

Testimony for the Record
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Before the
Subcommittee on Commerce, Justice, and Science, and Related Agencies
Committee on Appropriations
United States Senate
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The National Association of Marine Laboratories (NAML) is pleased to submit this testimony to the Subcommittee for consideration in the FY 2018 Commerce-Justice-Science Appropriations Act. In this statement, we provide our recommendations for the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA) that we believe would strengthen the Nation's research and education enterprise. The network of the Nation's marine laboratories is cost effective, highly relevant, and the vehicle that brings science to those who depend on research results to protect lives and support livelihoods.

NAML's Message

This Subcommittee is uniquely responsible for the health of our nation's research and education enterprise. Much of the Federal extramural nondefense, non-biomedical support for research and education is provided by this Subcommittee. Thus, this Subcommittee is in a unique position to impact the Nation's long term economic growth, national security, and public safety through its investments in the agencies under its jurisdiction.

The value of research investments is borne out by history. According to economists Charles Jones and John Williams of Stanford University, the National Bureau of Economic Research, and the Federal Reserve Bank of San Francisco, the return on investment for publicly funded scientific research and development is somewhere between 30 percent and 100 percent. Given the importance of the research investment to the economic health of the country, NAML is disappointed by the Administration's FY 2017 Supplemental and the FY 2018 budget requests which seek to reduce programs that are critical to the sustainability and creation of jobs and associated economic benefits. This includes funding for NSF research and education; eliminate over \$250 million in targeted NOAA grants and programs supporting coastal and marine research, education, and management, including Sea Grant and Knauss Fellowship program; and reductions in earth science research at NASA by over \$100 million including major reductions for Earth science research grants.

NAML Priorities and Recommendations for FY 2018

NAML is a nonprofit organization representing the ocean, coastal and Great Lakes interests of member laboratories that employ thousands of scientists, engineers and professionals nationwide. NAML labs conduct high quality research and education in the natural and social sciences and translate that science to improve the decision-making by policy officials on important issues facing our country and fostering economic development. NAML's priorities are drawn from and strongly support two important reports from the National Academy of Sciences. They are: *Sea Change: 2015-2025 Decadal Survey of Ocean Sciences (DSOS)*; and *Enhancing the Value and Sustainability of Field Stations and Marine Laboratories in the 21st Century*.

A recent report from the Center for the Blue Economyⁱⁱ reported that the ocean economy-generated a larger share of U.S. economic activity than farming, food products, oil and gas extraction, and forest products. Employment supported by the ocean economy is almost as large as the employment of these industries combined. The Great Lakes alone generate nearly \$5 trillion in economic activity or about 30% of combined U.S. and Canadian economic output. Finally, the U.S. marine transportation system is an essential driver of the U.S. economy and its impact is felt well beyond the coast and reaches into the heartland of the nation. America's seaports are crucial generators of economic development and well-paying jobs, both regionally and nationally, that is felt throughout all supply chains that use the ports.

The ocean, coastal, and Great Lakes network of NAML laboratories, is a vital part of the nation's research and education enterprise. That enterprise is a critical contributor to the economic and environmental health of the nation. The nation is faced with a widening gap between the actual level of federal funding for research and education and the required investment to sustain the U.S. as the world's leader in innovation. Accordingly, **NAML's priorities** are:

- The nation should build on its investment in **research** to develop the knowledge, people, and technologies that power the ocean and coastal economies, create jobs, improve health, strengthen our national security, and support the U.S. as *the* global innovation leader. The key programs that support this goal include:
 - *NSF funding for research, training, infrastructure, and education much of which is supported by the Directorates for Geosciences and Biological Sciences;*
 - *Extramural funding provided by NOAA Research (OAR) including funding the National Sea Grant College Program at \$80 million and marine aquaculture;*
 - *NOAA National Estuarine Research Reserves at \$27 million in FY 2018 and National Centers for Coastal Ocean Science; and*
 - *NASA Earth Sciences.*
- This investment should include ocean **observations, data integration, and related cyber and physical infrastructure**; monitoring, research, and response to changing environmental conditions such as:
 - *NSF's Field Stations and Marine Laboratories (FSML) at \$6 million;*
 - *NOAA Integrated Ocean Observing System program at \$43 million;*
 - *Research and Monitoring for Ocean Acidification; and*
 - *NSF's Long Term Ecological Research program and HBCU Research Infrastructure for Science and Engineering (RISE)*
- Renew the commitment to improve the quality of **STEM education** and re-energize efforts to attract, recruit, support, and retain women, minorities and others not currently well represented in the science and technology workforce through the following programs:
 - *NSF's Research Experiences for Undergraduates (REU), its Alliances for Minority Participation, the graduate and post graduate fellowship programs at NSF, NOAA, and NASA; and*
 - *Reject the Administration's proposal to terminate the NOAA and NASA Offices of Education*

NAML is concerned by the Administration's recommendations for reductions to NSF, NASA and NOAA as part of the FY 2017 Security Supplemental and the FY 2018 budget requests which seek to reduce support for the National Science Foundation (especially in the Geosciences and for education); eliminate over \$250 million in targeted National Oceanic and Atmospheric Administration (NOAA) grants and time-tested programs in coastal and marine management, research, and education such as Sea Grant and Knauss Fellowship program; and a reduction in earth science research at NASA by over \$100 million including major reductions for Earth science research grants.

The time-tested programs, that support the extramural research and education community via competitive, merit-based research, provide cost-effective and impressive returns on investment, leverage additional resources to meet science and management priorities, distribute economic and societal benefits over a broad array of communities, and provide the agency with valuable flexibility. Yet, in FY 2017 and FY 2018 the Administration is proposing steep reductions in these extramural programs. Additionally, past Administrations have sought authority for NOAA to "receive and expend funds made available by, any...private organization, or individual (i.e. proposed Section 108 of the General Provisions in the NOAA Section of the *Appendix to the FY 2016 Budget*, page 218)." NAML is concerned that this could result in the Federal Government competing with non-federal and private entities for limited private sector support.

NAML requests the Subcommittee to reject the Administration's proposed reductions for research, infrastructure, and education and training. Instead, NAML urges the Subcommittee to invest in the future of the Nation by supporting the ocean, coastal, and Great Lakes research and education enterprise represented in part by the NAML priorities articulated in this statement. NAML also requests the Subcommittee to continue its vigilance regarding proposals that would result in unfair competition with the private sector.

The Value of the Nation's Coastal and Ocean Economy

More than half of the United States population lives in coastal counties that generate 58% (\$8.3 trillion) of the nation's gross domestic product (GDP). In 2011, Americans, on average, ate 15 pounds of fish and shellfish per person – 4.7 billion pounds altogether – making the U.S. second in the world in total seafood consumption. The United States is the leading global importer of fish and fishery products, with 91% of the seafood we eat originating abroad – half of which is from aquaculture. Driven by imports, the U.S. seafood trade deficit has grown to over \$11.2 billion annually. Federal aquaculture programs, working in partnership with marine laboratories, offer the opportunity to advance U.S. aquaculture to reduce the seafood trade deficit. Tourism is a major economic driver in coastal states. The U.S. has jurisdiction over 3.4 million square miles of oceans – an expanse greater than the land area of all 50 states combined. This is a dynamic area with biologically diverse habitats that provide a wealth of natural resources and economic opportunities, while at the same time exposing human and biological communities to coastal hazards such as storms and hurricanes, shifting shorelines, outbreaks of harmful algal blooms, and water-borne pathogens.

Research conducted by people educated and trained, in part, at the nation's network of marine laboratories has uncovered the linkage between changes in ocean temperature and its impact on the lobster industry; the role science can play to maximize the return on shoreline restoration; and the impact of ocean acidification on the oyster industry. Training and research centered in the nation's network of marine laboratories should:

- develop vital, lifesaving adaptive and mitigation strategies to enhance coastal resiliency with forthcoming environmental challenges facing the Nation;
- develop a deeper fundamental understanding of earth system science so that we can more accurately predict severe weather and climate changes on local, regional, national, and global scales;
- develop technologies that will increase the competitiveness of the U.S. aquaculture industry, and contribute to sound fishery management practices, which enhance food security and by access to safe, sustainable, and healthy seafood; and
- lead to the discovery of new marine biological agents that may prove valuable in the treatment of diseases and other ailments.

To develop the knowledge and technologies needed to meet these and other challenges in the ocean, coastal, and Great Lakes environment, it will take the continued education and training of people in science, technology, engineering, and mathematics (STEM). This calls for a renewed commitment to improve the quality of STEM education at the pre-K levels and continuing on through the undergraduate and graduate levels that will attract and retain women, minorities, and others not currently well represented in our scientific and technical workforce.

Conclusion

This Subcommittee is uniquely responsible for the health of our nation’s research and education enterprise. Over 50% of the extramural nondefense, non-biomedical federal support for research and education is provided by this Subcommittee. Thus, the Subcommittee is in a unique position to impact the Nation’s long term economic growth, national security, and public safety through its investments in the agencies under its jurisdiction. The economic value of research investments is borne out by history. While we appreciate the difficult constraints facing the Nation and this Subcommittee we hope the Subcommittee will continue to be a leading and influential voice in the health of the Nation’s research enterprise via the decisions it makes in developing the FY 2018 Commerce-Justice-Science Appropriations Act.

NAML is grateful for the opportunity to provide the Subcommittee with our members’ priorities and recommendations.

ⁱ Charles Jones and John Williams, “Measuring the Social Return to R&D” (1997), available at <http://ssrn.com/abstract=2155> .

ⁱⁱ [State of the U.S. Ocean and Coastal Economies – 2016 Update](#), Middlebury Institute of International Studies at Monterey, Center for the Blue Economy.