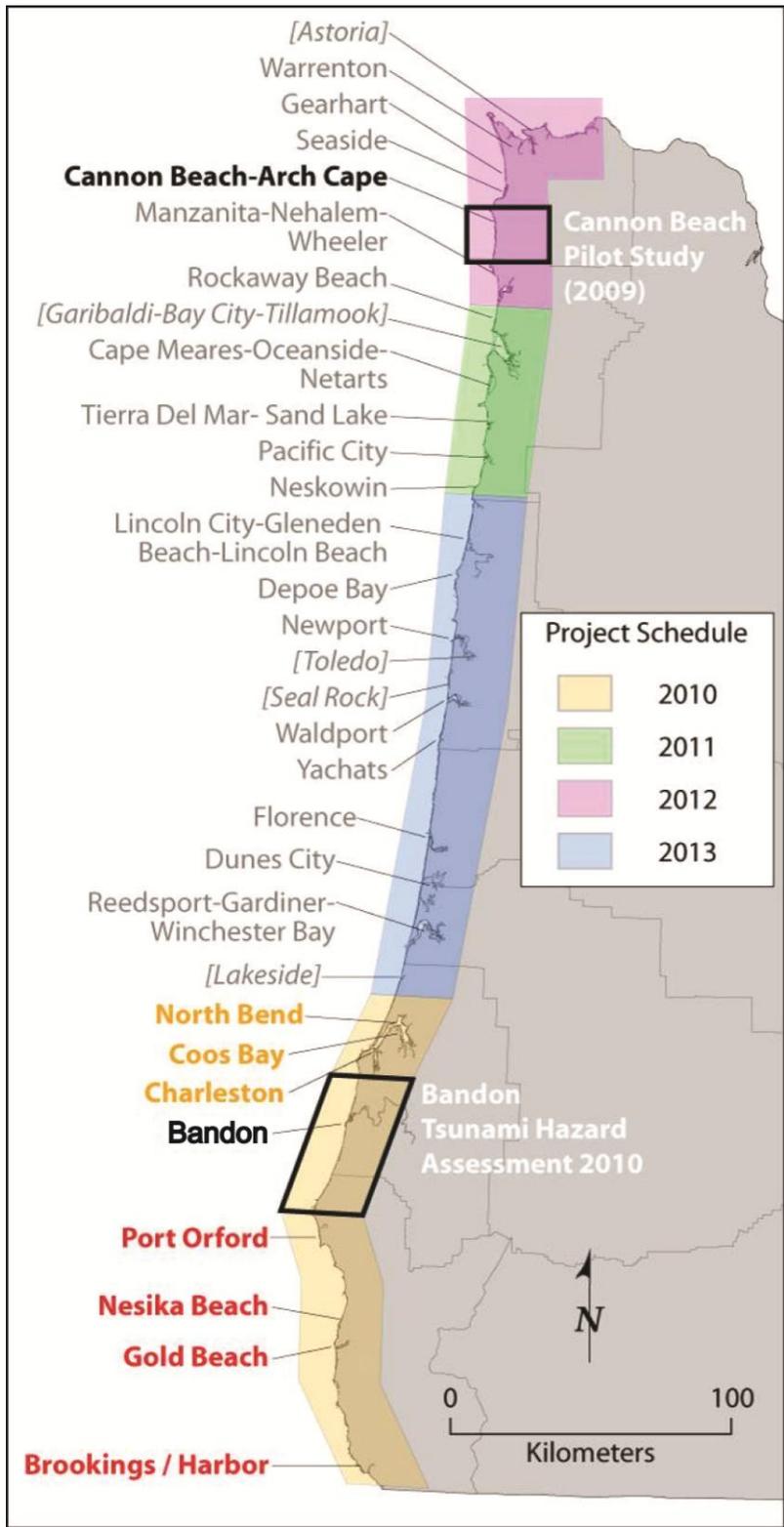


Figure 1. Thirty-five of the 43 *TsunamiReady* target communities in Oregon currently have tsunami evacuation maps. Seven communities, in brackets, lack evacuation maps. Communities in gray have 1st generation maps. Communities in black have 2nd generation maps. Communities in red and orange have draft preliminary 2nd generation maps or new maps under development, respectively. Highlighted regions along the coast indicate four project areas for accelerating tsunami inundation mapping in Oregon. Black boxes define areas of detailed hazard assessments conducted at Cannon Beach and Bandon.



TSUNAMI EVACUATION MAP

BANDON, OREGON

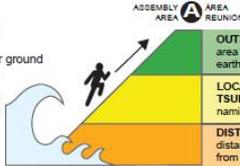


IF YOU FEEL AN EARTHQUAKE:

- Drop, cover, and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

SI USTED SIENDE EL TEMBLOR:

- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial



OUTSIDE HAZARD AREA: Evacuate to this area for all tsunami warnings or if you feel an earthquake.

LOCAL CASCADIA EARTHQUAKE AND TSUNAMI: Evacuation zone for a local tsunami from an earthquake at the Oregon coast.

DISTANT TSUNAMI: Evacuation zone for a distant tsunami from an earthquake far away from the Oregon coast.

ZONA DE PELIGRO EXTERIOR: Evacue a esta área para todas las advertencias del maremoto o si usted siente un temblor.

MAREMOTO LOCAL (terremoto de Cascadia): Zona de evacuación para un tsunami local de un temblor cerca de la costa de Oregon.

MAREMOTO DISTANTE: Zona de evacuación para un tsunami distante de un temblor lejos de la costa de Oregon.

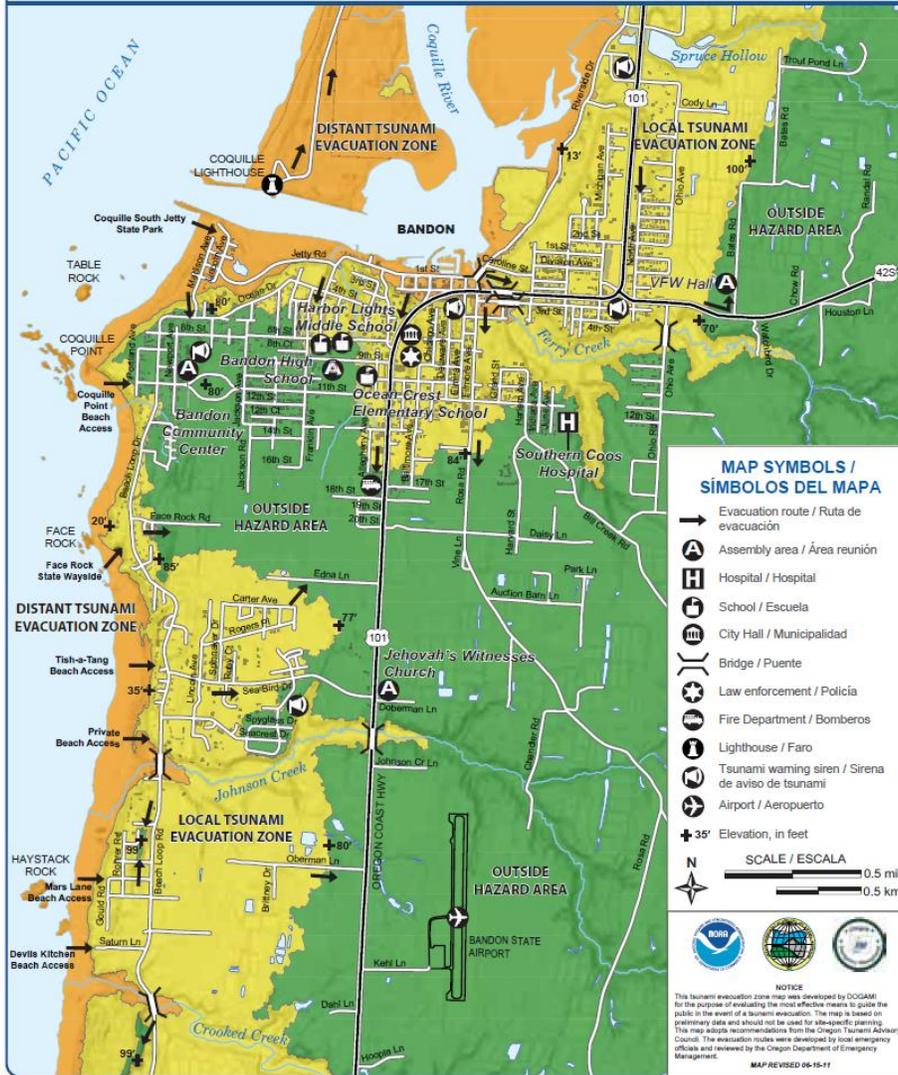


Figure 2. Tsunami evacuation map for Bandon, Oregon.

Table 1. Oregon tsunami inundation modeling and mapping accomplishments and future schedule.

Oregon Community	TsunamiReady Community ¹	<u>First Generation Maps</u>		<u>Second Generation Maps</u>	
		Tsunami Inundation Map (Pub #)	Tsunami Evacuation Map	Tsunami Inundation Map (Pub #)	New Tsunami Evacuation Map
<u>FY 2007 Objectives</u>					
Cannon Beach	Yes	<i>No</i>	<i>No</i>	Yes SP-41	Yes
Arch Cape	<i>No</i>	<i>No</i>	<i>No</i>	Yes SP-41	Yes
<u>FY 2008 / 2009 Objectives</u>					
North Bend	<i>No</i>	Yes (IMS-21)	Yes	Preliminary draft map in prep	Preliminary draft map in prep
Coos Bay	<i>No</i>	Yes (IMS-21)	Yes	Preliminary draft map in prep	Preliminary draft map in prep
Charleston	<i>No</i>	Yes (IMS-21)	Yes	Preliminary draft map in prep	Preliminary draft map in prep
Bandon	<i>No</i>	<i>No</i>	<i>No</i>	Yes SP-43	Yes
Port Orford	<i>No</i>	<i>No</i>	<i>No</i>	Final Map in prep	Final Map in prep
Gold Beach – Nesika Beach	<i>No</i>	Yes (IMS-13)	Yes	Final Map in prep	Final Map in prep
Brookings / Harbor	<i>No</i>	<i>No</i>	<i>No</i>	Final Map in prep	Final Map in prep
<u>FY 2010 Objectives</u>					
Rockaway Beach	Yes	<i>No</i>	Yes	<i>Testing grid</i>	<i>Dec 2011</i>
Garibaldi	<i>No</i>	<i>No</i>	<i>No</i>	<i>Developing grid</i>	<i>Dec 2011</i>
Bay City	<i>No</i>	<i>No</i>	<i>No</i>	<i>Developing grid</i>	<i>Dec 2011</i>
Tillamook	<i>No</i>	<i>No</i>	<i>No</i>	<i>Developing grid</i>	<i>Dec 2011</i>
Cape Meares	<i>No</i>	<i>No</i>	Yes	<i>Developing grid</i>	<i>Dec 2011</i>
Oceanside	<i>No</i>	<i>No</i>	Yes	<i>Developing grid</i>	<i>Dec 2011</i>
Netarts	<i>No</i>	<i>No</i>	Yes	<i>Developing grid</i>	<i>Dec 2011</i>
Sand Lake	<i>No</i>	<i>No</i>	Yes	<i>Testing grid</i>	<i>Dec 2011</i>
Tierra del Mar	<i>No</i>	<i>No</i>	Yes	<i>Testing grid</i>	<i>Dec 2011</i>
Pacific City	<i>No</i>	<i>No</i>	Yes	<i>Testing grid</i>	<i>Dec 2011</i>
Neskowin	<i>No</i>	<i>No</i>	Yes	<i>Testing grid</i>	<i>Dec 2011</i>
<u>FY 2011 Objectives</u>					
Astoria	<i>No</i>	Yes (IMS-11)	<i>No</i>	<i>Developing DEM Sept 2012</i>	<i>Sept 2012</i>

Oregon Community	TsunamiReady Community ¹	<u>First Generation Maps</u>		<u>Second Generation Maps</u>	
		Tsunami Inundation Map (Pub #)	Tsunami Evacuation Map	Tsunami Inundation Map (Pub #)	New Tsunami Evacuation Map
Warrenton	No	Yes (IMS-12)	Yes	Developing DEM Sept 2012	Sept 2012
Gearhart	No	Yes (IMS-3)	Yes	Developing DEM Sept 2012	Sept 2012
Seaside	In progress	Yes (IMS-3)	Yes	Developing DEM Sept 2012	Sept 2012
Manzanita	Yes	No	Yes	Testing grid	Dec 2011 (ahead of schedule)
Nehalem	Yes	No	Yes	Testing grid	Dec 2011 (ahead of schedule)
Wheeler	Yes	No	Yes	Testing grid	Dec 2011 (ahead of schedule)
<u>FY 2012 Objectives</u>					
Lincoln City	Yes	Yes (GMS-99)	Yes	Sept 2013	Sept 2013
Gleneden Beach–Lincoln Beach	No	Yes (GMS-99)	Yes	Sept 2013	Sept 2013
Depoe Bay	No	No	Yes	Sept 2013	Sept 2013
Newport–South Beach	No	Yes (IMS-2)	Yes	Sept 2013	Sept 2013
Toledo	No	No	No	Sept 2013	Sept 2013
Seal Rock	No	No	No	Sept 2013	Sept 2013
Waldport	No	Yes (IMS-23)	Yes	Sept 2013	Sept 2013
Yachats	No	No	Yes	Sept 2013	Sept 2013
Florence	Yes (2010)	Yes (IMS-25)	Yes	Sept 2013	Sept 2013
Dunes City	No	No	Yes	Sept 2013	Sept 2013
Gardiner	No	No	Yes	Sept 2013	Sept 2013
Reedsport	No	No	Yes	Sept 2013	Sept 2013
Winchester Bay	No	No	Yes	Sept 2013	Sept 2013
Lakeside	No	No	No	Sept 2013	Sept 2013

¹ Several counties in Oregon meet the *TsunamiReady* requirements, including Tillamook, Douglas, Coos Counties, and Clatsop County.

Appendix A: List of Oregon Tsunami Preparedness Accomplishments – February 2011 to July 2011

February 2011

- Great Oregon ShakeOut – a drop cover and hold on drill in Lane County.
- Map Your Neighborhood volunteer training workshop – Warrenton (19 participants)
- Map Your Neighborhood volunteer training workshop – Port Orford, Gold Beach, Brookings (100 participants)
- Education committee meeting – Warrenton/Astoria
- Astoria High School student volunteer recruitment activity in collaboration with American Red Cross.
- Tsunami awareness presentation at Unitarian Church/Astoria
- Tsunami awareness presentation for Warrenton High School seniors.
- One-on-one discussions with various lodging managers – Pacific City/Neskowin (DOGAMI Community Organizer)

March 2011

- Emergency preparedness fairs in Portland metropolitan area.
- Talk by Rob Witter of DOGAMI to the Oregon Association of Environmental and Engineering Geologists about his field survey of the Feb. 2010 Chile earthquake and tsunami; similarities to Cascadia tsunamis and earthquakes plus lessons learned for preparedness.
- Tsunami awareness talk to Warrenton Elementary and High School. OEM met with Hatfield Marine Science Center to begin discussions of tsunami evacuation procedures.
- Tsunami awareness presentation – Emerald Heights (Astoria)
- Static Tsunami Awareness Display (rotating locations) – Gold Beach, Port Orford, Warrenton, Astoria
- Community Volunteer Outreach meeting – Neskowin
- Middle & High School Assembly – Port Orford
- Middle & High School Assembly – Gold Beach
- Grade School and High School Assembly – Warrenton
- One-on-one discussions with various lodging and retail managers – Pacific City/Neskowin (DOGAMI Community Organizer)

- OEM - Numerous media contacts regarding the Japanese earthquake and tsunami.
- OEM - Public presentation, sponsored by Legislator Berger, at Roth's in Salem
- OEM - Distant Tsunami Working Group meeting
- OEM met with Hatfield Marine Science Center to begin discussions of tsunami evacuation procedures.

April 2011

- NOAA weather radio workshops in Warrenton by DOGAMI community organizer.
- Presentation on disaster preparedness to Red Cross Business Workshop.
- Cascadia earthquake and tsunami preparedness talk at the Bagdad Theater in Portland.
- Earthquake and tsunami preparedness talk to the Clark County Volunteer Training and Appreciation Dinner.

- Earthquake and tsunami preparedness talk at Coos Bay Emergency Preparedness Fair.
- Coordination meeting with Clatsop County officials to discuss impact of landslides and liquefaction on evacuation routing. Presentation Door-to-door outreach in tsunami evacuation areas-on on disaster preparedness to Red Cross Business Workshop.
- One-on-one discussions with various retail managers and school administrators – Pacific City/Neskowin (DOGAMI Community Organizer)
- Community Volunteer Outreach meeting – Pacific City
- NOAA weather radio/”Go Pack” training workshop – Neskowin
- Door-to-door/Disaster Exercise – Warrenton
- Door-to-door outreach in tsunami evacuation areas-Port Orford
- Door-to-door outreach in tsunami evacuation areas-Gold Beach
- Table top for evacuation drill – Gold Beach/Port Orford
- Tsunami awareness presentation for Port Orford League of Women Voters
- Tsunami awareness presentation for Brookings League of Women Voters
- Tsunami awareness presentation for Gold Beach Chamber of Commerce
- Cascadia earthquake and tsunami preparedness talk at the Bagdad Theater in Portland.
- Earthquake and tsunami preparedness talk to the Clark County Volunteer Training and Appreciation Dinner.
- Tsunami awareness presentation – Pacific City/Neskowin Chamber of Commerce
- Static Tsunami Awareness Display (rotating locations) – Gold Beach, Port Orford, Warrenton, Astoria
- CERT (Community Emergency Response Team) training workshop – Pacific City Area
- Earthquake and tsunami preparedness talk and community rally at Warrenton. (SRO)
- Earthquake and tsunami preparedness talk and community rally at Astoria.
- Earthquake and tsunami preparedness talk at Coos Bay Emergency Preparedness

May 2011

- Tsunami outreach rally at Pacific City with earthquake and tsunami preparedness talk by DOGAMI.
- Earthquake and tsunami preparedness talk and workshop at Seaside.
- Earthquake and tsunami vulnerability talk Northwest Transportation Commission.
- QuakePrep Road Shows (FEMA-supported) at Corvallis, Monroe, Eugene, Grants Pass, Medford, Brookings, Coos Bay, Reedsport, Toledo, Tillamook, and Seaside.
- OEM – Earthquake and Tsunami Train the Trainer – Astoria
- OEM – Hatfield Marine Science Center – met with Maryann Bozza about the evacuation project.
- Tsunami evacuation drill- Pacific City/Neskowin
- Tsunami evacuation drill – Port Orford
- Tsunami evacuation drill – Gold Beach
- Tsunami evacuation drill – Warrenton

June 2011

- OEM and DOGAMI staff met with Newport and other officials to examine the South beach Safe Haven Hill project for tsunami evacuation.

- Hatfield Marine Science Center Emergency Evacuation Forum – DOGAMI and OEM panel participation.
- Door-to-door outreach in tsunami evacuation areas- Pacific City/Neskowin
- Map Your Neighborhood outreach in collaboration with Clatsop County Emergency Management- (Warrenton/Astoria)
- Post-outreach survey conducted – Gold Beach
- Post-outreach survey conducted – Port Orford Post-outreach survey conducted – Pacific City/Neskowin
- Post-outreach survey conducted – Warrenton/Astoria

July 2011

- OEM - Distant Tsunami Working Group meeting
- Met with Clatsop County Emergency Management and the National Weather Service about TsunamiReady status.
- OEM – Earthquake and Tsunami Train the Trainer for Hispanic Community leaders– Tillamook
- Coos Bay steering committee formation meeting for 2011-2012 outreach project.
- Tillamook Bay steering committee formation meeting for 2011-2012 outreach project.
- Static Tsunami Awareness Display (rotating locations) – Gold Beach, Port Orford, Warrenton, Astoria