

# Japan Tsunami Marine Debris:

Information and  
NOAA updates

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[www.MarineDebris.noaa.gov](http://www.MarineDebris.noaa.gov)



## Overview

- Early tsunami-generated marine debris
- Overview of what we know (and don't)
  - Ocean models of tsunami marine debris movement
  - Amount and landfall locations of marine debris
  - Radioactivity
- Updates from NOAA



## March 2011

Photo taken on **March 12, 2011**  
off the Sendai coast, Japan.



Photo: US Navy Pacific Fleet

- Early on, debris was in concentrated patches, fields
- **Debris is disbursed** – Patches/fields no longer visible by April 14, 2011
- **Most debris probably sank near shore**
  - *Past experience:* American Samoa tsunami, hurricanes Katrina and Rita → most debris sank near shore
  - Likely 70% sank in nearshore waters of Japan (Government of Japan)



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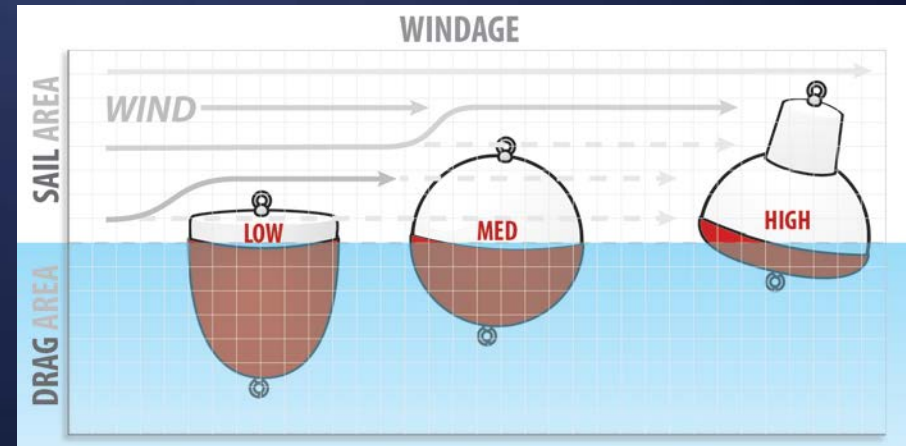
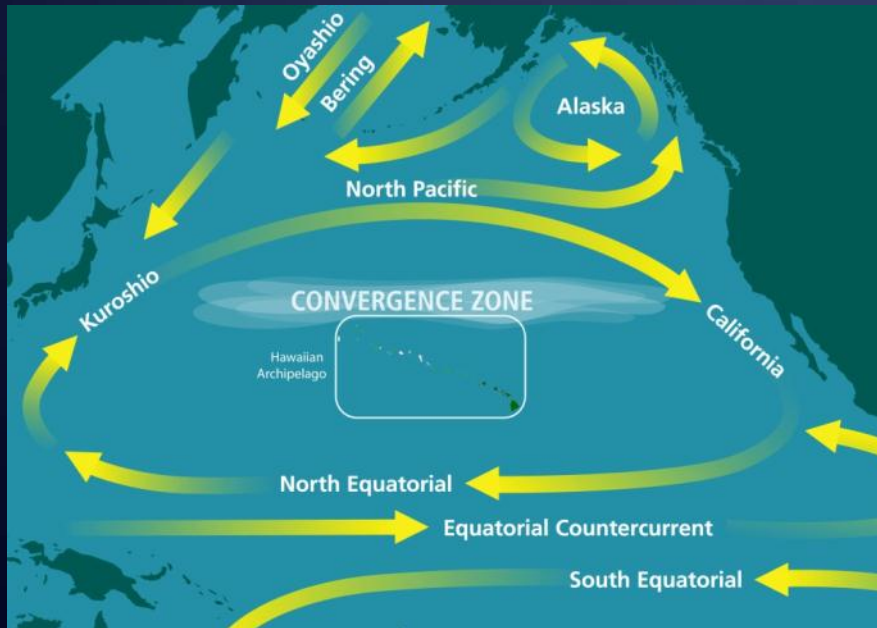
## Marine Debris Movement

Characteristics of a debris item will affect how it moves with ocean currents and winds.

Ocean currents

+

Winds



- Combination of sail area and drag
- **Low** = slow (e.g., wood)
- **Medium** = moderate (e.g., fishing vessel)
- **High** = fast (e.g., unoccupied inflatable life raft)



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## Marine Debris Modeling

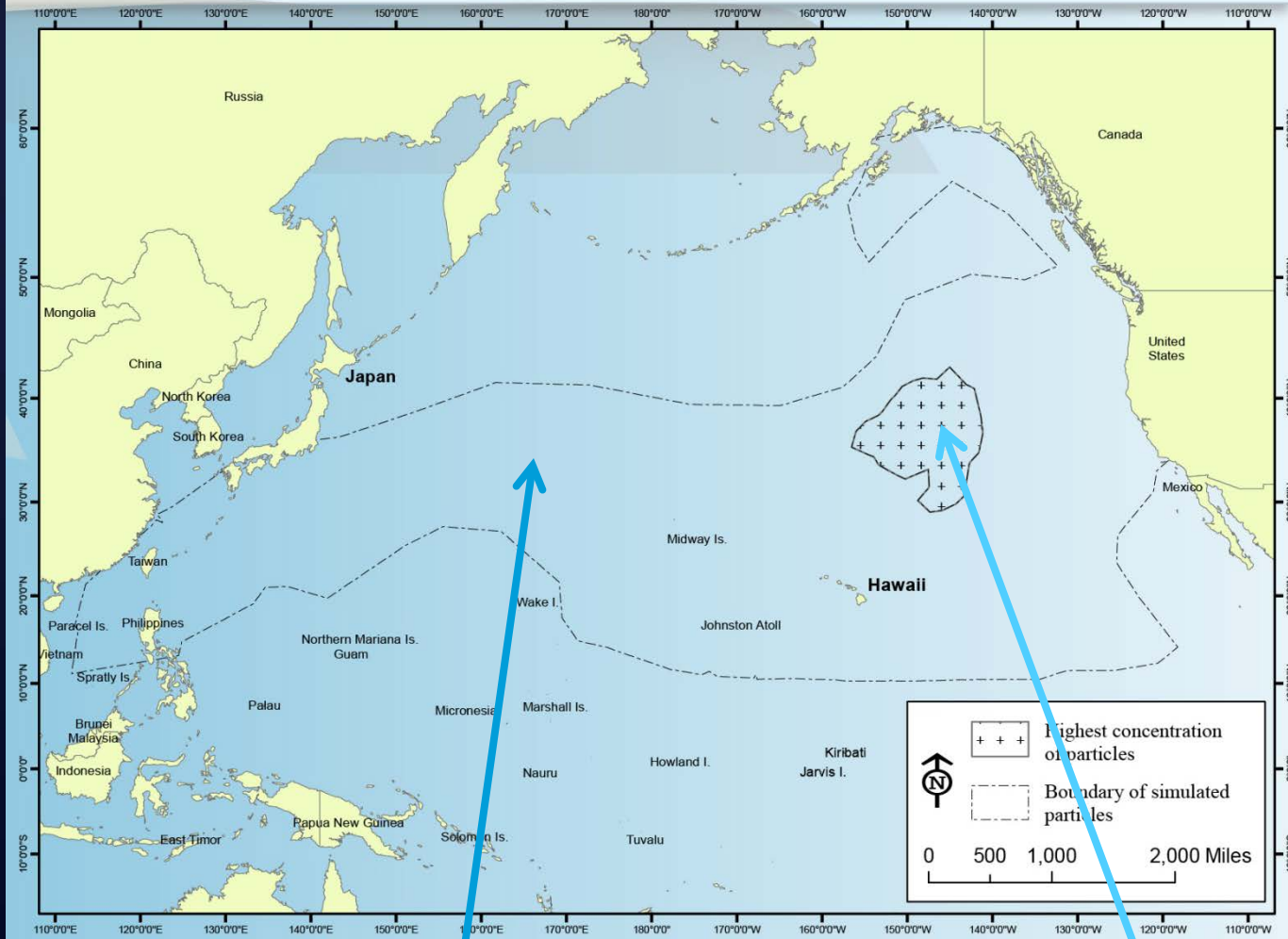
**No models exist yet specifically for marine debris of all shapes and sizes.**

**NOAA GNOME** (oil spill model; General NOAA Operational Modeling Environment)

- Hindcast; 1-5% windage or leeway
- Using Navy HyCOM (ocean currents) and NOAA data (wind)
- **Recent GNOME results**
  - **Late fall-winter of 2012-2013:** Seasonal changes in N. Pacific winds and currents will cause marine debris of mixed types to wash ashore in W. coast states.
  - **Hawaii:** Expect to see mixed debris during this time; debris will likely travel west toward the Main Hawaiian Island with ocean currents.

# NOAA GNOME Results

## Expected Distribution of Computer Simulated Particles Through Monday, 11/05/12



- 1,000 particles
- Random windage: low to high
- 8 locations (>3.5m)
- 0700, 11 March 2011 through 5 November 2012
- These do NOT represent fields/patches of debris

Area contains 95% of all simulated particles

Area with highest concentration of simulated debris with 1% windage

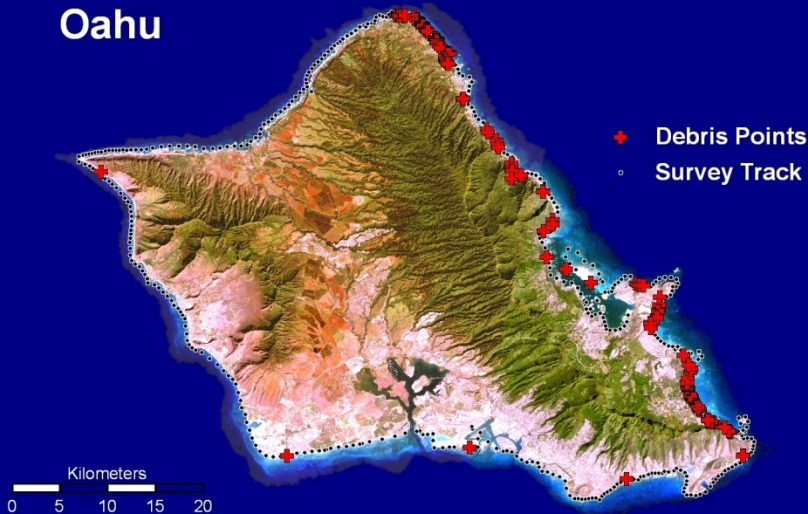


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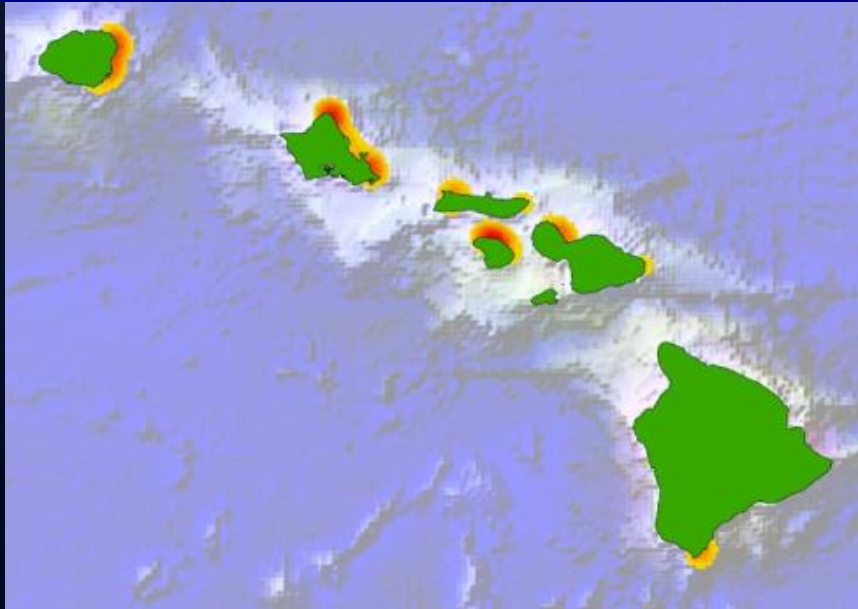
Oahu



## What We Know

### Where will debris wash ashore?

- Areas where marine debris typically washes ashore
- East-facing or windward sides of most Main Hawaiian Islands



**Maps:** NOAA conducted aerial surveys of the coasts of most of the Main Hawaiian Islands in 2006 and 2008 noting locations of derelict fishing net. *Credit: NOAA PIFSC CRED*



## What We Know



Photo: USCG

### Radioactivity above normal? **HIGHLY UNLIKELY**

- Debris washed out days before the Fukushima-Daiichi power plant incident
- Tsunami created debris over a large stretch of coastal Japan; power plant incident was in one area of the coast
- Confirmed JTMD tested: **Nothing above normal**
- Shoreline marine debris monitoring ongoing
- Hawaii State Dept. of Health **monitoring since April 2011**
- More information: <http://hawaii.gov/health/radiation/index.html>.





## What We Don't Know

### How much remains still floating? **NOT KNOWN**

- Estimates from Govt. of Japan (3/9/12 release):
  - ~5 million tons of debris washed into the ocean
  - ~70% of that likely sunk near shore
  - 30% (1.5 million tons) still floating soon after tsunami
  - **How much of that still remains afloat at this time = ?**

### Types of debris? **RELATIVELY UNKNOWN**

- **Very difficult to source identify Japan tsunami marine debris**
- 16 confirmed JTMD sightings (as reported to NOAA)— identifiable fishing boats (7), soccer ball (2), volleyball, motorcycle, buoys (2), dock, blue bin (2)



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2 August 2011; N. Pacific



22 Sept 2011; N. Pacific



22 March 2012; BC then AK waters



27 March 2012; AK



4 June 2012; OR



3 March 2012; AK



18 April 2012; BC



29 Sept 2012; N. Pacific



18 Sept 2012; HI



9 August 2012; Vancouver



2 Nov. 2012; Midway Atoll, HI



15 June 2012; WA



**16 confirmed JTMD items as of 12/5/12.**



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## National Oceanic and Atmospheric Administration (NOAA) UPDATES





## Roles and responsibilities

**Scientific support | Information dissemination |  
Trust resource protection and management**

**NOAA Marine Debris Program:** Federal lead for marine debris in the U.S.  
**Northwestern Hawaiian Islands**

- NOAA is a co-trustee; contingency response planning
- Marine debris removal efforts – 2012 removal efforts; NO potential JTMD sighted; radiation monitoring = NOTHING above normal
- Shoreline monitoring and data collection – coordination

### **Main Hawaiian Islands**

- Shoreline monitoring data collection – coordination
- Assistance in contingency response planning & response as appropriate



NOAA PIFSC CRED

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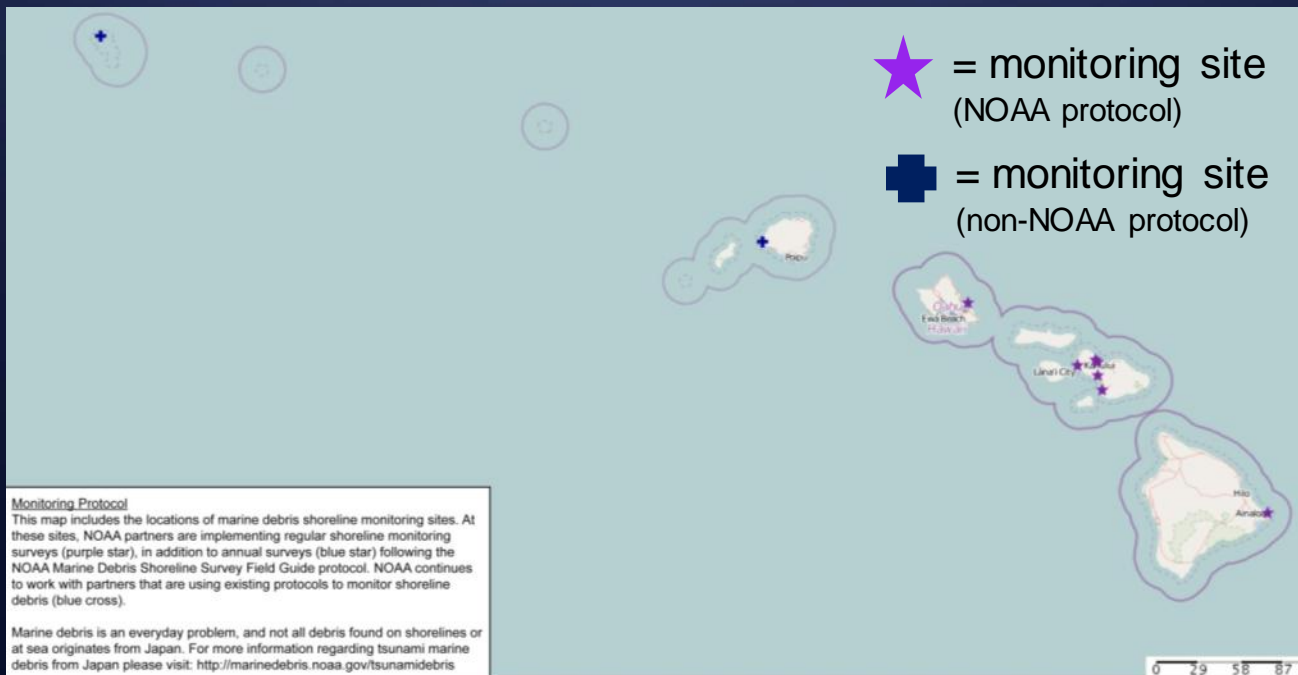
## Scientific support

### Modeling

- NOAA modelers + coordinating modeling subject-matter expert group

### Shoreline Monitoring

- NOAA Marine Debris Program Shoreline Monitoring Guide, data sheet, & database – [MD.monitoring@noaa.gov](mailto:MD.monitoring@noaa.gov)



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## Scientific support (cont.)

### Debris Sightings

- Reported to [disasterdebris@noaa.gov](mailto:disasterdebris@noaa.gov)
- **Info:** Lat/long, date, description, photos (if possible)
- Aerial, on the water, on shore
- 1,417 reports thus far: 769 at sea + 648 shoreline (as of 11/29/12)
- 3 confirmed JTMD in HI: blue bin and 2 boats



Salishan, OR, March 2012 (Credit S. Morris)



N. Pacific Ocean, June 2012



Tern Island, HI (Credit USFWS)



OR, Dec. 2011



Mexico, June 2012 (Credit: M. Traphagen)

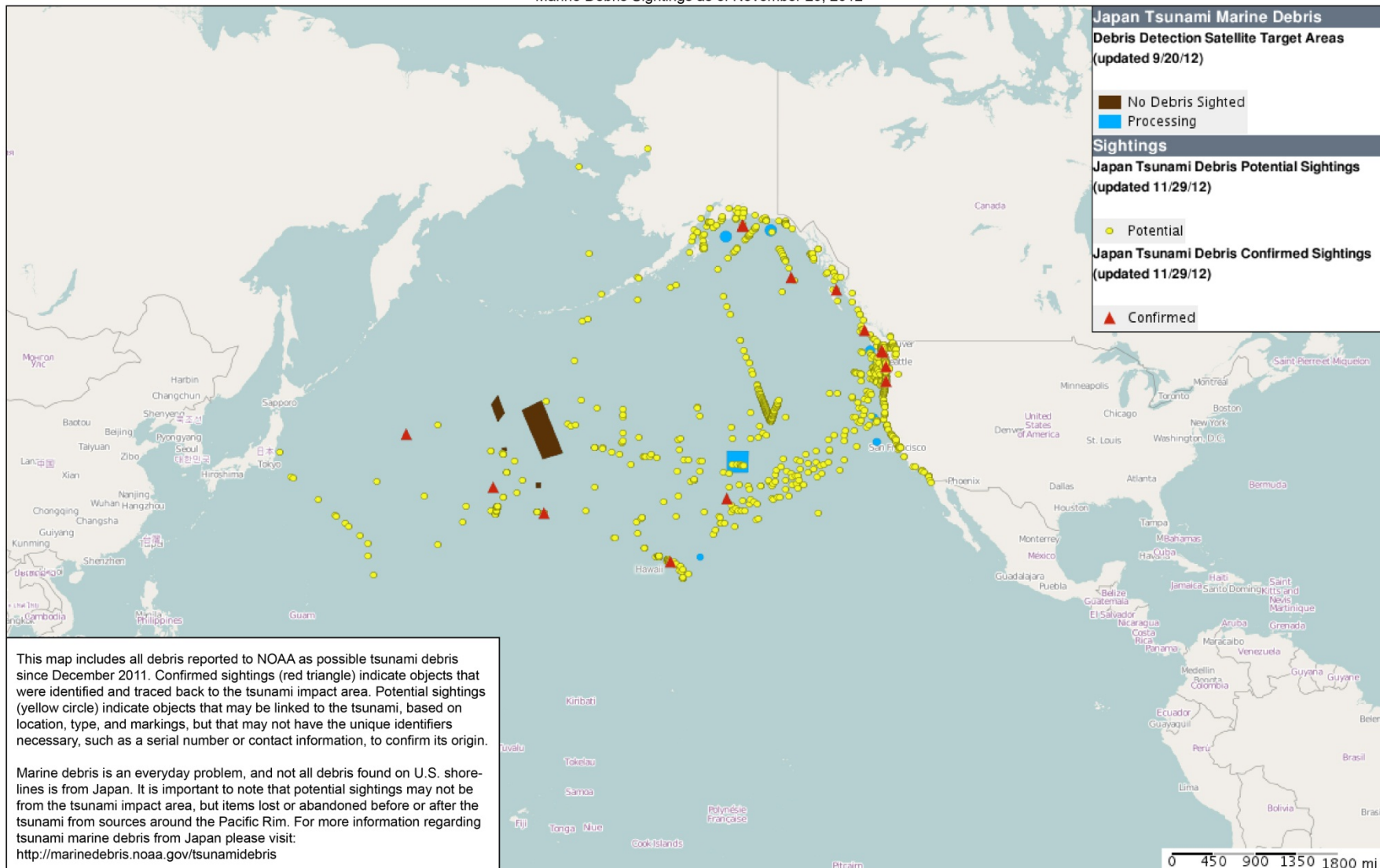


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Marine Debris Sightings as of November 29, 2012



This map includes all debris reported to NOAA as possible tsunami debris since December 2011. Confirmed sightings (red triangle) indicate objects that were identified and traced back to the tsunami impact area. Potential sightings (yellow circle) indicate objects that may be linked to the tsunami, based on location, type, and markings, but that may not have the unique identifiers necessary, such as a serial number or contact information, to confirm its origin.

Marine debris is an everyday problem, and not all debris found on U.S. shorelines is from Japan. It is important to note that potential sightings may not be from the tsunami impact area, but items lost or abandoned before or after the tsunami from sources around the Pacific Rim. For more information regarding tsunami marine debris from Japan please visit: <http://marinedebris.noaa.gov/tsunamidebris>

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## Scientific support (cont.)

**Satellite Imagery:** High resolution RADARSAT and multispectral

- National Geospatial Intelligence Agency (NGA)
- NOAA NESDIS – analysis
- 7 sites – monthly

**Unmanned Aircraft System (UAS)**

- Testing is ongoing
- Ship time 2013





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## Trust resource protection and mgmt.

- Working with response and resource management agencies on contingency response plans in the NWHI and Main Hawaiian Islands
- Co-coordinator of the Hawaii Interagency Marine Debris Working Group (*with DLNR*)
- \$50K grant to State DOH for JTMD removal → RFP
- \$5M from Government of Japan to NOAA (*no details yet*)





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## Information dissemination

- JTMD Bi-weekly Update Call – coordination
- Traditional, digital, & social media
- Meetings & briefings with partners, stakeholders (33)
- Congressional briefings (4)
- Public presentations (21)
- Events/materials (14)
- Web page: <http://marinedebris.noaa.gov/tsunamidebris/>
- Joint Information Center: <http://disasterdebris.wordpress.com>
- DLNR Web page: <http://hawaii.gov/dlnr/>

# Mahalo

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