



NATIONAL ASSOCIATION OF MARINE LABORATORIES FY 2019 PUBLIC POLICY AGENDA April 2018

Ocean, Coastal, and Great Lakes Research Priorities

U.S. leadership in science and technology is being challenged by our international competitors. Investing in science and technology that relates to our oceans, coasts, and Great Lakes will help sustain U.S. leadership and contribute significantly to national security, economic security, food and energy security, and the security of our natural resources. In the R&D Chapter of the FY 2019 Budget Request, the Administration acknowledged that "Innovation in science and technology has been a cornerstone of America's economic progress since the founding of this nation". The National Association of Marine Laboratories (NAML) strongly urges the Nation's decision makers to significantly strengthen the Federal Government's investment in extramural, merit-based, competitive research, infrastructure, and education programs at NSF, NOAA, NASA, EPA, DOI, and other ocean, coastal, and Great Lakes related agencies to develop the knowledge, the diverse workforce, and the technological innovations needed to power the nation's economy, create jobs, improve health, and strengthen national security.

NAML recommends expanded support for Federal agencies and programs that address the security-related issues in this Agenda. Expanded support in the form of research, infrastructure, and education must be focused on:

- U.S.-based aquaculture to reduce the ever-increasing demand for foreign imports, to advance seafood security and opportunities for economic growth.
- Oceanographic and geochemical exploration and associated technology development to advance national security, commerce and domestic energy independence.
- Data collection and adaptive management strategies to increase productivity and sustainability of marine fisheries and social-economic productivity of U.S. exclusive economic zones.
- Comprehensive understanding of ecosystems which support fisheries and other social-economic drivers.
- Defining the impacts and causative factors for shifting environmental regimes to inform risk management of critical defense, transportation, civic and business infrastructure along U.S. coastlines.
- Discovery and innovation in biological, chemical, geological and physical marine sciences to support advancement of human and environment health and social-economic objectives.

The Importance of Oceans, Coasts, and Great Lakes to National, Economic, and Environmental Security

The security of the U.S. is in large part dependent on our ocean, coastal, and Great Lakes resources:

- Fourteen percent of U.S. coastal counties produce 45% of the nation's gross domestic product (GDP), with close to one in 45 jobs directly dependent on the resources of the oceans and Great Lakes;
- In 2014, the ocean economy's 149,000 business establishments employed about 3.1 million people, paid \$123 billion in wages, and produced \$352 billion in goods and services. This accounted for about 2.3 percent of the nation's employment and 2.0 percent of its gross domestic product;
- Offshore mineral extraction represents 43%, and tourism and recreation account for 31%, of the ocean economy contributions to GDP. Tourism and recreation account for 72% of the ocean economy jobs; and
- In summer 2017, the first ship to traverse the Arctic Northern Sea Route without assistance from ice-breaking vessels completed its journey. That transformational moment drives home both the opportunity and the imperative for the United States, a Nation with an important Arctic presence, to ready itself for the new Arctic.

The oceans are a primary source of food for over one billion people; a globally significant regulator of the earth's weather and climate; the basic source of water for the hydrologic cycle; a cleaning agent that absorbs carbon dioxide and generates oxygen; and home to thousands of flora and fauna, many with pharmaceutical value. A wide gulf often separates science from the people who need it to protect and support their well-being.

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In 2014, the ocean economy employed more people in the U.S. than the telecommunications, crop production, and building construction industries combined. Additionally, if the nation's coastal counties were considered an individual country, they would rank number three in global GDP, behind only the U.S. and China. The Great Lakes alone generated nearly \$5 trillion in economic output or about 30% of combined U.S. and Canadian economic production.

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 grew to over \$14 billion in 2016. NAML laboratories are leaders in developing and supporting innovative methods that will improve and encourage sustainable U.S. aquaculture products that complement, not compete with, existing US commercial fisheries.

The U.S. marine transportation system is a major driver of the U.S. economy and its impact reaches into the heartland of the nation. America's seaports are crucial generators of economic development and well-paying jobs, regionally and nationally, throughout all supply chains that use the ports. Long-term sustainability of such critical ocean-front infrastructure in the wake of shifting - and dynamic - environmental conditions is a significant concern addressed by marine laboratories, which typically share the same geographic proximity to the water.

All the issues identified above – and more – can be addressed, in part, through a vibrant ocean science and technology enterprise. Such an enterprise is fueled by the support provided by NAML laboratories.

The Role of Marine and Great Lakes Laboratories in America's Research and Education Enterprise

NAML advocates for the importance of marine and freshwater science and education to America's health, security and productivity. NAML seeks to: champion the national value of marine and Great Lakes research, infrastructure, monitoring and observing, education, and outreach; advocate for robust merit-based federal funding programs to address societal needs,; enhance the capabilities and networking of Marine and Great Lakes laboratories to serve the Nation's coastal information needs and contribute to the education and training of a diverse workforce for the future.

The national network of Marine and Great Lakes science laboratories are place-based national assets. Their geographic reach includes estuaries, the coastal zone, the Great Lakes and inland watersheds, all the oceans of the world including polar regions, and the sea floor. They connect scientists, students, public and civic leaders with leading edge science, environmental intelligence, and professional training that contributes to the management and stewardship of our oceans, coastal zones and Great Lakes. NAML laboratories share common mission elements and broad expertise:

- To produce and assimilate knowledge of world oceans, coastal zones, Great Lakes and watersheds;
- To train future generations of marine and freshwater scientists, resource managers, and civic leaders;
- To inspire public and civic understanding and stewardship of marine and freshwater resources; and
- To inform preservation, restoration, management and utilization of marine and freshwater resources.

The intersection of ocean, coastal zone and Great Lakes natural resources and U.S. economic activity is complex and highly interdependent. The U.S. depends on healthy marine and freshwater resources, yet many economic activities have the potential to damage these resources, putting jobs, wages and gross domestic product (as well as human health and well-being) at risk. Marine Laboratories operate at this interface of human socioeconomics and the natural aquatic world. They provide access to the full spectrum of marine and Great Lakes habitats. Often affiliated with universities, marine laboratories are research, monitoring and placed-based teaching platforms that support faculty scientists, graduate and undergraduate students, and public/civic outreach activities to promote stewardship and informed environmental and business management practices. Programs such as NSF's ocean, earth, polar, and biological research programs, NOAA's ocean and coastal programs, Sea Grant, EPA's Wetlands, Oceans and Watersheds, and other mission agency programs rely on marine and Great Lakes laboratories to contribute access,





knowledge, data, and technologies to help improve management of these natural assets and sustain their development as socioeconomic drivers.

Marine and Great Lakes science laboratories play a vital role in the decadal science priority themes identified in <u>Sea Change: 2015-2025 Decadal Survey of Ocean Sciences</u>. The report indicates that Marine and Great Lake science laboratories are *critical* or *important* for several of the priority questions, including studies of coastal food webs, ecosystem biodiversity, and human impacts on coastal environments. NSF support of field stations and marine laboratories provides much-needed infrastructure and capital improvements that enhance the quality of scientific research and engagement with the public. Recent efforts by NSF to promote networking and data sharing among field laboratories will provide further opportunities for research and education. <u>Sea Change</u> *identifies marine and Great Lakes laboratories as having a high degree of relevance towards priority research questions with lower costs than other marine infrastructure*.

Conclusion

Innovation and discovery builds new knowledge and technology, contributes to national competitiveness, improves living standards, and furthers social well-being. Research and development (R&D) is a major driver of innovation, and R&D expenditures reflect a nation's commitment to expanding capabilities in Science & Engineering (S&E), which in turn drives innovation. On January 18, the National Science Board released the biennial Science and Engineering Indicators 2018. The report finds that our competitors are continuing to accelerate the growth of their technologyintensive economies. The report documents how the S&E landscape — historically concentrated in the U.S., Europe, and Japan — is rapidly shifting as China and other countries continue to aggressively increase their R&D investments, threatening our ranking as the global leader in many S&E measures. Investments in research, related infrastructure, and education are essential for maintaining technological innovations and advancements that will help our society and a global population survive in rapidly changing times. NAML urges stronger investment into the research and education enterprise of the United States, to reverse the trend of the last 24 years that has left the United States trailing our international competitors. Every research dollar invested returns economic prosperity many times over. If the U.S. is to meet the environmental and economic challenges facing this country, we must make the necessary investments in our research and education enterprise. Nowhere is this need greater than for our ocean, coastal and Great Lakes communities – which serve the economy of our entire nation. Failure to act will put us further behind our competitors.

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APPENDIX TO NAML FY 2019 PUBLIC POLICY AGENDA FY 2019 Overview of the Administration's Budget Request for Agencies Important to the Ocean, Coastal, and Great Lakes Research and Education Community

On February 12, the administration released its <u>FY2019 Budget Request</u>. The President's budget features significant increases in DOD and other defense programs, a plan for a \$1.5 trillion public-private multi-year infrastructure initiative with a proposed \$200 billion in Federal funding, and, once again, dramatic reductions in specific non-defense programs (such as NIH, NSF, NOAA, and EPA).

OMB Budget Adjustments Due to Bipartisan Budget Agreement for FY2018 and FY2019 -- As OMB finalized the FY 2019 Budget, the Congress reached a bipartisan agreement to significantly raise the defense and non-defense discretionary spending caps in FY2018 and FY2019, and the President has signed these new caps into law. In light of the BBA, the administration also transmitted an "Addendum to the President's FY2019 Budget to Account for the Bipartisan Budget Act of 2018."

"As reflected in the FY2019 Budget, the Administration strongly supports the overall defense spending levels included in the bipartisan cap deal. However, given the current fiscal situation, the Administration is not proposing a Budget at the new non-defense caps. The Administration does not believe these non-defense spending levels comport with its vision for the proper role and size of the Federal Government. However, we believe it is prudent to lay out the Administration's roadmap for how to account for these higher non-defense spending levels in a responsible manner. This addendum includes additional funding for a limited set of Administration priorities..."

The administration requests total defense discretionary spending of \$716 billion, the same as the newly raised defense cap. The defense budget is expected to track with the National Defense Strategy which emphasizes strategic competition with China and Russia means which calls for investing in advanced capabilities, rather than solely increasing the size of the force. Similarly, the strategy's language on force employment suggests a recalibration in favor of preserving readiness at the expense of some presence activities that are not focused on improving the military's ability to deter or respond to conflict.

For non-defense spending, the administration requests \$540 billion, the addendum adds \$75 billion to the FY2019 Budget, but this is still \$57 billion below the newly raised non-defense cap agreed to last week that allows non-defense spending of \$605 billion. The request for non-defense programs brings total non-defense spending to about the FY2017 level.

The President's budget also contains workforce reduction plans for many agencies. These plans rely on hiring freezes, buyouts, and provisions making it easier for agencies to release or terminate the employment of Federal employees.

Similar to the FY2018 request a large number of non-defense discretionary programs are proposed for elimination including: Sea Grant and other ocean and coastal grant programs, and the NOAA Office of Education, a reduction of some \$273 million; the Advanced Research Projects Agency - Energy (a reduction of \$305 million); the USAID Global Climate Change Initiative; and five Earth Science Missions at NASA including Radiation Budget Instrument (RBI), Plankton, Aerosol, Cloud; ocean Ecosystem (PACE), Orbiting Carbon Observatory-3 (OCO-3), Deep Space Climate Observatory (DSCOVR) Earth-viewing instruments, and Climate Absolute Radiance and Refractivity Observatory (CLARREO) Pathfinder (a savings of \$133 million).

Agencies slated for closure in the proposed budget include the Corporation for National and Community Service, Corporation for Public Broadcasting, Institute of Museum and Library Services, the National Endowment for the Arts, and the National Endowment for the Humanities. The FY2019 Budget moves the Agency for Healthcare Research and Quality to within the National Institutes of Health, but reduces the funds currently supporting AHRQ. With the





new spending caps in place for FY2019 and this being an election year, Congress can be expected to oppose many of these reductions.

For the <u>National Science Foundation</u> (NSF), the administration's addendum would provide an additional \$2.204 billion to NSF, bringing the FY2019 NSF request to a total of \$7.472 billion, the same as the FY 2017 appropriated amount. The Administration's budget shows that without the addendum, it would have requested a reduction of 30% below the FY2017 level. With the addendum, Research and Related Activities increases by 2%, while NSF Education and Human Resources would remain at the FY2017 level. Funding for the Major Research Equipment and Facilities Construction account would decline by 56% or \$120 million.

The increase for the Research & Related Activities account will allow NSF to invest in priority areas centered on accelerating focused, cross-disciplinary efforts around two of the NSF Big Ideas - The Future of Work at the Human-Technology Frontier, and Harnessing the Data Revolution. The requested increase would also support beginning construction on the Antarctic Infrastructure Modernization for Science project. The reduction for the Major Research Equipment & Facilities Construction account is largely due to the support for two new Regional Class Research Vessels.

For the National Oceanic and Atmospheric Administration (NOAA), the Administration is requesting \$4.6 billion NOAA which is \$1.1 billion or 19% below the FY 2017 level. NOAA is not included as one of the "add backs" in the addendum. Notable terminations in the NOAA budget include: Sea Grant, Coastal Zone Management Grants and Regional Coastal Resilience Grants, the National Estuarine Research Reserve Systems, NOAA Education programs, arctic research, the Prescott grant program, the reef fish stock assessment program, the Big Earth Data project, and the Research Transition Acceleration Program. Those programs proposed for substantial reductions include: elimination of the climate competitive research activity (this was a \$60 million program in FY 2017); the ocean exploration program, reduction in the IOOS program of \$11 million; reduction in the tsunami warning system (\$11 million); reduction in numerical weather prediction models and the national water model; reduce the ocean acidification research activity by \$2.4 million; regional climate centers would be reduced by \$2.4 million; and reduce the marine debris program by nearly \$500,000.

Areas or programs where NOAA is proposing modest increases despite an overall bottom line that declines by nearly 20% include: restore core capabilities at the National Weather Service; support increased costs for NOAA aircraft facility; improve disaster preparedness; strengthening NOAA's future satellite capabilities; maintenance of core geospatial and oceanographic data and products; and facilitate commercial space marketplace.

With respect to aquaculture, a priority area for the Department of Commerce and NOAA, support for NOAA's Office of Aquaculture is proposed to be \$9.3 million, an amount equal to the FY 2017 level. The aquaculture research component within Sea Grant (approximately \$9 million in FY 2017) is eliminated as part of the Administration's proposal to terminate the Sea Grant program. Also eliminated via the Sea Grant proposal would be the Knauss Fellowship program and other Sea Grant education activities.

NOAA Research (Office of Oceanic and Atmospheric Research - OAR) would decline in this budget proposal to a level of \$321.7 million which is about 37% below the comparable FY 2017 level. In addition to the proposed termination of Sea Grant and other ocean and coastal grant programs, other notable reductions include:

- \$60 million reduction in various climate research activities;
- \$14 million reduction for weather related cooperative institutes and laboratories;
- \$9 million to eliminate the joint technology transfer initiative;
- \$16 million reduction to ocean exploration;
- \$2.4 million reduction to ocean acidification from \$10.4 million in FY 2017 to \$8 million in FY 2019.

The National Ocean Service (NOS), in the FY 2019 budget request would decline by nearly 30% from the FY 2017 level. In the Navigation, Observations, and Positioning program support would decline by \$7 million via the





elimination of a single-year grant to the joint ocean and coastal mapping center in Mississippi and the elimination of geospatial modeling grants. The IOOS Regional Observations program would decline by about 30% or \$11 million to a level of \$19.4 million. The \$10 million competitive research program in Coastal Science and Assessment would be eliminated. The Coastal Science, Assessment, Response and Restoration would increase relative to FY 2017 by \$773,00 to a level of \$74 million. Coastal Zone Management Grants and the National Estuarine Research Reserve System programs would be terminated. Sanctuaries and Marine Protected Areas would be funded at \$49.7 million which is about \$1 million below the FY 2017 level.

The <u>National Marine Fisheries Services (NMFS)</u> would decline to \$837.3 million which is about 15% below the FY 2017 level. Under this proposal NMFS would terminate the Prescott Marine Mammal Stranding program, Interjurisdictional Fisheries Grants, Cooperative Enforcement Program with coastal states and territories to enforce marine conservation law; and reef fish stock assessments in the Gulf of Mexico. NOAA's Enforcement Program is proposed to decline by \$18 million or 26% below the FY 2017 level. Such a reduction could adversely impact NOAA's efforts to detect and deter Illegal, Unreported and Unregulated (IUU) fishing and enforce restrictions on imports of illegally-harvested and improperly-documented seafood.

The **National Weather Service** is requesting \$1.1 billion which is virtually equal to the FY 2017 level. Within this budget, NWS would increase its support for the restoration of core capabilities; increase by \$5 million its Advanced Weather Interactive Processing System (AWIPS) updates; and enhance the resilience and reliability of integrated dissemination program applications. Areas slated for reduction include \$15.5 million to reduce surface and marine observations by reducing the National Mesonet Program; reduce the tsunami warning program by \$11 million; reduce the investment in the National Water Model; reduce the NWS information technology workforce by \$10 million through consolidation of IT support services; reduce the NWS workforce by nearly 250 positions by implementing the Operations and Workforce Analysis plan; save \$2 million by terminating aviation science research to operations efforts; save \$1.2 million via the consolidation of the Climate Prediction Center and Weather Prediction Center; reduce investment in numerical weather prediction modeling by \$5 million; terminate NWS support for the COASTAL Act which among other things produces detailed post-storm assessments in the aftermath of severe storms; reduce by \$3 million support for the National Water Model;

The National Aeronautics and Space Administration (NASA) budget request for FY2019 is \$19.9 billion, an increase of about 1.2% over the FY2017 level; these numbers include the addendum that added \$300 million to NASA's request. NASA's Science Account would be funded at \$5.9 billion which is 2.3% over the FY2017 level. The addendum specifies that the additional \$300 million in the Science account would support lunar science research and technology development of future power systems for solar system exploration. Within the funding for the Science Account, Earth Science would decline to \$1.784 billion which is 7% below the FY2017 level. Earth Science would see the cancellation of five Earth Science Missions at NASA including Radiation Budget Instrument (RBI), Plankton, Aerosol, Cloud; ocean Ecosystem (PACE), Orbiting Carbon Observatory-3 (OCO-3), Deep Space Climate Observatory (DSCOVR) Earth-viewing instruments, and Climate Absolute Radiance and Refractivity Observatory (CLARREO) Pathfinder.

The <u>Department of Defense (DOD)</u>-- The FY 2019 Budget Request for DOD's Base Budget is \$647 and an additional \$69 billion for the Overseas Contingency Operations (OCO) account for a total budget of \$716 billion (Base +OCO). Total DOD Research, Development, Test, and Evaluation level is \$92.4 billion. Of this amount, \$18.6 billion is slated for the Navy which represents an increase of 8.3% over the FY 2017 level. Within the **Navy**, basic research would grow to \$597 million, an increase of 6%. Within the 6.1 program, Defense Research Sciences would increase to \$459 million which is an increase of 8.5%. At the same time, University Research Initiatives would decline by almost 2% (down to \$119.4 million). Navy applied research (6.2) and Navy advanced technology development (6.3) would each decline by 9%.

For the <u>National Institutes of Health</u>, the Budget requests a total of approximately \$34.8 billion, plus supplemental funding to help address the opioid epidemic. This includes the additional \$9 billion included in the addendum. However, the administration's proposal would consolidate the activities of the Agency for Healthcare Research and





Quality (AHRQ) into a National Institute for Research on Safety and Quality (NIRSQ) under the auspices of NIH. Similarly, programs currently administered by the Centers for Disease Control and Prevention (CDC), such as the National Institute for Occupational Safety and Health (NIOSH) are also shifted into the NIH portfolio. Thus, while the overall NIH budget would appear to increase, many programs across the Institutes and Centers could be adversely impacted by those consolidations.

At the Environmental Protection Agency (EPA) Categorical grants to help fund State environmental program offices and activities for such activities as the Clean Air Act, Clean Water Act, and Safe Drinking Water Act. The administration proposes to reduce many of these grants and eliminate others declining by \$469 million from the FY2017 level of \$1 billion. In the addendum, the administration adds \$724 million to EPA: an additional \$327 million to the Hazardous Substance Superfund account largely for the Superfund Remedial program, and an additional \$397 million to the State and Tribal Assistance Grants account for the Clean Water and Drinking Water State Revolving Funds (SRF). The Administration is proposing to terminate most the Geographic Programs such as the Gulf of Mexico, Lake Champlain, Puget Sound programs. For the Great Lakes Restoration Initiative funding would drop from \$300 million to \$30 million. The National Estuary program would be reduced to zero from its FY 2017 level of \$27 million. Beach and fish programs would also be zeroed out. Water Quality Research Projects, worth a total of \$12.6 million that were added in by the Congress in FY 2017 would be terminated. Overall R&D at EPA would decline by 37% under this budget proposal. EPA is not included in the "add back" contained in the Administration's Addendum to the FY 2019 Budget Request.

For the <u>U.S. Geological Survey (USGS</u>), the Administration is requesting \$860 million, \$223 million or 25% below the FY 2017 level. The 2019 budget provides \$92.3 million for Core Science Systems. This is \$23 million below the FY 2017 level. The budget includes \$50.9 million for the National Geospatial Program, a reduction of \$16 million. Within that \$16 million reduction is a proposed reduction of \$7.3 million for 3DEP. The National Cooperative Geological Mapping Program would be funded at \$23 million, a reduction of \$2 million from the FY 2017 level. The request provides for continued collection of high-resolution elevation (3DEP) and hydrography data for the Nation, including modernizing maps for Alaska and complete national lidar coverage by 2033. The budget also includes \$22.4 million for leveraged geologic mapping activities in coordination with States, which are important for infrastructure, resource development, and mitigation of hazards. Support for Earthquake Hazards would decline by nearly \$13 million below the FY 2017 level. <u>USGS is not included in the "add backs" contained in the Administration's Addendum to the FY 2019 Budget Request</u>.

The <u>Bureau of Ocean Energy Management (BOEM</u>) is slated to receive \$129 million in appropriations (an increase of \$17 million) plus \$50 million in offsetting collections from offshore rental receipts and other cost recoveries. In 2019, BOEM will continue to advance renewable energy through a leasing program and streamlining of its permitting and National Environmental Policy Act processes. The BOEM continues to support renewable energy development spurred by the renewable energy goals of coastal States. <u>BOEM is not included in the "add backs" contained in the Administration's Addendum to the FY 2019 Budget Request.</u>

Department of State's <u>Oceans and International Environmental and Scientific Affairs</u> (OES) program would be funded at a level of \$65.9 million, an amount similar to FY 2017. Funds will be used to support countries to phase out ozone depleting substances under the Montreal Protocol to protect U.S. citizens from skin cancer and cataracts and support global market-leading U.S. companies by promoting global adoption of advanced air conditioning and refrigeration technology. Funds will also be used to meet the annual commitment to Pacific Island partners, which secures access for U.S. vessels to lucrative fishing grounds thus supporting economic opportunities for Americans. <u>OES is not included in the Administration's "add backs" contained in the Administration's Addendum to the FY 2019</u> Budget Request.