



UNITED STATES DEPARTMENT OF COMMERCE
The Under Secretary of Commerce
for Oceans and Atmosphere
Washington, D.C. 20230

October 3, 2024

Mr. Scott Rayder
Chair, U.S. IOOS Advisory Committee
1315 East-West Highway, 2nd Floor
Silver Spring, MD 20910

Dear Mr. Rayder:

Thank you for inviting me to attend your recent U.S. Integrated Ocean Observing System (IOOS) Advisory Committee meeting in July. I appreciated the opportunity to talk with you further about your recent recommendations for the National Oceanographic Partnership Program (NOPP) and Marine Life components of the U.S. IOOS program.

As promised, attached is a detailed response further discussing what the National Oceanic and Atmospheric Administration is doing to implement the recommendations and what we intend to do. The U.S. IOOS Office has already begun to implement several of the recommendations provided and intends to continue making progress. I greatly appreciate the work done by the IOOS Advisory Committee in providing these recommendations.

With many of you having rotated off the Committee in September, I again want to express my gratitude for your time and commitment over the past 6 years.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard W. Spinrad".

Dr. Richard W. Spinrad
Under Secretary of Commerce
for Oceans and Atmosphere
and NOAA Administrator

cc: Debra Hernandez, Incoming Chair, U.S. IOOS Advisory Committee

Enclosure

THE ADMINISTRATOR



NOAA Responses to Phase 2 Recommendations

National Oceanographic Partnership Program (NOPP)

Recommendation 1: *NOAA should provide leadership, through NOPP, for interagency collaboration and coordination to enhance national observing programs, meeting national priorities that require an interagency approach.* IOOS is a critical piece of all national observing efforts and should be leveraged to enhance and better connect agency observing programs. Given the alignment of IOOS expertise working across stakeholders and partners, the agencies can develop plans that sustain and grow observing capacity in a holistic way. This will also require continuing to fund NOPP projects that support NOAA needs and innovations in ocean technology and ensuring a stable core funding base for a sustained NOPP program.

NOAA Response: NOAA concurs with this recommendation.

What we have done: NOAA is a leader in NOPP and actively supports interagency collaboration and coordination to enhance national observing programs. NOAA's NOPP coordination is led by NOAA's Office of Oceanic and Atmospheric Research (OAR). This coordination includes regular engagement with the NOAA Science Council's NOPP Committee (NOPP-C), NOAA leadership, the NOPP Interagency Working Group, and the Interagency Ocean Observation Committee (IOOC). The U.S. Integrated Ocean Observing System (IOOS) is routinely engaged with OAR, NOPP-C and the NOPP Interagency Working Group, and has been working with NOPP to advance coordinated observing capacity and technology development for many years. IOOS has successfully leveraged interagency and NOPP funding to support a range of efforts, including: estuarine and ocean sound, Bio-GO-SHIP, technology innovations such as eDNA, and the U.S. Marine Biodiversity Observation Network (from 2014 to present, over \$30 million in interagency funding has been leveraged to further MBON).

What we will do: NOAA, through National Ocean Service (NOS) and the U.S. IOOS Office, will remain engaged with OAR, NOPP-C and the NOPP Interagency Working Group to identify leveraging opportunities to advance interagency collaboration for coordinated observing capacity and technology development. The U.S. IOOS Office will also continue to incorporate NOPP into its funding opportunities.

Recommendation 2: *IOOS should work with NOPP leadership and appropriate sponsor agencies to develop a process that clearly identifies observing/sensing requirements for NOPP projects far in advance,* so that industry and academia, as partners, can invest in the technology that enhances NOAA's mission, encourages innovation, supports industry and academia investments in research and technology, and the ultimate transition of technology to IOOS and other sustained observing programs. In addition, the IOOS Program Office can provide leadership to improve communication and coordination with NOPP partners.

NOAA Response: NOAA concurs with this recommendation.

What we have done: NOAA through the U.S. IOOS Office has been working towards this goal in a couple of ways, and we shall continue finding new ways to improve and evolve this effort. Through the NOAA/Marine Technology Society (MTS) Ocean Enterprise Initiative cooperative agreement, MTS works in partnership with NOAA to consolidate recommendations from across the global Ocean Enterprise community and translate them into actionable recommendations, road maps, and needs assessments to support the delivery of ocean observing services, the

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development of the Ocean Enterprise workforce, and the enhancement of coastal and ocean climate resilience. These efforts will bring public and private interests in this sector into greater alignment and highlight opportunities for collaboration and support. IOOS and MTS are continuing the “Dialogues with Industry” project series which convenes NOAA, ocean observing industry partners, and other stakeholder agencies (such as the Department of Energy and the National Aeronautics and Space Administration) to discuss the state of ocean observing, the various roles of relevant stakeholders, and emerging needs and requirements.

NOPP and IOOS are actively engaged with many of the working groups under the Ocean Science and Technology Subcommittee (OST), which is co-led by Office of Science and Technology Policy (OSTP), NOAA, National Science Foundation (NSF), and Office of Naval Research (ONR), and looks to the topical working groups to identify observing and sensing requirements for agency, industry and academic partner investment. Three recently released strategies are important steps in defining priorities and NOPP can play an important role in partner coordination and collaboration for implementation. These strategies, which IOOS staff contributed to or led, include: U.S. National Strategy for a Sustainable Ocean Economy,¹ National Ocean Biodiversity Strategy,² and National Aquatic eDNA Strategy.³ The Ocean Climate Action Plan⁴ is yet another way ocean observing priorities are being defined.

What we will do: NOAA, through the U.S. IOOS Office, will work with NOPP to utilize the Ocean Technology Transition (OTT) program and the Coastal and Ocean Modeling Testbed (COMT) program as mechanisms for identifying future NOAA observing, data management, and modeling and prediction requirements. IOOS’ work with NOPP will complement the work of the NOAA Observing Systems Council (NOSC) and Earth System Integration Board (ESIB) NOAA Modeling Team. Increasing requirements coordination with NOPP will benefit from NOPP’s interagency partnerships and leveraged funding. Projects under OTT and COMT are targeted to late technology readiness levels and also targeted to specific applied uses of technologies and would therefore work well in the NOPP construct. Dedicated IOOS staff support would be needed to implement this successfully through multiple award cycles. In addition, the NOPP can leverage the IOOS Ocean-based Climate Resilience Accelerators (OCRA) program engagements with public, private, and academic stakeholders to incorporate industry feedback and customer needs to inform ocean-enterprise observing requirements. While the IOOS OCRA program has been funded through the Inflation Reduction Act to initiate this process, the ultimate success of any such effort will require longer term predictable resources and support.

Recommendation 3: NOAA and the IOOC should expand public-private partnerships, including working with philanthropic organizations, and assess ways to utilize innovative or alternate funding mechanisms other than BAAs to fund NOPP projects. NOAA and the IOOC agencies should leverage entities like the IOOS Regional Associations, which are experienced in accepting and distributing funds from different sectors to support projects and PIs across the community.

¹ Ocean Policy Committee. (June 2024). National Strategy for a Sustainable Ocean Economy. www.whitehouse.gov/wp-content/uploads/2024/06/National-Strategy-for-a-Sustainable-Ocean-Economy_Final.pdf

² Interagency Working Group on Biodiversity of the Subcommittee on Ocean Science and Technology Committee on Environment of the National Science & Technology Council. (June 2024). The National Ocean Biodiversity Strategy. www.whitehouse.gov/wp-content/uploads/2024/06/NSTC_National-Ocean-Biodiversity-Strategy.pdf

³ eDNA Task Team of the Interagency Working Group on Biodiversity of the Subcommittee on Ocean Science and Technology Committee on Environment of the National Science & Technology Council. (June 2024). National Aquatic Environmental DNA Strategy. www.whitehouse.gov/wp-content/uploads/2024/06/NSTC_National-Aquatic-eDNA-Strategy.pdf

⁴ Ocean Policy Committee. (March 2023). Ocean Climate Action Plan. www.whitehouse.gov/wp-content/uploads/2023/03/Ocean-Climate-Action-Plan_Final.pdf

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NOAA Response: NOAA concurs with this recommendation.

What we have done: NOAA, including the U.S. IOOS Office are constantly looking for ways to expand and increase our involvement in public-private partnerships related to ocean observations and the wider ocean enterprise. The OCRA program, as well as several investor and grant-making convenings that NOAA has participated in (managed by NOAA's Federally Funded Research and Development Center (FFRDC) manager MITRE and Investable Oceans), is starting to address this specific topic. IOOS has been in frequent communications with several philanthropic organizations through the OCRA and marine life programs and these organizations are active in or considering ways to help support the NOS/IOOS ocean observations mission. Other recent examples of expanding partnerships include the NOPP coordinated mCDR research opportunity,⁵ which included philanthropic funding partners, and the DOE - IOOS Ocean Observing Prize.⁶

What we will do: NOAA, through the U.S. IOOS Office, will continue to seek out new public-private partnerships and other funding mechanisms to support NOPP projects and utilize IOOS Regional Associations as nimble entities able to implement community solutions via flexible mechanisms. In addition, the continuation of the OCRA program over the next 4 years will consistently involve engagement with the private sector and philanthropic organizations. In addition, NOAA will continue to work with external partners from the private sector and academia to promote the "Ocean Enterprise Initiative," a collaborative effort between NOAA, MTS, and other business partners to identify opportunities for public-private partnerships in this space.

Marine Life

Recommendation 1: *Develop a national inventory of biological measurements routinely made across IOOS regions.* IOOS should develop a National Assessment of what type of biological data are being collected, who is collecting it, and where it is being stored. This inventory should include basic information such as the measure's specific measurement, latency, precision, sensitivity of the measurements taken, methods, and post-processing techniques. These data could be augmented with the extensive bathymetric and habitat data collected by private entities associated with offshore energy development, marine protected areas, and fishing.

NOAA Response: NOAA concurs with this recommendation.

What we have done: The IOOS network of Regional Associations (RAs); the IOOS-supported US Marine Biodiversity Observation Network (MBON) and US Animal Telemetry Network (ATN); and other academic, private sector, and non-governmental partners are collecting biological measurements within each of the IOOS regions. We are working diligently to develop and communicate common standards and practices including using long term archiving via the Ocean Biodiversity Information System (OBIS) and the National Centers for Environmental Information (NCEI). The IOOS Data Management and Cyberinfrastructure program regularly convenes data practitioners through code sprints and data standardization workshops to develop and implement biological data standards. Establishing and maintaining an inventory of

⁵ National Oceanic and Atmospheric Administration. (2023 September 7). *Announcing \$24.3M Investment Advancing Marine Carbon Dioxide Removal Research*. Ocean Acidification Program. <https://oceanacidification.noaa.gov/fy23-nopp-mcdr-awards/>

⁶ U.S. Department of Energy. (n.d.) *Powering the Blue Economy: Ocean Observing Prize*. American Made Challenges. <https://americanmadechallenges.org/challenges/oceanobserving>

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these measurements, mapping the flow of data, and integrating these observations systematically with environmental observations represents a significant and costly undertaking.

What we will do: NOAA, including the U.S. IOOS Office recognizes that such an inventory is a critical and needed step to advance national priorities for ocean biodiversity and a sustainable ocean economy and to support development and conservation actions in our ocean, coasts, and Great Lakes. Dedicated IOOS staff support is needed to develop this inventory. Enabling maximum use and application of marine life and ocean biodiversity information from IOOS RAs and thematic networks and from other members of the IOOS community is a primary goal.

Recommendation 2: *Identify core biological measurements and standards across the IOOS enterprise. Develop the capacity to ensure the development of a specific biological capability across the IOOS enterprise. IOOS should incorporate the GOOS framework for marine life observations to the extent possible.* One of the goals of IOOS is to detect a change in marine ecosystems due to a shifting climate. To this end, IOOS should implement consistent measurements across the RAs of the base of the food chain, including phyto and zooplankton. This should be done using equivalent methodologies and standards, such as cytobots. Measurements of upper trophic levels can be collected using passive acoustics (i.e., soundscapes) and the ATN. The Sanctuary Soundscape Monitoring Project and the NOAA Ocean Noise Reference Station Network presently carries out such measurements. Soundscapes provide baseline measurements of noise-producing marine animals, weather, and anthropogenic activities.

NOAA Response: NOAA concurs with this recommendation.

What we have done: The Global Ocean Observing System (GOOS) biology and ecosystem Essential Ocean Variables (EOVs) provide a framework for prioritized marine life observations that was developed through systematic analysis of multilateral agreements requiring collection of biology and ecosystem information and the feasibility and scalability of ocean observations to support those requirements. The U.S. IOOS, as a GOOS regional alliance, has adopted this framework through consultation with the IOOC as reflected in the IOOS list of core variables.⁷ The IOOC created the 'Biology – Integrating Core to Essential Variables (Bio-ICE) task team' to advance the integration of biological observations from local, regional and Federal sources using best practices to inform national needs and ultimately feed seamlessly into GOOS. The task team was charged with identifying where there are synergies in terms of spatial and temporal observing requirements and existing observation infrastructure and data delivery, including best practices and standard operating procedures for an initial two variables – marine mammals and corals. The task team made suggestions to improve pathways for data flow for observations of these variables from the RAs, other non-Federal partners, and Federal sources, identifying and implementing best practices surrounding standardized data collection and data delivery. In some cases, efforts are evolving within communities focused on a particular type of measurement – such as the coordination at the Federal interagency level of Ocean Sound and Marine Life observations and data aligned with approaches developed in the Sanctuary Soundscape Monitoring Project and the NOAA Ocean Noise Reference Station Network, in the plankton imagery and eDNA communities, and in U.S. and global development of standards for biology and ecosystem data.

What we will do: U.S. IOOS Office staff will remain extremely active in these efforts. Staff will continue to encourage all IOOS funding recipients, including RAs, to track and apply the

⁷ <https://iooc.us/task-teams/bio/ioos-core-variables>

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emerging standards and data schemas. In addition, the IOOC is open to considering the replication of this effort for other GOOS BioEco EOVs as resources and expert time become available as appropriate.

Recommendation 3: *IOOS should fully implement the ATN (ARGOS and acoustic tracking systems) and ensure that key sentinel species are measured routinely. Implementation would include tracking data collected by all Federal agencies.* Biological patterns are mobile (advective transport, fish migration, etc.) and require integrated measurements over regional scales. Therefore, providing standardized measurements across the regions is critical to delivering data streams to meet the needs of potential stakeholders (management, conservation, research, commercial). This will be critical to collect relevant information from climate impacts to effective management and conservation.

NOAA Response: NOAA concurs with this recommendation.

What we have done: The U.S. IOOS Office now has dedicated staff supporting ATN with the recent hire of a permanent Federal coordinator. This staff member, along with others in the office, are working on improvements to the ATN, building and strengthening the network of scientists, frequently communicating with other data end-users, and improving workflows for incorporating data collected by marine species using the ARGOS and acoustic tracking systems while seeking to obtain and distribute the resources to support these efforts. Much of the telemetry data that the ATN Data Assembly Center (DAC) aggregates, manages, displays, and delivers are from monitoring marine apex predators that have been identified as “sentinel” species in the recent scientific literature.^{8,3} The ATN continues to increase its collection of datasets in the DAC by leveraging funds from the Bipartisan Infrastructure Law, the Inflation Reduction Act, and cross-NOAA partnerships. Specific activities include working towards establishing a national network of acoustic telemetry nodes and by adding other novel data types used to track marine animals.

What we will do: NOAA, through the IOOS Office, will continue to advance relationships with other Federal agencies to identify and include marine species tracking data that are a priority to monitor, with input from ATN stakeholders and the broader community.

⁸ Hazen, E. L., Savoca, M. S., Clark-Wolf, T. J., Czapanskiy, M., Rabinowitz, P. M., & Abrahms, B. (2024). Ecosystem sentinels as early-warning indicators in the anthropocene. *Annual Review of Environment and Resources*, 49.

³ Hazen, E. L., Abrahms, B., Brodie, S., Carroll, G., Jacox, M. G., Savoca, M. S., ... & Bograd, S. J. (2019). Marine top predators as climate and ecosystem sentinels. *Frontiers in Ecology and the Environment*, 17(10), 565-574.



Exec Ecorr - NOAA Service Account <exec.ecorr@noaa.gov>

NOAA HQ AUTOPEN Request: FY 25 President's Budget - IOOS Advisory Committee (Package 24-0092586)

ExecAdvisor UNSEC - NOAA Service Account <execadvisor.unsec@noaa.gov>

Thu, Oct 3, 2024 at 8:51 AM

To: Exec Ecorr - NOAA Service Account <exec.ecorr@noaa.gov>

Cc: Kelly Quickle - NOAA Federal <kelly.quickle@noaa.gov>, Denise Johnson - NOAA Federal <denise.l.johnson@noaa.gov>, Michelle West - NOAA Federal <michelle.b.west@noaa.gov>

Good morning Denise,

Approved and e-signed response letter attached.

V/r,

[Quoted text hidden]

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CDR Sam Urato

Executive Advisor

Office of the Under Secretary of Commerce

for Oceans and Atmosphere

C: (202) 961-5904

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