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

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- 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
Sources and Impacts

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

Research, Monitoring, and Impact

Degradation rates and chemical impacts
Shoreline and at-sea monitoring

Environmental and Economic Impact Assessment
Outreach and Education

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 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 contributes 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 improperly discard trash while on land. The majority of ocean/waterway-based debris reaches the ocean when people improperly dispose of or throw their trash while on board their boats and vessels.

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 lures, 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 clog seawater intakes causing costly engine damage and becoming a safety hazard.
Fishing for Energy Project
Derelict Fishing Gear
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.”

Main Activities During Event Response:
1. Providing scientific support
2. Assisting in coordination
3. Communications and outreach

(US Navy, March 15, 2011)

(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)
Tsunami Debris Floats Out to Sea...
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
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.
- 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
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](mailto: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
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
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:
  o Involvement from federal, state and local agencies (State natural resource offices, FWS, NPS)
  o USCG Overflights/Detection
  o Informational/operational/logistical support from NOAA

• Outside Groups
  • Academia – Computer Modeling, Shoreline Monitoring, Aquatic Invasive Species Assessment

• International:
  o Japanese government and Embassy of Japan engaged with NOAA and U.S. State Department
Communications and Outreach

• Media – Traditional, social, and digital media

• Meetings, briefings, public presentations, events, & materials distribution

• Website: [http://marinedebris.noaa.gov/tsunamidebris/](http://marinedebris.noaa.gov/tsunamidebris/)
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
Marine Debris Monitoring and Assessment Project

Monitoring: MD-MAP.net

Request an account:
MD.monitoring@noaa.gov
Thank you

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