

## **National Ocean Service Response Capabilities December 2013**

NOAA's National Ocean Service brings a range of expertise, tools, and services in response to weather events, oil and chemical spills, marine debris, and tsunamis.

### **Water-level Monitoring**

*Weather events.* Before, during, and after coastal storms, the Center for Operational Oceanographic Products and Services monitors and disseminates observations of water levels, currents, and weather information (winds, atmospheric pressure, air/water temperature) in real time via the National Water Level Observation Network and the Physical Oceanographic Real-Time System. As a storm approaches and a National Weather Service storm track is issued, the National Ocean Service provides Storm QuickLook, a compilation of near real-time ocean and weather observations within the affected coastal area.

U.S. Integrated Ocean Observing System (IOOS<sup>®</sup>) partners provide wind, wave, visibility, and air and water temperature sensors; high-frequency radar ocean current data; coastal wave forecasts; and water temperature information from ocean gliders.

*Tsunamis.* NOS and IOOS partners also provide real-time coastal water level data to NOAA's Tsunami Program and the public, which is critical to issuing warnings and forecasts during an event.

### **Hydrographic Surveys for Navigation**

Immediately following a storm or after an emergency, the Office of Coast Survey deploys for emergency hydrographic surveys in affected port and coastal areas. Surveys are conducted by NOAA ships or smaller Navigation Response Teams—three-person mobile emergency response units equipped and trained to survey waterways immediately following a hurricane. Hydrographers and technicians use multibeam echosounders and side scan sonar to search for submerged wrecks or other dangers, or to “see” changes on the seafloor that could affect navigation. The U.S. Coast Guard and the maritime industry depend on these rapid response surveys to speed the re-opening of ports and waterways, allowing the flow of needed supplies and the resumption of maritime commerce.

### **Aerial Imagery and Light Detection and Ranging (LIDAR) Surveys**

In response to natural and man-made disasters—from hurricanes to tornadoes and floods, oil spills, etc.—the National Geodetic Survey begins flying aerial survey missions to assess damage and aid recovery. NOAA makes these spatially referenced datasets, including images which often number in the thousands, available on the Internet. The information contained in these images and datasets provide emergency and coastal managers with facts they need to develop recovery strategies, facilitate search and rescue efforts, identify hazards to navigation and HAZMAT spills, locate errant vessels or other marine debris, and provide documentation necessary for damage assessment through the comparison of before-and-after imagery.

### **Oil, Chemicals, and Marine Debris Response**

Every year NOAA responds to more than a hundred oil and chemical spills in U.S. waters, which threaten life, property, and public natural resources. Extreme weather events also spread oil, hazardous materials, and debris across waterways and industrial port areas. In these emergencies, NOAA's Office of Response & Restoration (OR&R), delivers critical scientific support for emergency response to protect coastal communities. OR&R's Scientific Support Coordinators advise the US Coast Guard and EPA on such issues as dispersant use, trajectory models, alternate response technologies, assessment of natural resource injury, and emergency restoration actions. OR&R's Marine Debris Program also models, tracks, and assesses the impact of marine debris, working with communities to prioritize removal.

IOOS also provides the ability for rapid response. For example, a five-year effort to introduce IOOS capability and develop trusted relationships with Federal Response agencies allowed IOOS to spring to action after Deepwater Horizon, with IOOS regions quickly deploying new observing technologies.

Unmanned, underwater robots called gliders and shore-based high frequency radar stations monitored for and tracked oil at various levels within the water column and on the surface. These technologies saved resources and improved safety by reducing the number of people sampling from surface vessels.

### **Contamination Assessments**

Response to an oil spill or hazardous substance release may not fully restore injured natural resources or address their lost uses by the public. Conducting a Natural Resource Damage Assessment (NRDA), Office of Response and Restoration experts assess injury to natural resources, and work to compensate the public for those damages and restore coastal habitats.

NOAA's National Status and Trends (NS&T) Program, part of the National Centers for Coastal Ocean Science, coordinates with multiple partners to assess the environmental impacts of contaminants in coastal and estuarine waters in the aftermath of coastal storms. Specifically, the NS&T Program measures contaminants in bivalve tissue, sediments, and waters in an affected region, testing for pesticides, herbicides, nutrients, metals, flame retardant chemicals, hydrocarbons, biphenyls, and other contaminants. The program's long-term historical monitoring (Mussel Watch) provides a baseline against which impacts can be compared, though event response generally requires a new sampling effort.

### **Maps and Data Analysis**

NOAA's Office of Response & Restoration provides information and data management tools for science based decision making and common operational picture support for emergency response. NOAA's Environmental Response Management Application (ERMA) is an online mapping tool that integrates both static and real-time data in a centralized, easy-to-use format for responders and decision makers.

Following coastal storms, the NOAA Coastal Services Center provides the satellite and aerial images needed to generate maps that help officials understand the long-term effects of the event. These data products include pre-hurricane imagery and digital elevation data from a variety of sources; before and after imagery comparisons; and maps depicting ecological impacts, debris assessment, and wetlands loss along the coast. The Center may also conduct studies that focus on a storm's economic impacts.

### **Marine Protected Areas**

NOAA's Office of National Marine Sanctuaries routinely responds to All Hazard events that may impact sanctuaries. These have ranged from weather related events, to losses of aircraft, marine mammal strikes, strandings and entanglements, vessel groundings and oil spills. Personnel support various response related activities, including GIS support, shoreline assessment (personnel trained in Shoreline Cleanup and Assessment Technique), injury assessments of a broad range of habitat types including coral, seagrass, rocky intertidal, assessment of impacts to historical and cultural resources and general coastal and marine operations support. Personnel routinely support both emergency response and natural resource damage assessment (NRDA) activities. If event is proximate to a National Marine Sanctuary, resources such as small boats and equipment (including both small and work class ROVs and small UAS) are offered to assist. ONMS also has a cadre of trained NOAA working divers (although not for polluted water environments.)

### **Long-term Recovery Planning**

The NOAA Coastal Services Center (CSC) and the Office of Ocean and Coastal Resource Management (OCRM) provide long-term recovery planning assistance in areas impacted by a hurricanes and severe weather events. CSC and OCRM provide an important connection to impacted state and local communities through the state Coastal Zone Management Programs, working across NOS and NOAA to deliver the data, tools, training, and technical assistance that are needed to inform community based recovery and redevelopment efforts. These partnerships provide an opportunity to inform state and local decisions, increase capacity for long-term recovery planning in local communities, and advance more sustainable and resilient outcomes. NOS may also deploy personnel to FEMA Joint Field Offices to carry out DOC/NOAA responsibilities under the Natural Disaster Recovery Framework and support the design, development, and implementation of recovery strategies.