

Testimony of Dr. Jo Ann Leong
President, National Association of Marine Laboratories
Before the
Commerce-Justice-Science Appropriations Subcommittee
Committee on Appropriations
United States Senate
Washington, D.C.
April 19, 2013

Madam Chair, Ranking Member Shelby and Members of the Subcommittee, my name is Jo Ann Leong and I am the director of the Hawaii Institute of Marine Biology at the University of Hawaii. I submit this statement as President of the National Association of Marine Laboratories (NAML).

NAML recommends the following actions to help maintain the health of the nation's ocean, coastal, and Great Lakes research and education enterprise:

- Maintain strong support for extramural investigator-initiated research and education programs within NSF, NOAA and NASA by supporting the Administration's research budget requests for these agencies;
- Support the NOAA Science Advisory Board's recommendations for increased use of extramural research programs as part of the effort to strengthen the health of the NOAA R&D portfolio;
- Reject the Administration's proposal to terminate STEM education funding in the mission agencies, including:
 - NOAA (specifically Sea Grant's STEM education funding including the Sea Grant Knauss and the Sea Grant-NMFS Fellowships and the other education programs administered by the NOAA Office of Education);
 - NASA (and its informal education programs);
 - the Environmental Protection Agency (the EPA graduate fellowship STAR program and the Greater Research Opportunities Undergraduate Student Fellowships); and
 - the National Institutes of Health (Science Education K-12 Program).
- Support efforts to incorporate NAML labs as sites for complementary marine and coastal networks to allow for the sharing and integration of data and observations leading to more cost effective research, increased access to valuable technical assistance, and an improved understanding of the relationships among and between multiple ecosystems; and
- Support an innovative and cost saving national partnership effort to co-locate federal scientists and their research infrastructure at NAML sites and facilities.

NAML is grateful to this subcommittee for the long-standing support it has provided for ocean, coastal, and Great Lakes research and education through the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA).

The Role of Marine Laboratories in the Nation's Research and Education Enterprise –

NAML is a nonprofit organization of member institutions representing coastal, marine, and Great Lakes laboratories in every coastal state, from Guam to Bermuda and Alaska to Puerto Rico. NAML

laboratories conduct research and provide education and public service programs to enable local and regional communities to better understand and manage their ocean, coastal and Great Lakes cultural and natural resources. The member institutions of NAML work together to improve the quality, effectiveness and relevance of ocean, coastal and Great Lakes research, education and outreach. Locally, NAML labs provide accessible, reliable, and relevant information to support wise coastal management and the understanding and protection of natural resources, nationwide.

Oceans, Coasts, and Great Lakes are Vital for Economic Growth and the Well-being of the Nation -

- The ocean is a major economic asset. For example, in the U.S. and using 2010 statistics, 52% of the population lived in coastal watershed regions generating nearly 60% of the nation's GDP in 2010. Most imported goods (over \$1.2 trillion/yr.) and exports moved through coastal waterways and ports. Commercial fishing generated over \$32 billion in income and more than one million jobs, while recreational fishing supported \$19 billion in income and millions of additional jobs. Over 25% of U.S. domestic oil was produced from coastal and offshore waters. Oil refineries and wind farms, military installations and assets, rail and road networks, all crucial for national security, energy, commerce, and transportation, are concentrated along coasts. In our globally connected world, land-locked nations derive many benefits from the ocean such as general commerce and ocean products, and are impacted by the ocean's influence on the distribution of rainfall and heat.

Meeting stewardship responsibilities for the oceans, coasts, and the Great Lakes requires a robust ocean and coastal research and education enterprise. Coastal areas face challenges that threaten our fisheries resources, impact recreational and commercial resources and impact ecosystems. We must reinvest in the nation's research enterprise that has been responsible for our long-term prosperity and technological preeminence through interdisciplinary research spanning a landscape of disciplines, from physics to geology, chemistry to biology, engineering to social sciences, and modeling to observation.

Recommendations Regarding Federal Marine and Coastal Research and Education –

NAML believes that research and education programs at the major federal science agencies with marine portfolios — including the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA) — should be viewed as priority investments in the future health and well-being of the Nation. While much attention has been justifiably focused on the need for our Nation to continue its support of premier basic research programs, it is equally important to maintain strong support for mission-oriented ocean, coastal, and Great Lakes research, observing, monitoring, and education programs. Programs that enhance agency internal research capabilities and support the extramural community in competitive, merit-based research provide highly cost-effective returns on investment and distribute economic and societal benefits over a broad array of communities.

Existing education and outreach programs focus on connecting experts in marine and coastal research with students, educators, and citizens who benefit from the knowledge provided and by personal contact with those conducting the research. There is a real concern that the centralization of some of these education and outreach programs proposed by the Administration in the FY14 budget request will both sever those connections and likewise dumb-down science while making real scientific understanding inaccessible to those who the programs are meant to serve.

National Science Foundation – NSF funds vital basic research that enhances the public understanding of the Nation's oceans, coasts, and Great Lakes. NSF also supports science, engineering and education to inform the societal actions needed for environmental and economic sustainability and sustainable human well-being. A sustainable world is one in which human needs are met equitably and without sacrificing the ability of future generations to meet their needs. Meeting this challenge requires a substantial increase in our understanding of the integrated system of society, the natural world, and the alterations humans

bring to Earth. NSF's Science, Engineering, and Education for Sustainability (SEES) initiative (including efforts such as the Coastal SEES initiative, ocean acidification, dimensions of biodiversity, sustainable energy pathways, water sustainability and climate, etc.) is an example of how this vital need is being met. Research in this area as well as in other ocean and coastal areas is supported via a highly competitive, merit-based process through a variety of modes of support at NAML labs involving individual investigators, small interdisciplinary teams of researchers, and students.

NAML is particularly supportive of the creation of new research networks that connect NAML labs and other entities in ways that would further enhance other ecosystem networks supported by NSF. NAML believes that research infrastructure support is needed to move the research enterprise forward and therefore we continue to support the longstanding modest program that provides competitive support via the Field Stations and Marine Laboratories (FSML) program. On the broader issue of national infrastructure support, NAML is concerned, however, that in an era of particularly scarce resources, an appropriate balance must be achieved that protects as much as possible that part of the portfolio that supports the actual conduct of research and training so that it does not become overshadowed by larger scale infrastructure efforts.

National Oceanic and Atmospheric Administration – NOAA is a critical federal leader in ocean, coastal and Great Lakes research and education. NOAA's extramural support for research and education at marine labs and universities greatly expands its access to world-class expertise and unique facilities, complementing and expanding the work carried out within NOAA labs. NOAA's extramural partnerships contribute invaluable information to our coastal resource managers. These include: the National Sea Grant College (NSGC) Program and Coastal Services Center; Aquaculture Initiatives; Prescott Marine Mammal Program; Highly Migratory Shark Fishery Research Program; NOAA Cooperative and Joint Institutes; the Integrated Ocean Observing Systems; NOAA's Center for Sponsored Coastal Ocean Research harmful algal bloom, hypoxia, and ecological forecasting initiatives; the National Estuarine Research Reserve System; the National Marine Sanctuary Program; and NOAA's Office of Education.

NAML urges the Subcommittee to reiterate its support for these important extramural programs as well reject, again, the Administration's plan to terminate the National Undersea Research Program, the Prescott Marine Mammal Program, and the STEM education programs in the Office of Education and the Sea Grant program (i.e. the Knauss Fellowships and the Sea Grant-NMFS Fellowships) which are all tightly integrated with the mission of the agency and the research activities that NOAA supports.

NAML strongly supports recent recommendations made to the NOAA Science Advisory Board that calls for priority support for NOAA extramural programs. Increased extramural research enables NOAA to leverage its R&D investment with the resources of the nation's leading university scientists resulting in greater and faster scientific advances at lower costs. A predictable and reliable partnership with the extramural research community is critical to NOAA's long-term success. As available resources become scarcer and major program reorganization is being considered, NOAA should enhance its partnership with the extramural research community in creative and innovative ways. NOAA should expand its efforts to co-locate agency research staff and infrastructure at non-Federal marine labs. Such actions will not only result in significant cost savings, achieve a greater return for its investment, and increase scientific collaborations and productivity. A robust NOAA budget directly coupled with solid support for extramural partnerships is essential for NOAA to serve national needs.

National Aeronautics and Space Administration – Part of NASA's mission is to develop an understanding of the total Earth system and the effects of natural and human-induced changes on the global environment. Oceans play a major role in influencing these changes. Long-term ocean data from satellites make it possible to employ modeling techniques for global mapping of seasonal changes in ocean surface topography, currents, waves, winds, phytoplankton content, sea-ice extent, rainfall, sunlight reaching the

sea, and sea surface temperature. Studying these patterns at a global scale can help forecast and mitigate the effects of floods and drought. Ocean observing satellite images tell us about the most fundamental climate changes. Satellite data have improved forecasting model capabilities to predict events such as El Niño and other global and regional climate cycles. Expanding NASA extramural support will further develop the ability to better predict ocean phenomena.

Education, Diversity and an Ocean Literate America -- The U.S. continues to be at risk with respect to student achievement in science, technology, engineering and math among industrialized nations, as well as, emerging industrializing nations. Therefore, it is critically important that we improve ocean literacy and workforce development among all sectors of our diverse nation. NAML labs seek to expand the engagement of individuals from groups that have been historically under-represented in ocean research, education and outreach through their own and university programs at marine laboratories. This is particularly important in fulfilling the goal of achieving a diversified STEM pipeline for future science and ocean workforce needs. Marine laboratories play an important role in formal and informal education and workforce development by providing students with a place to learn. Marine labs serve as primary training grounds for experiential ocean education and are committed to enhancing diversity within the field of ocean, coastal and Great Lakes research and education.

NAML laboratories continue to strongly support partnerships with Federal agencies to address the ocean education needs of the Nation as an integral part of the research enterprise. These include the NSF's Louis Stokes Alliance for Minority Participation, Centers for Ocean Science Education Excellence, Research Experiences for Undergraduates, and Research on Learning in Formal and Informal Settings programs; NOAA's Expanding Partnerships Program in the NOAA Education Office and the National Sea Grant College Program – including the Knauss and Sea Grant-NMFS Fellowships. The importance of marine labs in support of coastal states' Environmental Literacy Plans is essential in developing a literate public.

It is important that federal research agencies continue to integrate their research and education programs and maintain their support and involvement in formal and informal learning at all age levels, by all disciplines, and for all Americans. Therefore we call on the Subcommittee to reject the Administration's proposal to terminate the mission agencies' support for education as part of the Administration's STEM consolidation proposal.

Thank you for the opportunity to express our concerns. We would be happy to provide additional information if it would be helpful to the Subcommittee.