Japan Tsunami
Marine Debris:
Information and updates

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www.MarineDebris.noaa.gov

Great East Japan Earthquake and tsunami

- March 11, 2011
- 9.0 magnitude earthquake
- Tsunami: 130 ft max wave height
- 217 square miles inundated
- Nearly 16,000 dead, over 3,000 missing (Japan Ministry of Economy, Trade, and Industry)
March 2011

- 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)


March 2011

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

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)
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 for late fall-winter of 2012-2013
  - W. Coast: Seasonal changes in N. Pacific winds and currents will cause marine debris of mixed types to wash ashore in W. coast states.
  - Hawaii: Based on our models, we will likely see marine debris of mixed types reaching our shores.

NOAA GNOME Results

• 1,000 particles
• Random windage: low to high
• 8 locations (>3.5m)
• 0700, 11 March 2011 through 7 January 2013
• 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
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 nets.

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 for radiation is ongoing
• Hawaii State Dept. of Health monitoring since April 2011
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
- Unusual debris and debris with Asian markings is NOT unusual.

Updates

On Japan tsunami marine debris-related activities
**Nationwide: Remote Sensing** (NOAA)

**Satellite Imagery:** High resolution RADARSAT and multispectral
- National Geospatial Intelligence Agency
- NOAA NESDIS – analysis
- 7 sites – monthly

**Unmanned Aircraft System (UAS)**
- Testing is ongoing
- Ship time 2013

**Satellite tracking buoys**
- Available for use in Hawaii and Seattle

**Nationwide: Shoreline Monitoring** (NOAA)

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

- = monitoring site (NOAA protocol)
- = monitoring site (non-NOAA protocol)
Guidelines for Hawai‘i

Be Safe: If you don’t know what it is and it looks hazardous don’t touch it. Collect as much information as you can from a safe distance.

Report: Call DLNR at (808) 587-0400 or send an email to dinr.marine.debris@hawaii.gov and disasterdebris@noaa.gov.

Information Needed:
- Date and time sighted or found
- Location of sighting
- Finder’s contact information
- Detailed description of the object
- Description of any organisms growing on it
- Photo of the debris

http://hawaii.gov/dlnr/rotating-headline/headlines/marine-debris

JTMD Sightings

Debris Sightings – Tracked by NOAA

- 1,498 reports thus far: 782 at sea + 716 shoreline
  (as of 1/24/13; as reported to disasterdebris@noaa.gov)
- 5 confirmed JTMD in Hawai‘i: 1 blue bin and 4 boats

Unconfirmed / Potential Debris Items

- Oahu, HI, Nov. 2012
- Kauai, HI, Oct. 2012
- Near Molokai, HI, Sept. 2012
- Honokohau, HI, January 2013
- N. Pacific Ocean, June 2012
- Tern Island, HI, (Credit USFWS)
- OR, Dec. 2011
- Mexico, June 2012
- Salishan, OR, March 2012
Confirmed JTMD Items

20 confirmed JTMD items & ~150 alien species from Japan ID’d
(as of 1/21/13)  Map at: http://marinedebris.noaa.gov/tsunamidebris/

2 August 2011; N. Pacific
22 Sept 2011; N. Pacific
22 March 2012; BC then AK waters
27 March 2012; AK
18 Sept 2012; HI
29 Sept 2012; N. Pacific
2 Nov. 2012; Midway Atoll, HI
30 Nov. 2012; Kahana Bay, HI
18 Dec. 2012; Forks, WA
1 Jan. 2013; BC
18 Dec. 2012; Punalu’u, HI
24 Dec. 2012; Punalu’u, HI

Photo credits: USCG, STS Pillada, David Baxter, OR Parks, WA Department of Ecology, Kyodo Reuters, K. Head, Hawaii DLNR, P. Grill, USFWS, HI Department of Land and Natural Resources.
JTMD Coordination in Hawai‘i

• Hawai‘i Interagency Marine Debris Working Group (coordinated by DLNR and NOAA Marine Debris Program)
• Biweekly JTMD Update Calls – US, Canada, and Mexico

Communication/Outreach
• Traditional, digital, & social media
• Meetings, briefings, public presentations, events, & materials distribution
• NOAA web page: http://marinedebris.noaa.gov/tsunamidebris/
• DLNR Web page: http://hawaii.gov/dlnr/
• Joint Information Center: http://disasterdebris.wordpress.com

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Mahalo