NOAA | National Ocean Service

Office of Response and Restoration

Science Advisory Board Presentation

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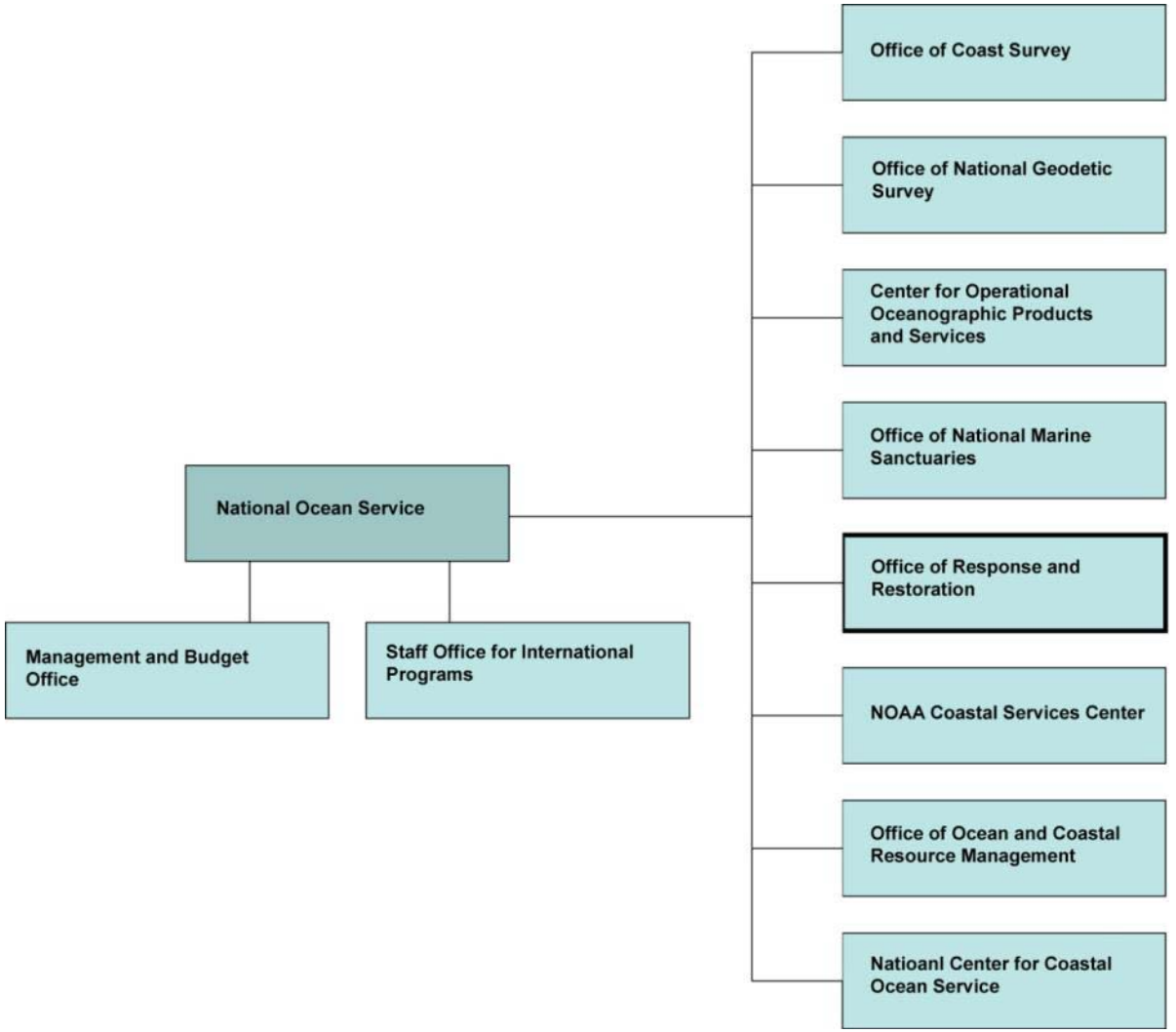
July 17, 2012

Office of Response and Restoration



Who We Are

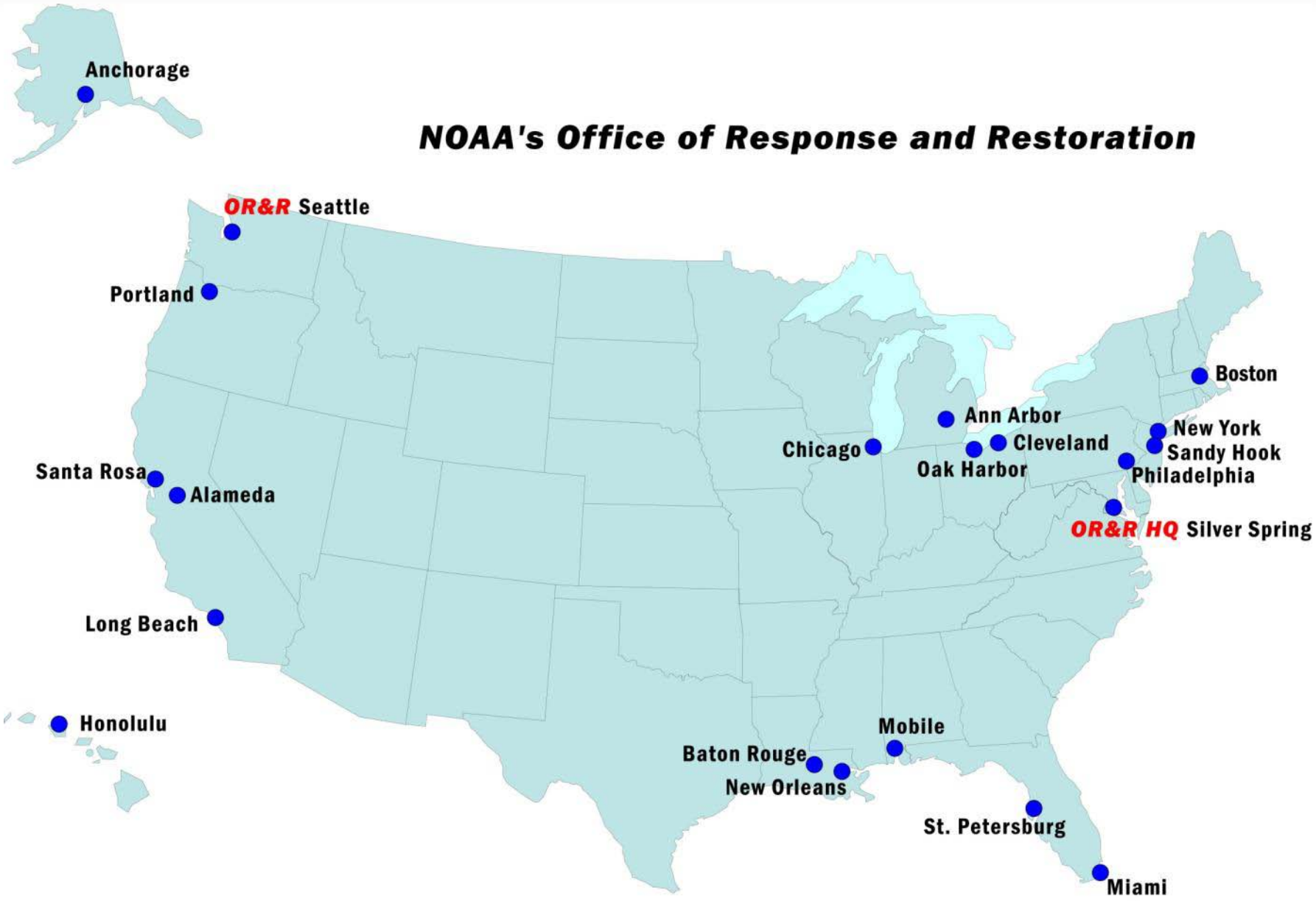
Four Divisions and One New Facility

- Emergency Response
- Assessment and Restoration
- Marine Debris
- Business Services and Cost Recovery
- Disaster Response Center

What We Do

Many Areas of Expertise

- Science Support
- Research
- Trajectory Forecasts
- Grants
- Cost Documentation
- Spatial Data
- Modeling
- Outreach
- Economic Analysis


NOAA's Office of Response and Restoration
Anchorage
OR&R Seattle
Portland
Santa Rosa
Alameda
Long Beach
Honolulu
Chicago
Ann Arbor
Cleveland
Oak Harbor
Boston
New York
Sandy Hook
Philadelphia
OR&R HQ Silver Spring
Mobile
Baton Rouge
New Orleans
St. Petersburg
Miami

Our Mandates

OR&R supports some of the nation's strongest ocean protection laws:

- Oil Pollution Act
- CERCLA/Superfund
- Marine Debris Research, Prevention and Reduction Act
- Clean Water Act

This year, OR&R will:

- Respond to 120-170 oil spills
- Train over 700 emergency responders for oil spills
- Support over 40 oil spill drills with the U.S. Coast Guard
- Settle 4-7 natural resource damage assessment cases and continue work on over 200 additional cases
- Support removal of hundreds of tons of marine debris
- Develop new tools and conduct research to address hazards on the water and prevent marine debris

Oil and Chemical Spills

Emergency Scientific Support

- Provide forecasts on fate and movement of pollutants
- Develop cleanup strategies, priorities, and endpoints
- Conduct shoreline assessment and aerial observations
- Coordinate NOAA's resources (i.e. forecasts, fisheries)
- Characterize pollutant chemistry and environmental effects
- Identify and characterize resources at risk
- Train emergency responders
- Provide a common operational picture (ERMA®)

Oil and Chemical Spills

Upcoming Actions/Critical Issues

- Arctic Exploration and Caribbean deep well drilling
- BSEE regulations and E&P plan review
- Implementation of new NRT guidance including dispersants
- EPA's Subpart J
- 3-D Modeling

Restoring Injured Natural Resources

Damage Assessment, Remediation and Restoration Program

- Provide scientific expertise during cleanup to maximize protection and recovery of NOAA trust resources
- Conduct Natural Resource Damage Assessments (NRDA)
  - Assess and restore for impacts from spills, waste sites, and groundings
  - Determine value of lost ecosystem services and human use
  - Implement and monitor restoration through NOAA Restoration Center

Restoring Injured Natural Resources

Upcoming Actions/Critical Issues

- Deepwater Horizon settlement/ongoing negotiations

Key Products

- Habitat Equivalency Analysis; Natural Resource Economic Analyses
- Damage Assessment and Restoration Plans
- Spatial Data and Information Management

Marine Debris Mitigation

Scientific Support and Products

- Federal lead for marine debris coordination (IMDCC-Interagency Marine Debris Coordinating Committee)
- Coordinate marine debris activities with partners including non-governmental organizations, state and local managers, federal partners, and the international community
- Conduct microplastics and derelict fishing gear research
- Provide grants for research, removal, and outreach
- Develop educational resources and materials

Marine Debris Mitigation

Upcoming Actions/Critical Issues

- Japan tsunami debris
- Reauthorization Bills in House and Senate

Key Initiatives

- International strategy for addressing marine debris impacts
- Public outreach and education
- Fishing for Energy campaign
- Marine Debris Tracker

NOAA's Disaster Response Center Mobile, Alabama

All-Hazards Support for the Gulf of Mexico

- Emergency managers in the Gulf Region
- Deliver tailored products and services for preparedness, response, and recovery applications
- Provide a state of the art facility for emergency operations, trainings, drills, and workshops

Upcoming Actions/Critical Issues

- Dedication in Fall 2012
- Coordination of concept across NOAA under new CONOPs

New Challenges: Arctic

Logistics of working in the Arctic

- Oil in ice detection and monitoring
- Models/data for behavior/transport of oil in ice and under ice

Oil spill cleanup technologies

- Cold weather response equipment
- Oil and ice
- Interacting with stakeholders of the North Slope communities
- Resources at risk in the Arctic and data to make environmental response decisions

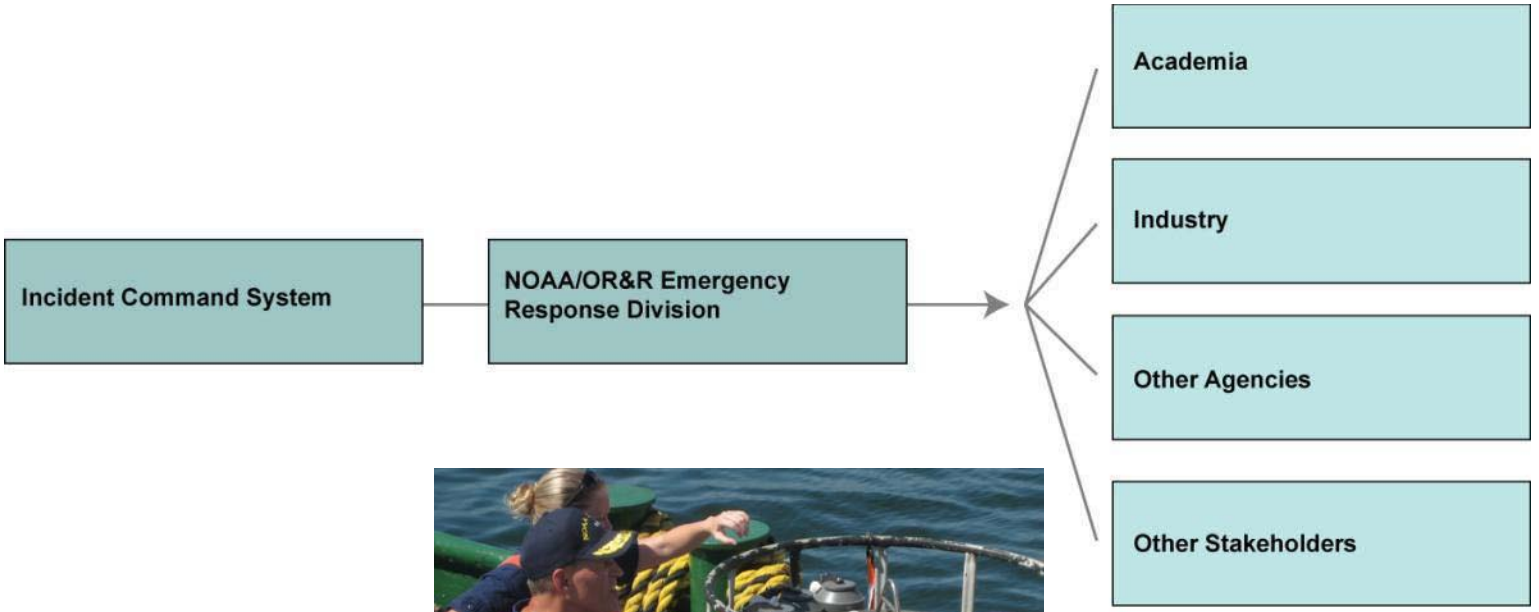
New Challenges: Subsurface

- Database of sunken vessels that contain oil (RUST, RULET, WORP)
- Effectiveness and consequences of subsea chemical dispersant operations
- Short and long-term fate/effects of subsurface oil including better understanding of biodegradation
- Well-blowout studies/models (including real time data and 3-D)

New Challenges: Marine Debris and Emergency Response

- Microplastics
- Derelict and abandoned vessels
- Long-term natural disaster marine debris issues
  - Japanese Tsunami Marine Debris
  - Katrina
- Unexploded ordinance
- International cooperation

Emergency Response-How We Operate

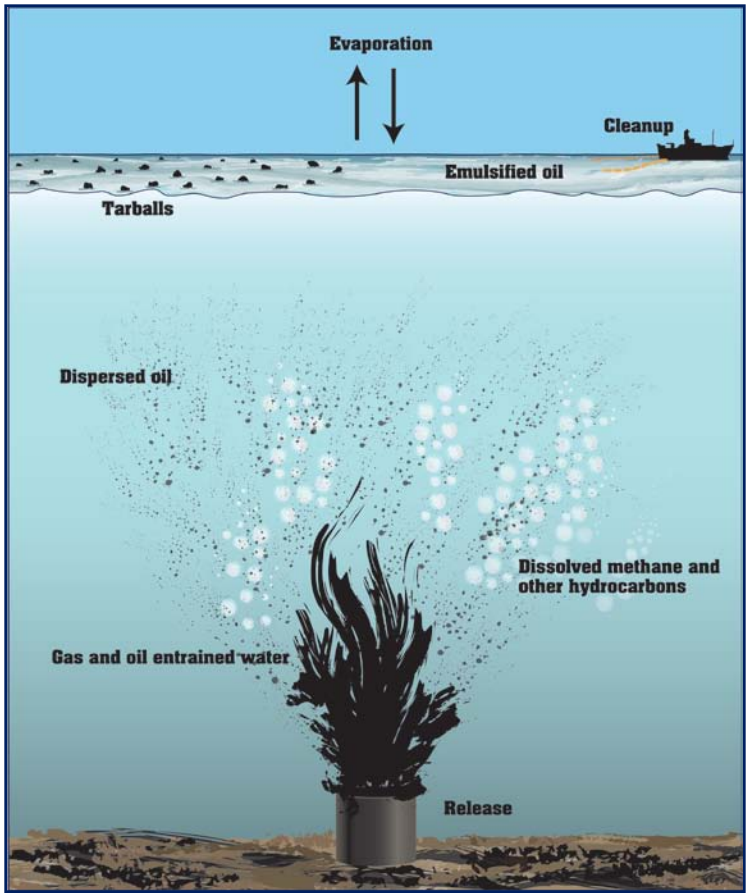


Emergency Response: How We Operate

"Time is of the essence."

How We Operate

Oil Budget Calculator



LEADS:

Lehr, Bill	National Oceanic and Atmospheric Administration (NOAA)
Bristol, Sky	U.S. Geological Survey (USGS)
Possolo, Antonio	National Institute of Standards and Technology (NIST)

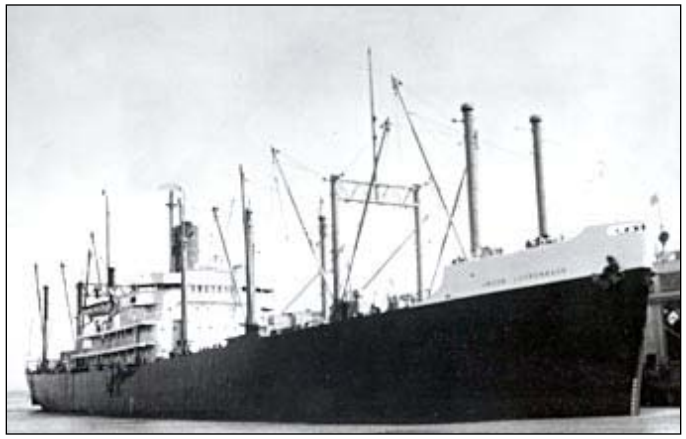
MAJOR CONTRIBUTORS OR REVIEWERS: (See Appendix 9 for short biographies)

Expert	Affiliation	Major contribution
Allen, Alan	Spiltec	In-situ burning
Boufadel, Michel	Temple University	Review
Coolbaugh, Tom	ExxonMobil	Review
Daling, Per	SINTEF	Field data
Fingas, Merv	Environment Canada (retired)	Emulsion
French McCay, Debbie	Applied Science Associates (ASA)	Review
Goodman, Ron	Innovative Ventures Ltd.	Review
Jones, Robert	NOAA	Evaporation
Khelifa, Ali	Environment Canada	Dispersion
Lambert, Pat	Environment Canada	Review
Lee, Ken	Fisheries and Oceans Canada	Field data
Leifer, Ira	University of California Santa Barbara	Hydrates
Mearns, Alan	NOAA	Biodegradation
Overton, Ed	Louisiana State University	Dissolution
Payne, James	Payne Environmental Consultants	Review

How We Operate

"OR&R Scientists identify unmet scientific needs for spill response/mitigation."

2.



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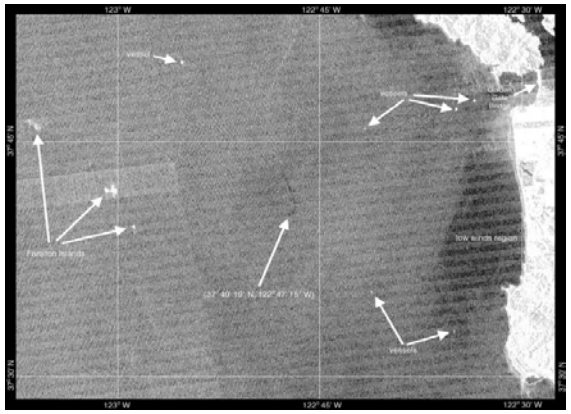

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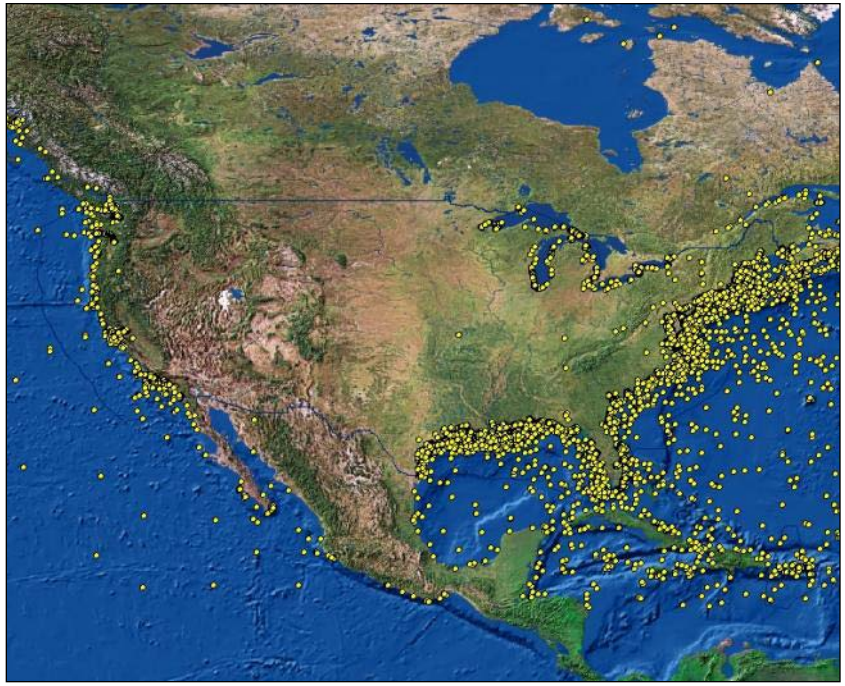
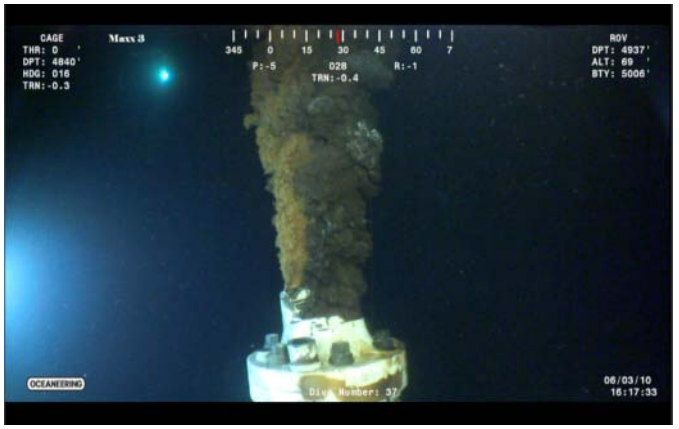


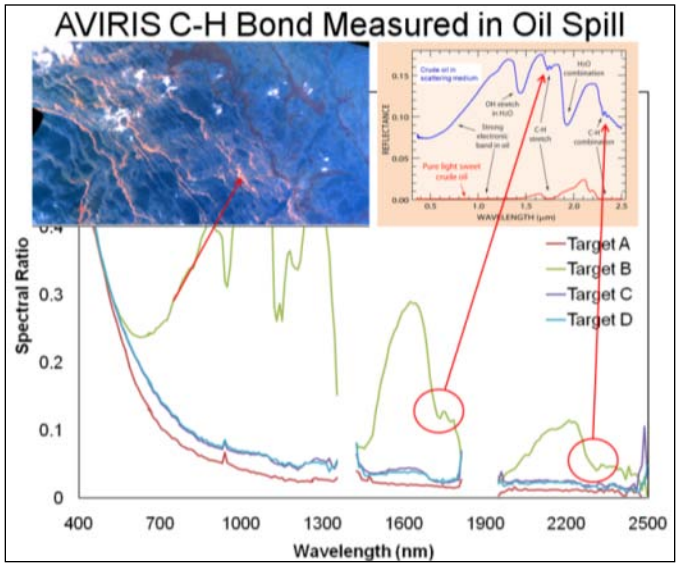
Above: NESDIS/OR&R analysis of SAR.

Top right: S.S. Jacob Luckenbach, *sank off of San Francisco in 1953. Oil removed in 2003.*

Spill Threats Today

- New locations
- New tools
- New expectations



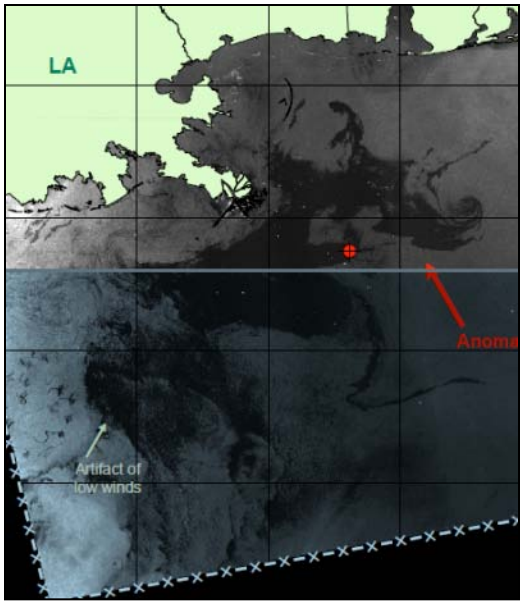


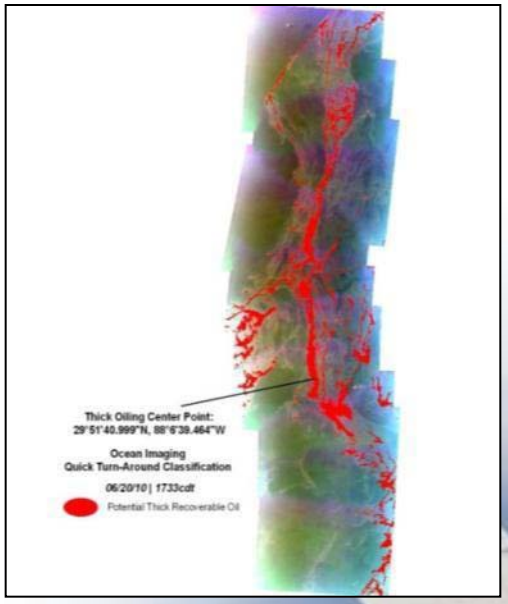
New Locations

Key R&D Topics

- Dispersant decision procedures
- Biodegradation research
- Droplet size distribution studies
- Well–blowout models
- Environmental risk assessment

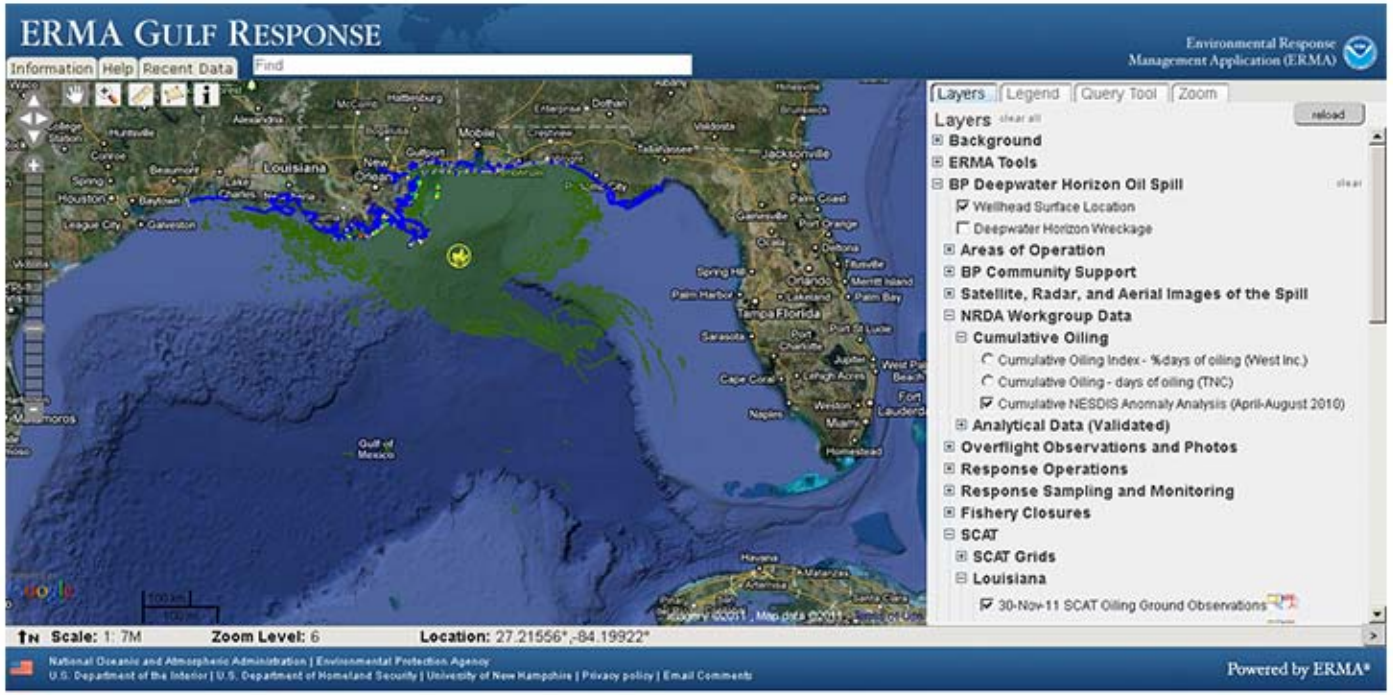
New Tools: Remote Sensing





New Tools: ERMA ®

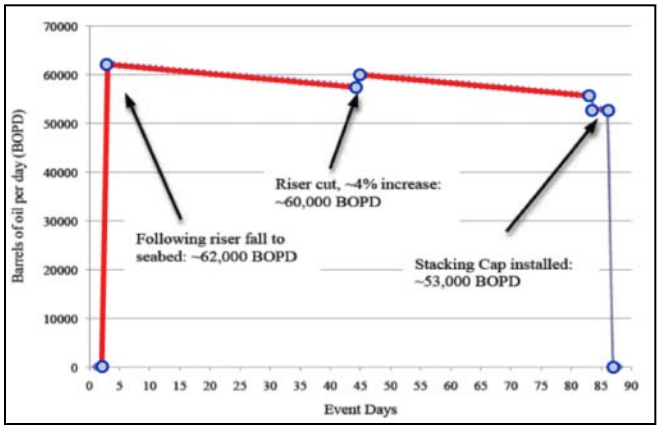
ERMA Gulf Response

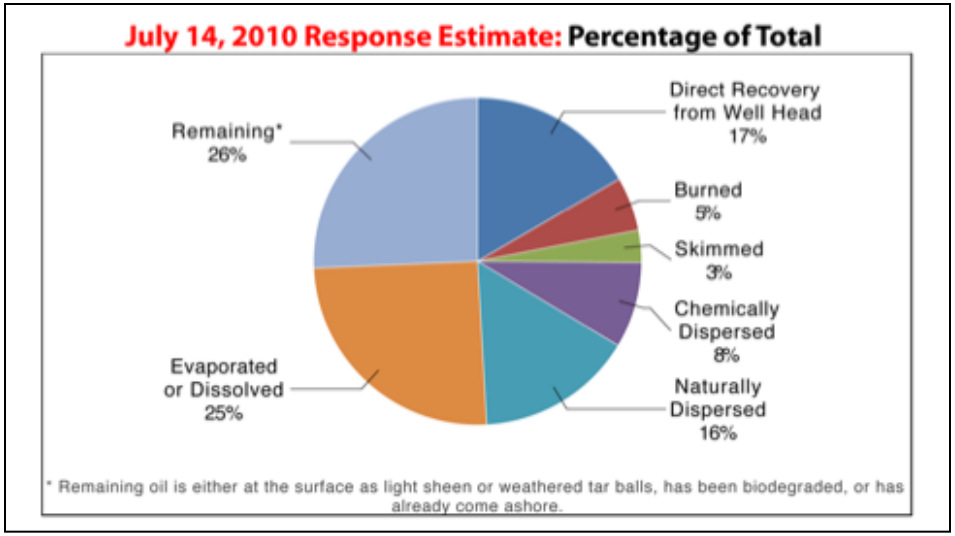


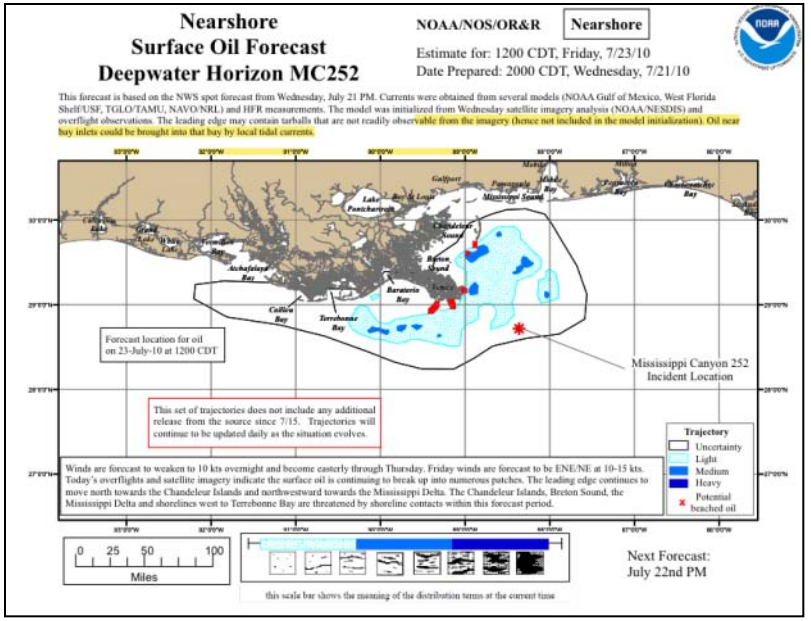
ERMA, a web-based Geographic Information System (GIS) tool is designed to assist both emergency responders and environmental resource managers who deal with incidents that may adversely impact the environment.

New Expectations

"Spill forecasts are no longer just for the on-scene command."







Next Generation Spill Models

GNOME 2 (oil trajectory model)

- 3-D Trajectory capability
- Better ability to assimilate real-time data
- New display products and ERMA export

ADIOS 3 (fate and behavior model)

- Environmental risk assessment
- Subsurface and longer-term processes
- Greater user interactivity
- Missing: Oil/ice interaction forecasting or tracking

Japan Tsunami Marine Debris

Information, action, and science

Mooring buoy, Alaska

Earthquake and Tsunami

- 9.0 magnitude earthquake
- Tsunami wave max. height: 130 ft.
- 217 square miles inundation
- 15,844 people confirmed dead, 3,451 missing
- Massive damage

Early Debris

Debris on March 13, 2011: Sendai coast

- Patches and fields
- Wood, construction materials abundant
- The debris dispersed, some sunk

NOAA's Actions

Safety first

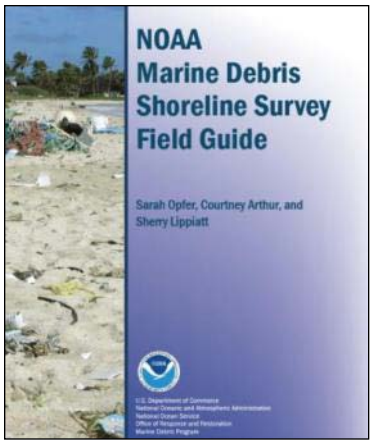
Modeling

At-sea detection

Sighting and reporting

Shoreline survey

Information and outreach



NOAA's Actions

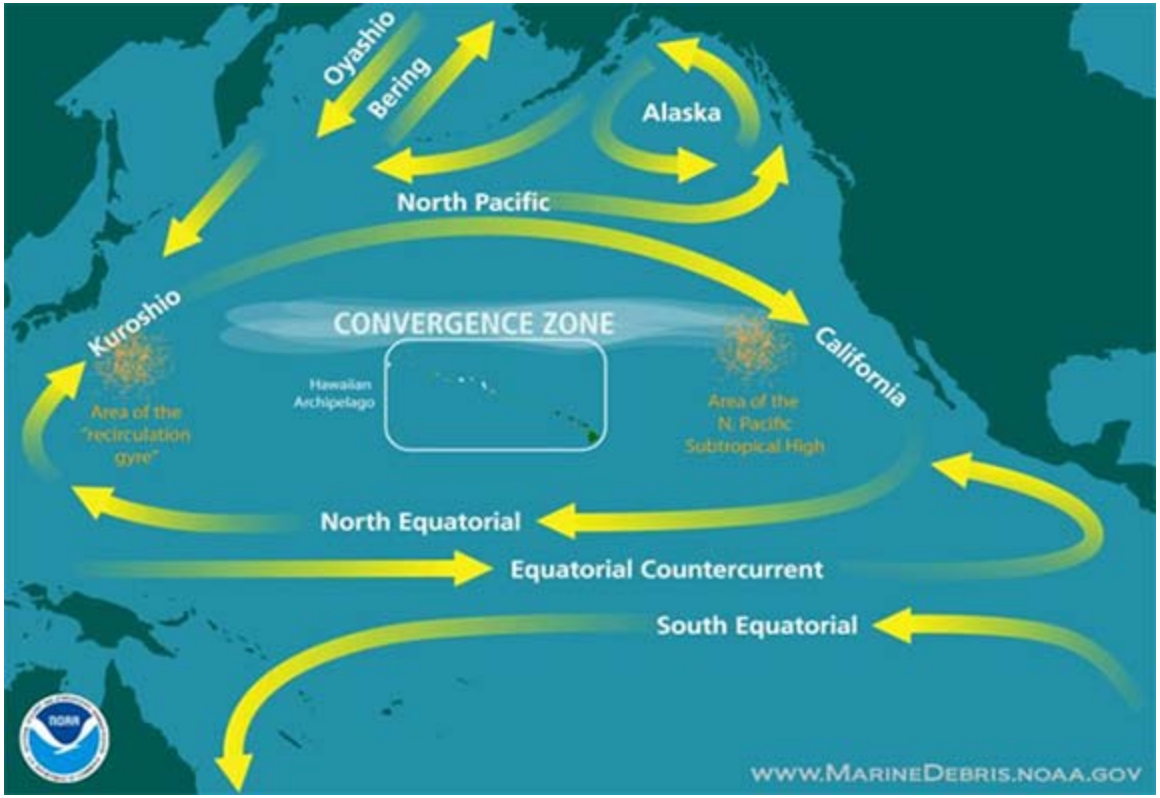
Collaboration with partners

- **NOAA:** OR&R (Emergency Response Division and Assessment and Restoration Division), National Marine Fisheries Service, National Weather Service, National Environmental Satellite, Data, and Information Service, Office of Oceanic and Atmospheric Research
- **Other Federal agencies:** EPA, USCG, Navy, Department of Interior, National Geospatial-Intelligence Agency, NASA, State Department
- **States:** California, Oregon, Washington, Alaska, Hawaii
- **Tribes:** Makah, Quileute, Quinault, Shoalwater Bay
- **Countries:** Japan, Canada
- **NGOs:** Washington Coast Savers, Surfriders Foundation , Save our Shores, Heal the Bay, California Coast Keepers Alliance, Puget Sound Keepers
- **Universities:** Oregon State University, University of Washington, University of New Hampshire, Kyoto University

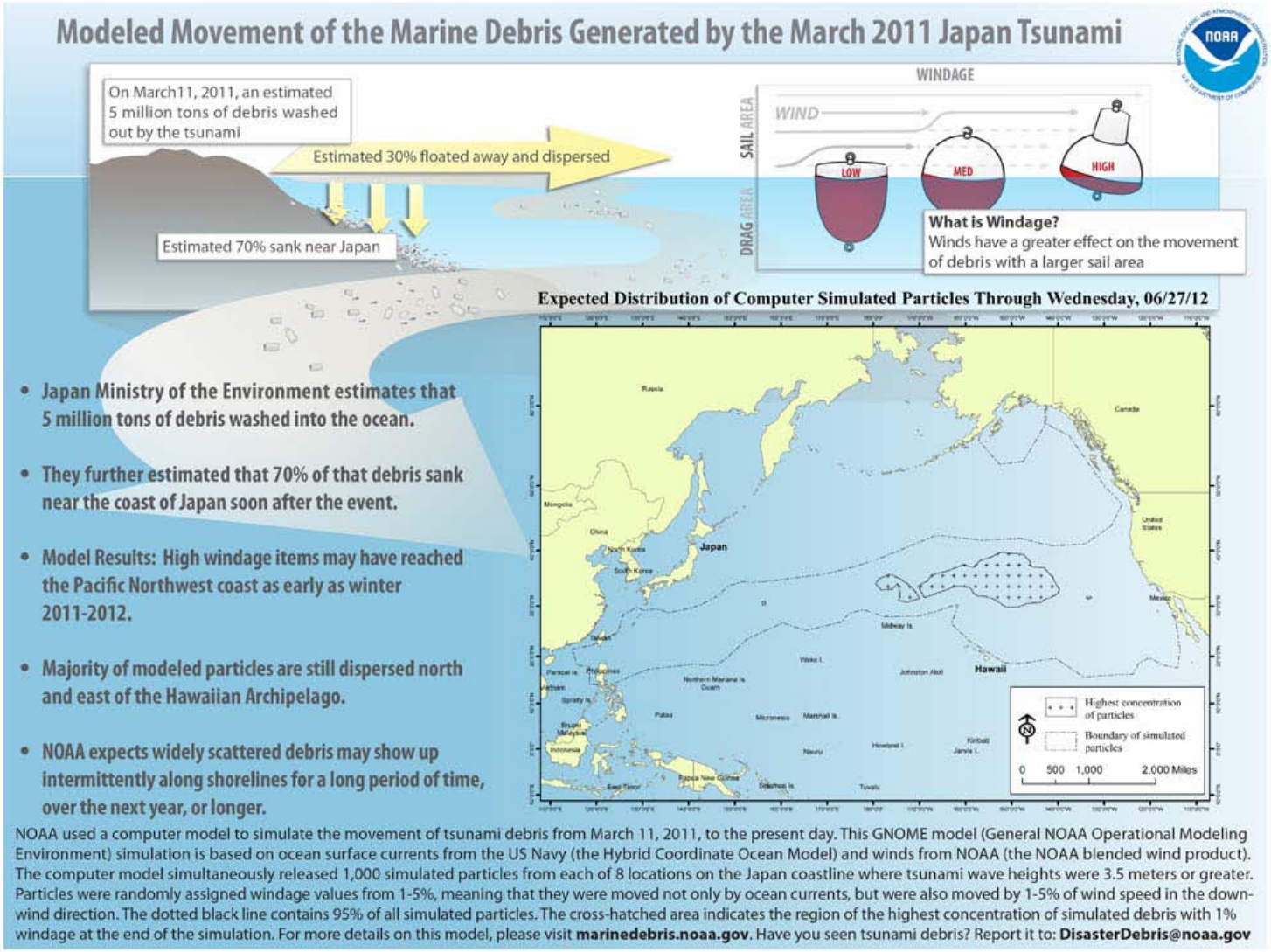
Safety First

- Radiation
- Maritime Advisory
- Guidelines for safe cleanup

Marine Debris Movement: Ocean Currents and Winds

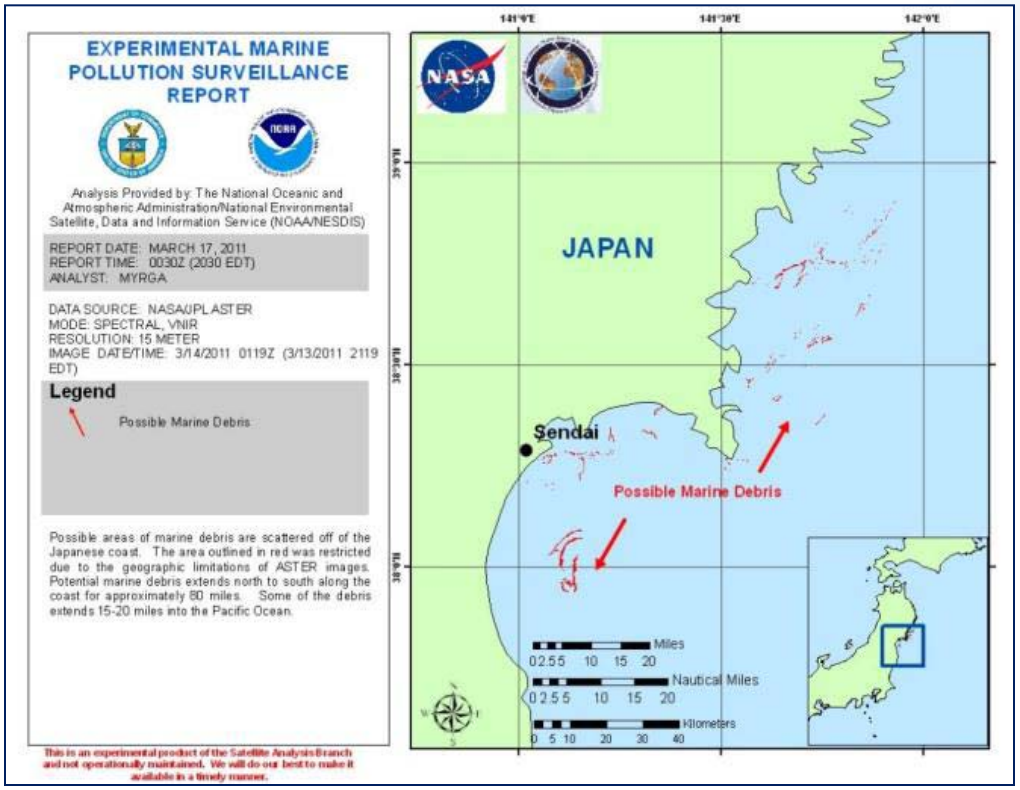


Modeling



NOAA used a computer model to simulate the movement of tsunami debris from March 11, 2011, to the present day. This GNOME model (General NOAA Operational Modeling Environment) simulation is based on ocean surface currents from the US Navy (the Hybrid Coordinate Ocean Model) and winds from NOAA (the NOAA blended wind product). The computer model simultaneously released 1,000 simulated particles from each of 8 locations on the Japan coastline where tsunami wave heights were 3.5 meters or greater. Particles were randomly assigned windage values from 1-5%, meaning that they were moved not only by ocean currents, but were also moved by 1-5% of wind speed in the down-wind direction. The dotted black line contains 95% of all simulated particles. The cross-hatched area indicates the region of the highest concentration of simulated debris with 1% windage at the end of the simulation. For more details on this model, please visit **marinedebris.noaa.gov**. Have you seen tsunami debris? Report it to: **DisasterDebris@noaa.gov**

Satellite and Aerial Detection



At-sea Sightings



Left to right: Sighted March 20, 2012 by USCG; September 21, 2011 by the Russian vessel Pallada*; August 1, 2011, by USCG.*

Shoreline Sightings

- Marine debris is a persistent problem
- What is tsunami debris?
- Trends and traceable items

Reporting Marine Debris

1. **Possibly tsunami related, inert items that are not hazardous or potentially hazardous**

   Report to: **Disasterdebris@noaa.gov**

   Examples: Soccer ball, float

2. **Hazardous or potentially hazardous items**

   Report to: **National Response Center, 1-800-424-8802 or call 911**

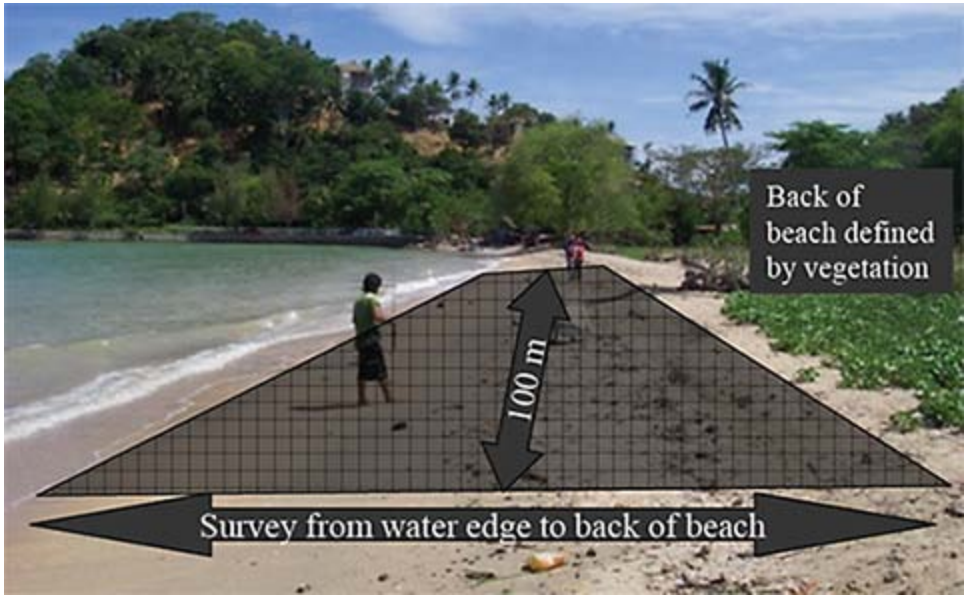
   Examples: drums, chemical containers

   Stay away--Don't open or remove item

Shoreline Monitoring

MD.monitoring@noaa.gov

- Survey a defined stretch of shoreline on a regular basis
- Follow established protocols
- Record types and amounts of marine debris present



Tsunami Marine Debris: Detection, Sightings, Monitoring

Questions

Web: response.restoration.noaa.gov

Blog: usresponserestoration.wordpress.com

Incident News: incidentnews.gov

MDP: marinedebris.noaa.gov

Report debris sightings: disasterdebris@noaa.gov

DARRP: darrp.noaa.gov