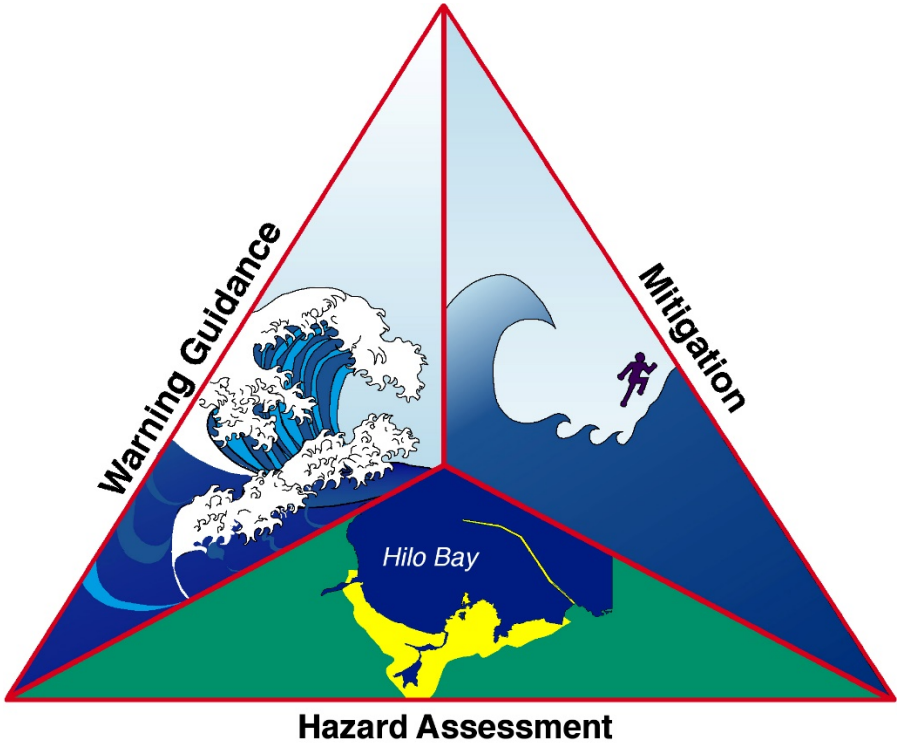
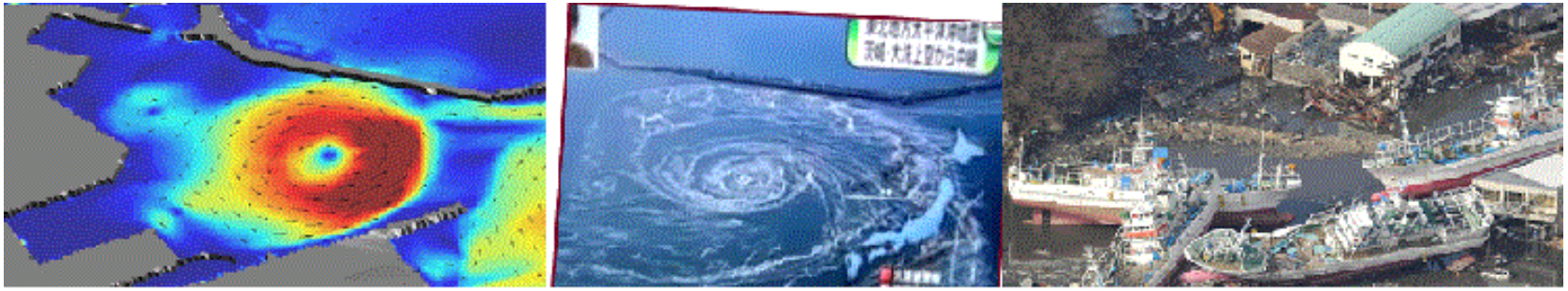
2015 Mapping and Modeling Subcommittee Report

- Current model benchmarking workshop
- Maritime tsunami response mapping and modeling guidance
- Maritime minimum offshore safe depth work group and guidance
- Other business



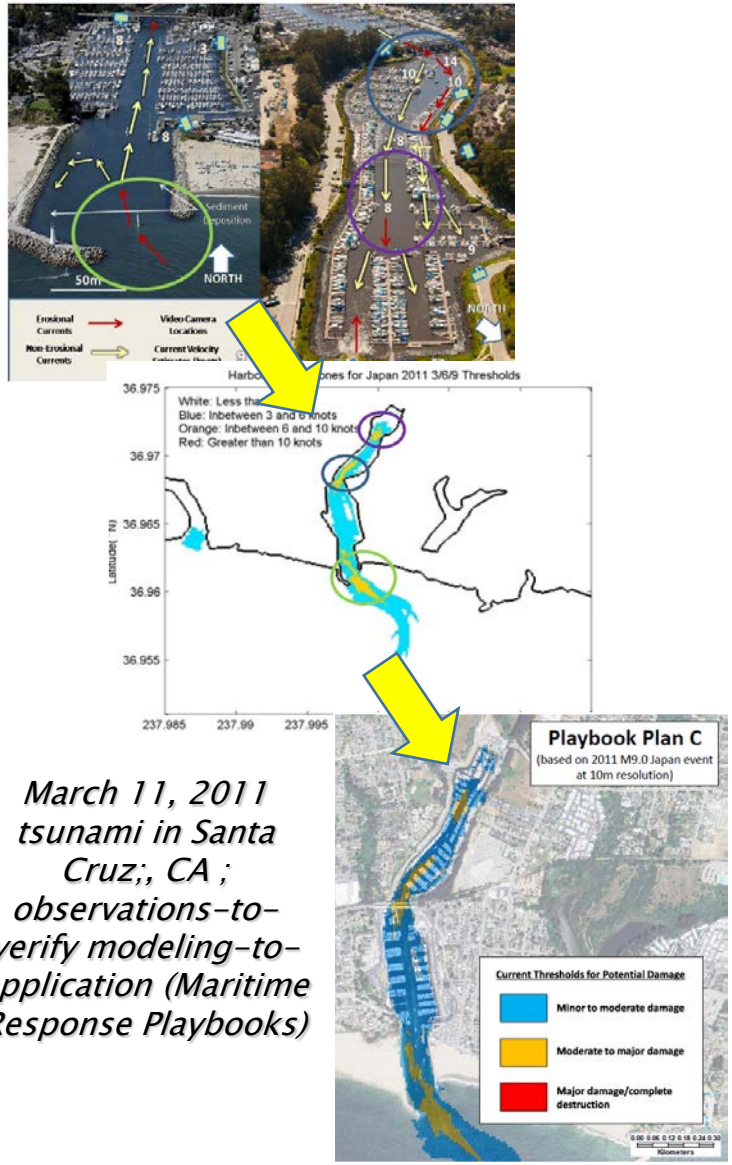
Tsunami Current Model Benchmark Workshop



NTHMP Mapping & Modeling Benchmarking Workshop: Tsunami Currents

- To help produce accurate and consistent products for maritime and coastal communities, the FY13-17 NTHMP Strategic Plan included a milestone for MMS to develop and run a benchmarking workshop to evaluate the numerical tsunami modeling of currents.
- Anticipated that modelers will have a better awareness of their ability to accurately capture the physics of tsunami currents, and therefore a better understanding of how to use these simulation tools for hazard assessment and mitigation efforts.
- Five different benchmarking datasets were organized. These datasets have been selected based on characteristics such as geometric complexity, currents that are shear/separation driven (and thus are de-coupled from the incident wave forcing), tidal coupling, and interaction with the built environment.
- 15 NTHMP and international modeling groups participated; we thank each modeling group for the effort and time put into this work!.

Tsunami Current Model Benchmark Workshop



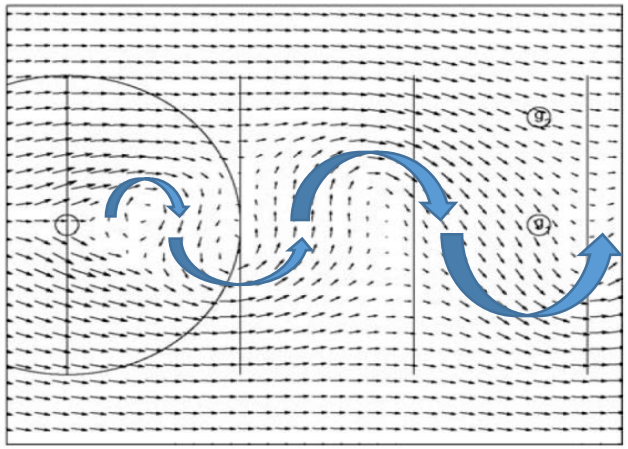
March 11, 2011 tsunami in Santa Cruz;, CA ; observations-to-verify modeling-to-application (Maritime Response Playbooks)

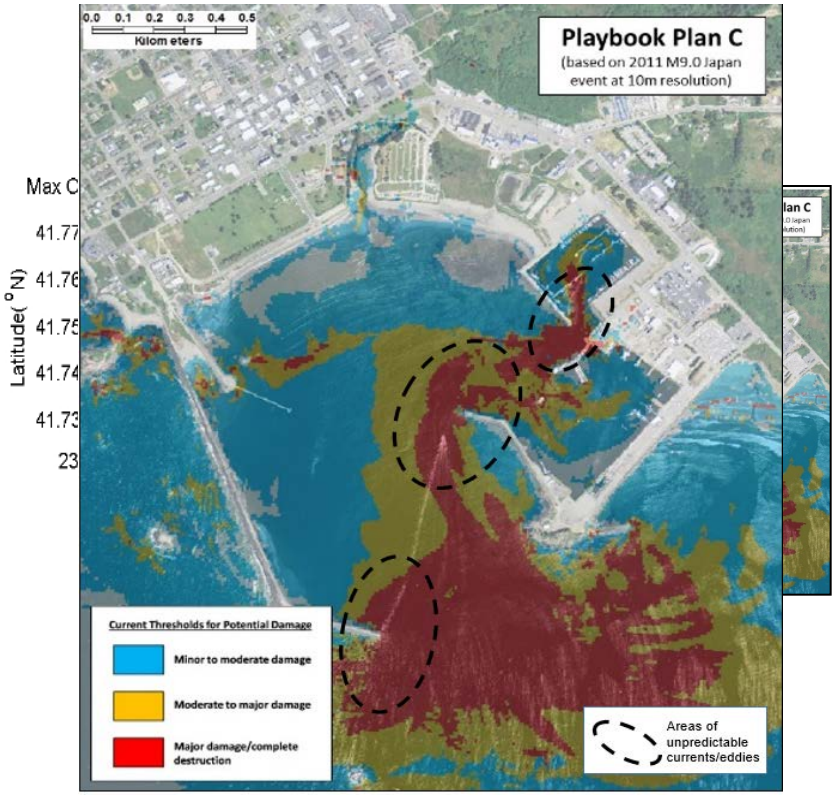
PRIMARY GOAL: Verify the accuracy/adequacy of current models for use by NOAA and NTHMP partners to help produce accurate and consistent maritime and other hazard reduction products.

Planned Outcomes:

- *Determine accuracy/adequacy of current models for use on NTHMP products.*
- *Establish group to write a report summarizing the benchmarks, the workshop, and model verification process.*
- *Follow up on benchmark improvements.*

Tsunami Current Model Benchmark Workshop





Workshop Outcomes, thus far:

- *Model evaluations are ongoing.*
- *Most models were consistent in their results.*
- *Obtaining absolute accuracy of models was a challenge due to complexity and limitations of the benchmarks, especially capturing eddies. Models did better at capturing envelope of maximum currents.*
- *Improvements to maritime hazard products:*
  1) simplifying results by binning velocities based on damage relationship; and
  2) identifying the error associated with where eddies occur, but might not be fully captured by the model
- *A report on the workshop proceedings and peer-reviewed paper will be completed.*
- *Next steps: examining improvements to the set of benchmarks and exploring the need and feasibility for creating a NTHMP ensemble model platform.*

Maritime Mapping/Modeling Product Guidance

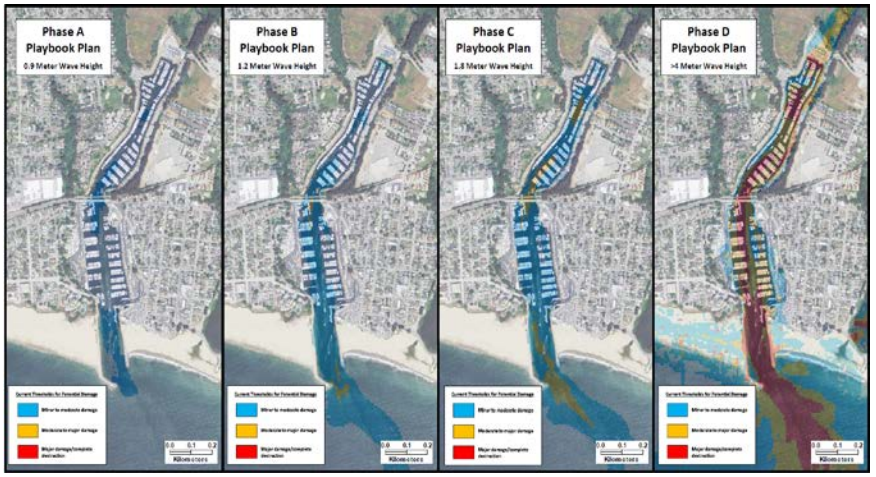
The purpose of these guidelines is to:

- Address the minimum requirements to develop consistent and reliable tsunami preparedness products for maritime communities.
- Outline products available for Mitigation and Education Subcommittee to develop guidance on maritime response.

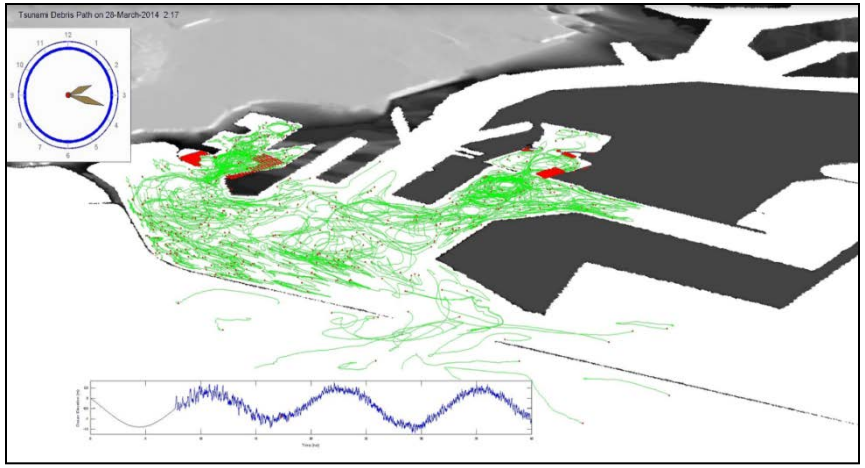
Response products include:

- Areas of past tsunami damage and strong currents
- Current velocities and relationship to damage
- Peak-to-trough water-level fluctuations
- Bores or amplified waves
- Length of time damaging currents are active
- Safe minimum offshore depth for vessels
- Movement of debris during tsunami

First version MMS guidance expected to be finalized by Summer 2015



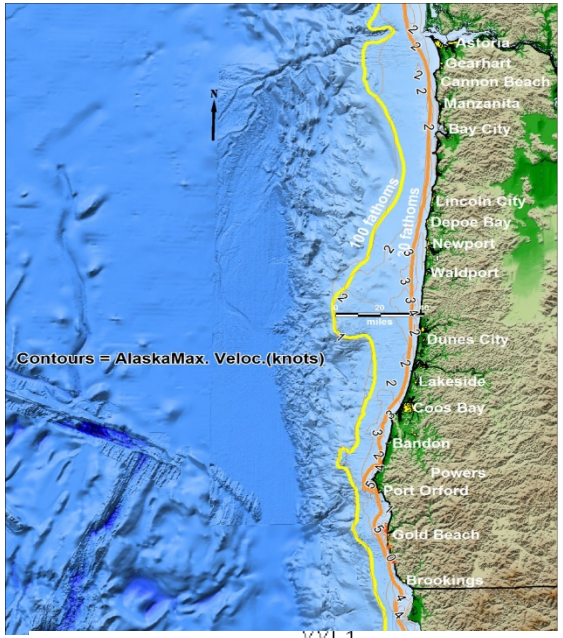
Example maps from Santa Cruz Harbor showing potential damage based on strong currents generated by a tsunamis of different amplitudes (Tsunami Planning Playbook for Santa Cruz Harbor, 2014).

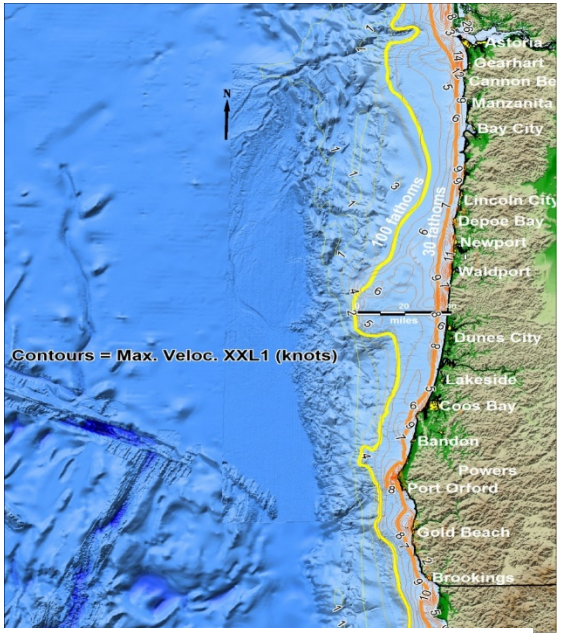


Modeled debris/particle movement from small-boat basins within the Port of Los Angele

Maritime Minimum Offshore Safe Depth and Work Group

- Existing NOAA recommendation is for ships to go beyond the 100 fathom (600 ft) depth for safety offshore.
- NTHMP and US Coast Guard representatives have formed a Work Group to address a number of maritime response issues.
- Recommendations from the group could/should provide a basis for USCG to improve existing tsunami response planning and provide a foundation for consistency nationwide.
- Evaluations of minimum offshore safe depth guidance is ongoing in many states and territories.





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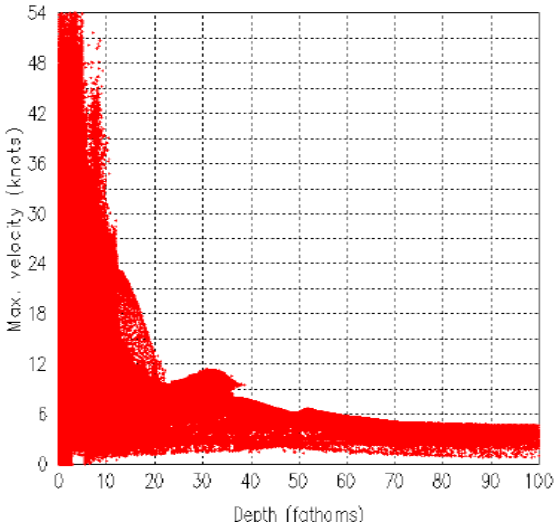
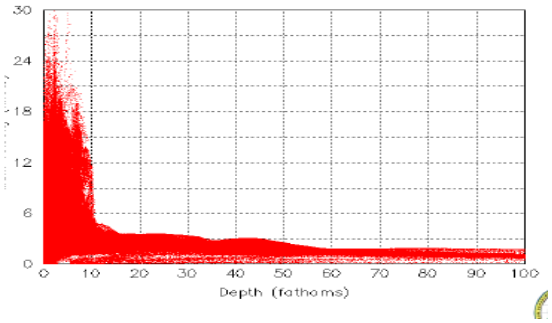


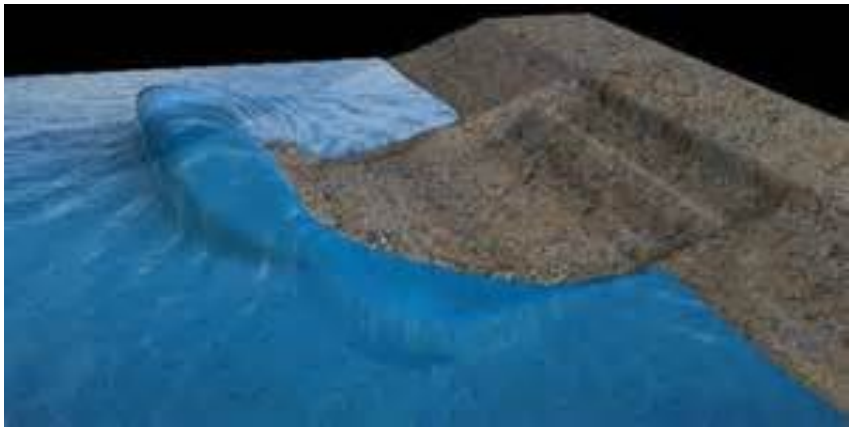
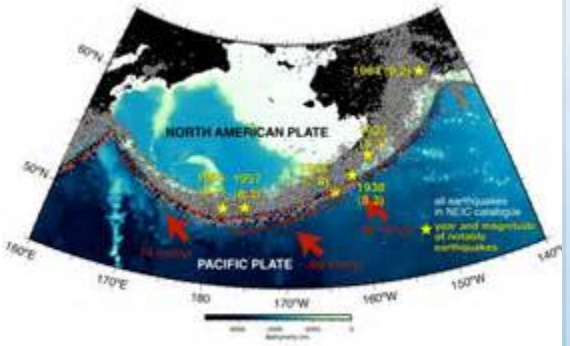
Evaluation of minimum offshore safe depth in Oregon for local and distant tsunami sources

AKmax



Recommendation Results for Minimum Offshore Depth

State/Territory	Distant Source (ships in harbor)	Local Source (ships at sea)	Notes
California	30 fathoms	100 fathoms	Evaluated; following Oregon for local source
Oregon	30 fathoms	100 fathoms	Evaluated
Hawaii	50 fathoms		Evaluated
Alaska			Still evaluating
Washington			Still evaluating; forming state harbor advisory group
Caribbean	50 fathoms	50 fathoms	General recommendation
Gulf Coast			Still evaluating
East Coast			Still evaluating
American Samoa			Evaluating, guidance from others
Guam			Evaluating, guidance from others
CNMI			Evaluating, guidance from others

Other MMS Business

- Many ongoing projects (benchmark workshop, maritime work, etc.) and addressing other Strategic Plan “milestones” will require follow up conference calls prior to Summer MMS meeting.
- Planning for landslide modeling benchmark workshop for Summer 2016 (Jim Kirby is the lead).
- Planning for acceptance of additional tsunami inundation models which have successfully completed the NOAA Benchmarking problems
- Selection of communities where NGDC digital elevation models (DEMs) are needed for new modeling.
- Discussed creation of a USGS Subduction Zone Initiative (SZI) which will address key scientific questions about the nation’s subduction zones, including reducing uncertainties in geologic hazard assessments.
- Accepted Dmitry Nicolsky (AK) as the new State Co-Chair for MMS for the next two years.