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On behalf of H.R. 1834  
The National Ocean Exploration Act  
and the  
National Undersea Research Program Act of 2007

June 5, 2007

**Summary**

I am pleased to strongly endorse passage of H.R. 1834, with several recommendations to enhance coordination of ocean exploration and undersea research activities, and to ensure a proper balance between ocean exploration, undersea research, technology development, and education and outreach. My recommendations fall into three areas: 1) the Ocean Exploration Advisory Board, 2) the Ocean Exploration Technology and Infrastructure Task Force, and 3) key elements of the National Undersea Research Program that must be preserved to ensure continued program success.

Two advisory elements proposed to help guide the Ocean Exploration Program, the Ocean Exploration Advisory Committee and the Ocean Exploration Infrastructure Task Force, should be expanded and applied to the National Undersea Research Program as a separate title of the bill. The Ocean Exploration Advisory Committee should be established following the model now in place for the National Sea Grant College Program, a program similar to NURP in that it is based on a strong partnership with the academic community. The Sea Grant model also contains explicit guidelines on eligibility, experience, and responsibilities of members which merit inclusion in H.R. 1834.

As with the Advisory committee, the Ocean Exploration Infrastructure Task Force should be expanded to provide advice and guidance on issues related to the National Undersea Research Program. One additional key responsibility should be given to the task force: conduct periodic reviews of existing program technology to ensure relevance to program missions. For technology deemed replaceable, the task force should help to develop plans to transition the technology to suitable users.

With respect to the National Undersea Research Program, peer-reviewed science programs, a hallmark of the network of regional undersea research centers, have driven the use of advanced technologies such as manned submersibles, ocean observing platforms and technology, and autonomous undersea vehicles. Research supported by NURP responds to a variety of ecosystem management needs identified by NOAA and its

research partners. NURP has been a significant source of support for scientists to use advanced undersea facilities that require specific skills to operate and maintain. Four key elements must be maintained to ensure continued success of the NURP program:

- strong partnerships with the academic community
- a rigorous peer review process that leverages the best talent and ideas on behalf of NOAA's management information needs
- development of innovative technologies in response to research requirements, and
- a regional presence that effectively leverages academic and private resources on behalf of NOAA's mission.

With respect to H.R. 2400, the integrated ocean mapping bill, I support this measure and its basic purpose. Of particular note is the establishment of joint centers with the academic community to conduct research and develop new mapping technologies. I am also pleased to support the two resolutions before the committee. House Resolution 186 aims to engage the public in raising awareness about the value of beaches, and House Concurrent Resolution 147 provides well-deserved recognition to NOAA and its predecessor agencies for their achievements over the past 200 years.

I would also respectfully ask the committee to accept a letter and attachment for the record on behalf of H.R. 1834 prepared by the National Association of Marine Laboratories. These documents are appended to my testimony, provide a strong endorsement for H.R. 1834, and present several key principles for inclusion in the legislation. I am a member of NAML and strongly support their recommendations.

## **Introduction**

Madam Chair and Members of the Subcommittee, thank you for the opportunity to testify today on behalf of H.R. 1834, the National Ocean Exploration Act and the National Undersea Research Program Act of 2007. My name is Fred Grassle and I serve as the Director of the Institute of Marine and Coastal Sciences at Rutgers University. My experience includes detailed knowledge of both the ocean exploration and undersea research programs. In 2001, I served on the President's Panel on Ocean Exploration, which produced the report *Discovering Earth's Final Frontier: A U.S. Strategy for Ocean Exploration*. From recommendations presented in this report, NOAA formed the Ocean Exploration program. I also have a great deal of experience with undersea research and the National Undersea Research Program, from the perspective of a scientist and as the first director of the Mid-Atlantic Bight National Undersea Research Program. As Members of this Committee will recall, the Mid-Atlantic NURP Center, has a strong record of research productivity and technology development. A few examples include:

- In 1996, the Mid-Atlantic Bight Center established the world's first Long-term Ecosystem Observatory (LEO-15). Situated on the continental shelf off New Jersey, LEO-15 provides a real-time interface

with advanced samplers and sensors enabling investigators to plug in instruments at guest ports, conduct and modify experiments remotely, and access data remotely via the Internet.

- Critical research on the fate and effects of deep-sea waste disposal that redefined national waste management strategy.
- Major studies on the effects of trawling on bottom communities that have informed stock management efforts.
- Development of the REMUS autonomous undersea vehicle that enables investigators to conduct detailed transects of coastal ocean processes and features.
- Development of an undersea docking capability for the REMUS vehicle.
- Creation of acclaimed education and outreach programs that capitalize on real-time data streams to enrich science education, teaching of basic skills, and enhancement of ocean literacy among our youth.
- Development of new samplers and sensors for ocean observing systems via the LEO-15 underwater observatory, novel applications of autonomous undersea vehicles, and emerging acoustic technologies to track and monitor fish behavior, migration, and habitat use.

I am pleased to support passage of H.R. 1834, with several recommendations. My recommendations fall into three areas: 1) the Ocean Exploration Advisory Board, 2) the Ocean Exploration Technology and Infrastructure Task Force, and 3) key elements of the National Undersea Research Program that must be preserved to ensure continued program success.

### **Ocean Exploration Advisory Board**

Section 104 of the bill proposes to establish an Ocean Exploration Advisory Board, appointed by the Administrator of NOAA. This represents an excellent mechanism to solicit advice and guidance, but should be expanded to provide advice and guidance on issues related to the National Undersea Research Program. This should be established as Title III to the bill to address both programs. These two programs have similar interests and can benefit from strong coordinated advice and guidance from a single advisory committee. Complementary interests include technology development, coordinated management and use of staff and technology, reliance on common extramural partners, and the requirement to follow up discoveries with directed research programs.

Expansion of the advisory mandate requires adding members who are expert in undersea research, technology development, and education and outreach. I recommend that this committee be established similar to the model now in place for the National Sea Grant College Program, a program similar to NURP in that it is based on a strong partnership with the academic community. Under this model, members are appointed by the Secretary of Commerce, and advise the Secretary and the Director or, in this case, the Directors of the Ocean Exploration and National Undersea Research Programs. In addition, the committee would have three nonvoting members including the two program directors and a director of one of the undersea research centers who is elected by the Council of Center Directors referred to in Section 204 of the bill. The Sea Grant model also contains explicit guidelines on eligibility, experience, and responsibilities of members which merit inclusion in H.R. 1834.

### **Ocean Exploration Technology and Infrastructure Task Force**

Section 105 of the bill establishes an Ocean Exploration Technology and Infrastructure Task Force to incorporate new technology into the program, improve communications infrastructure, develop a data management system, support public outreach activities, and to foster partnerships with governmental and nongovernmental institutions. As with my comments on the Advisory committee above, I recommend that the scope of the Task Force be expanded to provide advice and guidance on issues related to the National Undersea Research Program, and included in a separate Title to the bill. In fact, Title III can easily address establishment of the Advisory Committee and these new responsibilities for the Task Force. Members of the Task Force should include experts selected to address the five responsibilities set forth in Section 105, the Director of the Ocean Exploration Program, Director of the National Undersea Research Program, and a director of one of the undersea centers who is elected by the Council of NURP Directors.

I recommend that an additional key responsibility be given to the Infrastructure Task Force. In addition to facilitating the transfer of new exploration and undersea research technology to the program, the task force should conduct periodic reviews of existing program technology to ensure relevance to program missions. For technology deemed replaceable, the task force should help develop plans to transition the technology to suitable users. LEO-15, the undersea observatory off the New Jersey coast, provides an example where the Task Force could provide direction on the future role of this very capable platform.

Established in 1996, LEO-15 (Long-term Ecosystem Observatory in 15m water) is an underwater robotic system that enables investigators to collect real-time data on ocean processes. Scientists can then acquire high-density, long-term data sets that support collaborative efforts to investigate processes governing change in the coastal ocean. Equally important, LEO-15 provides information that can be used by environmental managers to inform their decisions. LEO-15 also supports the education community with development and delivery of interactive instruction and distance learning programs that are based on real-time science, a national service that is being used to enrich K-12

science education and help prepare the next generation of decision makers to become informed environmental stewards.

One of the critical roles of LEO-15 has been to serve as a “proving ground” for the science community and industry to test, demonstrate, or calibrate new instruments, sensors, and technology associated with collection of environmental measurements. Following a major refurbishment in 2005, LEO-15 continues to serve as a testbed for sensor development in support of the nation's emerging network of ocean observing systems--a major investment area for NOAA in particular and government in general. Research and technology development efforts at LEO-15 have led to development of a suite of sensors for observing systems such as an in situ flow cytometer, plankton pump, acoustic fish tracking, and sensors to measure turbulence, benthic boundary layer conditions and oxygen over time. The observatory fills a critical testbed role required for the emerging network of regional coastal ocean observing systems, a role that is recognized in Section 205 of H.R. 1834.

In the wake of devastating storms, natural disasters, declining natural resources, and environmental change resulting from booming population growth along the coast, maintenance of a critical undersea capability such as LEO-15 is essential. Unfortunately, NOAA has elected to phase out support for LEO-15, and transition the support costs to the user community. I do not believe the user community (primarily researchers) can support these costs at this time, and I am concerned that this decision was made before future undersea research priorities could be developed and fully vetted by the undersea research and technology community. Science has driven the constellation of undersea capabilities provided through NURP, and any decision to remove or add technical capability to the program should continue to be informed by research demands. At the same time that NOAA plans to eliminate support for LEO-15, the agency plans to convene a three-year process to review the utility and future role of another major undersea platform, the Aquarius habitat. LEO-15 should receive the same consideration as Aquarius, and the Task Force represents an ideal, independent mechanism to conduct this review.

### **Key Elements of NURP that Must be Preserved**

Since 1980, the National Undersea Research Program has been implemented through a network of regional undersea research centers located at major universities and field facilities. Peer-reviewed science programs, a hallmark of the program, drive the use of advanced technologies such as manned submersibles, ocean observing platforms and technology and autonomous undersea vehicles. Research supported by NURP responds to a variety of ecosystem management needs identified by NOAA and its research partners. NURP has been a significant source of support for scientists to use advanced undersea facilities that require specific skills to operate and maintain. There are four key elements that must be maintained in NURP to ensure continued success of the program, and that can benefit the emerging ocean exploration program. These are:

- strong partnerships with the academic community
- a rigorous peer review process that leverages the best talent and ideas on behalf of NOAA's management information needs
- development of innovative technologies in response to research requirements, and
- a regional presence that effectively leverages academic and private resources on behalf of NOAA's mission.

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. Regional centers are critically important to the conduct of undersea research and technology development. This importance is recognized in H.R. 1834, and I applaud the sponsors for their efforts to codify this structure.

The benefits of this approach are also manifest in NOAA's recent efforts to establish regional offices for a variety of its programs (National Marine Sanctuary Program, Coastal Services Center, and the National Estuarine Research Reserve System), and reflects recommendations in the report of the U.S. Commission on Ocean Policy, a recent external review of NOAA's ecosystem approach to management, and a congressionally-mandated review of NOAA research that noted "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."

The strength of the NURP program can also be attributed to a competitive, rigorous peer review process used to leverage the best science and technology development on behalf of NOAA mission priorities. Maintenance of this program strength is critical to NURP success and I'm pleased that section 206 of the bill ensures major support for extramural projects based on peer review.

Finally, I would like to present some brief comments on the mapping bill and the two resolutions pending before the committee.

### **H.R. 2400 Ocean and Coastal Mapping Integration Act**

I am well aware that a variety of agencies conduct mapping programs in ocean and coastal waters. These are conducted with diverse technologies, at a range of spatial and temporal scales, use different data standards and protocols, and are delivered in a variety of formats to users. This is certainly not a cost-effective approach, and presents a challenging maze to map users. Coordination of federal ocean and coastal mapping efforts is a laudable goal, and I support the mechanisms proposed to integrate these mapping efforts. Perhaps one of the most important features of the bill is to establish Joint Ocean and Coastal Mapping centers in partnership with the academic community.

This is an excellent mechanism to research and test new mapping approaches, and to address particular mapping challenges such as a low-cost, rapid approach for surveying shallow water habitats and habitat change over time. In summary, I support the bill and its basic purpose.

### **House Resolution 186**

I am pleased to provide strong support for Mr. Pallone's resolution to recognize the value of American beaches and their considerable role in American culture. One of the best ways to preserve the quality of our beaches for use by future generations of Americans, is to raise public awareness of their value, and to encourage informed stewardship of this national resource. Establishment and observance of a National Beaches Week certainly is a major step to engage the public in advancing conservation of beaches.

### **House Concurrent Resolution 147**

The concurrent resolution seeks to recognize NOAA for its vast contributions in ocean research and service to the nation, especially as these relate to mapping, charting, ocean observing and modeling programs, and services. The recognition is well-deserved and should be celebrated by the public. Ceremonies planned to celebrate NOAA's bicentennial should be shared by the public, and I look forward to participating in some of these events myself.

### **Closing Remarks**

Madam Chair and Members of the Subcommittee, thank you again for the opportunity to testify today on behalf of H.R. 1834. The bill codifies many of the critical elements required to sustain one of the nation's premier extramural programs, the National Undersea Research Program, and sets forth a structure to help guide development of the emerging Ocean Exploration Program. My recommendations are presented to foster coordination between these two programs, and to ensure that critical elements of the National Undersea Research Program are preserved to sustain the strong federal-academic partnership that characterizes this program.