

**WRITTEN TESTIMONY OF  
CAPT. JOHN E. LOWELL, JR., NOAA  
DIRECTOR, OFFICE OF COAST SURVEY  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
U.S. DEPARTMENT OF COMMERCE**

**LEGISLATIVE HEARING ON H.R. 295**

**BEFORE THE  
SUBCOMMITTEE ON FISHERIES, WILDLIFE, OCEANS AND INSULAR AFFAIRS  
COMMITTEE ON NATURAL RESOURCES  
U.S. HOUSE OF REPRESENTATIVES**

**May 12, 2011**

Good morning Chairman Fleming, Ranking Member Sablan, and Members of the Subcommittee. My name is Captain John Lowell, and I am the Director of the Office of Coast Survey at the National Oceanic and Atmospheric Administration (NOAA). Thank you for inviting me to testify before you today on H.R. 295, a bill to amend the Hydrographic Services Improvement Act of 1998 to authorize funds for enhancing NOAA's hydrographic services delivery in the Arctic.

Although our existing mandates already cover all U.S. waters, including the U.S. Arctic, and even allow activities outside U.S. waters, we certainly support the legislation's intent to recognize the Arctic as a region in particular need of NOAA geospatial services for safe navigation, sustainable economic development, delineating the United States' extended continental shelf, and monitoring and describing coastal changes. NOAA's Arctic Vision and Strategy, released on March 16, 2011, identifies these same objectives as priorities, supporting navigation safety, maritime security, and environmental protection. NOAA's geospatial services are also fundamental to many other activities in the Arctic, including effective climate change adaptation, community resilience, energy development, and coastal resource management.

NOAA's surveying and charting responsibilities have existed since 1807, and we have specific authorities under the Coast and Geodetic Survey Act of 1947 (33 U.S.C. 883a *et seq.*) and the Hydrographic Services Improvement Act (33 U.S.C. 892 *et seq.*), which include:

- The acquisition and dissemination of hydrographic, tide and current, and shoreline information for safe navigation of commerce, and
- Management of the National Spatial Reference System, which provides the fundamental geospatial control for transportation, mapping and charting, and any other activities requiring accurate latitude, longitude, and elevation data.

NOAA's hydrographic services cover the 3.4 million square nautical miles of the U.S. Exclusive Economic Zone (EEZ), including the nearly one million square nautical miles of U.S. Arctic<sup>1</sup> waters. Because of the authorities referenced above, explicit direction and funding authorization to work in the Arctic is not necessary for NOAA to deliver its hydrographic services to this important region.

Nonetheless, H.R. 295 puts a well-deserved spotlight on emerging Arctic issues. The Administration is looking closely at Arctic policy and management, as evidenced by the work underway to implement the January 2009 Directive (*National Security Presidential Directive 66/Homeland Security Presidential Directive 25*) on an Arctic Region Policy, the July 2010 National Ocean Policy's recognition of the Arctic as an area of special emphasis, and the July 2010 Presidential Memorandum on arctic research policy, which reinvigorates interagency research coordination in the Arctic.

As you know, there is now widespread evidence of climate change in the Arctic region, most dramatically observed in loss of sea ice. In four of the last five years, we have witnessed the lowest sea ice extents on record, as well as a 35 percent decrease in thicker multi-year sea ice. As access to the region increases with sea ice retreat, we are seeing a corresponding potential for growth in international and domestic Arctic interests. Oil and gas companies are investing more in energy exploration, as evidenced most recently by Shell Oil's 2012 proposal for 10 exploratory wells in the Beaufort and Chukchi Seas. Commercial shipping interests are anticipating open Arctic trade routes within the decade. As the Arctic eventually becomes more accessible, these companies, as well as cruise, fishing, and other economic sector interests, will exert pressure on a Marine Transportation System infrastructure. In addition, there are unique national security interests in the region that will benefit from enhanced geospatial and related information and services. As Dr. Jane Lubchenco, the NOAA Administrator and Under Secretary of Commerce for Oceans and Atmosphere, has said,

"The debate over climate change in the Arctic is over. Climate change is happening. The Arctic Ocean is warming. Permafrost is thawing. Sea ice is melting at an alarming rate, and shorelines are eroding. People's lives and livelihoods are being impacted... But while the loss of sea ice creates opportunities for commercial enterprises, these same economic growth opportunities have the potential to threaten Arctic ecosystems, communities, and cultures already impacted by the rapidly changing climate..." (Aspen Institute, March 2011)."

As the United States begins to confront these Arctic challenges, it is evident that despite some exploration and research to date, even the most basic data are lacking and the science to inform many decision-making processes and support services is inadequate. Because the region has been relatively inaccessible, without widespread need for such information, the Arctic is deficient in many of the hydrographic services capabilities that NOAA provides to the rest of the Nation. The region currently has:

---

<sup>1</sup> The Arctic Research and Policy Act of 1984 defines 'Arctic' as "all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain."

- virtually no geospatial infrastructure for accurate positioning and elevations;
- sparse tide, current and water level prediction coverage;
- obsolete shoreline and hydrographic data in most areas;
- poor nautical charts; and
- poor weather and ice forecast data.

For example, most Arctic waters that are charted were surveyed with obsolete technology, some dating back to the 1800s, before the region was part of the United States. Most of the shoreline along Alaska's northern and western coasts has not been mapped since 1960, if ever, and confidence in the region's nautical charts is low. Governance and management of the marine ecosystems within the Arctic is also a critical issue, due not only to the growing pressure of activities like shipping, drilling and fisheries but also to the fact that the region both strongly impacts and is impacted by global systems. NOAA's navigation services provide baseline scientific data, such as hydrography, shoreline mapping, oceanography, tides, currents, positioning and geodesy, that benefits not only navigation, but also supports more informed decisions for other economic development, resource management, and coastal planning decision making processes.

By strengthening its Arctic science and stewardship, NOAA aims to better inform policy options and management responses to the unique challenges in this fragile region. NOAA's Arctic Vision and Strategy aligns our capabilities in support of the efforts of our international, Federal, State and local partners, and within the broader context of our Nation's Arctic policies and research goals. The Strategy recognizes that NOAA can make the highest positive impact to Arctic communities and sustainable economic growth by providing products and services for safe navigation and security, oil spill response readiness, and climate change adaptation strategies. Much of this can be accomplished through improvements in the hydrographic services available to the Arctic region, including:

- Overhauling the Arctic geospatial framework of geodetic control and water levels, which will correct meters-scale positioning errors and enable centimeter-scale measurements to support such critical needs as marine transportation, sea-level change analysis, erosion and permafrost thaw impacts to infrastructure, oil and gas resource exploration, and storm surge modeling; and,
- Surveying and mapping Arctic waters and shoreline for accurate coastal maps and nautical charts, which will benefit navigation and national security, sea level change impact assessments, habitat characterizations, and extended continental shelf delimitation.

While much of NOAA's Arctic efforts are focused on assessing and prioritizing the region's needs, our navigation-based programs are taking initial steps to provide the essential geospatial foundation described above. In FY 2010, NOAA conducted surveys in key areas of interest to the U.S. Navy, completed a tide gauge demonstration project to test Arctic conditions in Barrow, and acquired gravity data over large swaths of interior and south-central Alaska to support NOAA's Gravity for the Redefinition of the American Vertical Datum (GRAV-D) work in the Arctic region. NOAA and the U.S. Geological Survey also collaborated with Canada on the third of a series of joint seafloor mapping missions to help define the limits of the extended

continental shelf in the Arctic according to the criteria set forth in UNCLOS Article 76. This work will help the U.S. delimit the outer limits of its shelf. On the international front, in our role as U.S. representative to the International Hydrographic Organization, NOAA worked with other Arctic member states to establish an Arctic Regional Hydrographic Commission to foster collaboration on hydrographic surveying, nautical charting, and other mapping activities.

In FY 2011, NOAA continues to work with partners like the U.S. Coast Guard and local vessel pilots to assess nautical charting requirements and prioritize surveys of likely shipping lanes in the North Bering and Chukchi Seas. Our objective is to help address the Bering Strait chokepoint in particular and more broadly to reduce the risk of accident and environmental impact in Arctic waters. Specifically, in FY 2011 NOAA will conduct hydrographic surveys in the Kotzebue area, which will include installation of a tide gauge and another gauge to enable datum transformation. NOAA will also contract for surveys in Kuskokwim (Northeast Bering Sea) and in Krenitzin (North side of Aleutians). In addition, NOAA is building on existing partnerships to acquire more gravity data in Northern Alaska so that by the end of FY 2012 most of Alaska will be covered. This GRAV-D work will vastly improve the positioning accuracies of elevation measurements, which will help coastal communities to develop climate change adaptation strategies and make decisions on infrastructure hardening, erosion and flood controls. Finally, the partnership with Canada on extended continental shelf mapping continues with a 7-week long expedition later this summer utilizing two icebreakers – the U.S. Coast Guard Cutter *Healy* and the Canadian Coast Guard Ship *Louis S. St-Laurent* – to map the seafloor using multibeam sonar, image the underlying sediment layers, collect dredge samples and gravity data, and conduct under-ice AUV operations.

NOAA also serves as a tri-lead, along with the Maritime Administration and U.S. Coast Guard, on the U.S. Arctic Marine Transportation Interagency Action Team (IAT), a subcommittee of the U.S. Committee on the Marine Transportation System (CMTS). Section 307(c) of the 2010 U.S. Coast Guard Authorization Act – Arctic Marine Shipping Assessment Implementation – directs the CMTS to coordinate the establishment of domestic transportation policy to ensure safe and secure maritime shipping in the Arctic. NOAA is working diligently with over twelve agency partners on the CMTS Arctic IAT to complete this task and ensure consistency with the policies of the *National Security Presidential Directive 66/Homeland Security Presidential Directive 25*. The Arctic region poses unique operational challenges for hydrographic surveying, such as in predicting future ice conditions, planning surveys in advance, and conducting those surveys under harsh environmental circumstances. NOAA and its contractors have some capability for working in Arctic conditions, but we are currently evaluating the best and safest approach to data collection. As indicated above, NOAA is also evaluating the technology and strategies needed for long-term monitoring of tides, water levels, and currents under harsh Arctic conditions.

Putting good information into the hands of mariners is essential for safe navigation and environmental protection, and coastal communities and scientists must have the same foundational support for good operational and research decisions. NOAA's hydrographic services are an essential component of an open Arctic where conservation, management, and use are based on sound science to support U.S. economic growth and resilient and viable ecosystems and communities.

Thank you again, Chairman Fleming and Members of the Subcommittee, for the opportunity to talk about NOAA's role in the Arctic with respect to hydrographic services. We appreciate the time and attention the subcommittee is devoting to this important issue, and look forward to working with you further on this legislation.