

***A National Imperative to Understand the Deep Ocean
Conclusions from the 18th Meeting of the Ocean Exploration Advisory Board***

America's future depends on understanding the ocean. We explore the ocean because its health and resilience are vital to our lives, our well-being, and our economy. We depend on the ocean to regulate weather and climate; sustain a diversity of life; for maritime shipping and national defense; and for food, energy, medicine, and other essential services to humankind.

In late 2016 the Ocean Exploration Advisory Board (OEAB) began its advice to the NOAA Administrator with a similar statement of purpose. The Board then identified directions the program should take to meet the need for high quality scientific information:

- (i) commit to full mapping and characterization of the nation's Exclusive Economic Zone (EEZ) in sufficient detail to inform decision makers how best to manage the rich ocean resources that are our nation's heritage;
- (ii) complete the assessment of the Extended Continental Shelf to substantiate claims of sovereignty in those areas;
- (iii) adopt a campaign strategy to maximize the value of NOAA-funded exploration expeditions;
- (iv) increase partnerships with other ocean explorers, both domestic and international; and,
- (v) raise the funding level for NOAA's ocean exploration program to \$75 million.

Since then, NOAA and its partners have made substantial progress in many of these areas:

- (i) The new National Strategy for Mapping, Exploring, and Characterizing the U.S. Exclusive Economy Zone charts how best to achieve a full baseline understanding of the nation's deep ocean resources.
- (ii) NOAA has completed its work to characterize the Extended Continental Shelf.
- (iii) NOAA has used an extensive public forum, coordinated through the Consortium for Ocean Leadership, to plan a campaign strategy for upcoming expeditions in the Pacific.
- (iv) NOAA has established an operational partnership with the Ocean Exploration Cooperative Institute (OECI) and has expanded cooperation with a number of philanthropic and privately funded ocean exploration entities. The initial report of the OEAB's Blue Economy Subcommittee recognizes that we need a better

understanding of the ocean to improve our stewardship of ocean resources. Importantly, these findings align closely with the spirit of the United Nation's Decade of Ocean Science for Sustainable Development, which commences in January 2021. NOAA has released a series of strategies to advance new technologies.

- (v) While the budget for NOAA's ocean exploration activities has never approached the \$75 million the Board recommended, Congress has routinely appropriated double the President's 2016 request.

Much remains to be done, and the work of the past few years has revealed new opportunities. The Board believes that NOAA's Ocean Exploration program, although small, is well placed to continue to lead a national program of ocean exploration. To succeed as a leader on the national and international stage, the Board suggests concentrated efforts in the following key areas:

- **Leadership.** NOAA's leadership in ocean exploration should be active and purposeful. If NOAA is the logical and capable leader of domestic ocean exploration, the United Nations Decade for Ocean Science in Support of Sustainable Development provides a framework for NOAA to lead through science diplomacy and collaboration with foreign partners and maritime nations without ocean exploration capabilities,
- **The Blue Economy.** The Blue Economy is a critical part of the U.S. economic recovery post-COVID. The OEAB Blue Economy Subcommittee Interim report includes recommendations that will accelerate sustainable economic development and recovery in sectors that depend on the ocean, whether in technology, mariculture, renewable energy, or recreation and tourism. Ocean exploration provides essential data and information to support the Blue Economy and is an essential economic stimulus.
- **Human Resources.** The relationship of humans to exploration must be rethought. We are far beyond the model of intrepid explorers setting sail for distant lands. Modern satellite-based communications now permit explorers to engage in their work remotely via computer screens. But next-generation explorers must still be educated, motivated, and trained to work in teams that make use of emerging technology. Prioritizing scientific operational training for the current and next generation of explorers will result in a workforce that is primed for interdisciplinary problem solving and decision making under demanding conditions. NOAA and its partners have made commendable efforts to expand the diversity of their workforces. But special effort should be made to ensure that the next generation of ocean explorers is as diverse as our nation.
- **Water Column.** To complement expanded knowledge of the seabed, renewed attention should be directed at understanding of the overlying water column. How can the health of the oceans be maintained? What changes are underway in ocean currents, temperature, salinity, and acidity? How can this understanding be used to improve our stewardship of the ocean?

- **Data.** NOAA's ability to gather, archive, make available for public use and analyze the data from ocean exploration make it a natural partner, indeed leader, for explorers both at home and abroad: oceanographic processes do not recognize geopolitical boundaries. At home, NOAA should work with partners to ensure that all federally funded data resources are publicly available and accessible, and to transform data to useful information that can be used to stimulate public interest in our oceans, including recognition of NOAA's role. Internationally, NOAA should collaborate with other ocean exploring nations and the cognizant international organizations to promote open exchange, and access to, data about the deep ocean.
- **Ships , Innovation & Technology.** The *Okeanos Explorer* has been an icon for NOAA's ocean exploration mission. The Board welcomes the prospect for a replacement vessel together with continuation of investments in pioneering innovation of advanced technologies for ocean exploration at the systems, platforms and sensors levels. NOAA investments in these areas are necessary, but not sufficient. Strong relationships with other federal agencies, philanthropic organizations, and academic institutions will allow NOAA to leverage other investments and assets to help meet national priorities.
- **Public Engagement.** NOAA and its partners have made commendable efforts to expand public interest in our oceans. Telepresence-based exploration allows NOAA to reach the public across the nation and beyond, and NOAA outreach and education programs bring ocean exploration results into classrooms and living rooms everywhere. NOAA should capitalize on its many opportunities to connect with the public, mindful of the imperative to reach underrepresented communities. For example, NOAA should resume the valued series of National Ocean Exploration Fora and seek opportunities to use the NOAA Ship *Okeanos Explorer*, its successor, other ships in the NOAA fleet, and partner vessels to increase public appreciation of and support for ocean exploration.

Still, more needs to be done. To stay relevant and effective in a fast-changing and dynamic media environment, NOAA should develop new media partnerships for direct outreach to increase public awareness of the national ocean exploration program, to prove its value, and to increase human curiosity and understanding of the ocean and its resources.