

Marine Debris

NOAA Marine Debris Program | Office of Response and Restoration | NOAA National Ocean Service



Japanese Tsunami Marine Debris Overview and Updates

24 October 2012

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Tsunami debris off the coast of Yamada, Japan.
US Navy Pacific fleet

NOAA Marine Debris Program



- Established in 2005
- Mandated by the Marine Debris Research, Prevention, and Reduction Act, Dec. 2006
- Reauthorization: S. 1119 and H.R. 1171



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NOAA Marine Debris Program



- **Vision:** the global ocean and its coasts, users, and inhabitants free from the impacts of marine debris
- **How?**
Research | Assessment | Removal
Prevention | Outreach & Education

Regional Coordination: East and West Coasts, Gulf of Mexico, Great Lakes, Alaska, Pacific Islands



Event overview

March 11, 2011

- 9.0 magnitude earthquake
- Tsunami: max wave height 130 ft
- Inundated 217 miles²
- 15,871 people confirmed dead, 2,778 missing (as of 10/17/12)



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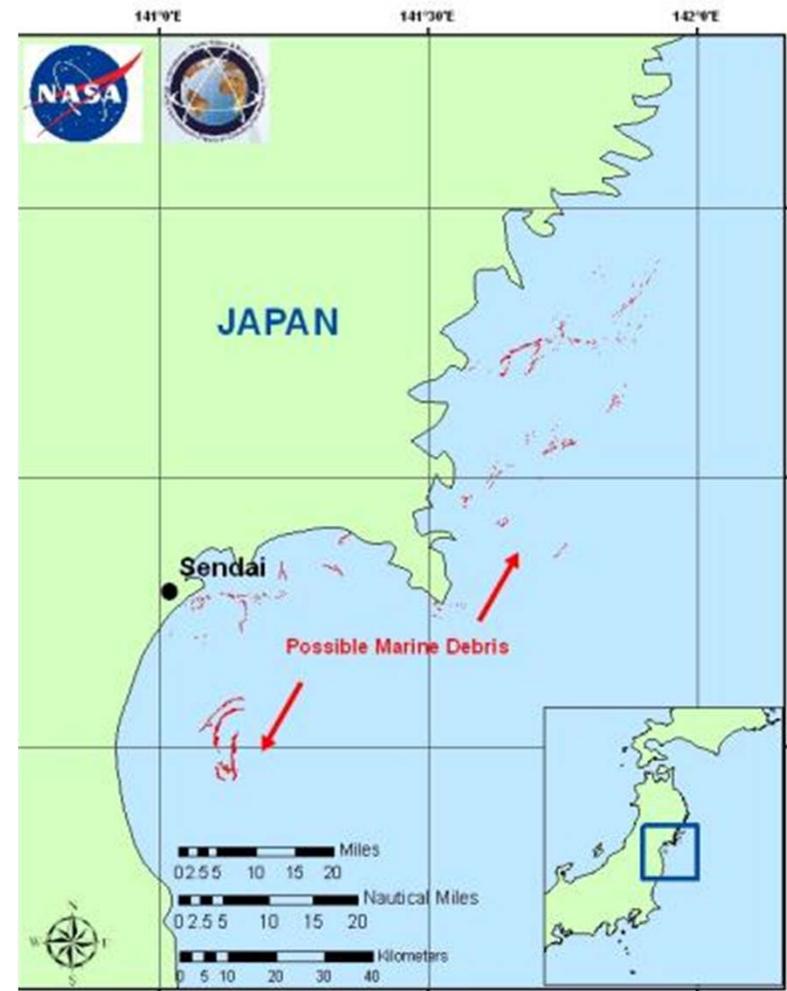


Debris aftermath



March 13: Debris off the Sendai coast

- Debris initially formed patches
- Most debris likely sank right away
- NASA/NESDIS collaborated on early satellite detection

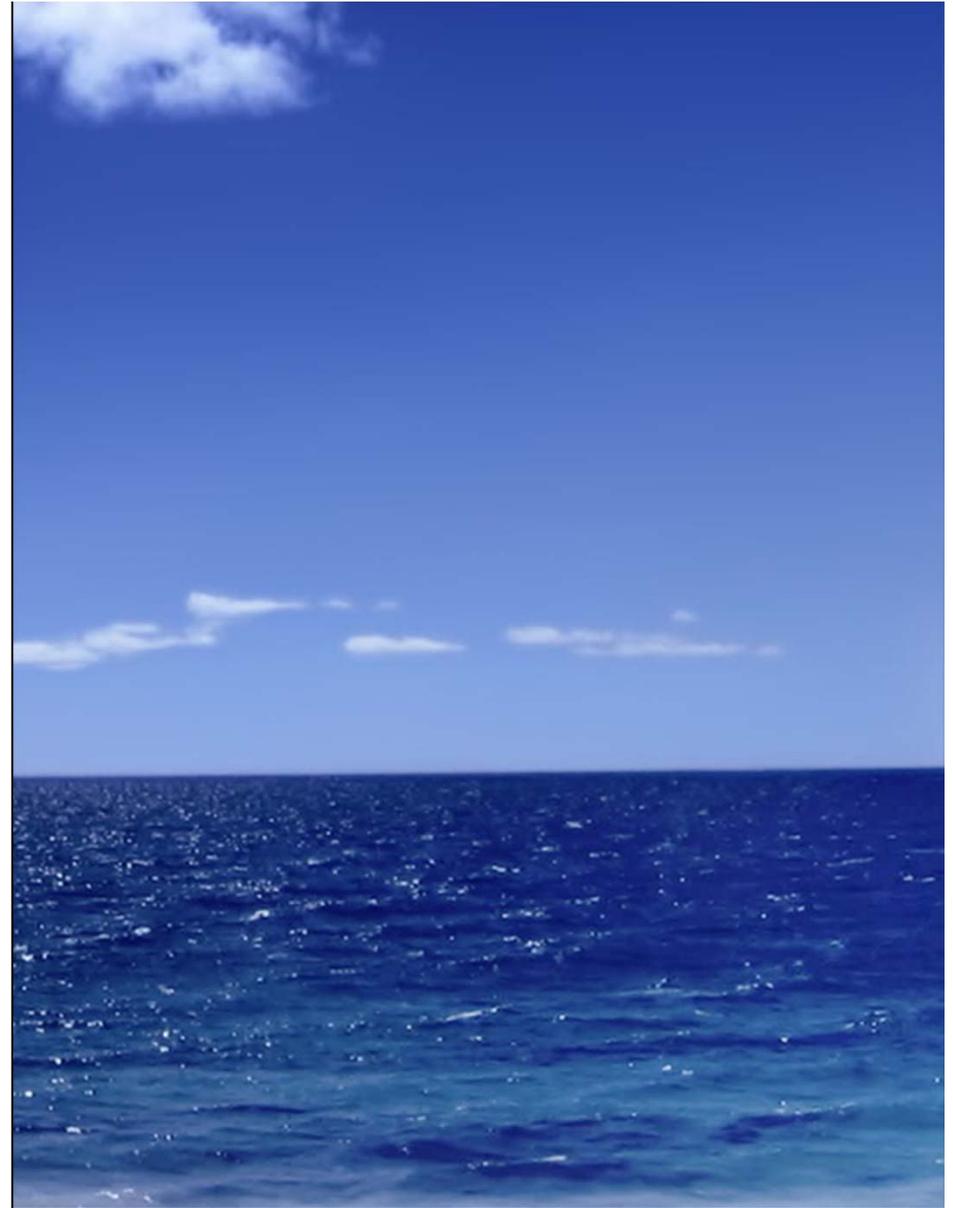


Debris dispersed; satellites could not detect after April 14, 2011

Challenges: Scope of problem

- Unprecedented event for U.S.
- Big ocean
- No accurate estimates of debris types or volume
- Debris sinks, weathers, and breaks apart
- Debris disperses
- Forecasts difficult

How do you find debris in the open Pacific?



Challenges: Misinformation



More Tsunami Debris Washes Up on Alaska's Shores

The latest find is fly swatters with team logos on the beaches of Kodiak

By KTVA CBS 11 News
Bio

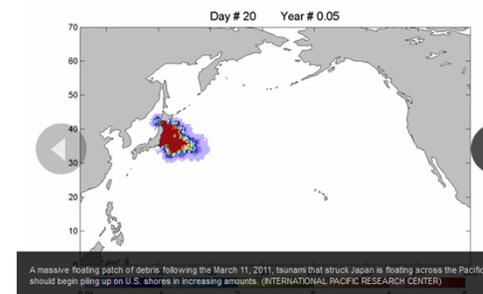
Story Created: Apr 30, 2012 at 8:42 PM AKDT
(Story Updated: May 1, 2012 at 10:36 AM AKDT)

ALASKA - Over five million tons of debris was washed out to sea from the Japanese tsunami last year and now it's starting to show up on beaches in Alaska.

The latest find is fly swatters with team logos on the beaches of Kodiak.

25 million tons of tsunami debris floating toward US shores

By Jeremy A. Kaplan / Published February 15, 2012 / FoxNews.com



Speculation and uncertainty

- Initial debris volume reports not accurate
- Radiation fears
- Reports of a massive wave of debris headed toward U.S.
- Assumption that all debris is from the tsunami

Finding debris: Observations



Call for at-sea sightings

- Vessels on the look-out
 - NOAA fleets, fishing vessels, commercial fleets, UNOLS, recreational yacht racers, World Ocean Council
- Aerial and at-sea sightings: USCG enforcement missions
- FAA Notices to Airmen
- MARAD advisories

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Finding debris: Data gathering

Public reporting email address

- Call for “significant” marine debris sightings; report to DisasterDebris@noaa.gov
- 1,380 official reports, 14 confirmed
- Email address used to:
 - Log reported sightings
 - Map sightings
 - Aid information exchange

→ **DisasterDebris is NOT a response system**

- State hotlines
 - Oregon: 211; WA: 1-855-WACOAST

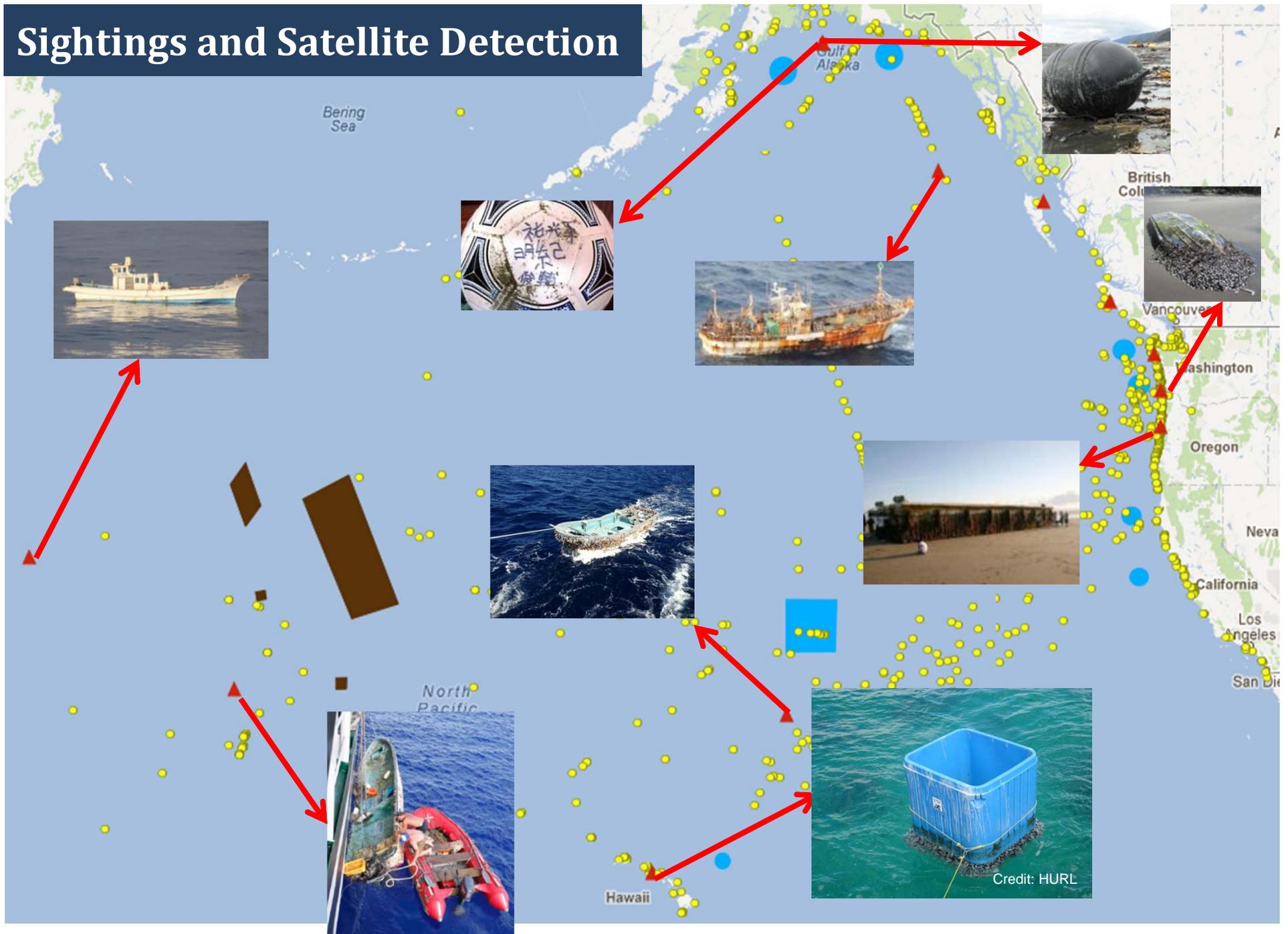


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Sightings and Satellite Detection



Finding debris: Remote Sensing



Satellite and UAS

- NGA, DOD assisting with high-resolution satellites
- Requested data for roughly 400,000 km²
- New technologies: UAS testing off the coast of Oahu
- Continued efforts to improve detection
- Targeted areas for observation based on sightings, models

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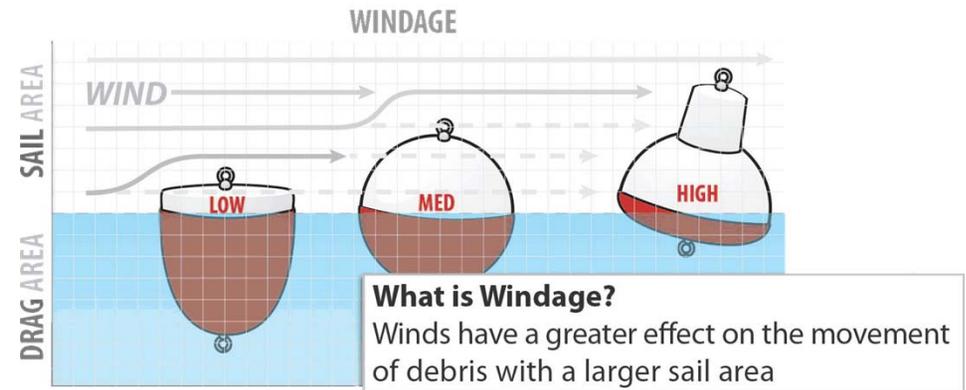
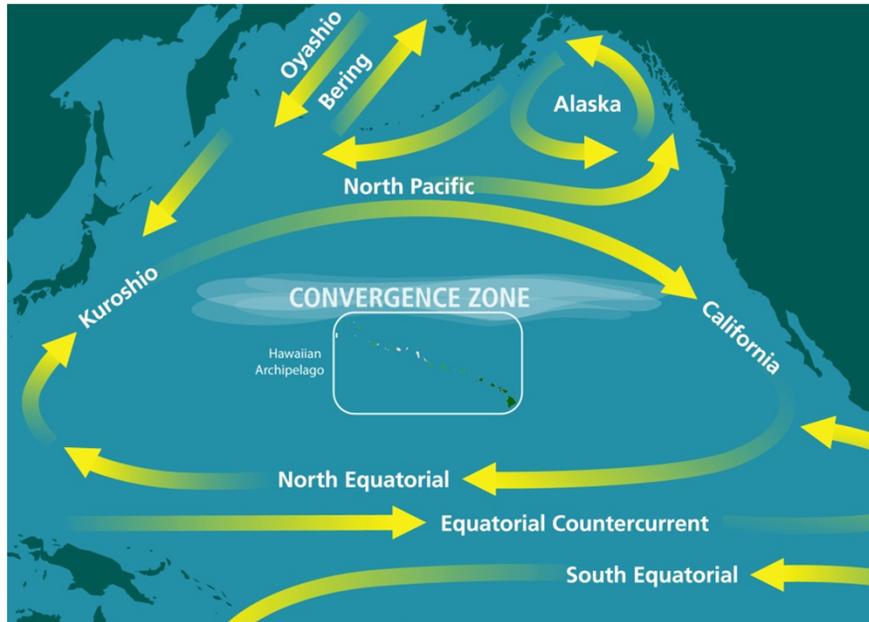
Finding debris: GNOME Model

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

Ocean currents



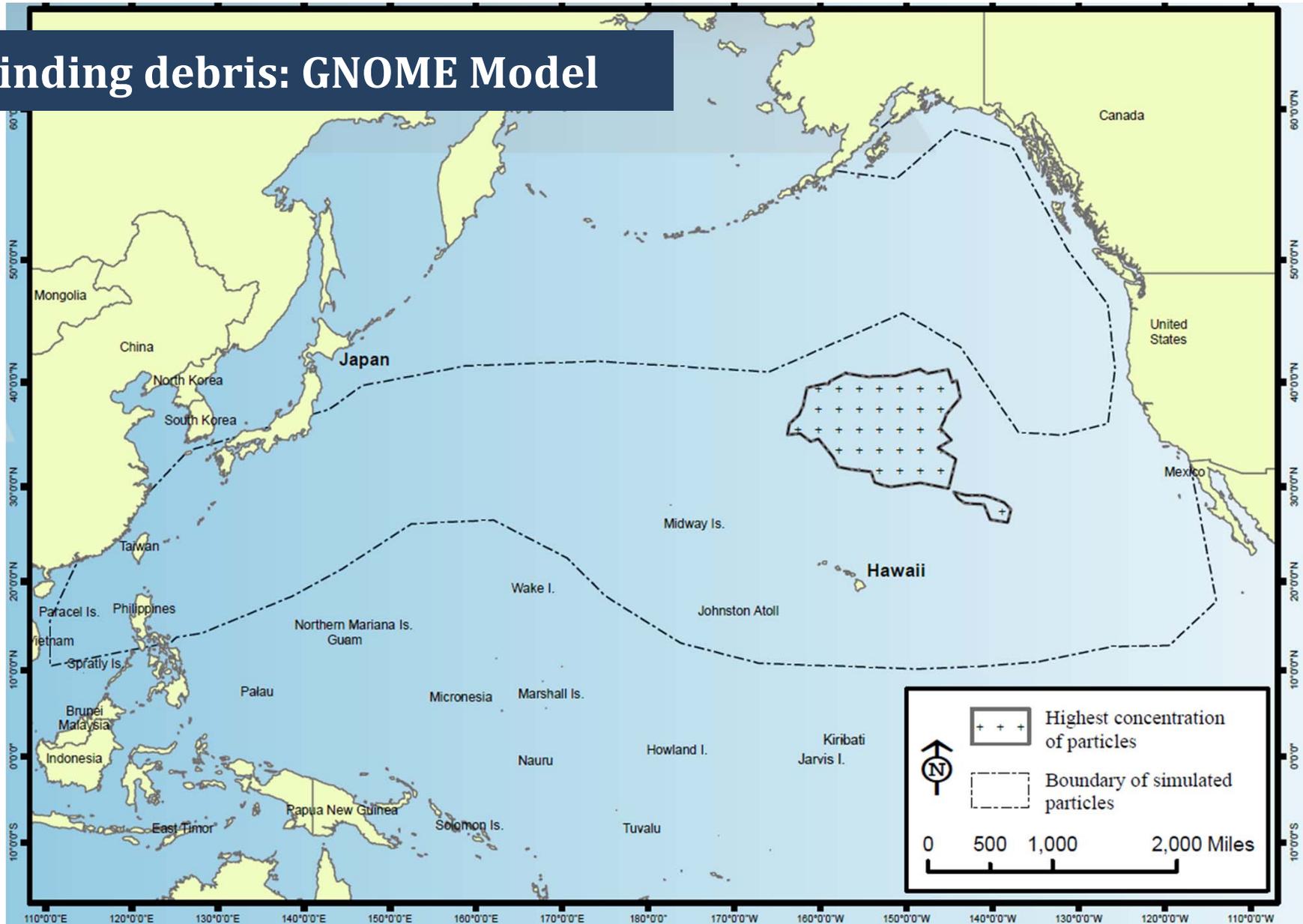
Winds



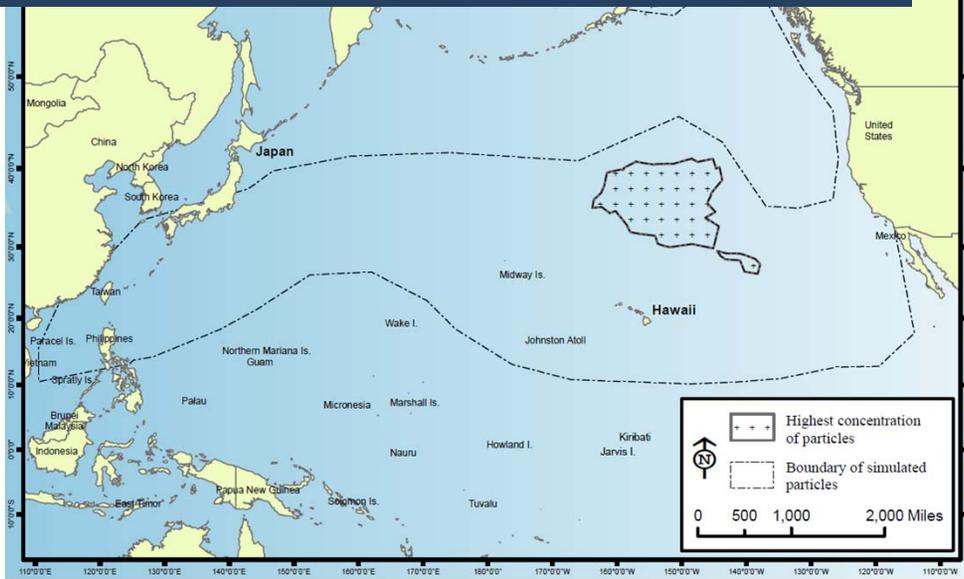
- **Low = slow** (e.g., wood, nets)
- **Medium = moderate** (e.g., fishing vessel)
- **High = fast** (e.g., unoccupied inflatable life raft, Styrofoam)



Finding debris: GNOME Model



Finding debris: GNOME Model



Future Outlook:

- Anticipate that in late fall/winter, seasonal variations in winds and currents will bring additional debris on-shore in West Coast and AK
- Intermittent and scattered

GNOME Results:

- Higher windage particles approached west coast of North America in fall/winter 2011/2012
- High and medium windage particles continued to come ashore in AK, WA, OR, NorCal into spring/early summer 2012
- Summer pattern moves particles south and offshore
- Lower windage particles in area north of HI

Collaboration

- Interagency:
 - Numerous programs and authorities
 - Response coordinated by NOAA
 - IMDCC (chaired by NOAA)
 - EPA, USCG, FWS, NPS, etc.
 - USCG / NOAA collaboration on sightings
- International:
 - Japanese government and Embassy of Japan engaged with NOAA and State Department
 - Canadian government
- Biweekly meetings



On-going challenges

- At-sea detection is difficult
- New challenges: invasive species
- Debris removal
- Getting the message out
- **What's coming next?**



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Questions?

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