



U.S. National Oceanic and Atmospheric Administration
National Weather Service
Caribbean Tsunami Warning Program



US Tsunami Services for PR and the VI: An Update from the NOAA NWS Caribbean Tsunami Warning Program

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Caribbean Regional Response Team Meeting
St. Thomas, USVI
June 16, 2016



Overview

- About CTWP
- About US TWCs
- About Tsunamis
- Tsunami Threat to Puerto Rico and the Virgin Islands
- Domestic Products for Puerto Rico and the Virgin Islands
 - Types – Informational, Watch, Advisory, Warning
 - Procedures and Timeline
 - Communication Methods



CTWP

- Established by the US National Weather Service in Mayagüez, Puerto Rico in 2010.
- The office supports an increased capability of the tsunami observational system and the continued enhancement of tsunami outreach and education capacity, including the implementation of the TsunamiReady® and the International Tsunami Ready recognition programs.
- The CTWP also participates and supports activities of the UNESCO Intergovernmental Oceanographic Commission's Intergovernmental Coordination Group for Tsunamis and Other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions (CARIBE EWS). The CARIBE EWS covers 48 states and territories in the Caribbean and Western Atlantic.



US NTWC's Location



National Tsunami Warning Center, Palmer, Alaska

NTWC Operations Room





US PTWC's Location



NOAA Inouye Regional Center, Ford Island, Pearl Harbor, Hawaii



PTWC Operations Room

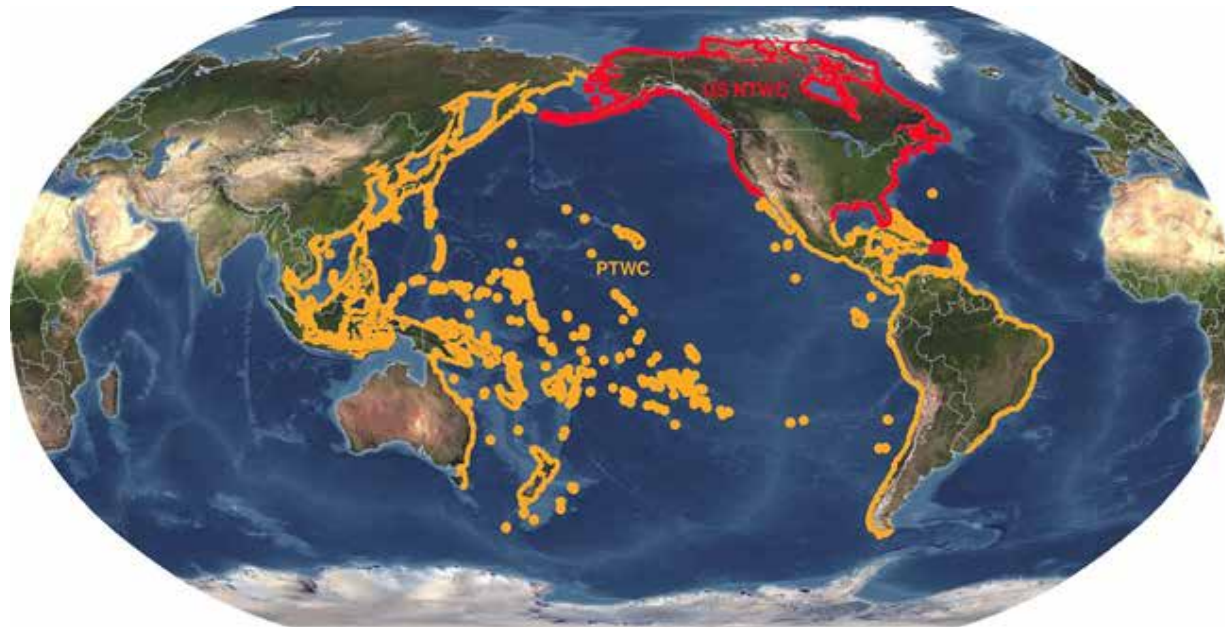


US TWC's Services

Directors

Mr. Paul Whitmore – US NTWC

Dr. Chip McCreery – US PTWC



The National Tsunami Warning Center serves all U.S. states except Hawaii. It also serves Puerto Rico, the Virgin Islands (US and British) and Canada.

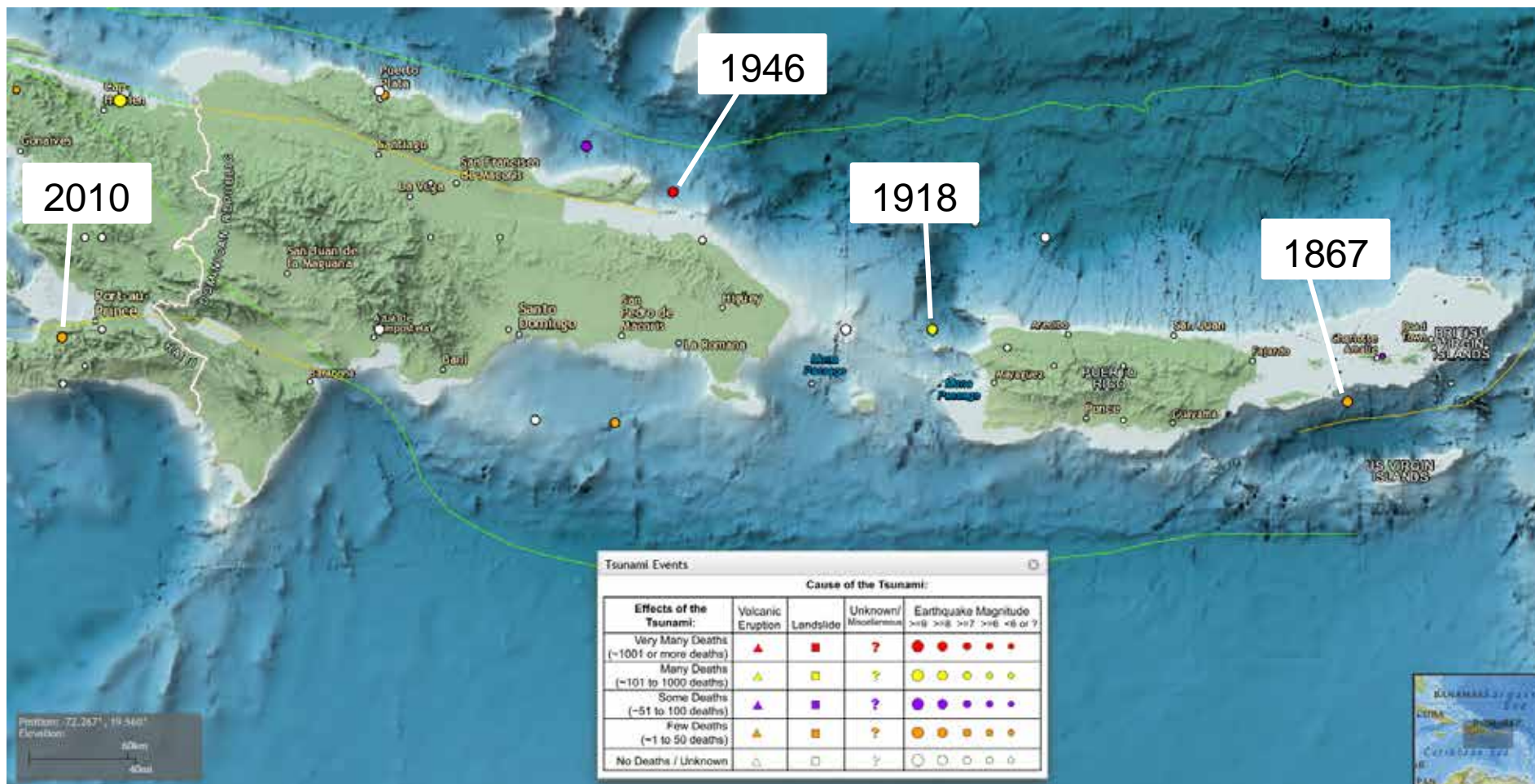
The Pacific Tsunami Warning Center directly serves Hawaii and the U.S. Pacific territories and is the primary international tsunami threat forecast center for the Pacific and Caribbean Basins.



Tsunami Threat - Historical

YEAR	EVENT	MAX <u>PRVI</u> RUNUP (meters)
1867	St. Thomas	15
1918	Mona Passage	5.5
1946	Dominican Republic	0.7 (5 in DR)
2010	Haiti	0.1 (3 in Haiti)

Tsunami Threat - Historical



Alert Levels



• ¡Peligro! / *Danger!*
• ¡Corra a tierras altas!
Run for high ground!
• Siga las instrucciones de emergencia / *Follow emergency instructions.*

**Aviso
Warning**

**Advertencia
Advisory**

• Posibles corrientes locales fuertes y peligrosas / *Possible strong and dangerous local currents.*
• Esté pendiente para más información oficial / *Stay tuned for local emergency guidance.*

• Peligro potencial / *Potential danger.*
• Permanezca alerta para más información / *Stayed tuned for more information.*

**Vigilancia
WAch**

• No se ha emitido Aviso, Advertencia o Vigilancia / *No Warning, Advisory or Wacht issued.*
• Una cuenca oceánica distante puede estar en riesgo / *A distant ocean basin may be in danger.*

**Boletín
informativo
Information Statement**



TWC PRVI Initial Criteria

- Initial Warnings and Advisories are for a quick response when there is no time to wait for later analyses
- Based on Seismic Data Analysis only
- Initial Criteria are conservative
- Initial Criteria are subject to TWC duty analyst on-the-spot judgments
- Initial Criteria may change over time as supporting data and science change
- Initial Criteria need to take into consideration capability of community to respond
- Public Education and Awareness still necessary for best initial response including self-evacuation

TWC Products Example: PR/VI Earthquake, No Tsunami Threat



Elapsed	Product	Description
00:00	Earthquake	Nearby Earthquake Occurs, Mw 4.0 - 6.4
00:03	Observatory Message*	TWC Preliminary Reviewed Earthquake Parameters – Triggers CISN Entry
00:04	PRVI Information Statement	Nearby Earthquake, Earthquake Shaking in PRVI, No Tsunami Threat to PRVI. Only Product.

* optional but usual for Seismic Networks

TWC Products Example: PR/VI or Caribbean Earthquake, Tsunami Threat



Elapsed	Product	Description
00:00	Earthquake	Local Earthquake Occurs, Mw \geq 7.1
00:05	Observatory Message*	PTWC Preliminary Reviewed Earthquake Parameters – Triggers CISN Entry
00:06	PRVI Warning or Advisory	Tsunami Warning or Advisory for PRVI based on Initial Criteria
00:25	PRVI Warning, Advisory, or Cancellation	Tsunami Forecast based on Earthquake Mechanism and sea level data. Maintains, upgrades or downgrades appropriate level of Alert or issues a Cancellation

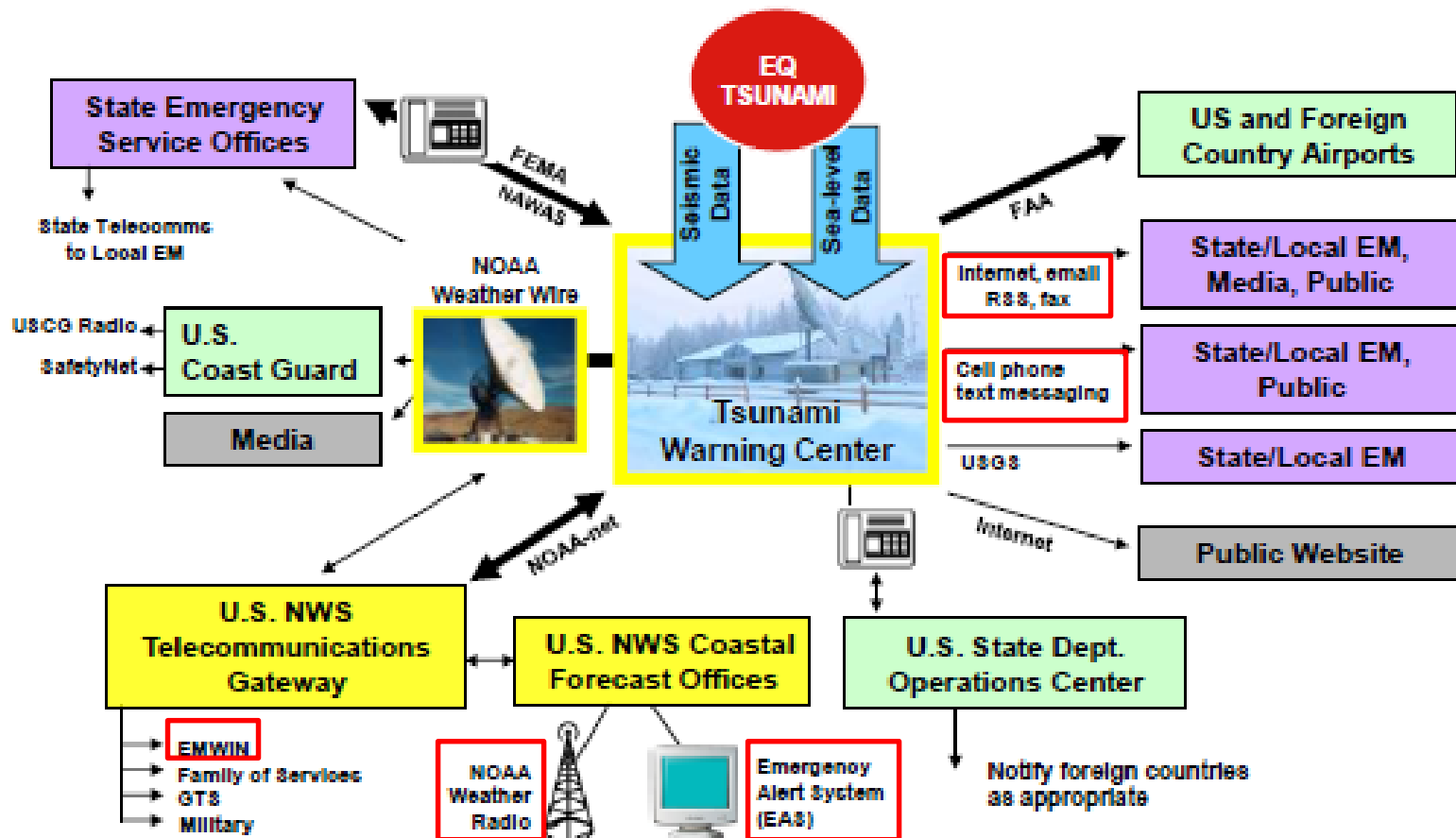
* optional but usual

TWC Products Example: PR/VI or Caribbean Earthquake, Tsunami Threat



Elapsed	Product	Description
00:55	PRVI Warning, Advisory, or Cancellation	Supplemental Message with Sea Level Readings from nearby Coastal or DART Gauges. Possible change in Alert Level based on Readings
01:25	PRVI Warning, Advisory, or Cancellation	Supplemental Message with Sea Level Readings from nearby Coastal or DART Gauges. Possible change in Alert Level based on Readings
01:45	TWC Conference Call Announcement	Message to PREMA, VITEMA, BVIDDM, WFOSJ, and PRSN announcing Conference Call
02:00	TWC Conference Call	TWC Conference Call with PREMA, VITEMA, BVIDDM, WFOSJ, and PRSN to discuss situation
03:00+	PRVI Warning, Advisory, or Cancellation	Every half-hour until alert reduced to cancellation

Communication Methods

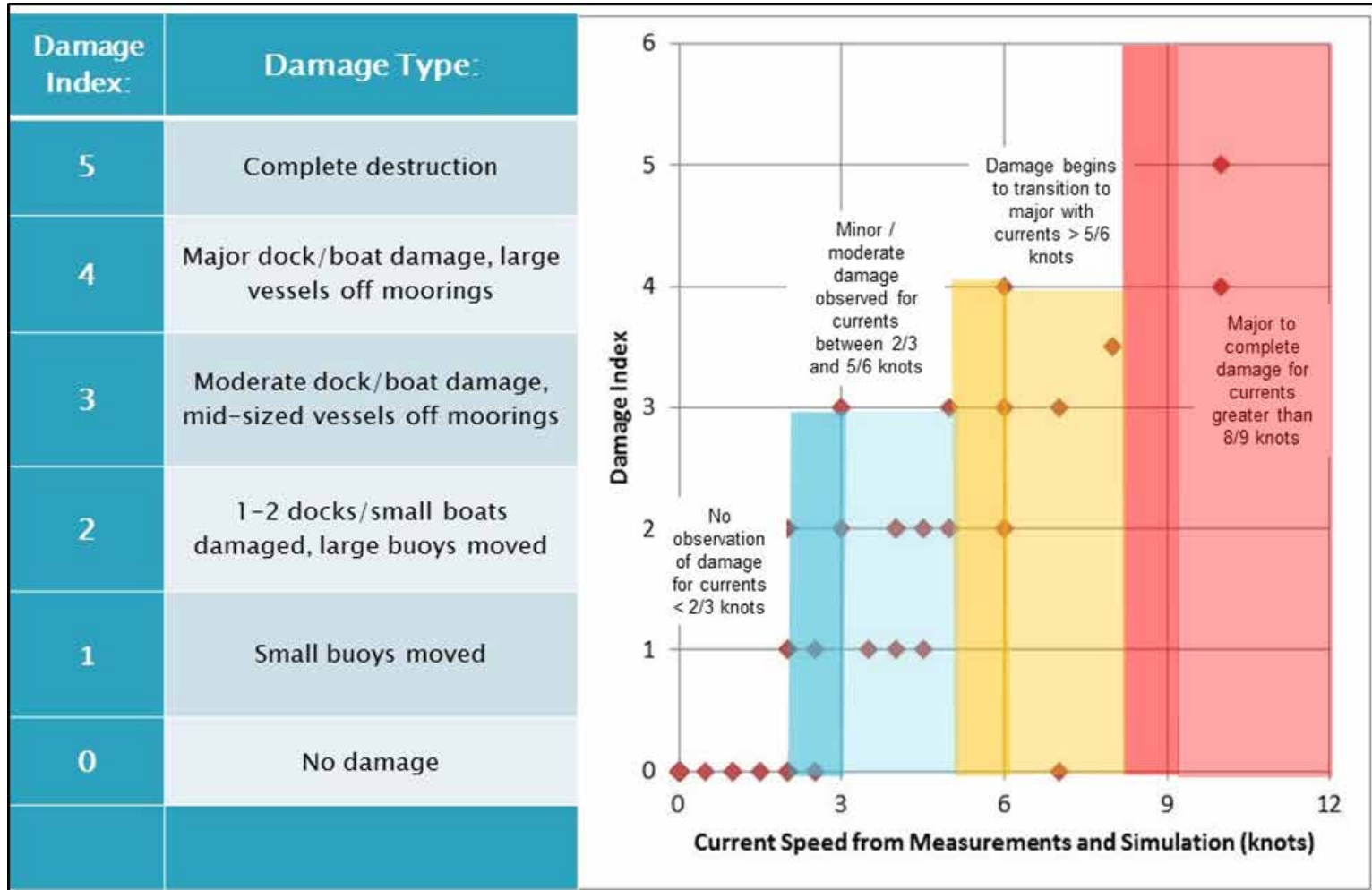




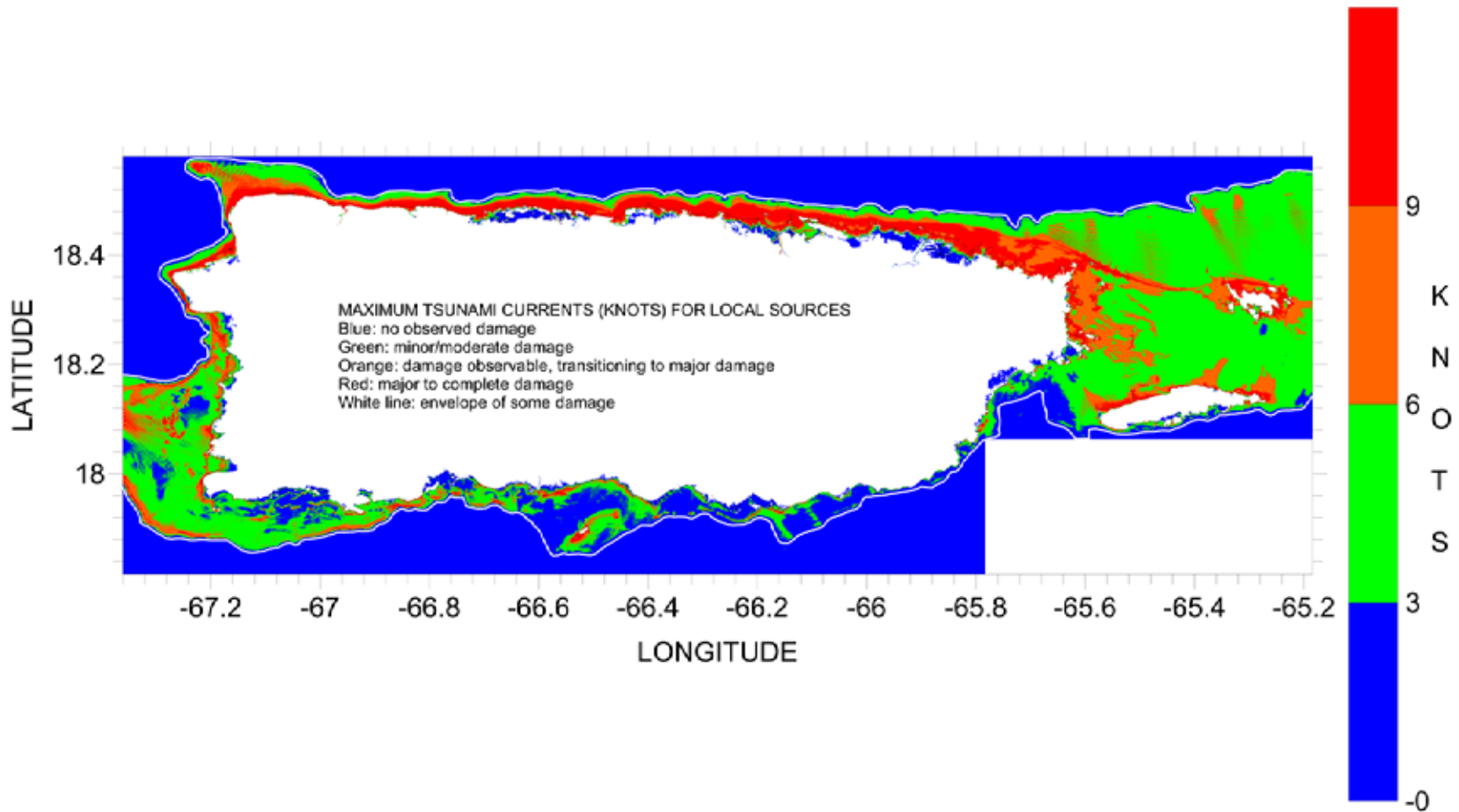
Updates

- Transfer of domestic services from NTWC (Alaska) to PTWC (Hawaii) for PR, USVI and BVI – **Scheduled for FALL 2016**
- CARIBE WAVE 17 - **March 21, 2017, 14h00 UTC (10 AM AST)**
- Finalization of Maritime Guidance for PR and USVI – **FY 17**

Maritime Guidance Under Development



Maritime Guidance Under Development



Maritime Guidance Under Development



State/Territory	Distant Source	Local Source	Notes
California	30 fathoms	100 fathoms	Evaluated, except for the San Francisco Bay, where some additional studies need to be completed
Oregon	30 fathoms	100 fathoms	Evaluated
Hawaii	50 fathoms	50 fathoms	Evaluated; implemented in Coast Guard plan in some locations
Alaska	30 fathoms	100 fathoms	Evaluated; ships should be at least 1/2 mile from shore
Washington	30 fathoms	100 fathoms	Special conditions exist inside Puget Sound
Puerto Rico	50 fathoms	100 fathoms	Evaluated. The 100 fathom is for both local and regional sources (less than two hour travel time)
USVI	50 fathoms	50 fathoms	Under evaluation,
Gulf Coast	N/A	100 fathoms	Evaluating; issues with long, shallow shelf complicate getting far offshore



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Thank you

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