

Ocean Exploration Advisory Board

A Federal Advisory Committee Act Board

November 22, 2024

Dr. Richard W. Spinrad
Under Secretary of Commerce for Oceans
and Atmosphere and NOAA Administrator
14th and Constitution Ave. NW
Washington, DC 20230

Dear Dr. Spinrad,

On May 14–15, 2024, the Ocean Exploration Advisory Board (OEAB) convened to discuss NOAA's ocean exploration mission. We are pleased to report on the outcomes of our discussions and to offer advice for advancing NOAA's ocean exploration priorities.

The Board members unanimously express our deep appreciation for NOAA Ocean Exploration's steadfast commitment to understanding our ocean. We acknowledge the program's ongoing efforts to leverage advancements in marine technology and research, enhancing the nation's ability to discover and document new marine ecosystems, geological features, and cultural heritage sites. These endeavors have significantly deepened our collective understanding of the ocean's complexities. We strongly advise NOAA to continue this forward-thinking and inclusive approach, further solidifying its leadership role within the ocean exploration community.

During our meeting, we had the opportunity to present you with a set of recommendations, which we appreciated discussing at length. The exchange was both engaging and insightful. *(a copy of the recommendations document is attached to this letter.)* Our discussions centered around several key areas where we believe NOAA can make substantial strides.

We emphasize the importance of making public engagement a front-end priority. By creating a participatory ocean exploration framework that actively involves local and Indigenous communities as partners in exploration activities, NOAA can enrich scientific data and ensure that diverse perspectives are considered in decision-making. Extending NOAA's exploration footprint beyond traditional boundaries to include shallower waters and areas beyond the U.S. Exclusive Economic Zone (EEZ) will expand the scope of research and foster inclusivity. Investing in community engagement will strengthen the public's connection to the marine environment and make ocean exploration more inclusive, meaningful, and sustainable.

Transforming collected data into accessible and actionable information products is another critical area. Prioritizing the deployment and use of middleware solutions and

data transformation layers will facilitate the translation of raw data into usable formats. Utilizing artificial intelligence and machine learning to process and organize vast amounts of data enables near real-time decision-making. Engaging with industry to develop scalable solutions will revolutionize how insights are derived from exploration data. This approach will create a robust data value chain, ensuring that data is Findable, Accessible, Interoperable, and Reusable (FAIR). By leading the development of interoperable data systems, NOAA can support the growth of the New Blue Economy and contribute to strategic imperatives such as climate adaptation, sustainable ocean uses, and national security.

We also highlight the need to drive strategic collaborations through innovative financial and legal strategies. Reinforcing the role of the National Ocean Mapping, Exploration, and Characterization (NOMECE) Council as a central coordinating body will catalyze the ocean exploration community around shared objectives. Adopting a Whole-of-Nation approach to coordinate investments and establish consensus-driven standards in technological, scientific, and operational aspects is essential for the success of the national program of ocean exploration. Leveraging the National Oceanographic Partnership Program (NOPP) can serve as a mechanism to fund priorities spanning multiple missions, enhancing research interoperability and efficiency.

In addition to these recommendations, we received an update on the transition from the NOAA Ship *Okeanos Explorer* to the new NOAA Ship *Discoverer*, anticipated to be commissioned in late 2027. Jeremy Weirich, Director of NOAA Ocean Exploration, shared details about the ship's basic design, proposed capabilities, and critical modifications currently under consideration. We are excited about the *Discoverer*'s enhanced capabilities and advise early engagement with stakeholders to consider the technological, operational, and scientific impacts this new vessel might contribute to the national program of ocean exploration. The Board views the transition to the *Discoverer* as a pivotal development for NOAA's leadership in ocean exploration, and we are committed to providing input and supporting this transition in any way we can.

The Ocean Exploration Advisory Board remains dedicated to supporting NOAA's mission to explore and understand our ocean. We believe that embracing these recommendations will help NOAA navigate challenges and opportunities, ensuring leadership in ocean exploration for the nation and the world. We stand ready to assist in these endeavors and look forward to continued collaboration.

Sincerely,

A handwritten signature in dark ink, appearing to read "Vicki Ferrini". The signature is fluid and cursive, with a large initial "V" and a stylized "F".

Dr. Vicki Ferrini
Chair, Ocean Exploration Advisory Board

**Recommendations to Dr. Richard Spinrad, Administrator, National
Oceanic and Atmospheric Administration (NOAA)
From
The Ocean Exploration Advisory Board (OEAB)**

Introduction

Over 20 years ago, the United States embraced the opportunity to strategically explore the ocean for national benefit, leading to the formation of NOAA Ocean Exploration. In the years since, the program has evolved to meet the challenges of exploring and understanding our ocean, sharing discoveries with the scientific community, policymakers, decision-makers, and the public. As deep-sea exploration has transitioned from a primarily governmental endeavor to one that spans all sectors and environments, NOAA Ocean Exploration must continue to adapt accordingly.

Dr. Richard Spinrad, the NOAA Administrator, tasked the Ocean Exploration Advisory Board (OEAB) with providing recommendations on how NOAA can facilitate the ocean exploration community into this next phase of exploration, discovery, and understanding.

The NOAA Ocean Exploration program serves as a catalyst for bridging gaps between discovery and the unknown, between data and its users, ultimately revealing the secrets of our submerged planet. Access to ocean knowledge and information improves lives, promotes stewardship of marine resources, and creates commercial opportunities for growth in a New Blue Economy built upon structured and interoperable data. Ocean exploration benefits everyone, allowing us to imagine a better future through the discovery of our world.

From this perspective, simply collecting data is not enough; data must be transformed into accessible information and knowledge that can be repeatedly used by diverse people for unique purposes. Respecting and enthusiastically including cultural and traditional ocean knowledge and practices—and offering the tools of discovery to local and Indigenous communities—are essential for growing our collective understanding of the marine environment. NOAA should embrace new approaches for exploration and partnerships that provide flexibility, integrate multiple (sometimes conflicting) perspectives, and deliver tangible societal benefits.

Recommendation 1: Make Public Engagement a Front-End Priority

Broaden the breadth and impact of ocean exploration by advancing partnerships and engagements beyond traditional boundaries by:

- Creating a participatory ocean exploration framework,
- Extending the scope of exploration activities to include shallower waters,
- Acquiring and integrating observational data from novel sources, with an emphasis on local and Indigenous communities.

NOAA is positioned to facilitate transformative changes throughout ocean exploration by making it a more inclusive and sustainable endeavor that values diverse perspectives and prioritizes accessibility across all sectors of society.

Engaging Communities Broadly and Inclusively

NOAA can democratize ocean exploration by intentionally broadening participation through virtual and in-person participatory science frameworks that encourage involvement from all sectors of society and promote multidirectional knowledge exchange. A truly national program offers knowledge and informed solutions to local coastal communities, Indigenous peoples, historically underrepresented groups, and communities with limited access to the ocean. Investing in this engagement creates opportunities to expand commerce in ways that benefit from and contribute to ocean exploration. This approach positions NOAA to enrich its robust research portfolio and strengthen the public's connection to, and stewardship of, the global ocean.

Expanding into Shallow Waters and Coastal Regions

By including shallow water exploration in its mission portfolio, NOAA Ocean Exploration can expand scientific and public understanding of connections between deep and shallow ocean processes that sustain and impact human societies—such as marine ecosystems, weather patterns, hazards, and climate change. Bridging shallow and deep water environments allows NOAA to foster greater community involvement through participatory engagement, enhanced stewardship, and improved appreciation of the global ocean.

Valuing Human Observations and Indigenous Knowledge

NOAA should embrace the value of human observations and unique perspectives, actively seeking ways to incorporate these vital sources of information into the tapestry of ocean exploration. Local and Indigenous communities have generations of experience

and unique insights into marine systems. Their observations of environmental changes—both natural and anthropogenic—hold enduring value for the nation as a whole.

Recommendation 2: Accelerate the Transformation of Data into Information Products

Model enhanced data-driven decision-making capabilities through the deployment and use of middleware solutions and data transformation layers by:

- Developing an ocean data transformation strategy,
- Investing in enterprise-level middleware technologies that facilitate real-time data processing and decision-making,
- Actively engaging industry to identify scalable solutions.

NOAA is in a position to revolutionize how researchers derive insights from exploration data. As one Board member put it, “Let the machines do the grunt work so that human brains can do the real thinking!”

Implementing Data Transformation Layers

Data transformation layers enable the rapid conversion of raw and processed data into information and knowledge products that can inform real-time operational decision-making. There is an immediate need for these tools to address the rapidly increasing volumes of digital data collected across the ocean exploration enterprise. By forging ambitious partnerships with industry leaders and leading the community to reach consensus on the value of interoperable datasets, NOAA can transform the value chain of ocean exploration data—essential for the widespread emergence and growth of the New Blue Economy.

Leveraging Middleware Solutions for Real-Time Processing

Middleware solutions—algorithms that reside between data collection systems and user interfaces—effectively translate various raw data formats, system parameters, and metadata into accessible data products. They serve as crucial intermediaries for the seamless integration of near real-time data processing. As innovation continues to spur the development of increasingly effective autonomous vehicles and sensors, and as biodiversity and ecosystem observations flood our data repositories, accelerating data transformation and analysis is paramount. The capability to deliver bespoke data and

information products in near-real time to decision-makers and stakeholders is a transformative foundation upon which the New Blue Economy will be built.

Contributing to National Strategic Imperatives

The proposed data enhancement strategies directly contribute to national strategic imperatives like climate adaptation; sustainable ocean uses; the expansion of the New Blue Economy; and National Security concerns.

Recommendation 3: Drive Strategic Collaborations Through Innovative Financial and Legal Strategies

Catalyze the entire ocean exploration community around shared scientific, operational, and economic objectives by:

- Reinforcing NOMECE's role as a holistic coordinating body,
- Advocating for policy and regulatory changes necessary to expand the use of non-traditional transfer authorities,
- Leading the ocean exploration community to reach consensus on shared technological, scientific, operational, and data management benchmarks.

NOAA is in a position to dramatically advance and expand the national program of ocean exploration by utilizing government powers and tools in unique and innovative ways.

Reimagining NOMECE as the Foundational Platform for Multi-Sector Partnerships

As an authoritative all-of-government coordinating body, the National Ocean Mapping, Exploration, and Characterization (NOMECE) Council has fundamental legitimacy underpinning its efforts to facilitate a cohesive approach to understanding and managing marine resources. Private industry, academia, and the philanthropic sector are eager to participate in NOMECE-related activities. This creates an opportunity for NOAA to exercise leadership and expand the portfolio of stakeholders actively engaged with the NOMECE Council, giving them a voice in shaping policies and standards related to ocean exploration.

Streamlining Partnerships Through Non-Traditional Transfer Authorities

Non-traditional transfer authorities can provide a flexible legal framework for NOAA to engage with private sector entities differently from traditional federal procurement

methods. For example, the flexibility of Other Transactions Authority (OTA) contracting offers adaptable agreements that can quickly and effectively address unique research and development requirements, balanced by the need for clarity about expected benefits. By adopting non-traditional transfer authorities into routine operations, NOAA could facilitate rapid technological advancements and encourage the growth of industries adjacent to the New Blue Economy. Since many non-traditional transfer authorities are unique, NOAA would need to secure the necessary legal authority to utilize these instruments.

Utilizing NOPP to Leverage Multi-Sector Funding

NOAA should adopt a Whole-of-Nation approach to coordinate investments in ocean exploration from various sectors, including federal agencies, academia, and industry. The National Oceanographic Partnership Program (NOPP) has distinct capabilities for funding priorities that either span multiple organizational missions or broadly affect the entire ocean exploration community. For instance, NOPP could support data purchases as part of a collaborative data exchange system negotiated through NOMECE.

Fostering Shared Standards Through NOMECE

NOAA can leverage its position on the NOMECE Council to lead the development of consensus-driven standards across technological, scientific, and operational aspects of ocean exploration. This leadership would significantly enhance the interoperability and efficiency of research efforts.