

Group #4: NOAA's Navigation Services Emergency Response and Recovery Capabilities

New Text and significant changes highlighted in blue

Strengthen NOAA's Navigation Services Emergency Response and Recovery Capabilities

Finding 4:

NOAA's Navigation Services support emergency response to incidents such as hurricanes and oil spills and are important contributors to Homeland Security and ~~Maritime Domain Awareness~~. NOAA's role is crucial but under-resourced requiring reallocation of resources in time of need from primary mission critical tasks.

Comment [rla1]: This is no longer a real NOAA priority (RLA talked to OCS Director) so take out.

Comment [LMW2]: Delete it

Gathering hydrographic data, surveying coastal disaster areas, and monitoring emergency spill situations; these activities do not often make front-page headlines or news video clips. That is why NOAA emergency response efforts remain relatively invisible to the public. But the HSRP recognizes how significant they are. In fact, the work NOAA does — before, during, and after a crisis — provides key information other agencies and responders depend upon to make decisions and to chart plans of action. During Hurricane Katrina and other 2005 storms, for example, NOAA's real-time water level and survey data were fundamental indicators of what was happening when and where in the Gulf. NOAA worked in concert with other federal and state, agencies and private contractors, but the tools NOAA provided — namely hydrographic data and response services — are unique to NOAA.

The U.S. economy and national security depend upon the reliable movement of waterborne cargo. Without the additional data needed to avoid collisions, charted or un-charted features can lead to huge economic impact. Even a brief disruption in a major port can cause significant economic losses. For example, in June of 2006 a major oil spill shut down the Calcasieu Ship Channel, closing the Port of Lake Charles, Louisiana, for nine days. Four percent of the nation's refining capability and one-third of the nation's Liquefied Natural Gas import capacity are located on the channel. The strategic petroleum reserve was opened as a result of this temporary disruption. According to an economic analysis released by the Port, the nine-day closure resulted in increases of energy costs to U.S. consumers exceeding \$1 billion.

In 2005, NOAA responded to Hurricane Katrina — the most devastating storm in U.S. history, resulting in at least 1300 casualties and causing damages exceeding \$80 billion — with NOAA ships, planes, scientific experts, and specialized response teams. In addition to the thousands of homes and businesses that were destroyed, and human lives lost and displaced, Katrina caused Exxon Valdez-size oil spills in Louisiana. Using its capabilities, NOAA responded immediately to the damaging event. NOAA, in conjunction with other agencies and contractors, surveyed transportation corridors to re-open ports and waterways to safe transport of commerce and relief supplies. NOAA assessed hurricane damage, conducted environmental assessments, and provided critical scientific support to the U.S. Coast Guard, Environmental Protection Agency, and the Federal Emergency Management Agency. In a situation fraught with communication

challenges, NOAA coordinated its emergency response efforts with numerous agencies, giving encore performances after Hurricanes Rita and Wilma.

In an effort to restore fishing grounds and improve navigational safety after Hurricane Katrina, Congress directed NOAA's Office of Coast Survey and the Office of Response and Restoration's Marine Debris Program to survey and map the impacted Gulf coast areas. As of August 29, 2009 – the fourth anniversary of Hurricane Katrina – the NOAA project team surveyed over 1,550 square nautical miles from Mobile Bay, Alabama to the Louisiana/Texas border, and located more than 7,000 debris items in offshore fishing and shrimping grounds impacted by Hurricanes Katrina and Rita. The Gulf of Mexico Marine Debris Project recently received an Environmental Protection Agency "Gulf Guardian" award for its work and partnerships in the region. Even today, with funding from the American Recovery and Reinvestment Act, the agency continues to support the region with marine debris surveys to detect hazards left in waterways by the hurricanes.

NOAA gears its response to each emergency. In case of hurricanes or maritime accidents, the agency rapidly mobilizes both in-house and contractor assets to conduct post-event aerial remote sensing/ imagery and hydrographic surveys to assess damages, obstructions, and debris. In advance of a hurricane's onslaught, NOAA delivers storm surge warnings from its real-time systems to support the evacuation of tourists, alert residents to coastal flooding, and allow the U.S. Marine Transportation System (MTS) infrastructure time to batten down the hatches. If our waters suffer a chemical or oil spill, such as the 3 million gallons of oil spilled in 2005 when a tug and barge struck an oil rig toppled by Hurricane Rita off the Louisiana coast, NOAA scientists track and predict spill movements, improving the deployment of response teams and protecting sensitive coastal environments. Accurate high-resolution bathymetry, tidal current measurements, and shoreline maps are critical to oil spill models. By working with ports to evaluate their development plans, NOAA can also pinpoint likely areas of risk and help to establish more disaster-resistant ports.

NOAA manages its emergency preparedness and response in concert with other agencies, often in advance of an incident. For example, NOAA partners with the Coast Guard and other authorities to maintain spill preparedness in major U.S. ports, thus helping to minimize the impact of oil or chemicals to the environment. In matters of Homeland Security, NOAA supports the U.S. Navy and the Coast Guard with aerial imagery, hydrographic survey vessels, and Navigation Response Teams. In a function vital to protecting our ports, harbors, and coastal borders, NOAA uses its state-of-the-art technologies to create highly accurate surveys of our nation's coastal areas and navigation routes.

The HSRP learned from reviewing NOAA's performance in the 2005 hurricane season that NOAA's information and service delivery during emergency events is stellar, but the agency lacks the capacity to sustain its response broadly and for extended periods. Further, resources to respond to the emergency needs of the Nation deplete resources from other NOAA primary missions. This concerns the HSRP, particularly with the predictions of increasing catastrophic-level storm activity. All of NOAA's emergency response capabilities need to be funded and staffed to meet this critical national demand. First and foremost, NOAA's suite of Navigation Response Teams (NRT) must be expanded from the **current 6** teams operating on a shoestring

budget to a minimum of 10 fully funded and staffed teams staged regionally around the country. Highly mobile, the NRTs respond on short notice to emergency situations requiring hydrographic survey support such as vessel groundings and hurricane damage to ports 365 days a year throughout U.S. waters. Consider that within a few weeks after Katrina and Rita made landfall, NOAA surveys, in conjunction with the survey efforts of the US Army Corps of Engineers, the US Coast Guard, and contractors, enabled the re-opening of all 13 major ports and waterways in the region, allowing access to over 100 ships awaiting entry with food and relief supplies. But to achieve this quick post-hurricane response, NOAA had to pull NRTs from California and the Great Lakes to work in the Gulf Coast, leaving these areas vulnerable.

The utility of NOAA's NRTs is limited by their numbers. The six NRTs — two each on the East and West Coasts, one on the Gulf Coast and one in the Great Lakes — cannot provide adequate rapid response on a national scale. The HSRP believes that NOAA's response to customer needs, navigation safety, Homeland Security, and economic stability will be dramatically improved when NOAA can provide NRTs for more geographically diverse customers. Additional teams, as well as the funding to staff and equip the teams with the most modern survey technologies will also allow the NRTs to complete critical port surveys more quickly. NOAA should consider requiring all new NRTs and upgrading all existing NRT's to contain equipment such as multibeam, side scan sonar, and position and orientation system that includes the use of dual frequency GPS receivers tightly coupled with an inertial solution. Use of these systems in conjunction with VDatum allows for real-time surveying to chart datum, thereby decreasing response time without the need for installing water level gauges. A dramatic and meaningful improvement to the resiliency of our Marine Transportation System can be achieved by a comparatively small investment in more NRTs. It is imperative for our economy and Homeland Security that we are able to re-open the Nation's ports and waterways very quickly after a significant incident.

In addition to increasing the number of NRTs, one way for NOAA to increase emergency response capability is to implement several hydrographic survey contracts in advance that are placed in areas that are not served by in-house NRTs. Local surveyors with local knowledge and needed vessels who are already staged in the area of need, can expedite an emergency response, and in fact, NOAA has reported to the HSRP success in utilizing a contractor to support an emergency navigation response survey. This approach was also useful in responding to Hurricane Ike. To increase the speed of NOAA's response to emergency events, the HSRP recommends that NOAA use contractors in times of need.

Similarly, NOAA's capacity to respond to oil and chemical spills is stretched thin. Since 2004, the annual appropriation for this function has been lower than the President's Budget Request, cutting into the program's base budget by 18%. The HSRP is alarmed by this reduction, as it significantly diminishes NOAA's ability to execute its core mission responsibilities, including scientific support on hazard characterization, environmental chemistry, oil slick tracking, pollutant transport modeling, natural resources at risk analysis, information management, and assessment of environmental trade-offs related to alternative spill countermeasures and cleanup techniques.

Comment [rla3]: NOAA needs to fact check.

Comment [V4]: NOAA needs to verify this figure still.

NOAA responds to a historic annual average of 120 incidents, primarily oil spills, but also hazardous materials releases, abandoned vessel searches, body searches, and whale strike casualties. However, some years there are many more incidents; in fiscal year 2009, NOAA provided support on 202 incidents, including 164 oil spills, 24 chemical spills and 14 miscellaneous incidents. After Hurricane Katrina, NOAA scientists remained on-scene providing scientific advice and environmentally based guidance to the Coast Guard to support the removal of hazardous containers from wetlands and waterways; and the salvage of abandoned and derelict vessels from commercial waterways. Currently, NOAA has the capacity to respond to one major incident a year. The HSRP believes it is critical to restore the budget for NOAA's emergency response to ensure that the program can provide its breadth of capabilities for a minimum of two simultaneous major incidents. Future incidents of national significance — caused by weather, pollution, or threats to Homeland Security — are not only foreseeable, they are probable. NOAA must be fully funded and staffed to execute its unique federal response and recovery missions for the nation.

NOAA's Navigation Services also need to be recognized and adequately funded as essential support functions in the National Response Framework. In the past NOAA received partial reimbursement for hurricane Katrina, Rita and Wilma efforts; however, FEMA funding does not always fully reimburse NOAA, and is not always available. The HSRP recommends that NOAA seek a dedicated source of annual funding for emergency training, planning, and coordinating joint response strategies with other federal agencies. If this is unachievable, NOAA should continue to seek funding through FEMA's Disaster Relief Fund to reimburse the agency for its emergency response activities. NOAA cannot sustain acceptable levels of mission performance without identifying, seeking, and receiving reimbursement for significant unbudgeted expenses incurred by the Navigation Services program in response to incidents of national significance.

NOAA needs to think creatively to increase awareness of its emergency response efforts. For example, the extensive aerial imagery that NOAA collects after hurricanes is sometime not credited to NOAA. Including a simple "watermark" on each NOAA image identifying the creator of the image would increase the awareness of NOAA response efforts. A similar "watermark" could be placed on charts and other images. Making data more easily accessible is another way of increasing awareness of NOAA's response efforts. For example, NOAA could create KMZ files for existing data and new incoming data and images that could be easily used in Google Earth.

Recommendation 4

The HSRP recommends that NOAA strengthen its Navigation Services emergency response and recovery capabilities, including kinematic GPS equipment for real-time surveying, by seeking adequate recognition and funding for its essential support functions within the Federal response to all-hazards crises.

- The HSRP recommends accelerated validation and the full implementation of VDatum to allow for near real time surveying to chart datum.
- The HSRP recommends that NOAA have cooperative agreements with local contractors in place before times of need.

Comment [LMW5]: Larry developed a sentence for this recommendation that needed to be fleshed out.

Sidebars (all new)

- a) **Use of GPS Techniques and VDatum for Efficient Emergency Response** (by Jon Dasler)

After high impact events such as hurricanes, critical shipping lanes are often choked with debris, effectively shutting down maritime commerce critical to the Nation. Rapid response to open shipping lanes is vital to the U.S. economy. Response efforts are often delayed by loss of infrastructure, primarily water level gauging stations and tidal bench marks, to support hydrographic surveys desperately needed to open shipping lanes. Deploying a portable dual frequency GPS base station and determining accurate position data using NOAA's Online Positioning User Service (OPUS) allows response teams to be survey ready within hours of deployment. Use of real-time or post-processed kinematic dual frequency GPS methods provides accurate height data aboard Navigation Response Team vessels. With the application of NOAA's VDatum tool, GPS heights can be converted to elevations relative to chart datum (Mean Lower Low Water) for real-time or near real-time surveys, thereby converting the vessel into a mobile water level gauge and eliminating the need to establish temporary water level gauges prior to survey operations. With these tools and techniques, desperately needed surveys to determine minimum keel clearance can rapidly and efficiently be conducted to open waterways to critically needed maritime commerce.

- b) **NOAA's Remote Sensing Imagery Aids Emergency Response Efforts** (adapted from a NGS 1 pager) – see document for photo

To support NOAA's homeland security and emergency response requirements, the National Geodetic Survey, Remote Sensing Division (NGS/RSD) is able to acquire and rapidly disseminate a variety of spatially-referenced datasets to federal, state, local government agencies, and the general public. Remote sensing technologies deployed by NOAA include lidar and high-resolution digital cameras.

In our largest response effort, NOAA collected over 8,000 aerial images of the hardest hit areas in Alabama, Mississippi, and Louisiana after Hurricane Katrina made landfall. These images were made available to emergency personnel and the public on the NOAA/NGS web site (<http://www.ngs.noaa.gov/>). Several commercial vendors have incorporated the aerial imagery into web-based map servers, allowing for searches based on street addresses, city names, and points of interest.

NOAA is able to support recovery efforts by providing the tools, technology, and expertise in a timely and efficient manner during emergency response efforts.

- c) **Emergency Response for Hurricane Ike: Accelerating the Opening of Shipping Channels** (this is the title in Rebecca's edited version of the sidebar); **Emergency Response for Hurricane Ike, a Contracted Approach** (this is the version in the original sidebar sent in by Larry Whiting) – see document for text and photo

Photos:

- a) **On page 6 photo**– Fix photo caption on photo for emergency response as it goes into the shadow part of the photo and is hard to read.
- b) **Photos of navigation services platforms on page 23** (3 photos – i.e. 1 aircraft, 1 person driving ship, and Nancy Foster with rust): **DELETE** first two photos and replace with some of the photos we have from HSRP staff – such as accident photos from Andrew McGovern & also Jon Dasler photos); **KEEP** *Nancy Foster* ship photo
- c) **Page 22 photo** – take caption off of photo so can be read