

**Testimony for the Record  
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President, National Association of Marine Laboratories  
for the  
Subcommittee on Commerce, Justice, and Science, and Related Agencies  
Committee on Appropriations  
United States Senate  
Washington, D.C.  
April 2020**

The National Association of Marine Laboratories (NAML) is submitting testimony that considers the impact of the COVID-19 pandemic that has gripped the country. The pandemic has fundamentally and dramatically changed our way of life for the foreseeable future. In less than four months, we have seen nearly every person, business, government, educational enterprise, health care system, and societal institution adversely impacted in previously unimaginable ways. Since the pandemic was detected in this country in January of this year, the interconnectedness of the world in which we live has been clearly demonstrated. This nation has been challenged before and has proven its resilience and ability to rise to the occasion. We must do so again while also learning from this pandemic to be better prepared for such challenges in the future.

***As most NAML laboratories are housed at academic institutions we are acutely aware of the impacts of this pandemic upon our research and educational enterprise. NAML requests supplemental funding for federal research agencies to support emergency paid leave for grant personnel – including students, post docs, technicians, and other support staff. Federal Agencies have provided some flexibility to continue to pay the salaries of grant personnel, but without supplemental support, grant funding will be depleted long before sponsored projects can be resumed and completed. Marine and freshwater laboratories at institutions of higher education face significant challenges in continuing to meet payroll obligations for graduate students, postdocs, and other research grant funded personnel where work has necessarily been suspended. We urge the Subcommittee to ensure that research agencies have the financial resources to help our institutions and principal investigators address the issues below as well as the ability to provide the grantees and their institutions with maximum flexibility in addressing these difficult circumstances. We strongly recommend funding in the next COVID-19 stimulus bill to alleviate the impact on our facilities and personnel and in so doing sustain the nation’s current and future research workforce and capabilities.***

**Issues of Concern/Areas for Investment**

- The education and training of, and loss of support for our students. Our laboratories play an important part of their education in that they provide unique, place-based experiential learning opportunities. At the same time many students are supported, in whole or in part, via the research grants our principal investigators are awarded. Many of these opportunities have been suspended for the foreseeable future with the consequence being the loss of support we typically provide our students. This creates additional hardships for the students.
- Salaries for graduate students, post-doctoral researchers, other research personnel, and laboratory technicians are often fully funded by federal grants. Campuses are responding to



COVID-19 public health recommendations and working diligently to ensure the safety of their employees and to accommodate work from home scenarios for researchers who can work remotely. However, many research projects not related to COVID-19 are suspended due to campus closures.

- Expenses to ramp-down and suspend federally sponsored work and eventual ramp-up costs to resume research activities include: loss or necessary destruction of cell cultures and biological samples, disposal of hazardous materials and other environmental safety costs, care for live specimens, and in some cases replacement of specimens, and restarting experiments that could not be completed due to the closure of research facilities, inability of personnel to conduct fieldwork, or missed seasonal opportunities;
- Recovery costs for federally funded services that researchers, students and staff perform for data acquisition, computational analysis, interpretation and deposition in national databases that inform national management strategies and policy.

Federal agencies are working with our institutions to minimize the pandemic's impact and the enactment by Congress of the CARES Act is a helpful step in terms of supporting our first responders, those who are now unemployed, small businesses, hospitals and healthcare providers, and industries hit hardest by this pandemic. However, the impacts and consequences of this pandemic run deep and additional relief and economic stimulation will be needed in additional legislation.

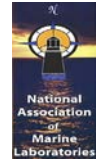
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### **Economic Stimulus - The Blue Economy Initiative**

Once the immediate outbreak is partially contained and officials deem it is time to begin to restore our lives and livelihoods, there will undoubtedly be a need for additional assistance to re-start the economy and all the societal elements that contribute to our quality of life.

As marine and freshwater laboratories, we see the role our ocean, coasts, and Great Lakes can play in helping to revitalize our overall economy through a specific focus on the ocean or blue economy. There are some estimates that put the value of the ocean to the world's economy at an estimated \$24 trillion, making it the world's seventh largest economy. According to the Organization for Economic Cooperation and Development, by 2030 the blue economy could outperform the growth of the global economy as a whole. In the U.S. NOAA estimates that the ocean economy has been growing at twice the rate of the rest of the U.S. economy, employing 3.2 million people and contributing \$320 billion.

We find ourselves in some of the most challenging times our nation has ever faced. Government at all levels is being called upon to respond, as is nearly every other facet of our society. Challenging times require bold and impactful actions. NAML believes this Subcommittee could significantly impact the blue economy by enacting, as part of a larger economic stimulus package, a strategic investment in the ocean, coastal, and Great Lakes enterprise through investments in research and related infrastructure; next generation observation platforms; advanced marine technology development; and the development of the "blue" workforce.



Given the importance and impact we believe the blue economy can make to the improved health and well-being of our citizens, NAML proposes a billion-dollar ***Blue Economy Initiative*** to aid the nation in recovering from the damage brought on by the COVID-19 pandemic. We recognize that a considerable number of Federal agencies are involved in the federal ocean science and technology enterprise with distinct roles and responsibilities. We will focus on the two agencies that are within the jurisdiction of this Subcommittee and have particularly significant roles in supporting the science and technology that underlies the foundation of our blue economy.

### **National Science Foundation**

**Ocean Science Research for Human Health** – The ocean, covering 75% of the planet, is full of potential human-health assets. In recent decades, scientists have discovered whole new ecological communities in the ocean with unique biochemical systems, such as those associated with thermal vents and hydrocarbon seeps. These communities hold huge possibilities for development of products to improve human health and well-being. Prior discoveries that now have practical applications include anti-cancer drugs, diagnostics, molecular probes, and nutrients.

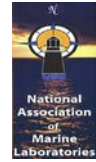
**Ocean Science Research for the Blue Economy** – Increase merit-based research related to “omics; sustained coastal and ocean data collection; comprehensive understanding of ecosystems; and adaptive management strategies to increase productivity and sustainability of marine fisheries and the social-economic productivity of U.S. exclusive economic zones; harmful algal blooms, ocean acidification and hypoxia, sea level rise and extramural research and education activities related to restoration of the Great Lakes. Support for NSF Big Idea – Navigating the New Arctic. Research should also be focused on the key challenges laid out in *Sea Change* – the National Academies’ report on ocean science priorities.

**Academic Research Fleet** – Support to re-start and continue operations for all vessels within the UNOLS Academic Research Fleet with sufficient operational support for the fleet to be fully utilized to its capacity for the next three years; expanded efforts to modernize the UNOLS fleet with the next generation research vessels, observing platforms, unmanned surface and subsurface vehicles, artificial intelligence, quantum computing, advanced computing and data analysis, etc.; funding sufficient for the acquisition of a next generation global class research vessel for the UNOLS fleet with state-of-the-art seabed and sub-seabed imaging capabilities, and on board educational and outreach capabilities.

**Next Generation Ocean Research Infrastructure** – Infrastructure support for ocean, coastal, and Great Lakes marine and freshwater labs, aquariums, and other related facilities through NSF’s Field Stations and Marine Laboratories Program, Major Research Instrumentation, and Mid-Scale Infrastructure initiatives; Ocean Observatories Initiative; and the International Ocean Discovery Program.

**Blue Workforce Development** – Support for graduate and undergraduate students, instructional resources, and public-facing programming that elevate ocean literacy and inspire careers in the ocean sciences.

**Presidential Ocean Exploration/Mapping Initiative** – This interagency effort is designed to develop and execute and strategic plan to map the U.S. Exclusive Economic Zone, explore and



characterize priority areas, partner with other entities, and integrate new and emerging technologies.

### **National Oceanic and Atmospheric Administration**

**Oceans for Human Health** – NOAA should partner with NSF, NIEHS, EPA and FDA given NOAA’s past Oceans and Human Health program. NOAA’s experience and assets combined with access to experts in marine science and other related fields across these agencies and within the nation’s marine and Great Lakes laboratories, could yield important advancements in pharmaceuticals, treatments, food security, and the interdependency of human and environmental health.

**Fisheries Assistance** – Additional assistance to tribal, subsistence, commercial, and charter fishery participants impacted by COVID-19, including assistance to fishing communities, aquaculture, young commercial fisherman professional development including fisheries extension and outreach via relevant current NOAA programs, such as Sea Grant.

**Coastal Communities Resilience** - Through the existing Title IX program and the National Sea Grant College Program to help coastal communities establish economic and environmental resilience actions that will spur economic growth while planning strategically to adapt to changing environmental conditions.

**Next Generation Marine Technology Development and Research Infrastructure** – Including modernizing research vessels, observing platforms, unmanned surface and subsurface vehicles artificial intelligence and quantum computing deployment, and commercial engagement through ocean technology.

**Research Centers and Management Support** -For the personnel and activities at NOAA Cooperative Institutes, labs, and centers; extramural ocean, coastal, and Great Lakes laboratories, Sea Grant College programs, integrated ocean observing systems, national estuarine research reserve system sites, national marine sanctuaries operations.

**Blue Workforce Development** – Support for NOAA education programs focused on the undergraduate level; graduate training; the Jose Serrano Educational Partnership Program; and public science education activities at museums, aquaria and zoos.

**Presidential Ocean Exploration/Mapping Initiative** – This interagency effort is designed to develop and execute and strategic plan to map the U.S. Exclusive Economic Zone, explore and characterize priority areas, partner with other entities, and integrate new and emerging technologies.

### **Conclusion**

Our nation has faced great adversity in the past and has always proven resilient and risen to any challenge. We will do so again with strategic investments for a robust recovery that includes our Ocean Research, Education and Economic Enterprise.



On behalf of the members of NAML listed below, thank you for the opportunity to submit this statement.

| <b>Host Institution</b>                           | <b>Laboratory/Facility</b>                             |
|---|--|
| Alabama's Marine Science Institution              | Dauphin Island Sea Laboratory                          |
| Bermuda Institute of Ocean Sciences               | Bermuda Institute of Ocean Sciences                    |
| Bigelow Laboratory for Ocean Sciences             | Bigelow Laboratory for Ocean Sciences                  |
| Bowdoin College                                   | Schiller Coastal Studies Center                        |
| California State University                       | Moss Landing Marine Laboratories                       |
| Central Michigan University                       | CMU Institute for Great Lakes Research                 |
| College of Charleston                             | Grice Marine Laboratory                                |
| Cornell University, University of New Hampshire   | Shoals Marine Laboratory                               |
| Duke University                                   | Duke University Marine Lab                             |
| East Carolina University                          | Coastal Studies Institute, Integrated Coastal Programs |
| Eckerd College                                    | Galbraith Marine Science Center                        |
| Florida Atlantic University                       | Harbor Branch Oceanographic Institute                  |
| Florida Fish and Wildlife Conservation Commission | FWC Fish and Wildlife                                  |
| Florida Institute of Oceanography                 | Keys Marine Laboratory                                 |
| Florida State University                          | Florida State University Coastal and Marine Laboratory |
| Grand Valley State University                     | Annis Water Resources Institute                        |
| Hubbs Sea World Research Institute                | Hubbs Sea World Research Institute                     |
| Humboldt State University                         | Telonicher Marine Laboratory                           |
| Jacksonville University                           | Marine Science Research Institute                      |
| Louisiana Universities Marine Consortium          | Louisiana Universities Marine Consortium               |
| Marine Biological Laboratory                      | Marine Biological Laboratory                           |
| Michigan Technological University                 | Great Lakes Research Center                            |
| Monterey Bay Aquarium Research Institute          | Monterey Bay Aquarium Research Institute               |
| Morgan State University                           | Patuxent Environmental and Aquatic Research Center     |
| Mote Marine Laboratory                            | Mote Marine Laboratory                                 |
| Natural History Museum of Los Angeles County      | Research & Collections Branch                          |
| New College of Florida                            | Pritzker Marine Laboratory                             |
| North Carolina State University                   | Center for Marine Sciences and Technology              |
| Northeastern University                           | Northeastern University Marine Science Center          |
| Ohio State University                             | Stone Laboratory on Lake Erie                          |
| Old Dominion University                           | Dept. of Ocean, Earth and Atmospheric Sciences         |
| Oregon State University                           | Hatfield Marine Science Center                         |
| Prince William Sound Science Center               | Prince William Sound Science Center                    |



| <b>Host Institution</b>                            | <b>Laboratory/Facility</b>                         |
|--|--|
| Roger Williams University                          | Marine Laboratory                                  |
| Rutgers University                                 | Institute of Marine and Coastal Sciences           |
| San Francisco State University                     | Estuary & Ocean Science Center                     |
| San Luis Obispo University                         | Center for Coastal Marine Sciences                 |
| Sanibel-Captiva Conservation Foundation            | Sanibel-Captiva Conservation Foundation            |
| Savannah State University                          | Marine Science                                     |
| Seattle Pacific University                         | Blakely Island Field Station                       |
| Sitka Sound Science Center                         | Sitka Sound Science Center                         |
| Smithsonian Institution                            | Smithsonian Marine Station at Fort Pierce          |
| South Carolina Aquarium                            | South Carolina Aquarium                            |
| Southern California Coastal Water Research Project | Southern California Coastal Water Research Project |
| Stanford University                                | Hopkins Marine Station                             |
| State University of New York                       | School of Marine & Atmospheric Sciences (SoMAS)    |
| Stockton University                                | Marine Field Station                               |
| Texas A&M University                               | Geochemical and Environmental Research Group       |
| Texas A&M University, Corpus Christi               | Conrad Blucher Institute                           |
| Texas A&M University, Corpus Christi               | Harte Research Institute                           |
| Texas A&M University, Galveston                    | Dept. of Marine Biology                            |
| University of Alaska, Fairbanks                    | Kasitsna Bay Marine Laboratory                     |
| University of California, Berkeley                 | Richard B. Gump South Pacific Research Station     |
| University of California, Davis                    | Bodega Marine Laboratory                           |
| University of California, San Diego                | Scripps Institution of Oceanography, UCSD          |
| University of California, Santa Cruz               | Institute of Marine Sciences/Long Marine Lab       |
| University of Connecticut                          | Marine Sciences/CT SeaGrant                        |
| University of Delaware                             | School of Marine Science and Policy                |
| University of Florida                              | Nature Coast Biological Station                    |
| University of Florida                              | Whitney Laboratory for Marine Bioscience           |
| University of Georgia                              | Marine Institute at Sapelo Island                  |
| University of Georgia                              | Skidaway Institute of Oceanography                 |
| University of Guam                                 | University of Guam Marine Laboratory               |
| University of Hawaii                               | Hawaii Institute of Marine Biology                 |
| University of Hawai'i at Manoa                     | Kewalo Marine Laboratory                           |
| University of Maine                                | Darling Marine Center                              |
| University of Maryland                             | Chesapeake Biological Laboratory                   |
| University of Maryland                             | Horn Point Laboratory                              |



| Host Institution                          | Laboratory/Facility                                  |
|---|--|
| University of Massachusetts, Boston       | Nantucket Field Station                              |
| University of Miami                       | Rosenstiel School of Marine and Atmospheric Sciences |
| University of Mississippi                 | National Center for Natural Products Research        |
| University of New England                 | Marine Science Center                                |
| University of New Hampshire               | Jackson Estuarine Laboratory                         |
| University of North Carolina, Chapel Hill | Institute of Marine Sciences                         |
| University of North Carolina, Wilmington  | Center for Marine Science                            |
| University of North Florida               | Coastal and Marine Biology Flagship Program          |
| University of Oregon                      | Oregon Institute of Marine Biology                   |
| University of Rhode Island                | Graduate School of Oceanography                      |
| University of South Carolina              | Belle W. Baruch Institute                            |
| University of South Florida               | College of Marine Science                            |
| University of Southern California         | Wrigley Marine Science Center                        |
| University of Southern Mississippi        | Gulf Coast Research Laboratory                       |
| University of Texas                       | Marine Science Institute                             |
| University of Texas Rio Grand Valley      | Coastal Studies Lab                                  |
| University of Washington                  | Friday Harbor Laboratories                           |
| University of Wisconsin, Milwaukee        | School of Freshwater Sciences                        |
| Virginia Institute of Marine Science      | Virginia Institute of Marine Science                 |
| Walla Walla University                    | Rosario Beach Marine Laboratory                      |
| Williams College at Mystic Seaport        | The Maritime Program                                 |
| Woods Hole Oceanographic Institution      | Woods Hole Oceanographic Institution                 |