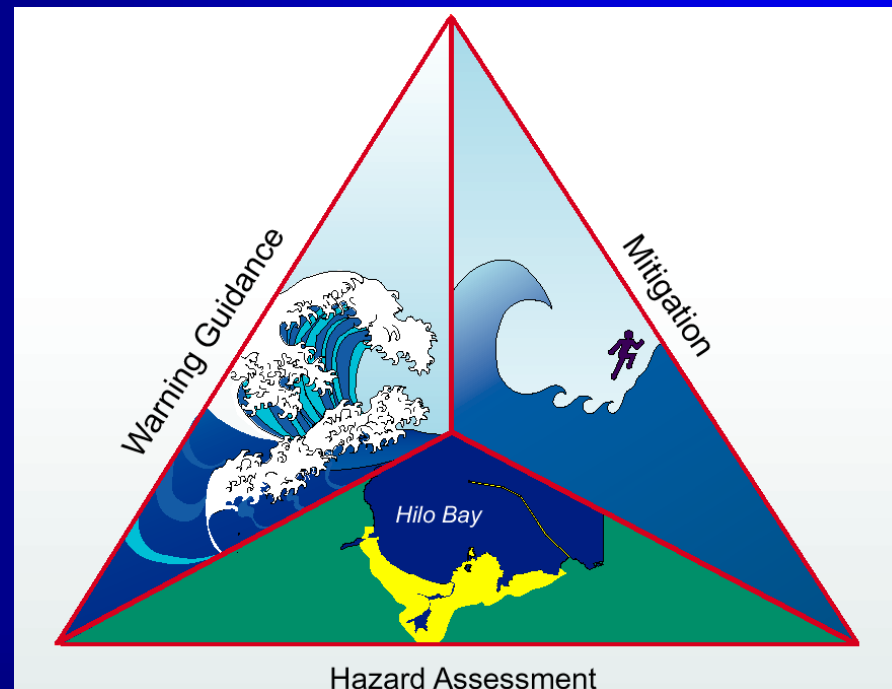


U.S. National Tsunami Hazard Mitigation Program

Subcommittee on Disaster Reduction Briefing

June 4, 2009



Jenifer Rhoades
NWS Tsunami Program Manager
NTHMP Program Administrator

The NTHMP's Mission is to reduce loss of life and property damage from tsunamis.

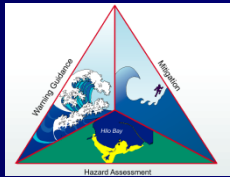
Our Vision is resilient coastal communities that are highly informed and prepared for all tsunami hazards, that loss of life is negligible, and loss of property is minimized should a tsunami strike any U.S. state, commonwealth, or territorial coastline.



U.S. National Tsunami Hazard Mitigation Program

History

- A partnership between Federal and State agency representatives designed to reduce the impact of tsunamis on U.S. coastal communities.
- Formed in 1995 by Congressional action which directed NOAA to form and lead a Federal/State tsunami mitigation working group based on:
 - Increased recognition of the Cascadia tsunami threat due to the April 1992 earthquake and tsunami on the Cascadia subduction zone in northern California
 - The loss of life and property in Japan due to the 1993 Hokkaido Nansei-Oki tsunami that devastated the island of Okushiri
 - The historic Alaska tsunamis of 1946 and 1964 and Chilean tsunami of 1960
- Indian Ocean Tsunami of 2004 enhanced U.S. awareness of tsunami threat



U.S. National Tsunami Hazard Mitigation Program

Partners

States

Alaska - California - Hawaii - Oregon – Washington - Guam - Puerto Rico

U.S. Virgin Islands – Texas – Georgia – Maine – New York – Alabama

Maryland – Connecticut – Louisiana – Florida – New Hampshire

South Carolina – Mississippi – Virginia – North Carolina – Massachusetts

New Jersey – Rhode Island – American Samoa – Virginia - Delaware

Federal Agencies

NOAA – FEMA – USGS



U.S. National Tsunami Hazard Mitigation Program

Strategic Plan Outcomes

NTHMP Outcomes

- Reduction of loss of life and property damage from tsunami
- Successful execution of NTHMP tsunami mapping, modeling, mitigation, planning and education efforts
- Tsunami inundation maps that support informed decision making in tsunami-threatened communities
- Tsunami evacuation maps that support effective preparedness and response
- A culture of tsunami preparedness and response
- Establishment of more tsunami resilient communities
- Effective and reliable warning dissemination to people at risk
- Understandable and effective Tsunami Warning Center products



U.S. National Tsunami Hazard Mitigation Program

Sub-Committees

Outcomes achieved through:

- Warning Coordination Sub-Committee
- Mitigation and Education Sub-Committee
- Mapping and Modeling Sub-Committee



U.S. National Tsunami Hazard Mitigation Program

Sub-Committees

Warning Coordination Sub-Committee

- Addresses improving tsunami warnings and associated information, seismic data acquisition and processing, and communications
- Co-Chairs: Jim Goltz (California), Paul Whitmore (NOAA), and Chip McCreery (NOAA)

2009 Goals:

- Develop a post-event review process with performance measures to determine the effectiveness of tsunami warning products





U.S. National Tsunami Hazard Mitigation Program

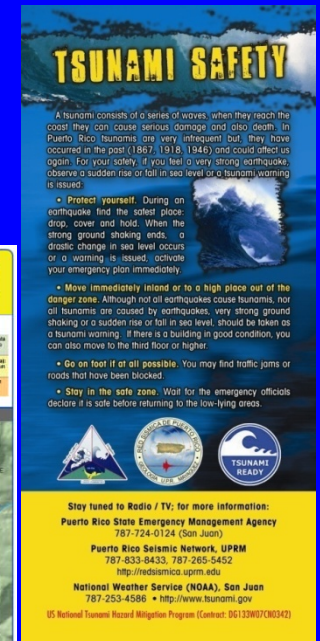
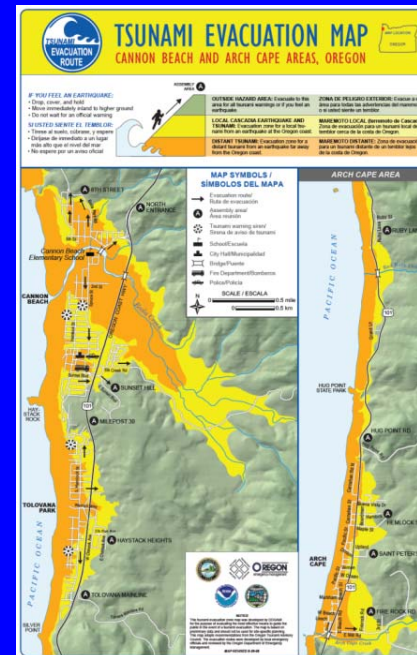
Sub-Committees

Mitigation and Education Sub-Committee

- Works toward improving tsunami outreach activities, hazard mitigation planning, evacuation planning and exercises, education material development, public education, and NWS' TsunamiReady Program
- Co-Chairs: Tom LeBlanc (Texas), Chris Jonientz-Trisler (FEMA), and Jenifer Rhoades (NOAA)

2009 Goals:

- Establish definitions of mitigation and preparedness
- Establish inventory of NTHMP federal and state mitigation and preparedness activities
- Complete evaluation of TsunamiReady Program
- Implement electronically available education toolkits and curricula for educators



Broadcasters Tsunami Emergency Guidebook





U.S. National Tsunami Hazard Mitigation Program

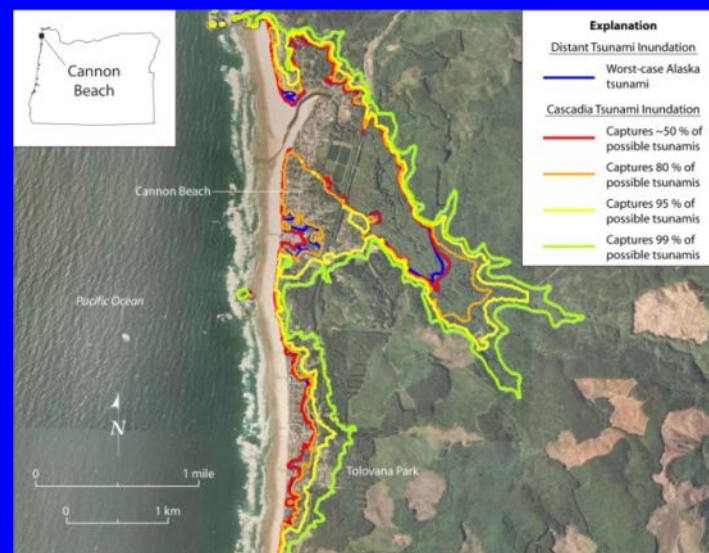
Sub-Committees

Mapping and Modeling Sub-Committee

- Works toward the production of tsunami inundation maps for use in community planning
- Co Chairs: Rob Witter (Oregon) and Susan McLean (NOAA)

2009 Goals:

- Prioritize U.S. Digital Elevation Map Development Requirements
- Establish Inundation Map Guidelines





U.S. National Tsunami Hazard Mitigation Program

SDR Actions*

- Develop standardized and coordinated tsunami hazard and risk assessments for all coastal regions of the United States and its territories
 - On-going
- Improve Tsunami sensor and seismic data infrastructure for better tsunami detection and warning
 - Achieved Full Operating Capacity of U.S. Strengthening Program in 2008
 - 24/7 Tsunami Warning Centers
 - Completed DART Network
 - Upgraded and installed new tide gauges to meet tsunami sampling requirements
 - Enhanced global seismic networks (USGS); acquisition of CTBTO seismic data
 - 24/7 National Earthquake Information Center (USGS)
 - 32 Site Specific Inundation Forecast Models developed
 - On-going efforts to enhance international tide gauge networks
 - On-going research to improve tsunami detection equipment and inundation models
 - Operational Requirements Development



* SDR co-authored [Tsunami Risk Reduction for the United States](#), 2005.



U.S. National Tsunami Hazard Mitigation Program

SDR Actions (continued)

- Enhance tsunami forecast and warning capability along our coastlines (Pacific, Atlantic, Caribbean, and Gulf of Mexico) by increasing the number of Deep-ocean Assessment and Reporting of Tsunamis (DART) buoys, tide gauges, and seismic sensors feeding real-time data into on-line forecast models.
 - Completed

- Ensure interoperability between U.S. national system and other regional tsunami warning systems.
 - On-going

- Provide technical expertise and assistance, as appropriate, to facilitate development of international tsunami and all-hazard warning systems, including for the Indian Ocean.
 - On-Going



U.S. National Tsunami Hazard Mitigation Program

SDR Actions (continued)

- Encourage data exchange and interoperability among all regional tsunami and all-hazard warning systems, such as The Intergovernmental Oceanographic sub-commission for the Caribbean (IOCARIBE).
 - On-Going
- Promote development of model mitigation measures and encourage communities to adopt construction, critical facilities protection and land-use planning practices to reduce the impact of future tsunamis.
 - On-Going



U.S. National Tsunami Hazard Mitigation Program

SDR Actions (continued)

- Increase outreach to all communities, including all demographics of the at-risk population, to raise awareness, improve preparedness, and encourage the development of tsunami response plans.
 - On-Going
- Conduct an annual review of the status of tsunami research and develop a strategic plan for tsunami research in the United States.
 - 1st Report Completed in 2007
 - Annual Review of Research within Program



U.S. National Tsunami Hazard Mitigation Program

For More Information

NTHMP Links

- www.nthmp.tsunami.gov – NTHMP Home Page
- <http://nthmp.tsunami.gov/organization.html> - Strategic Plan, Charter, Rules of Procedure
- <http://nthmp.tsunami.gov/nthmpcc.html> - Coordinating Committee

NWS Links

- www.tsunami.gov – Latest tsunami information
- <http://wcatwc.arh.noaa.gov/> - West Coast/Alaska Tsunami Warning Center
- <http://www.prh.noaa.gov/pr/ptwc> - Pacific Tsunami Warning Center
- <http://www.tsunamiready.noaa.gov/> - TsunamiReady

Background Slides



U.S. National Tsunami Hazard Mitigation Program

Approved Activities

- Preparing tsunami inundation maps for at-risk communities
 - Inputs to mapping and modeling
 - Application of model
 - DEM/Grid generation
- Promoting the adoption of tsunami warning and mitigation measures by Federal, State, tribal, and local governments and non-governmental entities
 - Local warning reception and dissemination infrastructure (e.g., sirens)
 - Providing Guidance for Land-use Planning
 - Promoting adoption of tsunami building codes



U.S. National Tsunami Hazard Mitigation Program

Approved Activities

- Promoting and improving community outreach and education networks and programs to ensure community readiness
 - TsunamiReady
 - Outreach products
 - Accessible knowledge repository
 - Workshops
 - Support educational efforts at learning institutions
 - Decision-support tools
 - Risk Assessments
 - Technical training and public education programs



U.S. National Tsunami Hazard Mitigation Program

Approved Activities

- Integrating tsunami preparedness and mitigation programs
 - Development and Integration of tsunami information:
 - Emergency Response and Recovery Plans
 - Mitigation Tools, Programs and Plans
 - Risk Management Activities
 - Signage
 - Supporting community efforts to create evacuation maps and tsunami response plans
 - Tsunami evacuation drills, exercises, etc.
 - Evaluation/Assessment Tools

Types of TWC Data

- Seismic
 - Broadband (need to measure biggest magnitudes)
 - Short-Period (hypocenter location and depth)
 - Accelerometer (stays on scale for nearby events)
- Sea Level
 - Coastal Tide Gauges (less costly, denser networks)
 - DART Deep-Ocean Gauges (pure tsunami signal)
 - Coastal Runup Gauges (least costly but only wet or dry)
- GPS Data (future)
- Hydroacoustic Data (future)

Sources for TWC Data

- Seismic

- USGS National and Regional Networks
- IRIS Global Seismic Network
- TWC Regional Networks
- CTBTO International Monitoring System
- Foreign National and Regional Networks

- Sea Level Data

- NOS Coastal Stations (US)
- NDBC DART Deep Ocean Gauges
- IOC GLOSS Global Sea Level Network
- TWC Real-Time Sea Level and Runup Gauges
- Foreign Coastal Gauges

The Role of Seismic Networks

- The TWCs operate only a very small fraction of the seismic stations needed for their operations
- Other networks provide data on a cooperative basis but their mission is different (earthquake hazard, earth studies, earthquake engineering, volcanic monitoring)
- Earthquake analysis results of other networks can complement the TWC's rapid analysis
- Products from other networks, while not targeted at the tsunami hazard, may still be beneficial (e.g., shakemaps)
- TWCs are vulnerable to any problems with those networks (technical, political, funding)

The Role of Sea Level Networks

- The TWCs operate only a very small fraction of the coastal sea level stations needed for their operations
- NOAA operates most of the critical DART deep ocean stations (strategically located, pure tsunami signal)
- Other networks provide data on a cooperative basis but their mission is different (global sea level rise, storm surge, internal waves, El Nino)
- TWCs are vulnerable to any problems with those networks (technical, political, funding)