



NOAA Action to Reduce the Impacts of Marine Debris: Responses to Pervasive Problems and Natural Disaster Events

Jason Rolfe

Southeast and Caribbean regional coordinator
NOAA Marine Debris Program



www.MarineDebris.noaa.gov

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National Oceanic and Atmospheric Administration (NOAA)

- NOAA Marine Debris Program (MDP)
- Mission and Mandates
- Partners and Products
- Day to Day Activities and Severe Marine Debris Event Response



Derelict fishing gear removal in the Northwestern Hawaiian Islands. Credit: NOAA PIFSC CRED

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Sources and Impacts

- Wildlife entanglement
- Wildlife Ingestion
- Economic costs
- Aesthetic value/costs
- Vessel damage / navigation hazards
- Habitat destruction
- Invasive species
- Human health / safety





NOAA Marine Debris Program

Marine Debris Research, Prevention, and Reduction Act of 2006 mandates:

- NOAA authorized to implement the MDP through: Research, Assessment, Removal, Prevention, Outreach & Education
- Chair the Interagency Marine Debris Coordinating Committee (IMDCC)
- Develop and Maintain Information Clearinghouse



NOAA MDP Core Functions

- **Research Goals:** 1) Understand the fate and impacts of marine debris; 2) Mitigate those impacts
- **Prevention Goal:** Encourage social behavior changes through outreach and education
- **Reduction Goal:** Prevent and reduce the occurrence and impacts of marine debris

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Research, Monitoring, and Impact



Environmental and Economic
Impact Assessment

Degradation rates and
chemical impacts

Shoreline and at-sea
monitoring

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Outreach and Education

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Photo Galleries

Japan Tsunami Marine Debris
Get the latest information on debris from the 2011 Japan tsunami.

Marine Debris Blog
[Derelict Crab Traps in the Chesapeake Bay](#)
[Addressing Marine Debris Along Washington's North Outer Coast](#)
[A new year, reflections and resolutions](#)

Marine Debris Tracker App
Track the trash you're keeping out of the sea!

FAQs
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[Debris Model](#)
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Marine debris threatens oceans and coasts.

MARINE 101 DEBRIS

BEACH AND WATERWAY CLEANUPS

Three photographs showing people participating in beach and waterway cleanups, collecting trash into bags.

UNDERSTANDING MARINE DEBRIS

GAMES & ACTIVITIES FOR KIDS OF ALL AGES

A cartoon illustration of a yellow fish with large eyes swimming in the ocean, surrounded by various pieces of marine debris like a plastic cup, a tire, and a can.



Fishermen can contribute to the debris problem when they fail to retrieve fishing gear or improperly dispose of fishing-related trash.

Impacts of Marine Debris
Marine debris poses threats to fishermen, their catch, and important fish habitat and breeding grounds.

Discarded or abandoned fishing gear and other forms of debris can entangle and maim many wildlife species. Abandoned nets, plastic tarps, traps, and other debris can smother and crush sensitive ecosystems, many of which are essential habitat for sea life.

Fishing line, nets, rope and other trash can also wrap around boat propellers and dog seawater intakes causing costly engine damage and becoming a safety hazard.

What Is Marine Debris?
The National Oceanic and Atmospheric Administration defines marine debris as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes.

Where Does It Come From?
All marine debris shares a common origin - people. In fact, people's mishandling of waste materials and other items constitutes the bulk of the marine debris problem. Most researchers traditionally classify marine debris as coming from **land- or ocean/waterway-based** sources.

Most **land-based** marine debris reaches the ocean when people carelessly discard trash while on land. The majority of **ocean/waterway-based** debris reaches the ocean when people improperly dispose of or stow their trash while onboard their boats and vessels.



TURNING THE TIDE ON TRASH

A LEARNING GUIDE ON MARINE DEBRIS

A photograph of a beach completely covered in a large amount of marine debris, including plastic bottles, bags, and other trash.

Marine Debris BLOG

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Fishing for Energy Project

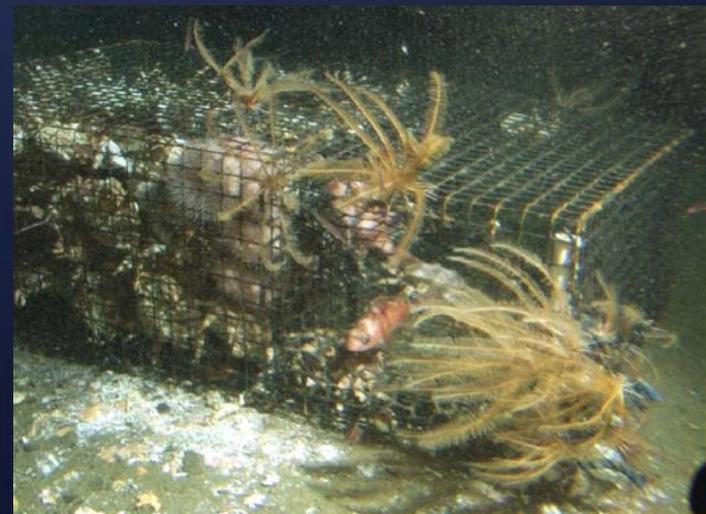
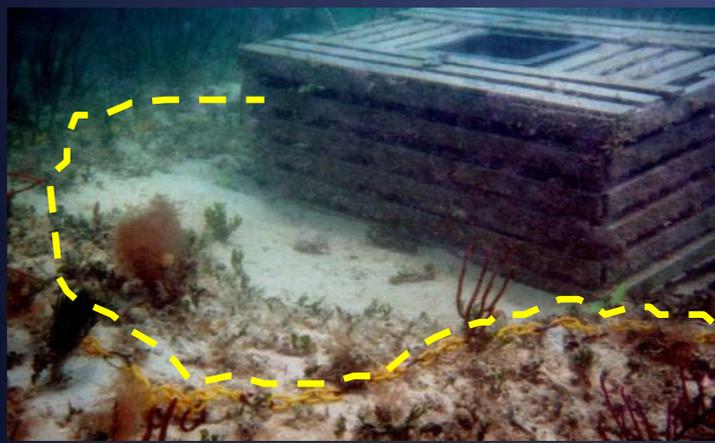


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Derelict Fishing Gear



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Reel In and Recycle

- **Goals of this project:**
 - Reduce the amount of monofilament line along coastal zones
 - Promote community awareness and action towards better stewardship of coastal resources
- Currently, there are >2,500 bins along US coastlines



Severe Marine Debris Events

MDP Reauthorized in December 2012

Marine Debris Act defines a “severe marine debris event” as “atypically large amounts of marine debris caused by a natural disaster, including a tsunami, flood, landslide, or hurricane, or other source.”



(US Navy, March 15, 2011)

Main Activities During Event Response:

1. Providing scientific support
2. Assisting in coordination
3. Communications and outreach



(David Gard/The Star-Ledger October 30, 2012)

Tsunami Event Overview

- 9.0 magnitude earthquake
- Tsunami: 130 ft max wave height
- 217 square miles inundation
- 15,844 people confirmed dead, 5,890 injured, and 3,451 missing



(Keichi Nakane/Associated Press)

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Tsunami Debris Floats Out to Sea...



(US Navy, March, 2011)

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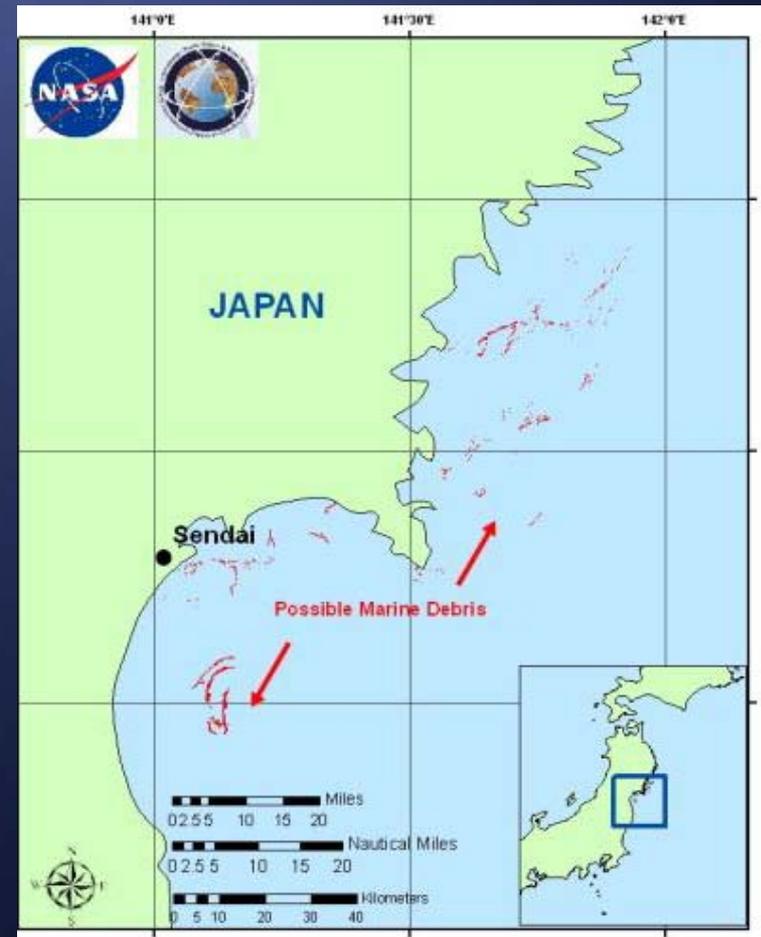
Debris Aftermath – Initial Tracking



(US Navy, March 2011)

March 13, 2011: Debris off the Sendai coast

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



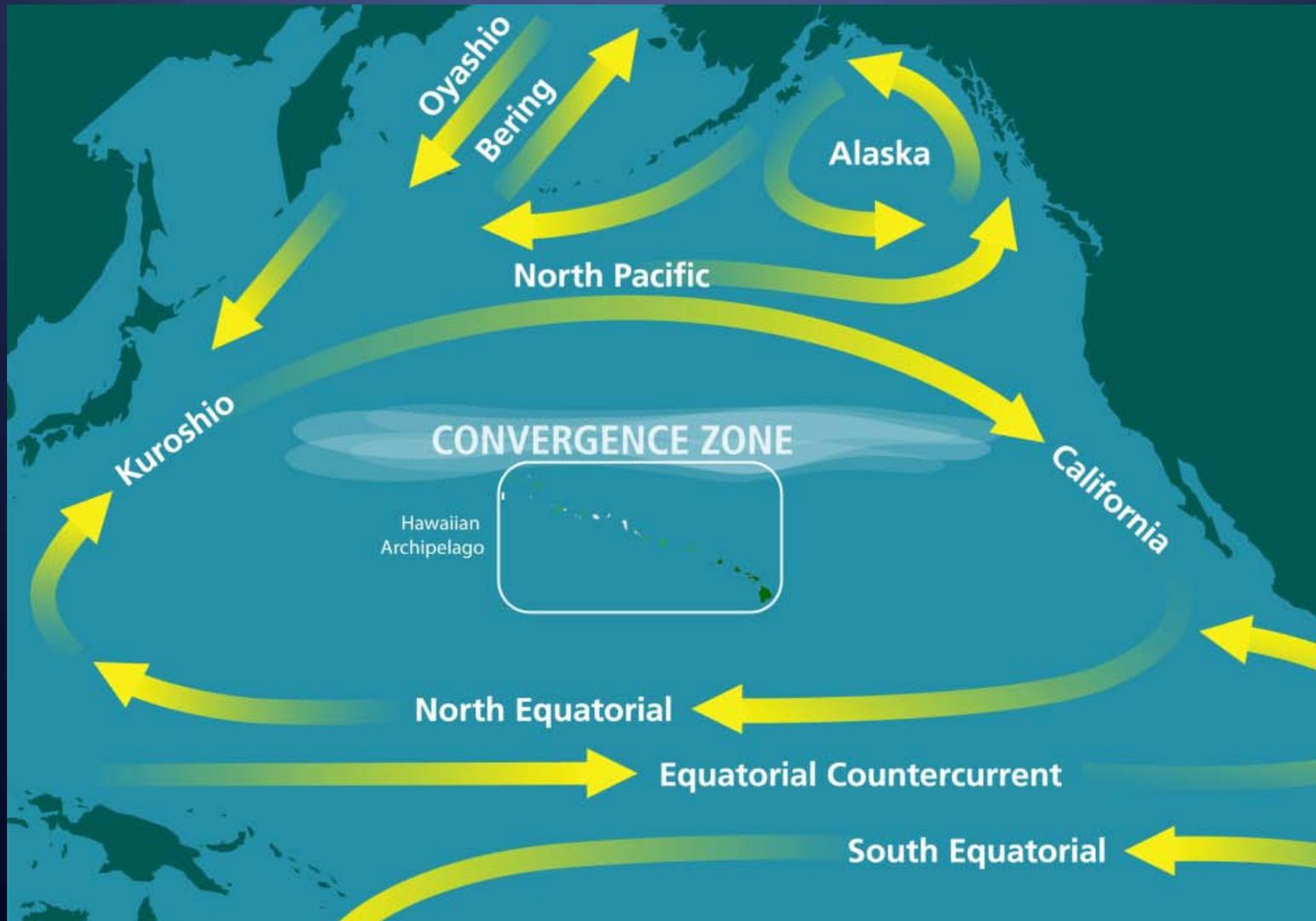
Debris dispersed; satellites could not detect after April 14, 2011

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North Pacific Ocean: Currents

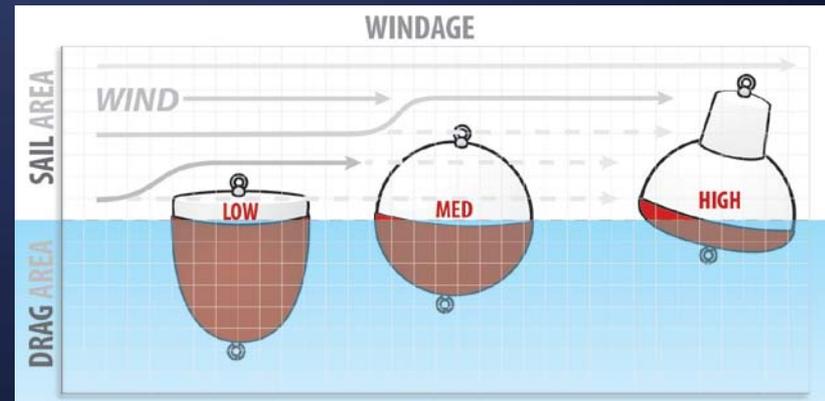


Computer Modeling

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

NOAA GNOME (General NOAA Operational Modeling Environment)

- Hindcast (vs. forecast)
- Low, medium, and high windage →
- U.S. Navy HyCOM (ocean currents) and NOAA data (wind)



Recent GNOME results

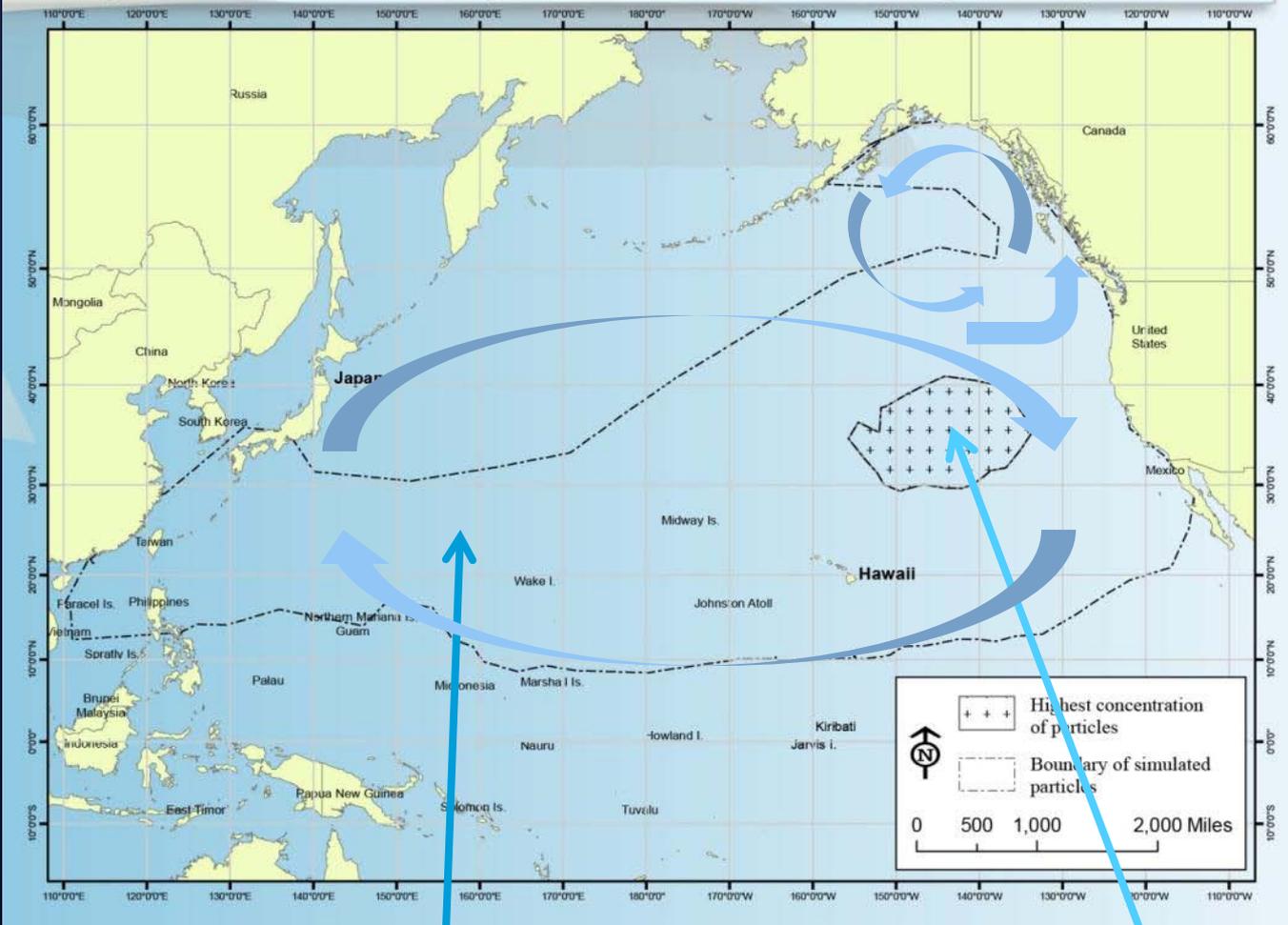
- Winter of 2012-2013: Marine debris of mixed types may wash ashore in W. coast states, AK, and Hawaii.

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Expected Distribution of Computer Simulated Particles Through Tuesday, 02/05/13



- 1,000 particles
- Random windage: low to high
- 8 locations (>3.5m)
- 0700, 11 March 2011 through 5 February 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

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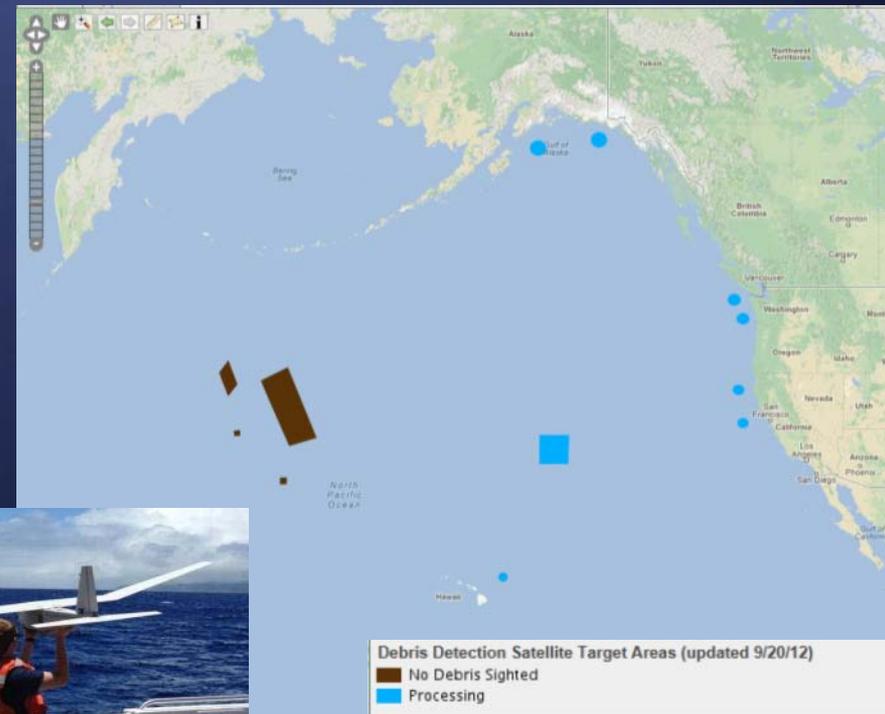
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Satellite Detection & Unmanned Aircraft Systems

Satellite Detection

- March – April 2011: Tracking debris fields (with NASA)
- National Geospatial Intelligence Agency – images
- NOAA National Environmental Satellite, Data, and Information Service – analysis
- 7 sites – monthly



Unmanned Aircraft System (UAS)

- Testing phase
- NOAA ship *Fairweather* – Gulf of Alaska in 2013





Reporting and Tracking of Sightings

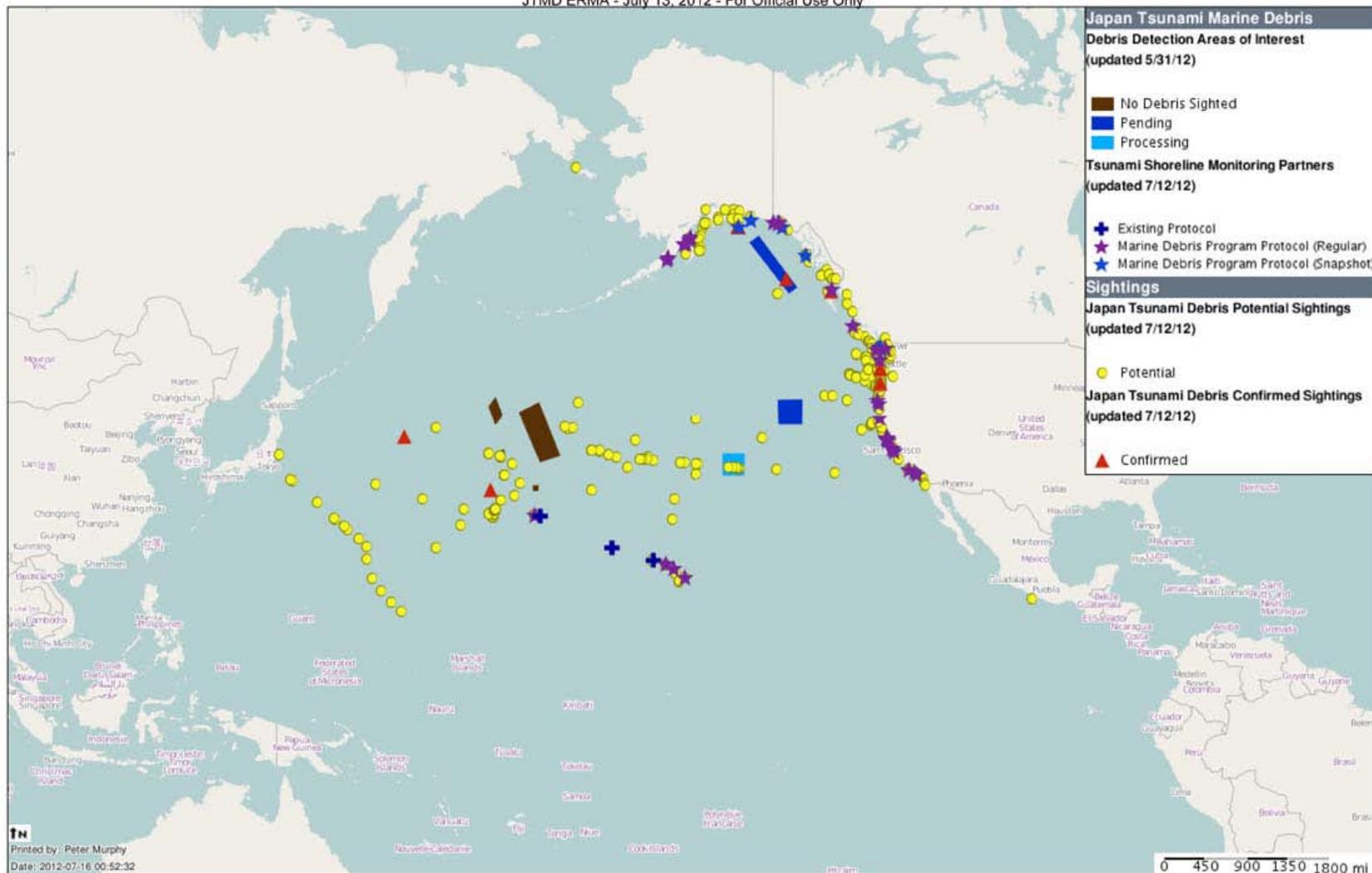
- **Aerial** (e.g., NOAA winter storms, U.S. Coast Guard Auxiliary)
- **At-sea** (e.g., World Ocean Council, NOAA fleet, Hawaii longliners)
- **Shoreline** (e.g., Non-governmental organizations, general public)
- Reported to disasterdebris@noaa.gov
- 1,548 reports of potential Japan tsunami marine debris (since Dec. 2011)
 - HI, AK, WA, OR, CA, British Columbia, and Mexico + N. Pacific
 - At-sea sightings = 784; On shore sightings = 764
- **21 confirmed** Japan tsunami marine debris items

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JTMD ERMA - July 13, 2012 - For Official Use Only



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Coordination Support

- NOAA Marine Debris Program – Regional coordinators (WA/OR, CA, AK, Pacific Islands Region)
- Work with partners in all states/territories of potential impact
 - Response coordination support and planning
 - Meetings, workshops, and table-top exercises
 - Communications
 - Funding (\$50K from NOAA and \$5M gift from Japan)
- Work with the Consulates and Government of Japan
 - Debris item confirmation as originating from the tsunami

29 Sept 2012; N. Pacific



2 Nov. 2012; Midway Atoll, HI



30 Nov. 2012; Kahana Bay, HI



24 Dec. 2012; Punalu'u, HI



18 Jan. 2013; HI



State-led Response Plans

- All states have developed action plans to respond to tsunami marine debris
- Plans include rapid-response protocols; leverage state knowledge and capabilities
- State partners take lead with support from various agencies, groups, and individuals
- NOAA provides support and helps coordinate response efforts



Tsunami Debris Response: Collaborative Effort

- Interagency:
 - Involvement from federal, state and local agencies (State natural resource offices, FWS, NPS)
 - USCG Overflights/Detection
 - Informational/operational/logistical support from NOAA
- Outside Groups
 - Academia – Computer Modeling, Shoreline Monitoring, Aquatic Invasive Species Assessment
- International:
 - Japanese government and Embassy of Japan engaged with NOAA and U.S. State Department



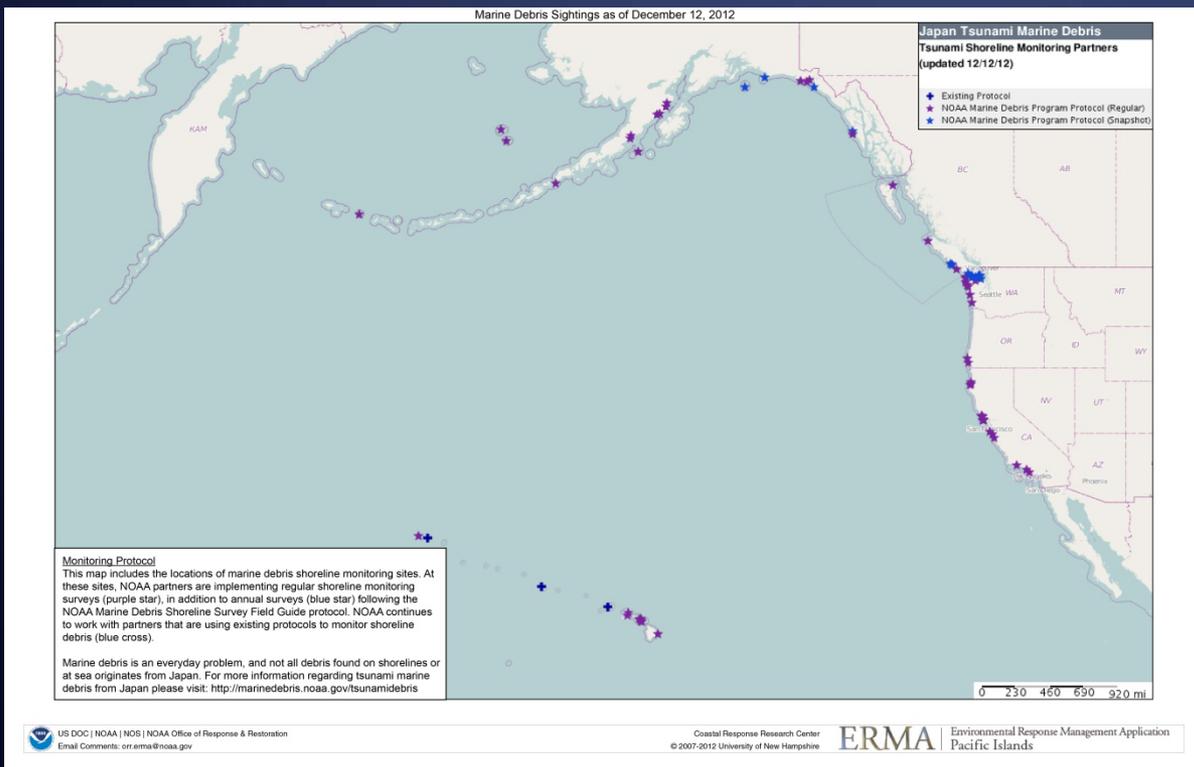
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Shoreline Monitoring

NOAA Marine Debris Program Shoreline Monitoring Guide, data sheet, & database – MD.monitoring@noaa.gov



- ★ = monitoring site (NOAA protocol)
- ◆ = monitoring site (non-NOAA protocol)





Marine Debris Monitoring and Assessment Project

Disseminate protocols and tools

- Monitoring protocols

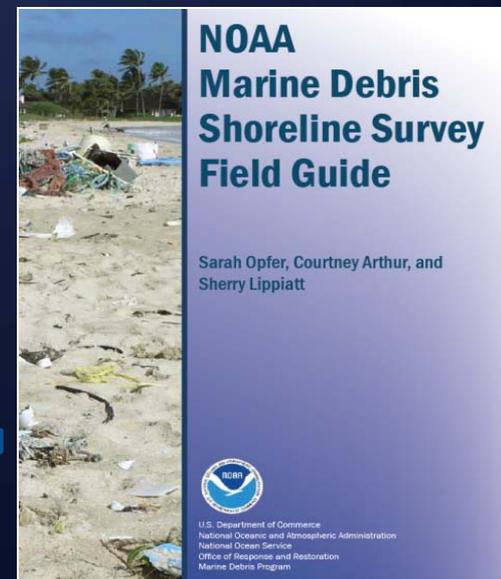
Coordination of efforts

- Facilitate data collection and analysis
- Standard protocols add context to local issues or initiatives

Synthesis and communication of results

Request a copy:

MD.monitoring@noaa.gov



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Monitoring: MD-MAP.net

MD-MAP ID #14 - South Beach, Point Reyes National Seashore, Marin California - Standing-Stock

[Edit Site](#)

General Info

Organization: Gulf of the Farallones National Marine Sanctuary
Surveyor Name: Kate Bimrose
Phone: (415) 970-5245
Date: 06-22-12

Shoreline Characteristics

Length of Sample Area: 42m
Substratum Type: sand
Substratum Uniformity: 98%
Tidal Range: 8
Tidal Distance: 40
Back of Shoreline: vegetation and dunes
Aspect: Northwest

Map



Sampling Area

MD-MAP ID#: 14
Shoreline Name: South Beach, Point Reyes National Seashore
State: California
County: Marin
Lat. Lon. Start Coords: 38.05476 -122.98576
Lat. Lon. End Coords: 38.05578 -122.98581

Land-Use Characteristics

Location: Rural
Major Usage: recreation
Access: pedestrian
Inverness: Inverness
Nearest Town: 13miles
Nearest Town Direction: East
Nearest River Name: Abbots Lagoon
Nearest River Distance: 2miles
Nearest River Direction: North
River/creek Input: no
Pipe or Drain Input: no

Notes

steep beach; landmark correlates to 1st coordinant (SE corner) at back of the shoreline

Photos

Map depicting site plot with reference photo of landmark at SE corner and survey transect table

07-10-12 Survey | MD-MAP ID #12 - Carbon Beach, Los Angeles CA - Standing-Stock

[Edit Survey](#)

General Info

Surveyor Name: Eveline Bravo - Heal the Bay
Email: ebravo@healthebay.org
Phone: (310) 451-1500
Date: 07-10-12
Survey ID: 28
MD-MAP ID #: 12

Additional Info

TransectID: 4
Start Coords: 34.03815 -118.8542
End Coords: 34.03883 -118.85408
Width: 18.3
Start Time: 0:00 PM
End Time: 0:00 PM

Additional Info (cont.)

Season: Summer
Date of Last survey: 06-13-12
Storm Activity: None
Current Weather: Clear, sunny
of Persons Assisting: 2
Large Items: no

Notes

Start and end time not recorded

Photos



Carbon Beach - 10 July 2012 Carbon Beach - 10 July 2012 Carbon Beach - 10 July 2012 Carbon Beach - 10 July 2012

Debris Data

Plastic	Metal	Processed Lumber
Hard Plastic: 0	Aluminum/Tin Cans: 0	Cardboard Cartons: 0
Foamed Plastic: 0	Aerosol Cans: 0	Paper and Cardboard: 3
Filmed Plastic: 4	Metal Fragments: 1	Paper Bags: 0
Food Wrappers: 3	Other: 0	Lumber/Building: 0
Beverage Bottles: 0	Glass	Material:
Other Jugs/Containers: 0	Bottle/Container Caps: 0	Other: 0
Bottle/Container Caps: 0	Beverage Bottles: 0	Cloth/Fabric
Cigar Tips: 0	Jars: 0	Clothing & Shoes: 0
Cigarettes: 0	Glass Fragments: 0	Gloves (non-rubber): 0
Disposable Lighter: 0	Other: 0	Towels/rags: 0
6-Pack Rings: 0	Rubber	Rope/net pieces (non-nylon): 0
Bags: 0	Flip Flops: 0	Fabric Pieces: 0
Plastic Rope/Net: 0	Rubber Gloves: 0	Other: 0
Pieces:	Tires: 0	Unclassified
Buoys & Floats: 0	Rubber Fragments: 0	Other: 0
Fishing Lures & Line: 0	Other: 0	
Cups: 1		
Plastic Utensils: 0		
Straws: 0		
Ballons: 0		
Personal Care Products: 0		
Other: 0		

Debris Description

Large Items

Request an account:

MD.monitoring@noaa.gov



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Thank you

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