

# Bay Area Tsunami Preparedness and Mitigation Efforts



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# Topics

Overview

Alert & Response

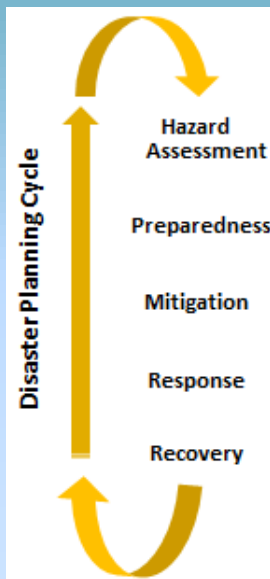
Where you can get info

Preparedness

Summary

# State of California

## Tsunami Preparedness & Mitigation Program



### Hazard Assessment & Understanding

- Inundation modeling & maps
- Evacuation modeling & maps
- Probabilistic modeling & maps

### Preparedness

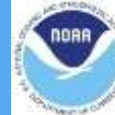
- Evacuation/Maritime Planning & Playbooks
- Training and Exercise Support
- System and Comms Testing
- TsunamiReady® Program Support
- Tsunami Preparedness Week
- Public Education

### Response

- 24/7 Duty Officer Program
- Real-Time / Post-Tsunami Field Teams

### Mitigation & Recovery

- Policy Analysis and Development
- Resiliency and Improvement Reports



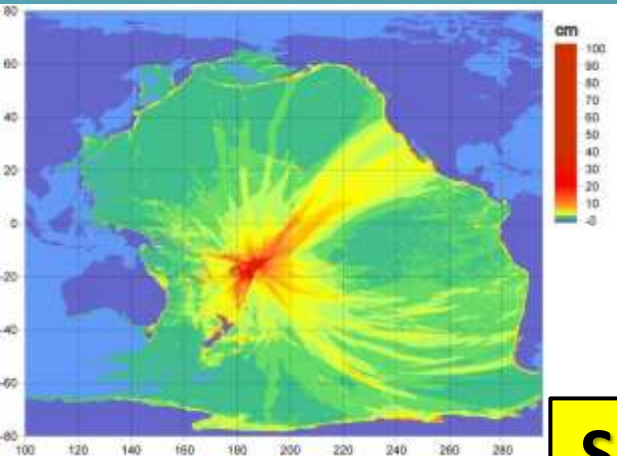
# Tsunami Alert & Response



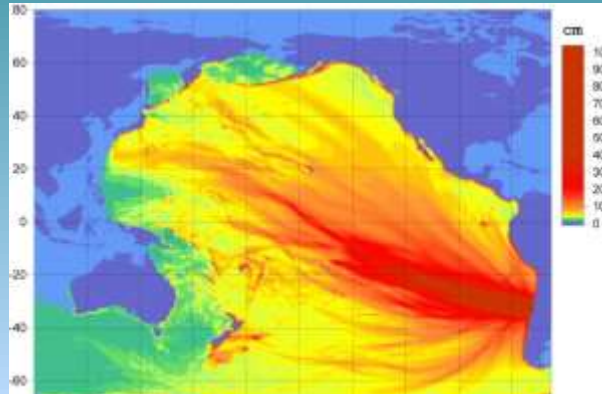


# Recent Tsunamis Activating California Emergency Response

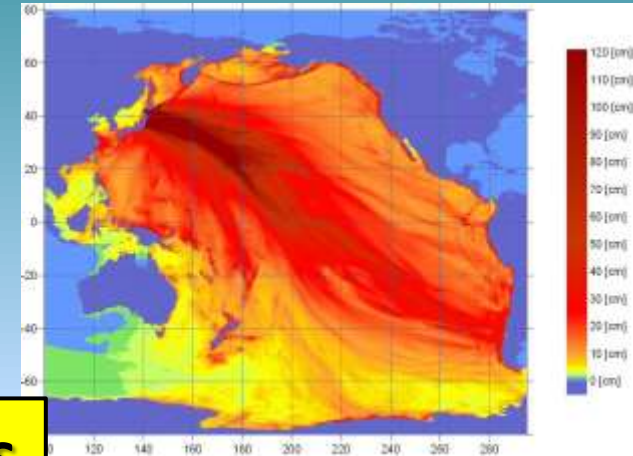
Samoa Sept 2009



Chile Feb 2010

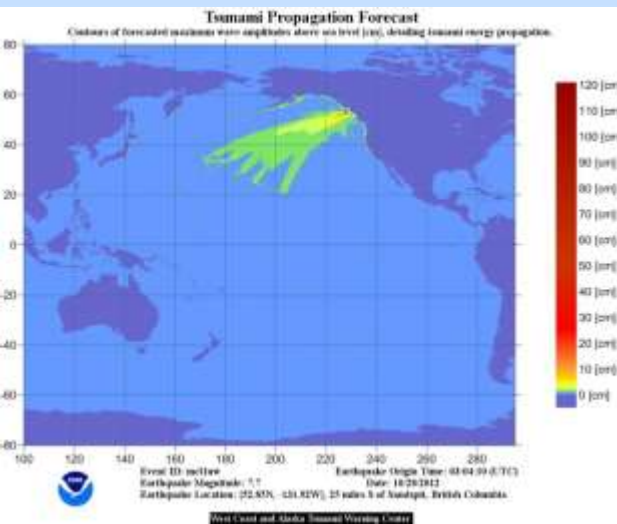


Japan March 2011

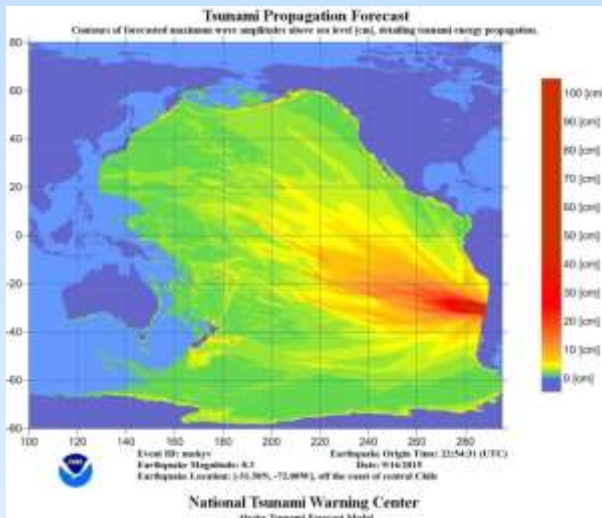


**Six Events in Nine Years**

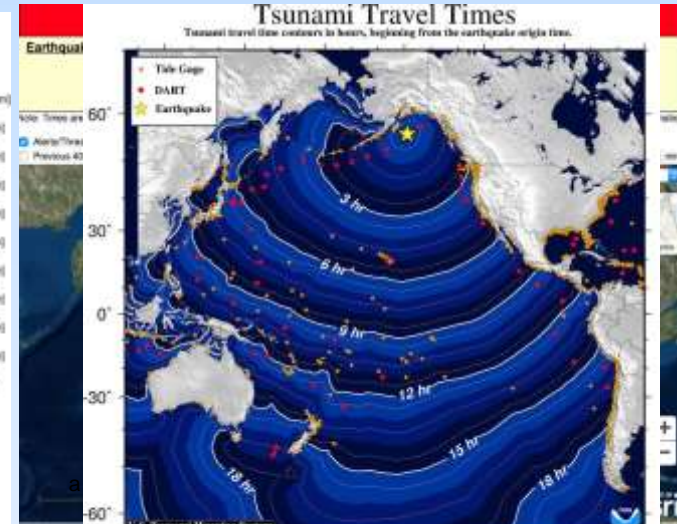
Haida Gwaii Oct 2012



Chile Sept 2015



Alaska Jan 2018



# State Response to: WARNING, WATCH and/or ADVISORY

## ACTIONS:

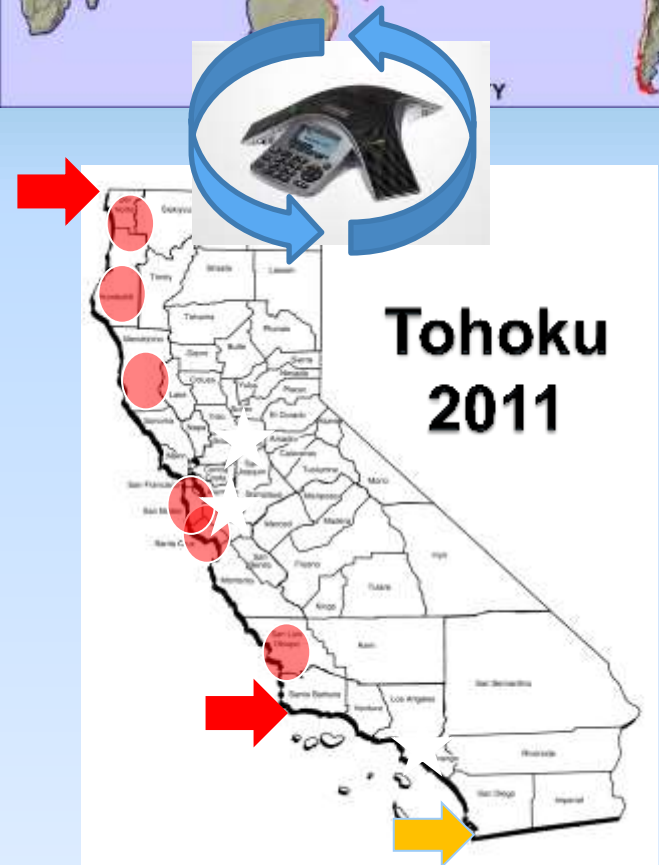
- PARTICIPATE in CALLS WITH NOAA TSUNAMI WARNING CENTER
- ACTIVATE STATE EOC's (SOC/REOC's)
- CONDUCT CALLS WITH EMERGENCY MANAGERS IN 20 COASTAL COUNTIES

Focus on specific areas or locations of heightened concern based on:

**Start of Tsunami**

**Wave Heights**

**Tide Conditions**



# Official NOAA Alert Bulletins



## **Tsunami WARNING** (>3 feet)

Widespread inundation is imminent or occurring  
Full Evacuation Suggested, Move to Higher Ground

## **Tsunami ADVISORY** (1 foot to 3 feet)

Strong currents are imminent or occurring  
Move Away From Shore, Harbors, Marinas

## **Tsunami WATCH**

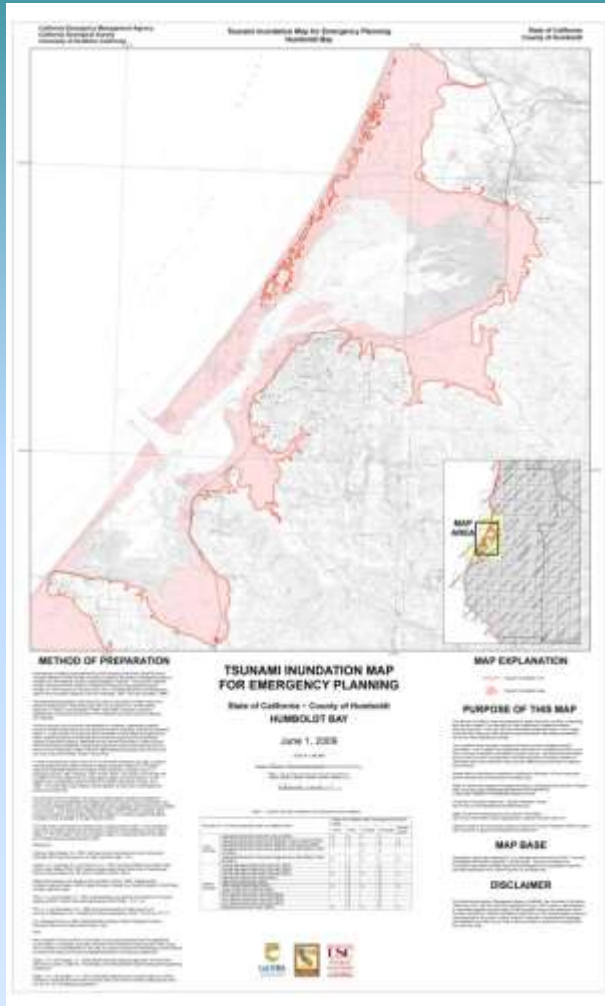
There is potential tsunami which may later impact your area  
Stay Alert For More Info, May be upgraded to  
Warning/Advisory

## **Tsunami INFORMATION**

Minor Waves at Most  
No Action Suggested



# Evacuation Maps & Plans



**Inundation Map**



**Evacuation Map**



## City Evacuation Plan/ConOps

1. "Evacuate Sector (1) South of Main Street and West of First Street"
2. "Evacuate Sector (2) West of PCH between Newport Blvd. and 60<sup>th</sup> St."
3. ...



# Lessons Learned from Recent Tsunamis in California

## Public messaging / education

- Keeping people away from the water
- Over-evacuating (language barriers)

## Evacuation issues

- Near source events will be a challenge to get everyone out in time

## Maritime issues

- Who should evacuate to sea?

## Emergency Response

- Duration staffing fatigue / jurisdiction inconsistencies



Santa Cruz Harbor 3/11/11.



Crescent City Harbor 3/11/11.



**Where can you get Info?**





# National Tsunami Warning Center

send a text message to **40404** with '**follow NWS\_NTWC**' for NTWC messages or go to **Tsunami.Gov**

United States Department of Commerce  
National Oceanic and Atmospheric Administration's / National Weather Service  
National Tsunami Warning Center

Home News Organization Search for: [ ] NWS All NOAA Go

**No Watch, Warning, or Advisory**  
For the continental U.S., Canada, Alaska, Puerto Rico or the Virgin Islands. For other regions please see [PTWC](#)

**Last Event Details**  
  
**Location:** near the east coast of Honshu, Japan  
**Magnitude:** 6.8 **Depth:** 29.8 (Mi.)  
**Lat:** 38.9 ° N **Lon:** 141.8 ° E  
**Origin Time:** 5/12/2015, 2:13:01 PM

**Information** \* There is no tsunami danger for the U.S. West Coast, British Columbia, or Alaska. \* Based on earthquake information and historic tsunami records, the earthquake was not sufficient to generate a tsunami. Issued at: 5/12/2015, 2:28:14 PM

Alert Layer  Latest Event  
 Previous 20  Observations  Forecasts  Tide Gauges  Dart Buoy  NTWC Break Points Layer

**Preliminary Quake Information (NTWC)**  
Location: near the east coast of Honshu, Japan  
Preliminary Magnitude: 6.8(Mwp)  
Depth: 29.8 (Mi)  
Lat: 38.9 ° N / Lon: 141.8 ° E  
Origin Time: 5/12/2015, 2:13:01 PM  
Bulletin 1 5/12/2015, 2:28:14 PM

# National Weather Service San Francisco/Monterey

Located in Monterey, California website - <http://www.wrh.noaa.gov/mtr/>

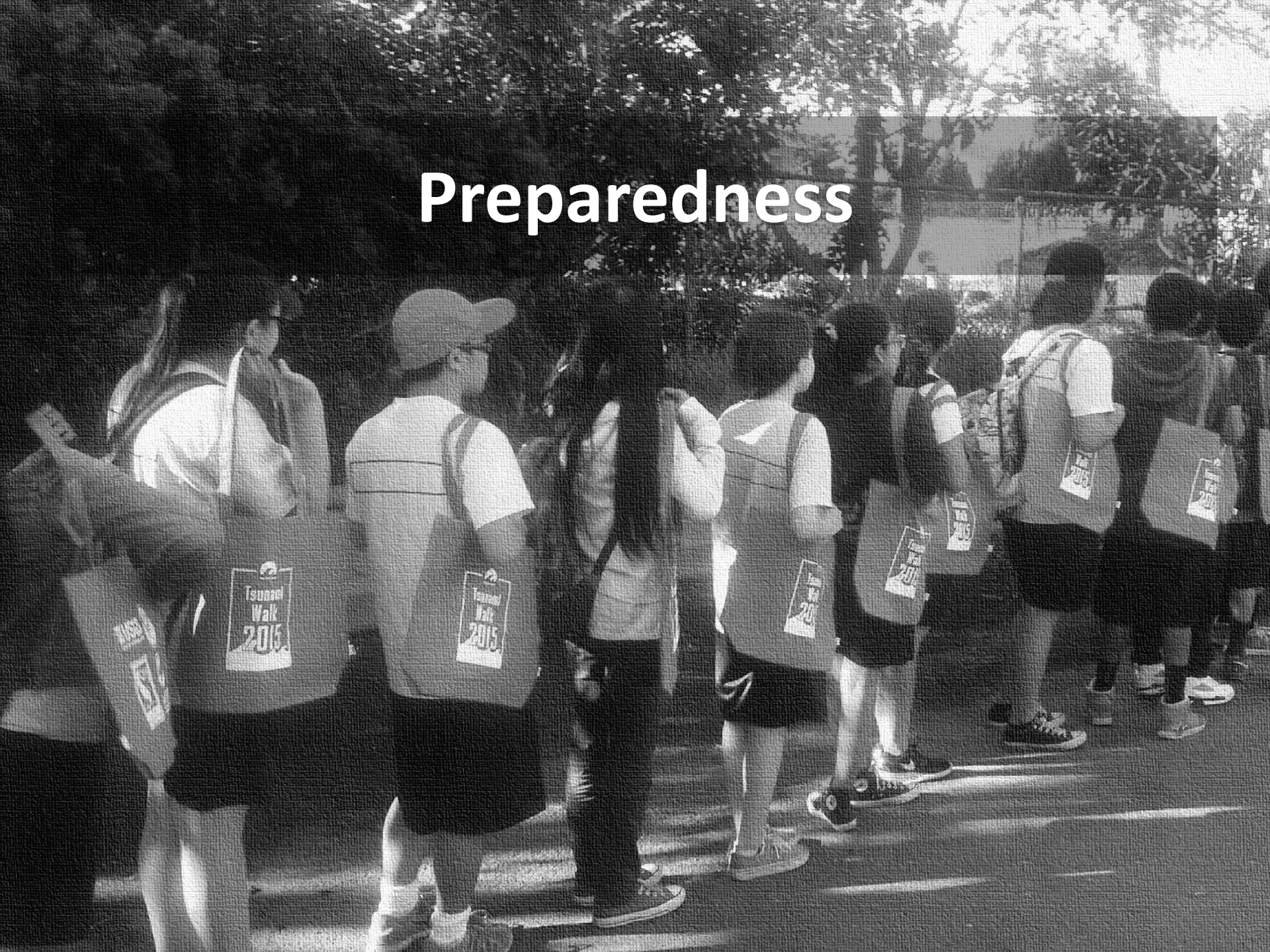
- This office relays tsunami warnings, advisories, and watches from the National Tsunami Warning Center by activating the Emergency Alert System and notifying critical public agencies.
- In addition, NWS San Francisco/Monterey provides local tsunami statements each hour on expected impacts to local communities during a tsunami.



A screenshot of the National Weather Service San Francisco Bay Area/Monterey website. The page features a blue header with the NWS logo and the text "National Weather Service Forecast Office San Francisco Bay Area/Monterey". Below the header, there are navigation tabs for "Home", "News", "Organization", and "FAQ". A "Weather Story" button is also visible. The main content area includes a "Top News of the Day" section with a dropdown menu for "Last 100 Products Issues" and a "Forecast by City" dropdown. A prominent alert states "Thunderstorms are predicted for the North Bay tonight...more...". Below this, there are tabs for "Watches &amp; Warnings", "Observations", "Forecast Graphics", "Rivers &amp; Lakes", "Climate", "Fire Weather", "Detailed Hazards", and "Useful Links". The central focus is a map titled "The San Francisco area Weather" with the instruction "Click on the map below for the latest forecast." The map shows various locations in the San Francisco Bay Area, including Fort Ord, Ukiah, Point Arena, Sausalito, San Rafael, San Francisco, Oakland, Stockton, San Jose, Fremont, San Cruz, San Luis Obispo, Monterey, Big Sur, and King City. A legend on the right side of the map lists various weather alerts: "Read watches, warnings &amp; advisories", "Gale Warning", "Small Craft Advisory", "Fire Weather Watch", "Air Quality Alert", "Hazardous Weather Outlook", and "Zoom Out". At the bottom of the page, it says "Last map update: Aug, 29th 2016 at 3:31:50 pm PDT".



# Preparedness





# Tsunami Preparedness Week March 26 – 30, 2018

## Potential Activities

- Governor's Proclamation
- Board of Supervisors' Proclamation
- Community Outreach
- Local Brochures / Videos developed
- Progress toward TsunamiReady criteria (e.g. Signs, Warning Point, Planning, Outreach)
- Tsunami Meetings / Exercises
- **Drills / Tsunami Walks**
- Media Events / Street Fair
- Website / Social Media
- Workshops / Training / Courses
- Planning updates (Response, Evacuation ConOps, Annex, LHMP)



Category	Participants	Participation totals for each area	Total
<b>Total:</b>	<b>217,035</b>	<b>California</b>	<b>98981</b>
<a href="#">Individuals/Families</a>	427	<a href="#">North Coast</a>	483
<a href="#">Childcare and Pre-Schools</a>	552	<a href="#">Shasta Cascade</a>	0
<a href="#">K-12 Schools and Districts</a>	7,426	<a href="#">Bay Area</a>	612
<a href="#">Colleges and Universities</a>	34,085	<a href="#">Delta Sierra</a>	26
<a href="#">Local Government</a>	1,670	<a href="#">Inyo-Mono</a>	0
<a href="#">State Government</a>	92,560	<a href="#">Central Valley South</a>	6
<a href="#">Federal Government (Including Military)</a>	64,780	<a href="#">Central Coast</a>	35093
<a href="#">Tribes</a>	0	<a href="#">Southern California Coast</a>	1057
<a href="#">Businesses</a>	681	<a href="#">Inland Southern California</a>	215
<a href="#">Hotels and Other Lodgings</a>	0	<a href="#">San Diego</a>	61484
<a href="#">Healthcare</a>	2,252	<a href="#">Other Areas</a>	5
<a href="#">Senior Facilities/Communities</a>	220	<b>Caribbean</b>	<b>118009</b>
<a href="#">Disability/AFN Organizations</a>	0	<a href="#">Anguilla</a>	0
<a href="#">Non-Profit Organizations</a>	732	<a href="#">Antigua and Barbuda</a>	0
<a href="#">Neighborhood Groups</a>	0	<a href="#">Aruba</a>	3
<a href="#">Preparedness Organizations</a>	10,690	<a href="#">Bahamas</a>	0
<a href="#">Faith-based Organizations</a>	170	<a href="#">Barbados</a>	0
<a href="#">Museums, Libraries, Parks, etc.</a>	0	<a href="#">Belize</a>	0
<a href="#">Volunteer/Service Clubs</a>	0	<a href="#">Bermuda</a>	160
<a href="#">Youth Organizations</a>	0	<a href="#">Bonaire</a>	0
<a href="#">Animal Shelter/Service Providers</a>	0	<a href="#">Brazil</a>	0
<a href="#">Agriculture/Livestock</a>	0	<a href="#">British Virgin Islands</a>	157
<a href="#">Volunteer Radio Groups</a>	83	<a href="#">Cayman Islands</a>	0
<a href="#">Science/Engineering Organizations</a>	68	<a href="#">Colombia</a>	0
<a href="#">Media Organizations</a>	0	<a href="#">Costa Rica</a>	7
<a href="#">Other</a>	639	<a href="#">Cuba</a>	0

The  
**TsunamiZone**

[Register Here!](#)

[Know](#)

[WELCOME TO THE T](#)

[ESPAÑOL](#) | [FRANÇ](#)

Everyone, everywhere should know how to be prepared for tsunamis and what to do to be safe. This is for all people who live or work near the ocean, but also for anyone who will visit someday. Are you in?

TsunamiZone.org provides [suggestions](#) and [resource suggestions](#) for your family or organization to "register your zone" and to [learn](#) how to be prepared.

Be counted among people who are registered for tsunami preparedness activities.

# Outreach Materials







## As much about the process as the goal...

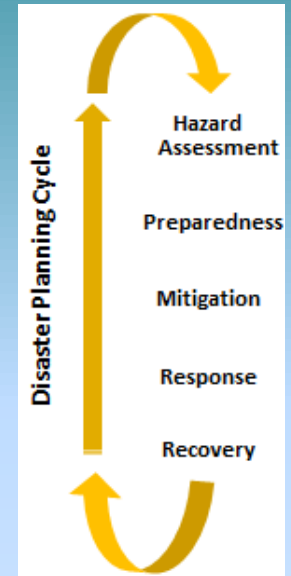
- 1. Communications and Coordination**  
(24 hour warning point; EOC)
- 2. Tsunami Warning Reception** (ways for EOC/WP to receive NWS tsunami messages)
- 3. Local Warning Dissemination** (ways EOC/WP can disseminate warnings to public)
- 4. Community Preparedness**  
(outreach; warning signs)



# Summary Points

Having a program that addresses all aspects of the disaster cycle has helped California focus on common goals to:

1. Understand the hazard; where can tsunamis go
2. Help communities plan to respond; evacuation
3. Educate the public about what to do
4. Develop capability/tools for resilient communities in the future





富嶽三十六景 神奈川沖  
浪裏

**Thank You!**

**TsunamiZone.ca.gov**

**tsunami.ca.gov**

**myHazards.CalOES.ca.gov**

**tsunami.gov**