

## How should boat owners PREPARE for tsunamis?

*Prior to arrival of the March 11, 2011 tsunami along the California coast, many boat owners took their boats offshore without adequate supplies or knowledge of how long they would need to stay offshore. As a result, boaters tried to re-enter harbors too early, while dangerous tsunami conditions still existed. They put themselves and harbor personnel at risk of injury and death.*

Before you plan to leave safe harbor, consider the following:

- Talk to the harbor master or related officials to learn about your harbor's tsunami safety protocols.
- Sign up to receive tsunami alerts from NOAA and emergency calls from your harbor master or community emergency services office.
- Know weather conditions out on the ocean.
- Know how long it takes your boat to get to deep water. The 100-fathom line is the NOAA recommendation.
- Have adequate supplies (water, shelter, food) and fuel to remain at sea for 24 hrs or more.
- Have a family plan for tsunamis in place so you know your family will be safe.

If you do not have these essential preparedness items covered, DO NOT attempt to take your boat offshore. Secure your boat to the dock and leave the dock area before the tsunami arrives.



Boat attempting to leave Crescent City Harbor during the March 11, 2011 tsunami

## Other resources for tsunami information in California

### California Harbor Master and Port Captain Association :

[www.harbormaster.org/](http://www.harbormaster.org/)

### State of California Tsunami Program (California Geological Survey website):

[www.tsunami.ca.gov/](http://www.tsunami.ca.gov/)

### California Emergency Management Agency Earthquake and Tsunami Program:

<http://www.calema.ca.gov/PlanningandPreparedness/Pages/Tsunami-Preparedness.aspx>

### NOAA – National Weather Service Weather Forecast Offices:

Eureka – [www.wrh.noaa.gov/eka/](http://www.wrh.noaa.gov/eka/)

SF Bay/Monterey – [www.wrh.noaa.gov/mtr/](http://www.wrh.noaa.gov/mtr/)

Los Angeles/Oxnard –

[www.wrh.noaa.gov/lox/](http://www.wrh.noaa.gov/lox/)

San Diego - [www.wrh.noaa.gov/sgx/](http://www.wrh.noaa.gov/sgx/)

### Federal Emergency Management Agency:

[www.ready.gov/tsunamis](http://www.ready.gov/tsunamis)

### Redwood Coast Tsunami Work Group/ Humboldt State University:

[www.humboldt.edu/rctwg/](http://www.humboldt.edu/rctwg/)

# TSUNAMIS!

## What

## RECREATIONAL BOATERS

## should know



The March 11, 2011 tsunami in Santa Cruz Harbor



Crescent City Harbor after the March 11, 2011 tsunami

Prepared by:



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FEMA

## What is a TSUNAMI?

A tsunami is a series of water surges usually caused by an earthquake beneath the sea floor. These can cause strong, dangerous currents inside harbors and bays.

### *TSUNAMIS CAN TRICK YOU!*

- The first surge may not be the largest.
- It is not unusual for tsunami surges to continue for 12 hours and in some cases much longer.
- Just when you think it is all over, another very large surge may come.



## 2 Ways to Know if a Tsunami is Coming:



### \*Natural Warnings\*

On shore: GROUND SHAKING, a LOUD OCEAN ROAR, or the WATER RECEDING UNUSUALLY FAR exposing the sea floor.

On the water: You may still feel the earthquake through the hull of your boat. You could see a rapid and extreme shift to an outgoing tide.

### \*Official Warnings\*

On shore: You may hear an outdoor siren or announcements from airplanes. Determine how you can receive a call from your harbor master or sign up for receiving emergency notification.

On the water: You may receive a Tsunami Advisory or Warning on your marine radio CHANNEL 16 or weather frequency (as long as your VHF has the Alert feature).

## Natural Warning



The natural warnings described to the left indicate that a tsunami could arrive within minutes. Your response depends on where you are:

If you are on land or tied up at the dock: Leave your boat and go to high ground on foot as soon as possible. You don't have time to save your boat in this situation and could die if you try to do so.

If you are on the water but very near shore: If you can beach or dock your boat and get to high ground on foot within ten minutes of a Natural Warning, then this is your best chance. If that is not possible, head to deep water as quickly as possible.

If you are in deep water or very close to deep water: If you are already in 100 fathoms of water (600 feet) then you are safe from tsunamis. If you are in deep water but not quite 100 fathoms, head to deeper water.

There are a number of TSUNAMI HAZARDS that could effect boats/boaters:

- Sudden water-level fluctuations
- Boats that strike bottom as water level drops
- Strong and unpredictable currents
- Tsunami bores and amplified waves
- Eddies/whirlpools
- Drag on large keeled boats
- Collision with other boats, docks, and debris

## Official Warning

The National Weather Service, West Coast and Alaska Tsunami Warning Center provides tsunami information for California important to boaters:

•ADVISORIES – Called when peak tsunami wave heights between 1-3 feet are expected, indicating strong and dangerous currents can be produced in harbors.

•WARNINGS – Called when tsunami wave heights could exceed 3 feet, indicating very strong, dangerous currents and inundation of dry land is anticipated

Information about tsunamis can come from a variety of sources, but the following sources are the most reliable:

- Harbor masters and port captains
- Local Coast Guard contact
- State and local emergency managers
- Local National Weather Service – Weather Forecast Offices

## Should you take your boat OFFSHORE?

The answer to this question depends on three things:

- 1)The SIZE of the tsunami.
- 2)How much TIME you have.
- 3)The PREPAREDNESS of the boat and its captain.

Your harbor master or port captain may provide the best advice. For most harbors in California, it is safer to keep your boat docked during a tsunami because most tsunamis are relatively small. On the rare occasion when a larger tsunami is expected (Warning level), the boat owner may consider taking their boat offshore using the 3 criteria above.