

# NOAA's National Ocean Service

## Fiscal Year 2013 Annual Report

*The National Ocean Service (NOS) is the nation's ocean and coastal agency. NOS is the nation's leader in observing, measuring, assessing, protecting, and managing coastal, ocean, and Great Lakes areas. NOS provides science-based services to inform decision making, thereby positioning America's communities, economies and ecosystems for the future.*

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### A Few Highlights from Fiscal Year 2013

**138 incidents.** That's the number of oil spills, chemical releases, and other threats that the Office of Response and Restoration responded to in 2013, including the freight train derailment in Paulsboro, N.J., and the Shell Drill Rig *Kulluk* grounding in the Gulf of Alaska.

**152 years.** Almost to the day, 152 years after 20 crew members died when it was lost in a violent collision at sea, NOAA identified the wreck of the ship *Robert J. Walker*, a steamer that served in the U.S. Coast Survey.

**\$3.4 billion.** That's the estimate of total economic value of coral reefs for the United States based on data collected over a ten-year period for all U.S. coral reef jurisdictions.

**53 percent.** That's the percentage of shoreline in the contiguous 48 states that has been updated with data collected by the National Geodetic Survey and its partners.

**30 percent.** That's the percentage of the United States that has been surveyed by the National Geodetic Survey's Gravity for the Redefinition of the American Vertical

Datum (GRAV-D). Upon completion, the GRAV-D project will allow surveyors and scientists to employ GPS to determine more precise and accurate elevations than currently possible, in less time and with less effort.

**One format.** This year the U.S. Integrated Ocean Observing System completed templates to serve data to customers in one format. For the first time, data from any of the 11 IOOS regions will be available in just one format, making the data easier to both access and use.

**Three languages.** The manual to help coastal managers control the spread of invasive lionfish, developed by scientists from the National Centers for Coastal Ocean Science and their partners, is available in English, Spanish, and soon to be released in French.

**1,200 people.** That's the number of coastal professionals trained in social sciences, geospatial technologies, and coastal issues such as preparing for climate change. 98 percent of participants say they would recommend the NOAA Coastal Services Center training to other coastal professionals.

**70 years.** That's the number of years since the last circulation survey was completed for the Florida Keys. In 2013, the Center for Operational Oceanographic Products and Services completed current surveys in San Francisco Bay and the Florida Keys to update tidal current predictions in these areas.

**1,700 hours.** Educators in NOAA's Planet Stewards Education Project completed over 1,700 contact hours of professional development in climate change science and pedagogy through webinars, teleconferences, online tutorials, and face-to-face workshops in 2013.

**15,000 square feet.** That's the square footage of the new "green" Ocean and Science Education Building that the Channel Islands National Marine Sanctuary opened with the University of California, Santa Barbara.

**115 nautical miles.** That's the number of miles that Office of Coast Survey vessels surveyed immediately following Sandy to search for dangers to navigation in eastern seaboard shipping lanes, channels, and terminals.

**65,000 structures.** The Federal Emergency Management Agency used imagery collected by the National Geodetic Survey and the Civil Air Patrol to assess damages to more than 65,000 structures following Sandy.

This information provides only a snapshot of what we've been up to in the last fiscal year. Get the full picture by browsing our office accomplishments.

## Fiscal Year 2013 Accomplishments

View National Ocean Service accomplishments for fiscal year 2013.

### **Navigation, Observations, and Positioning**

- [Office of Coast Survey](#)
- [National Geodetic Survey](#)
- [Center for Operational Oceanographic Products and Services](#)
- [Integrated Ocean Observing System Program](#)

### **Coastal Science and Assessment**

- [National Centers for Coastal Ocean Science](#)
- [Office of Response and Restoration](#)

### **Ocean and Coastal Management Services**

- [Office of Ocean and Coastal Resource Management](#)
- [NOAA Coastal Services Center](#)
- [Office of National Marine Sanctuaries](#)

### **National Ocean Service Staff Offices**

- [International Program Office](#)

- [Management and Budget Office](#)

## NOS Responds to Sandy



This image shows the area of Music Pier, Ocean City, N.J., shortly after Sandy passed over the Eastern Seaboard.

In October 2012, Hurricane Sandy roared toward the mid-Atlantic Coast. Even as the hurricane transitioned to a post-tropical cyclone, wind, waves, and storm surge wreaked havoc along the Atlantic Coast, especially to the coasts of New York, New Jersey, and Connecticut.

After striking the Caribbean as a Category 3 Hurricane, Sandy weakened over the Atlantic Ocean. Though the storm weakened in power, it grew massively in size. Sandy sustained hurricane-force wind in the Atlantic as a Category 1 hurricane before making landfall in Brigantine, N.J., as a post-tropical cyclone. For the purpose of clarity, the articles on this page refer to the storm as 'Sandy.'

The communities hit by this massive storm will be [rebuilding and recovering](#) for years to come. In Fiscal Year 2013, staff from across the National Ocean Service continue to support these impacted communities by delivering coastal science, management, and operational expertise. Here is a summary of some of these activities:

- **Real-Time Water Levels, Currents, and Weather Information.** Before, during, and after the storm, NOS's Center for Operational Oceanographic Products and Services (CO-OPS) monitored and disseminated observations of water levels, currents, and weather information in real time. This information helped coastal authorities prepare for, mitigate, and respond to the storm

tides flooding the coast. CO-OPS operates a network of oceanographic and meteorological stations along U.S. coastlines and Great Lakes whose data is also integrated directly into NOAA's National Hurricane Center storm surge forecasts. Throughout the storm, CO-OPS regularly posted and updated its [Storm Quicklook](#), a synopsis of locations most affected by severe storm tides.

- **Navigation Response.** Immediately following the storm, the NOS Office of Coast Survey completed surveys of the Port of New York and New Jersey to help the port reopen, allowing emergency fuel and other supplies to move into the affected area. Over five days, Office of Coast Survey teams worked aboard NOAA hydrographic survey vessels, including two navigation response teams (NRTs) and the NOAA Ship *Thomas Jefferson* with her two survey launches, to search approximately 71 nautical miles of shipping lanes, channels, and terminals to locate dangers to navigation.

Surveys completed by the NOAA Ship *Ferdinand R. Hassler* and R/V *Bay Hydro II* helped re-open the Port of Baltimore and the port complex at Hampton Roads where naval vessels and ships carrying coal exports were waiting for clearance. Surveys by the NRTs and R/V *Potawaugh* provided valuable data for ships transiting the Delaware River and ferry service that connects Lewes, Del., and Cape May, N.J.—an important access route to bring aid to stricken New Jersey and Delaware shore communities.

In August, as part of the Hurricane Sandy Rebuilding Task Force, the Office of Coast Survey and federal partners launched an effort to [remap parts of the East Coast](#) impacted by Sandy. The team of NOAA, U.S. Geological Survey, and U.S. Army Corps of Engineers will use ships, aircraft, and satellites to measure water depths, look for submerged debris, and record altered shorelines in high priority areas.

- **Remote Sensing Imagery Collection.** The NOS National Geodetic Survey flew remote sensing missions immediately following Sandy aboard NOAA's King Air and Twin Otter aircrafts. The U.S. Coast Guard District in New York requested that [NOAA collect imagery](#) of the waterways supporting the ports of New York and New Jersey to look for navigational aids and storm debris. The Federal Emergency Management Agency (FEMA) used the NOAA imagery, along with imagery collected by the Civil Air Patrol, to assess damages to more than 65,000 structures. The images helped speed FEMA's response to individuals in desperate need of temporary housing due to the damage incurred to their homes and property as a result of Sandy. The imagery was also used by media sources, including NBC News and an Australian broadcast company. The data contained in these photos provide emergency and coastal managers with the information they need to develop recovery strategies, facilitate search-and-rescue efforts, identify hazards to navigation and HAZMAT spills, locate errant vessels, and provide documentation necessary for damage assessment through the comparison of before-and-after imagery.



• A NOAA navigation response team measured depths and searched for hidden dangers to navigation around Liberty Island.

### **Scientific Coordination, Oil Spill Response, and Marine Debris**

**Assessment.** NOS's Office of Response and Restoration (OR&R) responded immediately following Sandy. Using real-time data, OR&R's Environmental Response Management Application (ERMA®) provided a common operational picture for responders to view all of the storm-related data and imagery as well as various cleanup efforts by the states and other federal agencies. OR&R's scientific support coordinators served as a focal point for NOAA-wide response in the Incident Command. In this role, scientific support coordinators provided critical science for U.S. Coast Guard decisions through oil spill modeling, shoreline assessments, and technical expertise to respond to several spills.

The scope and severity of Sandy led to widespread pollution threats. Among these threats, OR&R responded to:

- Sandy's largest single spill from a Motiva facility in Sewaren, N.J., which released an estimated 336,000 gallons of low sulfur diesel.
  - The Kinder Morgan facility in Carteret, N.J., which released an estimated 10,000 gallons of biodiesel.
  - Approximately 8,800 gallons of slop oil (heavy persistent black oil) released from a Phillips 66 facility which stopped short of the Kills, but contaminated ditches, a cemetery, and other low-lying areas.
  - A wide range of hazardous materials such as intermodal containers, commercial and recreational boats, tank containers and pressure vessels of all sizes, gas cylinders, and drums were stranded in the marshes, along the shoreline, and on land. These items require careful consideration so that removal operations do not further damage sensitive habitats.
- Finally, immediately after the spill, OR&R worked on-scene with state and federal co-trustee agencies to lead a preliminary assessment of natural resource impacts from the spills for possible natural resource damage assessment claims and restoration.

And now, almost one year later, OR&R continues to help with the recovery

from Sandy. OR&R is [updating Environmental Sensitivity Index maps](#) on the East Coast, with particular emphasis on areas affected by Sandy and other coastal storms over the past several years.

- [Atlantic ERMA](#) provides mapping support and tools to show aerial imagery, debris dispersion models, and identified marine debris locations supplied by stakeholders. This mapping support also helps with the planning efforts for debris cleanup.
- With a combination of aerial, underwater, and shoreline surveys, OR&R is estimating the debris impacts to economies and ecosystems, identifying priority items for removal, supporting limited removal efforts, and [helping restore our northeastern shores](#).
- **Ocean Observations Critical for Saving Lives, Protecting Property, and Keeping Commerce Moving.** The [U.S. Integrated Ocean Observing System \(IOOS®\)](#) data and products were used to forecast and prepare for, as well as respond to, Sandy. Prior to Sandy's landfall, IOOS information allowed decision-makers to divert vessels from the ports of New York and New Jersey, ensuring the safe delivery of more than 23,000 cargo containers to other ports not in the storm's path. This action helped the goods be transported by other means to the NY-NJ metropolitan region in time for the 2012 Christmas shopping season.

In Hoboken, N.J., approximately 1,700 buildings were severely flooded, which impacted close to 34,000 people. Advanced warnings provided by IOOS-derived storm surge forecasts gave local officials more time to protect property, order timely evacuations, and spare further discomfort or injury for residents. The mayor ordered an evacuation of all ground floor apartments by midnight the day before landfall. This single decision saved a significant number of lives as there are thousands of residents in street-level and basement-level apartments.

The Navy's Atlantic Fleet Headquarters sent 80 ships out of its Hampton Roads ports and shipyards three days prior to the onset of the storm at a cost of \$10 million. The NOAA advanced warnings from IOOS observations allowed for a safe and orderly evacuation. Based on historic damage to the fleet from past hurricanes, a storm of Sandy's magnitude could have resulted in up to \$500 million worth of damage to ships.

- **Coastal Coordination, Data Collection, and Long-Term Resilient Design Principles.** Staff from the NOAA Coastal Services Center and Office of Ocean and Coastal Resource Management supported multiple on-the-ground activities following Sandy:
  - NOAA staff worked in FEMA's New York and New Jersey joint field offices to help coordinate federal interagency activities for long-term recovery planning and to implement the National Disaster Recovery Framework. Staff helped communities identify priority needs and then coordinated across federal agencies to get needed resources including

aerial imagery and water level data. State coastal management staff surveyed storm damage, issued emergency permits to remove debris, rebuilt and restored habitat, and met with local community leaders and property owners to discuss long-term recovery.

- Disaster assistance awards were provided to nine of the [National Estuarine Research Reserves](#) to replace and repair observing systems, equipment, supplies, and infrastructure that was lost, damaged, or compromised during Sandy. While many of the data loggers and weather stations deployed during the storm continued to provide real-time data that was invaluable in tracking the storm as it moved across the coastal states, storm-surge and high winds eventually destroyed or compromised much of this equipment.
- NOAA and the U.S. Army Corps of Engineers developed a set of principles adopted by the Hurricane Sandy Rebuilding Task Force to incorporate "green," habitat-oriented approaches into coastal infrastructure and rebuilding strategies. These strategies included habitat restoration, land acquisition, and planning for inland migration of wetlands.
- Grant proposals were solicited for projects that help communities address existing and future storm-related risks through a networked approach. The NOAA funding is made available through CRest (Community Resilience Networks), with the intent to improve upon or build the networks needed to make coastal resiliency happen. Selected projects could focus on existing and future risks to the natural environment, infrastructure, local economies, and vulnerable populations.
- NOAA is supporting an economic analysis of how effective the shoreline rebuilding and restoration alternatives were in those areas along the New York and New Jersey coast. This assessment will show the benefits of a range of shoreline restoration options, including tradeoffs between hardened shorelines and natural shorelines in coastal habitats, to be considered in future recovery decisions.