HYDROGRAPHIC SERVICES REVIEW PANEL

A federal advisory committee, advising the NOAA Administrator

Hydrography: A Core NOAA Mandate

ISSUE AND STATUS

NOAA's leadership and the National Ocean Service should emphasize the importance of hydrography within NOAA and to the Department of Commerce, Office of Management and Budget, and Congress. Funding for NOAA's Office of Coast Survey should be at levels that will decrease the hydrographic survey and charting backlog, maintain NOAA's status as a world leader in hydrography, and sustain U.S. economic growth.

Two of NOAA's most long-standing and important responsibilities are to:

- Survey the coasts of United States (An Act to provide for surveying the coasts – 1807)
- Provide nautical charts and products for safe maritime commerce and navigation (Coast and Geodetic Survey Act of 1947).

Although NOAA's missions have grown substantially since its formation in 1970, these original mandates are as critically important today as they have been over the past two centuries.

Hydrography is the science of the measurement, description, and mapping of the surface waters of the earth, with special reference to their use for navigation. Hydrographic data includes bathymetry (depths), positions, tide and water levels, geodetic data, bottom types, water column and coastline information. This document primarily addresses the bathymetric surveying and charting issues.

Hydrographic services are essential to the nation's economic health. The U.S. marine transportation system moves 72% percent of the United States' overseas trade (by weight). In 2014 marine cargo activity generated around $4.6 trillion of total economic activity, or about 26% of the nation's $17.4 trillion gross domestic product[1]. Keeping our marine transportation system functioning in a way that is safe, efficient, and environmentally sound requires the information that hydrography provides. As container and cruise ships grow ever larger, our economy will suffer if the U.S. cannot guarantee safe passage into ports that must expand to serve these larger vessels.

More recent legislative initiatives (Integrated Ocean and Coastal Mapping Integration Act 2009, Hydrographic Services Improvement Act 1998/2002/2008, and multiple environmental statutes) mandate that NOAA provide the information needed to understand, protect, and manage our ecosystems and natural resources. Hydrographic data is used by environmental managers, scientists, engineers, and stakeholders as foundational data for a wide variety of issues: sea level rise; tide levels; ecosystem description and management; installation of offshore facilities such as wind farms and oil platforms; storm and hurricane prediction and recovery; tsunami modeling; coastal resilience; protected area definition; resource evaluation; placement of coastal projects; insurance restrictions; national security; construction and dredging; and fisheries management.

1 Martin Associates March 2015 report, prepared for the American Association of Port Authorities

A survey launch from NOAA Ship Thomas Jefferson*, along with the ship and several navigation response teams, surveyed in the post-Sandy operation. New York/New Jersey harbors opened within five days after the storm passed.*

NOAA provides much of the hydrographic data and information that support port safety, expansion, and recovery. Closure of a major port complex, such as New York/New Jersey or Los Angeles/Long Beach, can cost the nation's economy $50-$150M per day.

CHALLENGES

NOAA faces challenges in fulfilling its hydrographic mission:

- A more than 13-year backlog of highest priority hydrographic surveys
- Bringing hydrographic science, practice, and products into the digital 21st century
- Competition for limited resources with constrained budgets while critical environmental problems continue to expand NOAA's responsibilities

NOAA is responsible for providing nautical charts for the nation's exclusive economic zone and has designated 43,000 square nautical miles of this area as "in critical need of modern surveys." Coast Survey uses both in-house and contractor services ($20-$30M annually for contracts) to perform hydrographic surveys. However, current funding levels do not provide the personnel, contracting, and ship resources to substantially decrease the estimated 13 years' worth of survey backlog. Twenty-two years after survey priorities were designated in 1994, Coast Survey is in the process of revising its survey priorities to reflect modern technology changes, seafloor characteristics that impact an area's requirements for regular resurveying, and an overall better understanding of how to meet stakeholder needs. These priorities take into consideration increasing vessel size, effects on commerce and the environment, and the relative risk of an incident occurring in a given area. The frequent re-surveys will also require a parallel, improved responsiveness and efficiency in the production of charts and other products to inform users of changes.

NOAA must compete for limited federal resources both internally and with other agencies, yet funding for Coast Survey has remained essentially static over the past decade, when corrected for cost of living, as the unique responsibilities and mandates have increased. While Coast Survey's long-standing nautical charting and safety of navigation mandates are still primary responsibilities, 21st century issues such as larger ships, sea level rise, climate change, and severe weather events require *additional* Coast Survey and NOAA resources. Hydrographic surveys provide essential foundational data that helps to define, understand, and combat these expansive threats. Coast Survey also provides post-disaster services (e.g., harbor surveys by NOAA vessels) that speed economic and environmental recovery.

Although year-to-year funding has been erratic, the long-term trend has been flat over the past decade. Despite this, Coast Survey has made impressive strides in modernizing NOAA's hydrographic services to increase efficiencies over the past five years:

- Transition to electronic navigational charts (ENCs) and electronic chart display and information systems (ECDIS) with weekly electronic chart, Coast Pilot, and Notice to Mariner updates
- Survey automation by use of autonomous vehicles
- Evaluation of lidar, satellite bathymetry, and third party bathymetry as possible inputs to nautical charts
- Implementation of a pilot "precision navigation" system to provide real-time decision-making tools in two of the largest and busiest U.S. ports, Los Angeles and Long Beach.

Limited funding, both from Congress and within NOAA, is the foremost issue Coast Survey faces to accomplish its hydrographic mission. For example, the Navigation, Observations, and Position line item's entire 2016 budget totaled $176M, which is then divided among Coast Survey and three other NOAA offices. Funding levels for both in-house and contract surveys, $76M in 2016, is a mere 0.0017% of the $4.6 trillion total economic activity generated by our ports. Replacement of two of the three NOAA hydrographic survey ships, which are among the oldest ships in the NOAA fleet and often out of service due to breakdowns, is also critical to decreasing the survey backlog. The ability to hire and/or train qualified hydrographers also limits survey efficiency. For example, in early 2016, only four of six navigation response team vessels were operational due to a lack of qualified surveyors.

RECOMMENDATIONS FOR NOAA ACTION

- Stress the importance of legislative mandates for hydrographic services to the Department of Commerce, Office of Management and Budget, and Congress, and request funding to decrease the hydrographic survey and charting backlog.
- Return hydrographic services as one of highest internal priorities for NOAA's National Ocean Service. If NOS does not highlight hydrographic services as one of its critical priorities, it will never be perceived as such, within or outside of NOAA.
- Formulate a long-term, sustainable plan for recapitalization of the NOAA fleet and make replacement of hydrographic survey ships one of the highest priorities.

In October 2003, Secretary of Commerce Don Evans established the Hydrographic Services Review Panel as directed by the Hydrographic Services Improvement Act of 2002, Public Law 107-372. Panel members, appointed by the NOAA Administrator, include a diverse field of experts.