Testimony on behalf of H.R. 3835

The National Ocean Exploration Program Act

The National Undersea Research Program Act

May 4, 2006

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Summary

The subject of today's hearing, H.R. 3835, provides an authorization for NOAA's ocean exploration effort, and is a major

step forward in providing stable support for NOAA's Undersea Research Program, a program that has pioneered many innovative capabilities in support of undersea research and helped to launch ocean exploration as a new program at NOAA. NURP, comprised of six regional undersea research centers and a national institute of undersea science and technology, provides access to state-of-the-art ocean observing and diving capabilities, expertise to operate these systems safely, and a foundation to develop new research and technology in response to NOAA's mission and the research needs of the academic community. The bill maintains the current structure of NURP, a structure that works well and merits continuation.

NURP possesses unique capabilities to leverage resources through regional partnerships, to engage private industry to develop technology in response to research and management information needs, and to work with partners to translate research results into information products for managers, educators and scientists. NURP possesses a diverse arsenal of undersea research tools and a great deal of critical expertise in the form of staff who possess decades of experience in operating and maintaining technology in support of science. H.R. 3835 is an excellent bill to maintain this core expertise.

NURP centers are funded via institutional grants, much similar to Sea Grant programs or NOAA's Cooperative Institutes. Long-term stability is critical to sustain the key infrastructure, technology and field expertise required to conduct undersea research safely—H.R. 3835 provides this much needed stability.

In summary, H.R. 3835 is a simple, straightforward bill that serves the national interest in ocean exploration and undersea research. Two modest changes are recommended to the bill. These are 1) to recognize undersea research in the short title, and 2) to ensure that a mechanism is in place to promote technology transfer, program coordination, and information sharing between the ocean exploration and undersea research programs.

Introduction

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to testify today on behalf of H.R. 3835, the National Ocean Exploration Program Act. My name is Mike De Luca and I serve as the Senior Associate Director of the Institute of Marine and Coastal Sciences at Rutgers University, as well as the Director of the Mid-Atlantic Bight National Undersea Research Center. On behalf of my colleagues in undersea research at the five other regional research

centers and the National Institute of Undersea Science and Technology, we support passage of Titles I and II of the bill - with a few recommendations. Both titles of the bill are important in their own right. With the broad expertise in ocean exploration represented by the other witnesses today, my comments will focus primarily on Title II, the NOAA Undersea Research Program Act of 2006. I will highlight how H.R. 3835 codifies four key features of NURP: 1) the regional construct, 2) ecosystem-based management, 3) technology access and development, and 4) education and outreach.

Appended to my testimony is a letter dated September 8, 2005, from the National Association of Marine Laboratories submitted on behalf of H.R. 3835. This organization represents more than 120 marine science and education institutions. I respectfully request that this letter be included as part of the written record.

NOAA's Undersea Research Program

NOAA's Undersea Research Program (NURP), an original element of NOAA, was initially known as the Manned Undersea Science and Technology Program. As the name implied, initial emphasis focused on placing humans underwater in support of research needs. In 1980, the National Research Council reviewed the program and recommended establishment of a regional structure with academic partners. This approach was reaffirmed by another review in 1987, and subsequent external peer reviews conducted on a regular basis.

Along with the regional structure, NURP has other features that bear mention, and are underscored in the report of the U. S. Commission on Ocean Policy, the President's Ocean Action Plan, and the current initiative to develop an Ocean Research and Priorities Plan led by NOAA, the National Science Foundation and the Office of Science and Technology Policy. These are:

- NURP enables an ecosystem-based approach to managing coastal, ocean and Great Lakes resources, providing critical data on commercially important fish and their habitats, coral reefs, deep water corals, biodiversity, methane hydrates, biotechnology, and coastal hazards.

- NURP is a world leader in ocean technology development such as smarter, deeper vehicles, new tools and sensors for these vehicles, seafloor observatories such as LEO-15, and the world's only underwater laboratory, Aquarius.

- NURP supports education and outreach by providing hands-on learning opportunities for teachers and students using underwater vehicles and data from seafloor observatories.

Regional Construct

The regional construct constitutes an important feature of NURP, a structure that is designed to leverage resources from the academic community and private industry to address NOAA's mission. Many benefits accrue from this approach including:

- Increased participation in regional ocean management and education activities
- Strengthened field operations through in-house and extramural (industry, academia) capabilities
- Links to regional pools of expertise including scientists, managers, educators, and students
- Enhanced productivity (e.g., research missions, publications, outreach and education activities) through academic and private partners
- Improved access and closer proximity to the public and science communities
- Increased efficiency and reduced administration

The benefits of this approach are also manifest in NOAA's recent efforts to establish regional offices for the National Marine Sanctuary Program, Coastal Services Center, and the regional structure used by the National Estuarine Research Reserve System to deliver coastal training programs at regional and local scales. Additionally, the approach reflects recommendations in the report of the U.S. Commission on Ocean Policy, which devotes an entire chapter to discussing the benefits of regional research approaches to ecosystem management. A recent external review of NOAA's ecosystem approach to management recommended that "NOAA should commit to supplying ecosystem science support on a regional basis." In addition, a congressionally-mandated review of NOAA research noted that "Extramural research is a critical component of NOAA's business model. Through engagement of the extramural research community, NOAA can effect a more efficient means of identifying its research priorities and addressing the most critical scientific problems." Regional centers are critically important to the conduct of undersea research and technology development. This importance is recognized in H.R. 3835, and I applaud the sponsors for their efforts to codify this structure.

Ecosystem-based Management

NURP has been critical to advancing our understanding of ecosystem function and response to human disturbance. Information developed from this research activity is published regularly in the peer-reviewed literature, but the regional structure enables transfer of science-based information directly to the management community such as the Regional Fisheries Management Councils and coastal managers to inform policy decisions. A few examples are:

- Research on the effects of trawling and other fishing gear on habitat was used to improve fishery management decisions and has been used in recent reports on gear impacts (e.g., Pew Commission Report)
- Investigations to define essential fish habitat for economically important finfish and shellfish contributed information to a variety of fishery management plans, especially in deep water reef systems where trawls are inadequate sampling platforms
- Studies of factors affecting coral reef health (e.g., bleaching, overfishing, water quality and climate change) provided information to help sustain reef ecosystems
- Research on deep ocean disposal led to a ban on ocean dumping

Future efforts will focus the unique undersea science and technology of NURP on the seven societal themes that form the basis of the emerging Ocean Research Priorities Plan—enhancing human health, improving quality of life, sustaining natural resources, ocean's role in climate variability and change, mitigating effects of natural hazards, improving ecosystem health, and promoting marine operations. Two cross-cutting issues also merit NURP attention—ocean observations and infrastructure, and ocean education and outreach.

Technology Access and Development

Advances in undersea research and technology have enabled us to enter a new era in oceanography—that of the well-sampled ocean. New samplers, sensors, autonomous vehicles and ocean observatories now allow us to sample the ocean at time and space scales never before achieved. Technology development, including development of samplers and sensors for the emerging network of ocean observing systems, represents an investment area for NURP. NURP centers already have developed a suite of sensors for observing systems such as an in situ flow cytometer, plankton pump, acoustic fish tracker, and sensors to measure turbulence, benthic boundary layer conditions and oxygen over time. This capability constitutes a test bed to develop and pilot innovative sampling and sensing technology for observing systems—a critical role required for the emerging network of regional ocean observing systems, and a role that is recognized in Section 205 of H. R. 3835.

To date, NURP technology access and development efforts have been driven by NOAA's operational research needs in the ocean and Great Lakes, and the undersea research needs of the academic community. This has led to development of an impressive inventory of undersea assets including ROVs, AUVs, an undersea habitat, undersea observatory, and a variety of other sampling and sensing equipment. NURP also has developed many samplers (e.g., suction, sediment and imaging) and sensors (e.g., acoustic, chemical) and communication systems for ROVs and AUVs in response to scientific demand. Support for this and other technology development has been and can continue to be leveraged through partnerships with industry and other academic institutions.

Investments in technology development must be coordinated with other NOAA elements including Ocean Exploration, National Marine Fisheries Service, National Ocean Service and Sea Grant. The Council of Center Directors, identified in Section 204 of H.R. 3835, is an excellent mechanism to foster communication among these programs, share resources, and avoid duplication of effort. Historically, NURP has supported research from the estuaries to the abyssal ocean. Recently however, emphasis has been placed on the most pressing issues facing the coastal ocean and Great Lakes. Authorization of Ocean Exploration and NURP enables NOAA to develop a coordinated program that spans exploration, research, technology development, education and public outreach. The Office of Ocean Exploration should continue to provide first order observation and mapping in unexplored areas of the oceans, especially with the capabilities of the Okeanos Explorer and the 4000 meter ROV system. The deep water capabilities of the Institute for Exploration and the National Deep Submergence Facility are well recognized as complements to NURP.

Education and Outreach

An area in which NURP partners have excelled is in the development of innovative education and outreach programs, conducted largely with support from external NOAA partners (e.g., NSF Centers for Ocean Sciences Education Excellence, Dodge Foundation, National Ocean Partnership Program). Partnerships with the National Estuarine Research Reserve System, Centers for Ocean Sciences Education Excellence, National Marine Educators Association, National Ocean Partnership Program and others enabled NURP to create a variety of K-12 enrichment programs to enhance basic skills and critical thinking among our youth. NURP also was a founding partner in the development of the highly successful Ocean Exploration Education Program including preparing lesson plan formats and inaugurating the at-sea education portion of the Deep East Expedition.

The report of the U.S. Commission on Ocean Policy also devoted an entire chapter to the importance of lifelong learning to address the critical need of raising public awareness of the plight and role of the oceans in the lives of all U.S. citizens. The administration responded with its U.S. Ocean Action Plan mandating that NOAA develop ocean education programs. NURP welcomes this mandate and the authorizing text in H.R. 3835 that enables NURP to capture the public fascination with the oceans and Great Lakes by bringing the visual excitement of the undersea world into classrooms and living rooms as a means to enhance ocean literacy, enrich science education, and promote environmental stewardship.

Ocean Exploration and NOAA's Undersea Research Program

NOAA has initiated a process to merge the Office of Ocean Exploration and NURP into an Office of Ocean Exploration and Advanced Undersea Technology. This presents an opportunity for both programs to capitalize on respective strengths, and to collaborate on mutual interests. NURP, with its rich history of exploring the oceans, coasts and Great Lakes brings novel undersea technology, regional benefits, and a talented network of undersea investigators to bear on ocean exploration, research and technology development. The Office of Ocean Exploration brings new deepwater capabilities and a strong education program to support and promote exploration expeditions. Areas of likely collaboration include joint proposal processes, an integrated program of technology development, and development of science-based exploration expeditions that provide a foundation for future research programs. Exploration poses the questions, and research provides the answers.

During the merger process however, care must be taken to ensure that the four existing strengths of NURP are preserved. H. R. 3835 certainly recognizes these strengths, but as with other NOAA extramural programs such as Sea Grant and the National Estuarine Research Reserve System, the NURP centers should be actively engaged in the planning process and development of future directions. As stated in the NOAA Research Review report "NOAA should formalize the involvement of the extramural community in the assessment and evaluation of the Agency's overall research activity."

Recommendations

- Short Title - The short title of the bill refers only to establishment of an ocean exploration program. Recognition of undersea research in the short title is recommended.
- Coordination of Effort – The bill establishes similar authorities for both ocean exploration and undersea research. For example, both programs are authorized to develop technology, administer proposal-driven programs, and conduct education and outreach activities. A mechanism to ensure coordination of effort among these programs is recommended.

Closing Remarks

For more than two decades, NURP has led NOAA's undersea science and technology development efforts. NURP possesses unique capabilities to leverage resources through regional partnerships, enable mechanisms for interacting with private industry, develop technology in response to research and management information needs, and work with partners to translate research results into information products for managers, educators and scientists. NURP possesses a diverse arsenal of undersea research tools and a great deal of critical expertise in the form of staff who possess decades of experience in operating and maintaining technology in support of science. H.R. 3835 is an excellent bill to maintain this core expertise. Passage of H.R. 3835 will also provide much needed stability for a program that provides many benefits to NOAA and the nation. My colleagues at the other five undersea research centers and the national technology institute have strongly endorsed passage of H.R. 3835. Mr. Chairman and Members of the Committee, it has been my pleasure to speak on behalf of the bill. Thank you again for this opportunity. I welcome any questions you may have on my comments.