



# NOAA Response to NAS Report



# Recommendations Completed and In Process

## Section 1: Aligning Priorities with Societal Risks from Tsunamis

- 1: Assessment of tsunami risk. (C) (IP)
- 2: Periodic assessment of tsunami sources. (C)
- 3: Periodically review progress in hydrodynamic models. (C)
- 4: Conduct modeling efforts consistently across political boundaries. (C)
- 5: Develop guidelines on evacuation-map production. (IP)
- 7: Conduct tsunami vertical evacuation modeling studies. (C)

Legend: (C) – Completed (IP) -- In Process



# Recommendations Completed and In Process

## Section 2: Education and Preparedness of Individuals, Communities, and Decision Makers

9-1: Develop consistent education efforts among its members. (C)

9-2: Tailor tsunami education to local circumstances. (C)

9-3: Create and maintain an on-line repository. (C)

9-5: Leverage hazard-education efforts and expertise of other NOAA entities. (C)

11: NOAA/NWS should remedy current differences between TWCs and other NWS warning products and ensure consistency in the future. (IP)

12: The NWS should establish a committee of experts in the social science of warning messaging to review the format, content, delivery channels and style of TWC messages. (IP)



# Recommendations Completed and In Process

## Section 2: ... continued

13: The NOAA/National Weather Service (NWS) should better integrate the TWC warning functions with the state, county, and city warning functions. (IP)

14: The NTHMP should actively encourage all members to develop and maintain strong tsunami working groups. (C-IP)

16: Social science post-event research audits should be performed. (C – resources are in place)

17: Tsunami field surveys should be conducted. (C – resources are in place)



# Recommendations Completed and In Process

## Section 3: Threat Detection and Forecasting

18: NOAA and USGS could jointly prioritize the seismic stations needed for tsunami warnings. (IP)

19: TWCs work jointly with NEIC to test the potential utility of the W-phase algorithm in the tsunami warning process. (C)

20-1: Construct a priority list of the coastal sea level stations (C)

20-2: Perform risk assessment of the data flow from the highest priority stations. (C)

21-1: Create a formal data archive for both CO-OPS and TWC data and metadata including, 15s data; (C)

21-2: Address 1-minute and 15-second quality control issues in unison with the archive issue to ensure quality of the archive; (C)

21-3: Enact Federal Geographic Data Committee (FGDC) compliant station meta data; and (C)

21-4: Create an operational website providing a portal for 15s tsunami station water level data. (C)



# Recommendations Completed and In Process

## Section 3: Threat Detection and Forecasting (cont.)

22: NOAA should regularly assess the numbers, locations and prioritizations of the DART stations. (IP)

23: NDBC should engage in a vigorous effort to improve the reliability of the DART stations and minimize the gaps caused by outages. (C)

24: NDBC to establish rigorous quality control procedures, perform relentless pre-deployment tests of all equipment, and explore new maintenance paradigms. (C)

25: The NDBC should improve its efforts at failure analysis. (C)

26: NOAA should encourage access to the DART platform by other observational programs. (IP)



# Recommendations Completed and In Process

## Section 3: Threat Detection and Forecasting (cont.)

27: NOAA should assess on a regular basis the appropriateness of the spatial coverage of the current DART sea level network and coastal sea level network. (IP)

28: NOAA should prioritize the existing DART stations and coastal sea level gauges according to their value to tsunami detection and forecasting. (IP)

29: NOAA should assess on a regular basis the vulnerabilities to, and quality of, the data streams from all elements of the sea level networks. (IP)

30: NOAA should establish a "Tsunami Sea Level Observation Network Coordination and Oversight Committee." (C)

31: TWCs and the NOAA Center for Tsunami Research at PMEL should continue to work together to bring the SIFT tsunami forecast methodologies into full operational use. (C)



# Recommendations Completed and In Process

## Section 3: Threat Detection and Forecasting (cont.)

32: TWCs coordinate with the NEPTUNE Canada and the Ocean Observatories Initiative (OOI) managers to ensure that their seismic and bottom pressure data are made available in near-real-time to the appropriate telecommunications gateways. Data interpretation tool(s), jointly applied to the seismic and bottom pressure data, will need to be developed to realize the most rapid tsunami detection possible. (IP)

33: Use of arrays and networks such as Hi-Net and EarthScope Array National Facility to determine rupture extent and moment of great earthquakes. (IP)



# Recommendations Completed and In Process

## Section 3: Threat Detection and Forecasting (cont.)

34: NOAA should explore further the operational integration of GPS data into TWC operations from existing and planned GPS geodetic stations along portions of the coast of the U.S. potentially susceptible to near-field tsunami generation including Alaska, Cascadia, the Caribbean and Hawaii. Where GPS geodetic coverage is not adequate NOAA should work with NSF and the states in extending coverage including the long-term operation and maintenance of the stations. (IP)



# Recommendations Completed and In Process

## Section 4: Long-Term Reliability and Sustainability of TWC Operations

35: NOAA/NWS should harmonize and standardize checklists, tsunami warning products, and decision support tools and standard TWC software tools and applications should be used in the TWCs. (IP)

36: The TWCs should consider alternative warning message composition software. (IP)

37: The tsunami warning program should undertake a comprehensive, enterprise-wide long-range technology planning effort. (IP)

38: NOAA/NWS should provide the TWCs with stronger IT commitment and leadership. (IP)



# Recommendations Completed and In Process

## Section 4: Long-Term Reliability and Sustainability of TWC Operations

39-A: IT staff should be provided to the TWCs so that IT hardware and software design, development and maintenance are not a collateral duty of a watchstanding scientist. (C)

40: NOAA/NWS and the TWCs should adopt national and international standards, best practices, and lessons learned for all functions, technology, processes and products. (IP)

41: The TWCs should also regularly and systematically apply continuing process and product improvement models for hardware and software planning, development, operations and maintenance; organizational processes; and develop a learning organizational culture. (IP)



# Recommendations Completed and In Process

## Section 4: Long-Term Reliability and Sustainability of TWC Operations

42: TWC human capital requirements and TWC recruiting, training, re-training, development, mentoring and professional exchange needs should be included, reassessed and updated as part of the NOAA/NWS enterprise-wide technology planning effort. (IP)

43: Organizational structures for the two TWCs should be evaluated and fully described as part of the enterprise-wide technology planning effort previously described. (IP)

44: NOAA/NWS and the TWCs should undertake on-going, joint or NOAA-wide continuous process improvement activities for their functional, technological, organizational and human capital initiatives. (C)



# Recommendations Not Implemented

6A: NTHMP should periodically inventory the number and type of people in tsunami hazard zones.

**Why not:** Economically infeasible. There are less expensive survey techniques that would provide results that will aid decision-making, which is what this recommendation is about.

6B: The NTHMP should establish a Science Advisory Committee.

**Why not:** NTHMP already has the expertise. FACA concerns.

8: NTHMP should give priority to systematic, coordinated perception and preparedness studies of communities with near-field tsunami sources.

**Why not:** such studies are economically infeasible.



# Recommendations Not Implemented

10: The NOAA Tsunami Program could strengthen the TsunamiReady™ Program by modeling it after the Emergency Management Accreditation Program (EMAP).

**Why not:** NOAA cannot operate an accreditation program and will keep TsunamiReady™ as a recognition program.

15: To ensure that managed evacuations for far-field tsunamis are effective and minimize societal and economic interruptions, the NTHMP should develop guidelines on the design of effective exercises for use by emergency-management agencies.

**Why not:** FEMA Homeland Security Exercise and Evaluation Program (HSEEP) already has developed tsunami exercise guidance.



# Recommendations Not Implemented

## Subcomponents Not Implemented

9-4: Develop and implement an evaluation program of the effectiveness of education efforts.

**Why not:** While an Assessment of Tsunami Education was completed in 2011, no ongoing evaluation program of education effectiveness has been developed.

39-B: An external IT Advisory Board, with membership from the USGS, other seismic network operators, human factors, information technology, and other large-scale, safety-critical systems professionals should be established to advise the TWCs. (NOAA doesn't set up external IT advisory boards.)