

Ocean Research Advisory Panel

December 13-14, 2023

AGU Conference Center
2000 Florida Avenue NW
Washington, D.C.

ORAP Members Present:

Mary Glackin, Co-Chair
Christopher Ostrander, Co-Chair
Claudia Benitez-Nelson
Derek Brockbank
Jorge Corredor
Danielle Dickson
Tim Gallaudet (virtual)
Eunah Hoh
Sandra Knight
Tommy Moore
Purnima Ratilal-Makris
Edward J. Saade
Ana Spalding
Amy Trice
Maria Tzortziou
Violet Sage Walker
Kawika Winter (virtual)

Also Present:

Viviane Silva, ORAP Designated Federal Officer
Joe Fillingham, ORAP Alternate Designated Federal Officer
Rick Spinrad, Under Secretary of Commerce for Oceans and Atmosphere & NOAA Administrator
Brenda Mallory, Chair of the White House Council on Environmental Quality (CEQ) and Co-Chair of the Ocean Policy Committee (OPC)
Jane Lubchenco, Deputy Director for Climate and Environment at the White House Office of Science and Technology Policy (OSTP)
Danielle Farelli, Co-Chair of the OPC Ocean Science and Technology Subcommittee
Jeremy Weirich, Co-Chair of the National Oceanographic Partnership Program (NOPP)
Deerin Babb-Brott, Assistant Director for Ocean Policy at the White House Office of Science and Technology Policy

Amanda Carter, Deputy Director for Ocean Resource Management at the White House Council on Environmental Quality

Day 1, December 13, 2023

Engagement with OPC

Meeting Opening & Review Agenda

Viviane Silva, ORAP Designated Federal Officer; Chris Ostrander and Mary Glackin, ORAP Co-Chairs

Ms. Silva opened the meeting at 9:00 a.m. and reminded all participants that this is a federal advisory committee meeting and all proceedings are public. Co-Chairs Glackin and Ostrander reviewed the agenda and objectives for the meeting, which included exploring the Ocean Policy Committee (OPC) Action Plan and identifying areas for ORAP to address. Since this was ORAP's new member's first meeting, it was also an opportunity to organize internally to conduct work. The co-chairs emphasized that there were a lot of members of the OPC staff present and that it was a good time to engage with them, to ask questions, to seek clarity, to better understand the landscape from the perspective of the federal partners in the room to inform ORAP discussion.

Member Moore asked if it was required to follow specific procedures during the meeting, such as Robert's Rules of Order. Co-Chair Glackin explained that it was largely informal. Ms. Silva reminded that ORAP is a representative group, any product delivered by ORAP, has to be presented and approved at a public setting. Given the panel's large purview, Co-Chair Glackin hoped to create working groups at this meeting, which would meet more informally and report back to the full panel. At some point, ORAP will submit a product to OPC, but that was not expected from this meeting.

Ms. Silva announced that the next, in-person, ORAP meetings were scheduled for May 21-22 and September 4-5 with the locations still to be determined. Ms. Silva hoped to have the dates for FY2025 scheduled soon.

Welcome from NOAA

Rick Spinrad, Under Secretary of Commerce for Oceans and Atmosphere & NOAA Administrator

Dr. Spinrad welcomed ORAP new members to their first meeting. He stressed the value of ocean research and the important role ORAP will play in helping to guide the agency's work. He discussed some of his recent activities, including visiting a habitat restoration project in San Mateo County, California, and attending the COP28 climate change conference in Dubai. COP28 topics of discussion included marine carbon dioxide removal and ocean acidification. Dr. Spinrad praised the National Oceanographic Partnership Program (NOPP) for providing tools, information, and environmental intelligence for a diverse range of users. He encouraged ORAP to consider partnering with users such as emergency managers, tribes, industry, and NGOs when providing advice on NOPP. He outlined NOPP's

success in launching collaborations, particularly in marine carbon dioxide removal research, and stressed the importance of ORAP's recommendations for shaping future ocean research and policy agendas. NOPP's future work, the ocean research that will help shape not just NOAA's future operations but the operations and activities of all the agencies, will depend on ORAP recommendations. Dr. Spinrad expressed his confidence in ORAP's diverse and expert membership and urged them to make the most of the meeting's agenda, which allowed for substantial discussion. He emphasized that NOAA has established a great and proactive team to support the work of the ORAP on its day to day operations and assured ORAP members of NOAA's support in compliance with relevant rules and regulations. He ended by congratulating and welcoming the ORAP members again and closed by saying that NOAA is really looking forward to seeing what ORAP can accomplish and to benefitting from its work and partnership.

ORAP Member Introductions

ORAP Members

The members provided details about their backgrounds, affiliations, and interests related to ocean and coastal issues. Some mentioned specific projects, areas of expertise, tribal perspectives, and/or connection to government agencies and committees. The introductions showcased a diversity of expertise and interests in the group.

Session 1: First Engagement between the OPC and the ORAP

Brenda Mallory, Chair of the White House Council on Environmental Quality (CEQ) and Co-Chair of the OPC and Jane Lubchenco, Deputy Director for Climate and Environment at the White House Office of Science and Technology Policy (OSTP), on behalf of Arati Prabhakar, OSTP Director and Co-Chair of the OPC

Ms. Mallory expressed gratitude for the expertise and commitment of the individuals involved in ORAP. She emphasized interdisciplinary collaboration and breaking down silos in addressing ocean-related challenges. President Biden and Vice President Harris envision an ocean that is vibrant, clean, bountiful, culturally accessible, and life-sustaining for future generations. Ms. Mallory mentioned the United States Ocean Climate Action Plan (OCAP), which was released earlier in the year and focuses on a whole-of-government approach to ocean-based climate action. OCAP led to the development of the Ocean Justice Strategy (OJS), which is aimed at integrating principles of equity and environmental justice into federal ocean activities.

Dr. Lubchenco reiterated Brenda Mallory's comments and said that ORAP will play a crucial role in advancing the President's agenda, including OCAP, OJS, and the upcoming National Strategy for a Sustainable Ocean Economy. All of those should signal to you that we are serious, we are ambitious, we are focused, and we are getting things done. And we need your help. In the past ORAP has really moved the needle on the matters related to ocean science and technology. Dr. Lubchenco acknowledged that time was critical because of challenges like climate change, habitat loss, and ocean pollution. She highlighted a commitment to bold solutions and ambitious actions by federal agencies, with an emphasis on smart and strategic development. She acknowledged the history and impact of ORAP's

previous incarnations in providing advice on ocean science and technology over the past two decades. She recognized that a collective effort involving diverse partners, including tribal nations, local governments, the private sector, academia, and NGOs is crucial for success.

Dr. Lubchenco continued by saying that, to help guide ORAP work, the Ocean Policy Committee (OPC) asks that ORAP begin with two taskings. For the first task the OPC asks the ORAP to advise on areas of opportunity for partnership on the topic of emerging technology with ocean industry and other sectors over the next five to ten years. Examples of partnerships included through the NOPP and examples of emerging technologies included Artificial Intelligence/Machine Learning, eDNA, and similar technologies. Dr. Lubchenco highlighted that these examples are just examples and that the ORAP should interpret opportunities broadly, expansively and strategically focusing on things that would have the biggest impact. For the second task, ORAP is asked to identify a subject it believes is important for the OPC to receive recommendations for consideration.

She encouraged ORAP members to have discussions outside of Washington, D.C., in order to engage with different communities and stakeholders. She expressed overall appreciation for ORAP members' commitment and excitement for the group's work.

Session 1 Continued: Overview of OPC Subcommittees

Danielle Farelli, Co-Chair, Ocean Science and Technology (OST) Subcommittee; Jeremy Weirich, Co-Chair, National Oceanographic Partnership Program (NOPP); Deerin Babb-Brott, Assistant Director for Ocean Policy at the White House Office of Science and Technology Policy; Amanda Carter, Deputy Director for Ocean Resource Management (ORM) at the White House Council on Environmental Quality

Mr. Babb-Brott shared his background and outlined the role of the OPC, which was established by Congress in 2021 to coordinate federal actions on ocean-related matters. Under the Biden administration, the high-level goals of OPC include maximizing benefits of the ocean for Americans, developing OCAP, and strengthening the U.S. ocean science and technology enterprise. Mr. Babb-Brott explained the structure of OPC, which includes two subcommittees: Ocean Resource Management Subcommittee and the Ocean Science and Technology Subcommittee. The committee is co-chaired by the chair of CEQ and the director of OSTP.

Dr. Carter described the goals and functions of the ORM Subcommittee, emphasizing its role in supporting regulatory and policy coordination associated with coastal and ocean management. She discussed the significance of OCAP, highlighting its ambitious goals: achieving a carbon-neutral future, accelerating solutions that tap the power of natural coastal and ocean systems, and enhancing community resilience to ocean change. She introduced the OJS as a groundbreaking initiative that integrates environmental justice principles into federal ocean activities. She emphasized the collaborative process involving various stakeholders and the positive feedback received from incorporating diverse voices.

Member Saade asked for clarification on the role of specific agencies, particularly the Bureau of Ocean Energy Management (BOEM), and how their responsibilities interact with ORM. Dr. Carter explained that agencies like BOEM retain their responsibilities, and ORM's role is to facilitate interagency coordination rather than replacing agency-specific functions. Member Saade also raised a question about deep ocean mining, particularly in areas more than 200 miles offshore. Dr. Carter acknowledged that matters falling outside the U.S. Exclusive Economic Zone (EEZ) would involve the State Department and might not fall directly under ORM's purview.

Member Trice sought clarification on how the various actions outlined in the OCAP, such as blue carbon and offshore wind, were being addressed. Dr. Carter explained that there was an OCAP Implementation Working Group to handle informational briefings and coordination across different agencies. She added that ORM wanted to avoid creating separate interagency working groups for each topic.

Member Benitez-Nelson inquired about the timeline for the completion of the National Strategy for a Sustainable Ocean Economy. Ms. Farelli chimed in and stated that ORM is actively working on a draft and aiming for a completion date in 2024.

Ms. Farelli outlined the components of the OST Subcommittee, which also serves as the Subcommittee on Ocean Science and Technology (SOST) under the National Science and Technology Council. She is the lead focal point for a high-level Panel for a Sustainable Ocean Economy and the development of the National Strategy for a Sustainable Ocean Economy. She addressed actions taken in response to OCAP, specifically the establishment of the Marine Carbon Dioxide Removal Fast Track Action Committee (FTAC). FTAC's charter is available online and has three main components: policy and regulation guidelines, a federal research and scale testing program, and stakeholder engagement. OST provides science and research needs to inform resource management and policy development within ORM and OPC.

Ms. Farelli discussed three main OST-related work plan items: strengthening the U.S. science and technology enterprise, focusing on coordination and collaboration, and addressing priorities for the NOPP and National Ocean Mapping, Exploration, and Characterization (NOMECE). She highlighted recent accomplishments and actions from the past year, including federal ocean acidification-related documents delivered to Congress. She mentioned documents like the Decadal Vision of Ocean Science and Technology Priorities and the Opportunities and Actions for Ocean Science and Technology as tools for coordinating agencies and interagency groups. She highlighted four congressionally mandated groups, the Interagency Working Groups on Ocean Acidification (IWG-OA), Ocean and Coastal Mapping (IWG-OCM), the Harmful Algal Bloom and Hypoxia Research and Control Act (IWG-HABHRCA), and the Interagency Ocean Observation Committee (IWG-IOOC).

Member Knight asked a clarification question about the NOMECE Council and the term "characterization" in the context of ocean exploration. Ms. Farelli and Mr. Weirich explained that characterization includes detailed examinations, such as habitat characterization and exploration of specific sites and features.

Mr. Weirich provided an overview of NOPP's history, recent developments, and future directions. NOPP addressed the need for interagency coordination when it was established, fostering collaboration

among civilian and defense agencies. The 2021 reauthorization built upon the historical context, reflecting changes and the necessity for resource pooling. NOPP involves multiple agencies, the private sector, academia, industry, and philanthropy, serving as implementers, catalysts, coordinators, and communicators. Its projects typically originate from small pots of money via broad agency announcements, with dedicated funding from agencies like the Navy and NOAA. Coordination signaled by NOPP authorization facilitates agreements and serves as a tool for agencies to collaborate.

The presentation highlighted NOPP's success in facilitating the OCAP, particularly in the marine carbon dioxide removal (mCDR) domain. Mr. Weirich acknowledged Dr. Libby Jewett's role in catalyzing a \$24 million program involving academia, industry, and philanthropy. He stressed the importance of focused, strategic efforts, urging collaboration with SOST and other groups to set priorities aligned with federal goals. He acknowledged that NOPP cannot be everything for everybody, and emphasized the need for a clear vision. He discussed the development of a short white paper outlining the next generation of NOPP, emphasizing areas for advancement like diversity and equity, and highlighting external partnerships, particularly with philanthropic communities. The NOPP Program Office, reauthorized for five years, provides support services to the work group, contributing valuable resources.

Member Corredor highlighted the success of NOAA's Educational Partnership Program for Minority-Serving Institutions and suggested exploring similar initiatives for First Nations. He expressed concerns about the level of expertise within ORAP related to emerging technologies like environmental DNA (eDNA), artificial intelligence, and machine learning. Mr. Babb-Brott clarified that these examples were illustrative and not binding, and emphasized the flexibility of the panel's scope.

Member Benitez-Nelson sought clarification on agency coordination, especially regarding mCDR and interactions with agencies like the Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E). Mr. Weirich and Ms. Farelli explained the coordination mechanisms at the NOPP level, emphasizing collaboration, tactical support, and community engagement.

Co-Chair Glackin raised questions about funding mechanisms, coordination, and the potential for public-private partnerships, and expressed hopes for creative ways to collaborate. Mr. Weirich discussed exploring new funding mechanisms and leveraging existing relationships with other agencies.

Member Spalding mentioned her involvement in a high-level panel and international efforts like Friends of Ocean Action and the Climate Group. Ms. Farelli and Mr. Weirich discussed the importance of soft power in science diplomacy. They emphasized amplifying domestic work and encouraging other countries to follow suit.

Member Knight commented on the limited funding allocated since 1998 and inquired about efforts to identify and leverage available resources. Mr. Babb-Brott explained the awareness of available resources and the challenge of navigating existing funding mechanisms.

Member Trice asked about coordination, information flow, and the role of subcommittees, using mCDR as an example. Mr. Weirich and Ms. Farelli highlighted cross-pollination, weekly conversations, and coordination efforts between ORM and OST.

Member Saade expressed gratitude for Dr. Lubchenco's guidance and emphasized the diverse expertise within the group. He highlighted the importance of engaging non-scientists and non-engineers. He discussed the potential of digital twins as a broad and powerful tool for collaboration.

Member Moore shared concerns regarding tribal engagement and consultation, emphasizing the need for government-to-government engagement with treaty tribes, not just community level involvement. He mentioned OCAP and the Biden administration's consultation guidelines for federal agencies. Mr. Weirich noted that NOPP 2.0 includes a special focus on tribal engagement along with state and local engagement at a community level. He highlighted the importance of engaging tribal communities on the front end of projects, ensuring meaningful impact.

Member Dickson sought clarification on the budget process for NOPP-participating agencies, whether they access additional funds or reallocate existing budgets. Mr. Weirich explained the collaborative nature of funding, citing broad agency announcements (BAAs) from NOAA and the Navy. He encouraged looking beyond NOPP's funding pot and exploring broader partnerships, involving entities like the Office of Management and Budget (OMB).

Session 2: Conversation with the OPC Team

Deerin Babb-Brott, Assistant Director for Ocean Policy at the White House Office of Science and Technology Policy; Amanda Carter, Deputy Director for Ocean Resource Management at the White House Council on Environmental Quality; Danielle Farelli, SOST Co-Chair; Jeremy Weirich, NOPP Co-Chair

Mr. Babb-Brott presented OPC's request to ORAP to advise on areas of opportunity for partnership, such as through NOPP, on the topic of emerging technology, which could include artificial intelligence/machine learning, eDNA, and similar technology, with ocean industry and other sectors over the next five to ten years and ask ORAP members to interpret the words "opportunities" and "emerging technologies" broadly.

Co-Chair Glackin emphasized the broad scope of technologies and the need to explore various models of partnership beyond traditional mechanisms like NOPP, focusing on creativity and inclusivity, especially in engaging the private sector.

Member Saade shared the California Mapping Program as an example of a successful partnership. Member Hoh mentioned collaborations on offshore DDT dumping, underscoring the importance of flexible and creative approaches, particularly in the deep blue ocean, where players and dynamics differed from coastal areas.

Mr. Babb-Brott provided insights into the OPC and its role in implementing the NOME Council plan. He touched on the desire for more inclusive and engaged ways for non-federal entities to participate in decision-making related to mapping, exploring, and characterizing the U.S. EEZ.

Member Trice highlighted the Regional Wildlife Science Collaborative for Offshore Wind as an example of successful industry involvement in partnerships. Participants emphasized the need for measurable

goals, active contributions from all stakeholders, and effective data sharing as essential elements for successful collaborations.

Member Brockbank pointed to regional ocean partnerships as an effective model. Member Knight suggested federal agencies developing specific operating plans for partnerships as a means to track progress and ensure accountability.

Participants emphasized the value of partnerships that go beyond mere convening and talking, focusing on tangible solutions to shared challenges. Member Walker highlighted the role of data sharing and effective data management, particularly in the context of cultural landscapes and tribal perspectives. Co-Chair Ostrander urged members to consider technology at a macro-scale, focusing on emerging verticals that can be adopted by industry and contribute to broader advancements in the field.

Ms. Farelli highlighted ongoing work and encouraged an open-minded approach to technology and industry partnerships. Dr. Carter added a perspective on the ORAP charter and the importance of diversity and inclusion in tribal partnerships.

Member Benitez-Nelson emphasized the need to define guardrails in industry partnerships, considering data collection, privacy, and inclusion. She also urged strategic engagement across the country, beyond specific regions. She suggested thinking creatively about technologies in tourism and health for immediate and impactful applications, citing water quality prediction as an example.

Members Moore, Hoh, and Brockbank expanded the discussion to include various technological aspects, such as social sciences, citizen science, and the importance of comprehensive data collection. Member Spalding discussed the role of social science in informing decision-making, highlighted the importance of considering process structure as a technology and the need for a just transition in ocean technology. Member Dickson commented on the potential for technology to engage citizen scientists, especially in collaboration with the gaming industry.

Member Ratilal-Makris raised concerns about artificial turf fields and their contribution to plastic pollution in the ocean. She urged an investigation into pollutant levels in the U.S. EEZ and advocated for federal mandates to address the issue. She emphasized the potential impact on wildlife and the need to protect vulnerable populations, particularly children.

Dr. Carter cautioned against getting fixated on specific examples of AI, machine learning, or eDNA. She emphasized the significance of technologies like harmful algal bloom (HAB) sensors in the Great Lakes, showcasing their effectiveness in improving public health work. Drawing from her experience, she suggested that AI and machine learning could be valuable for processing data resulting from identified technology partnerships.

Member Benitez-Nelson expressed a need for clarification on the intent behind forming partnerships. She questioned whether the goal was to engage more communities, leverage research beyond current funding capabilities, or facilitate workforce development. She sought guidance on how to prioritize partnerships in the diverse and broad landscape. Mr. Babb-Brott emphasized the necessity of addressing

thematic priorities before delving into specifics. He suggested that the panel should collectively determine the most critical issues to be solved before identifying suitable technologies and partnerships. Co-Chair Glackin concurred, emphasizing the importance of defining problems, outcomes, and realistic expectations.

Member Hoh expressed concerns about lack of industry interest in funding advanced technologies, presenting a potential roadblock for scientific endeavors. Member Ratalil-Makris suggested developing proprietary technologies when external support is lacking.

Member Tzortziou emphasized the gap in making observation datasets available to decision-makers and proposed using AI and machine learning to bridge this divide. She stressed the importance of partnerships between agencies, industry, and local communities to effectively translate observations into relevant information.

Member Spalding highlighted the need for technology to address urgent issues, such as early warning systems for adaptation in the face of limited time and space. She also touched on the importance of co-location in technology development, considering the equitable distribution of ocean uses and accommodating vulnerable communities.

Member Walker proposed repurposing cell phone technology for ocean research, emphasizing its wide accessibility. Member Benitez-Nelson expanded the discussion to the economic aspects of oceans, highlighting the role of technology in managing coastal infrastructure and supporting the blue economy.

Public Comment Period

Ms. Silva opened the floor for public comments, noting that there were two individuals present to provide their insights.

Sonya Legg, the director of the Center for Ocean Leadership, introduced her organization, emphasizing its small team with a mission to serve and support the oceanographic community. She highlighted the center's role in coordinating and convening activities, supporting initiatives like the Interagency Ocean Observing Committee (IOOC) and the U.N. Ocean Decade programs. She pointed out the importance of partnerships with federal agencies, industry, academia, and nonprofits, showcasing collaborations such as the National Ocean Science Bowl and a recent memorandum of understanding with the Regional Wildlife Science Collaborative for Offshore Wind. She stressed the need for neutral management of research funds to maintain independence from commercial interests, particularly when assessing industry impacts. She expressed the center's commitment to facilitating communication between affiliates and federal agencies.

Craig McLean, a former NOAA employee with 40 years of experience at the agency, provided comments as a private citizen and policy advisor for the Woods Hole Oceanographic Institution. He focused on international collaboration, emphasizing the significance of the U.N. Decade of Ocean Science for Sustainable Development and urging increased U.S. involvement. He discussed the need for strengthened science and technology efforts, especially in ocean observation technology, to address

global challenges such as sea level rise and severe storms. He called attention to the U.S. losing ground to other nations in oceanographic research ship construction and emphasized the importance of leadership in driving global efforts. He advocated for increased investment in ocean observations to enable rational decision-making in areas like marine carbon dioxide removal and digital twins.

Mr. McLean suggested partnerships with international bodies like the All-Atlantic Ocean Research and Innovation Alliance and encouraged industry collaboration. He commended Fugro for contributing ocean mapping data for free and proposed tax incentives for companies donating ocean data that the government would otherwise collect. He emphasized the need to understand and address impediments with industry, including legal and cultural factors, agency risk aversion, and challenges in transferring funds between federal agencies. He commended the efforts of ORAP members and acknowledged the hard work of the federal team in bringing the discussions forward.

ORAP Members Discussion

Co-Chair Ostrander opened the session by acknowledging the progress made on the agenda so far and emphasized the need to continue populating the idea pool. He outlined the plan to condense and narrow down ideas in the following session. He posed two key questions to the panel: identifying key areas of need or focus within the ocean research community and formulating questions for OPC members to clarify intent and focus.

Member Corredor expressed support for ocean observing, emphasizing the importance of data density for true assimilation and underscoring the role of data in research. Member Walker called for a focus on accessibility and information sharing. She raised concerns about gaps in communication, particularly regarding offshore wind and the importance of making information universally available.

Member Trice shifted the discussion towards impediments to partnerships, with a focus on industry sharing data. Members discussed the cultural aspects of collaboration and suggested exploring incentives for data sharing. Co-Chair Ostrander raised the idea of creating a marketplace for ocean data, emphasizing interoperability, discovery, accessibility, and standardization.

Various members highlighted the interdisciplinary nature of the work, emphasizing the need for collaboration between different sectors and the importance of social science in understanding stakeholder needs. Member Dickson cited specific examples from Alaska, and Member Corredor mentioned the integration of sociologists in NOAA programs.

Member Moore expanded the discussion to include the global perspective, touching upon the importance of open science principles. Member Ratilal-Makris urged considering the needs of future generations. Member Knight highlighted the role of observation, data management, and setting standards for data quality. She stressed the necessity of defining the problem and understanding the perspectives of end-users, including communities, industries, and tribal nations.

Member Trice encouraged further exploration of themes related to technology, partnerships, and industry collaboration. Member Ratilal-Makris suggested considering definitions for key terms,

addressing equity, and exploring the potential for comprehensive and scalable observations. She also emphasized the importance of public appreciation for nature and incorporating it into education.

Member Benitez-Nelson emphasized the need for leveraging partnerships with international entities to address the lack of investment in larger scale ocean observing systems, autonomous underwater vehicles (AUVs), and gliders. She suggested creative approaches to remove impediments and facilitate collaborations globally.

Mr. Weirich provided a broader perspective, indicating that the federal policy discussion should consider the challenges faced by high-level administration agencies, such as OSTP and CEQ, in balancing various priorities and limited budgets. He emphasized the importance of the ongoing ocean decadal process led by the National Academies and urged the group to think about recommendations, urgency, and impact.

Member Moore highlighted the importance of prioritizing ocean data for predicting global climate changes and mentioned the Tropical Pacific Ocean Observing System as an example. Member Corredor emphasized the need for a clear definition of NOAA's perspective on research and suggested understanding stakeholder needs through survey results currently available. Member Moore suggested setting a timeline for delivering products and recommendations to stay on track.

The discussion touched on various topics, including the role of the U.S. in international ocean research, the need for clarity on NOAA's definition of research, and the importance of addressing global climate issues. Some members emphasized the significance of international collaboration, while others noted the challenges and urged the group to consider specific areas of focus.

Member Saade highlighted the importance of understanding international efforts, such as the U.N. Decade of the Ocean and Seabed 2030.

Co-Chair Ostrander encouraged participants to think about where the ocean research community is primed for action, existing gaps in federal agency approaches, and potential areas of focus. He tasked the group with refining its problem space and defining actionable tasks for the next day's discussions. Ms. Silva shared administrative details, including optional dinner plans and a group photo.

Day 2, December 14, 2023

Internal ORAP Deliberations on how to tackle the OPC Tasking and to identify another Topic on their Own

Meeting Opening

Viviane Silva (DFO); Chris Ostrander and Mary Glackin (Co-Chairs)

Ms. Silva reopened the meeting at 8:30 a.m. She started the session with announcements, mentioning that it typically takes 10-12 business days before the transcript is ready. The court reporter also develops an executive summary, subject to final approval, which will be published on the site for public access, and will likely be available by mid- to late January. She also discussed the idea of creating

branding for the new ORAP and requested volunteers for design ideas. Member Walker volunteered to contribute, and Member Benitez-Nelson offered her assistance. Ms. Silva expressed gratitude to the support team for monitoring the chat and to AGU for providing the meeting space.

Session 3: ORAP Baseline

ORAP Co-Chairs & Members

Co-Chair Ostrander gave an overview of the session's schedule, highlighting the importance of accomplishing specific objectives. Referring to discussions from the previous day, he reminded the panel of the first task OPC had given ORAP, of looking at emerging industries in the ocean economy and providing areas of opportunity for partnerships on emerging technology over the next five to ten years. The second task (self-defined), which he briefly touched upon, involved discussions on data, particularly fair data standards and practices. The goal for the day was to establish two working groups, one for each task, with designated chairs or co-chairs to commence work product development. Co-Chair Ostrander hoped to outline 50-75 percent of the topics for Task No. 1's technology space.

Co-Chair Glackin emphasized the timeline, aiming to deliver a product by the Fall. She added the importance of impactful deliverables rather than lengthy reports.

Co-Chair Ostrander presented the first question: where is the ocean research community primed for action and able to focus efforts over the next five to ten years? Member Dickson mentioned advances in Arctic observing technology, underwater navigation arrays for the Arctic, and the importance of indigenous participation in research.

Member Benitez-Nelson expressed frustration about existing reports and community input not translating into significant progress. She suggested exploring innovative approaches, such as creating an XPRIZE-like competition to develop a standardized data submission system. Member Knight mentioned existing initiatives like the U.N. Ocean Decade, U.S. Coastal Research Program, and the Committee on the Marine Transportation System.

Participants also proposed the need for standardization in data submission, the integration of existing reports and frameworks, and involving industry partners for data collection on various vessels. They highlighted the significance of defining environmental thresholds for marine species, using AI for predictive modeling, and considering the operationalization of observing work.

Member Moore cautioned against prioritizing new, flashy initiatives over addressing basic needs and urged the inclusion of industry partners. He pointed out the importance of involving data scientists to create a water/fish language model using AI and machine learning.

Member Hoh underscored the significance of industry involvement in research activities, emphasizing the potential for industry to drive advancements and address specific challenges. She stressed the importance of considering industry involvement across various sectors, not limited to conservation, but extending to film business and tourism.

Member Spalding mentioned several specific initiatives and projects, including the Ocean DNA project led by the Smithsonian and an XPRIZE for coral reef restoration. She raised issues related to data accessibility and utilization, with a focus on the need for effective organization and emphasis on the value of data in the larger context. Member Dickson mentioned the Climate Ecosystem Fisheries Initiative.

Member Ratilal-Makris touched on the potential negative impacts of industry activities, as seen in the case of marine pollution from artificial turf, prompting a call for federal regulations to curb ocean pollution. She advocated for the creation of a National Ocean Data Center as a centralized repository for diverse ocean-related data, ensuring accessibility for various stakeholders.

Member Moore highlighted the importance of involving donors, both federal and private, in shaping research agendas. Member Brockbank spoke about making research data more understandable and trusted by end-users, recognizing the influence of political and social factors in decision-making processes.

Mr. Babb-Brott emphasized the availability of resources from various agencies for ocean-related work. He mentioned expertise in prizes and challenges, referring to a previous position at OSTP. He also highlighted ongoing work by agencies like NOAA and the Department of Energy (DOE), particularly in areas like ocean observing platforms and renewable energy. He suggested that as the panel forms working groups, they tap into agency expertise. He touched on data-related discussions, with an emphasis on recent efforts by OSTP and the administration in the realm of diversity and equity, and resources available for coastal management priority issues.

Co-Chair Ostrander introduced a second question, asking about gaps in the current approach of federal agencies, both within their individual mission areas as well as in the interagency space, regarding ocean research. Member Dickson expressed concerns about capacity and funding mechanisms for indigenous participation. Member Hoh cited interdisciplinary challenges. Member Knight highlighted the need for better baseline data on issues like greenhouse gas emissions and infrastructure risk assessment.

Member Moore emphasized the importance of ocean literacy programs to build trust in ocean data. He mentioned the problem of silos within agencies. Co-Chair Glackin spoke of data access difficulties. Member Benitez-Nelson discussed the challenges associated with interdisciplinary collaboration and policy mechanisms to incentivize collaboration. Member Trice commented on the need for strategic alignment of agency missions. Mr. Babb-Brott acknowledged the imperfections in the system but emphasized the importance of advocacy for driving change.

Session 3 Continued: ORAP Baseline

ORAP Co-Chairs & Members

Co-Chair Glackin emphasized the need to refocus on the agenda due to time constraints. She acknowledged the fruitful morning discussion, hinting at the flexibility to concentrate on one report if needed. Co-Chair Ostrander presented a framework, summarizing key topics for consideration, followed by a proposal for technology-focused areas. The challenges identified included plastic noise and nutrient

pollution; biodiversity, climate change, including characterization, mitigation, and adaptation; coastal and community resilience; and environmental justice and equitable management of resources, opportunity, and impacts. The proposed technology clusters comprised eDNA and biological monitoring, autonomous systems and robotics, long-term continuous observing networks, and large-scale, accessible, interoperable data.

Member Walker underscored the importance of standardizing biodiversity data, addressing disparities in research directives, and incorporating community benefits into large-scale projects. She suggested real-time observation of eDNA sampling during the next meeting. Member Saade highlighted the significance of repetition in effecting change and the success story of achieving uniformity in LIDAR accuracy. Member Dickson veered the conversation towards existing collaborative frameworks like the Interagency Arctic Research Policy Committee (IARPC) and the challenges of fostering interagency funding for joint projects. Member Tzortziou advocated for an integrated and interdisciplinary approach, emphasizing the need to connect environmental and social datasets.

Member Benitez-Nelson encouraged deeper reflection on the identified challenges, considering existing frameworks like the Ocean Climate Action Plan, SOST recommendations, and the U.N. Decade. She suggested exploring nuanced framings of the identified themes. Member Corredor raised the importance of addressing a broader spectrum of pollutants within the human impact category. Member Spalding proposed alternative ways of organizing things to encourage innovative thinking. Member Moore suggested synthesizing existing documents as a starting point for further deliberation.

Member Knight emphasized the need for a list of references, particularly those from National Academies, to better understand the context and previous work related to the topics under consideration. She expressed the importance of synthesizing information and cross-referencing ideas from various sources. She raised a crucial question about the approach to shaping federal policy, whether the focus should be on identifying problems and gaps or delving into existing federal policies hindering problem-solving efforts. She suggested obtaining a list of programs and budgets from federal agencies related to the subject areas under discussion.

Co-Chair Glackin highlighted the importance of emergent technologies and suggested that subgroups could receive briefings from federal experts to gain a better understanding of ongoing initiatives. Co-Chair Ostrander prompted a group discussion on the selection of emerging technologies and whether the identified four areas were appropriate. He questioned whether the group could handle all four areas simultaneously or if a phased approach would be more effective. Member Benitez-Nelson sought clarification on whether the group should narrow down specific technologies or provide examples of technology types that could be useful in the conversation. Co-Chair Glackin noted that the goal was to focus on emerging technologies within the larger context. Member Saade emphasized that the broader landscape involves challenges such as climate change, human impact, inequitable practices, and sustainability concerns.

Members suggested considering cross-cutting themes like ocean science literacy, education, and social sciences. Member Brockbank proposed focusing on two emerging technologies and including

continuous observing as an area of focus. This would strike a balance between addressing entirely new technologies and improving existing ones. Member Spalding highlighted the need to include social science, differentiating between its role as a science and as a tool for integration and engagement.

Member Tzortziou emphasized the importance of long-term, interdisciplinary observing networks and the coordination of activities and funding to enhance efficiency. Member Moore highlighted the issue of international discussions on high seas, particularly regarding genetic materials, patents, and ownership, bringing attention to the ethical and equity considerations in the marine space.

The conversation delved into the definition of "emerging technologies," with a focus on eDNA as an example. Member Benitez-Nelson argued that certain technologies, like eDNA, are no longer emerging but are already in use. Co-Chair Ostrander raised concerns about the term "emerging industries" versus "emerging technologies," leading to a clarification that the tasking involves focusing on emerging industries but with a strong emphasis on the technologies driving them. Member Benitez-Nelson explored how to facilitate industries in adopting and scaling up technologies, with considerations for market incentives, partnerships, and the role of federal agencies. Co-Chair Glackin highlighted the need for large-scale, accessible, comprehensive, interoperable, and trusted data.

Member Walker acknowledged that there is an underfunding of ocean research compared to land research, emphasizing the need for equitable funding to address critical challenges. Member Benitez-Nelson emphasized the need to consider microfluidic sensors addressing fundamental parameters such as pH and nitrate. Co-Chair Glackin emphasized the importance of low-cost, distributed, and durable sensors.

Member Moore made a recommendation to avoid getting too focused on specific technologies and instead adopt a top-down, bottom-up approach that synthesizes the significant challenges outlined in the OCAP and identifies the appropriate tools and technologies to address them. Member Spalding called to align the focus on emerging technologies with broader industry sectors, such as blue carbon and conservation, to provide a comprehensive framework for developing and deploying technologies within the context of a sustainable economy.

Mr. Babb-Brott emphasized the need to step back and consider an organizing principle that respects various interests. He highlighted OCAP, the Environmental Justice Strategy, and the National Strategy for a Sustainable Economy. He called on the panel to think about partnerships and broader goals rather than getting lost in specific details. He touched on issues such as biodiversity, pollution, and climate change, emphasizing the need to collectively address these challenges. He raised questions about how a healthy ocean supports thriving communities and the role of international efforts in synthesizing diverse concepts.

The co-chairs proposed forming two working groups: one focused on biogeochemical observing, including eDNA, and another on data. The biogeochemical observing group would assess applications, maturity, players, and partnership opportunities. The data group would focus on the status of federal agency efforts, barriers, and partnerships related to ocean data.

Member Benitez-Nelson raised concerns about ensuring the working groups address the needs outlined in OCAP and involve diverse communities. She emphasized the importance of understanding why partnerships and progress might be failing despite various funding initiatives.

Co-Chair Glackin emphasized the importance of addressing barriers in environmental justice and determining eligibility criteria for grant applications. Member Moore discussed the need to highlight both challenges and successes in the panel's endeavors. Co-Chair Glackin proposed to send a follow-up email to affirm the discussed topics and establish clarity.

Member Dickson and Member Tzortziou offered to co-chair the biogeochemical group and Member Saade volunteered to lead the data group. The biogeochemical group will consist of Members Dickson, Tzortziou, Walker, Ratalal-Makris, Corredor, Moore, Hoh, and Benitez-Nelson. Member Moore asked if an individual member could be in both groups. Mr. Fillingham clarified that this is possible, but he cautioned against having one group be composed of the entire panel. Ms. Silva added that the working groups can invite subject matter experts as they see fit. Member Knight inquired about the duration of the subgroup assignments. Co-Chair Glackin clarified that they are until February, but there is the potential for continuity. The data group will consist of Members Saade, Trice, Tzortziou, Spalding, Brockbank, Knight, and Benitez-Nelson. Members not present will also have the opportunity to choose which group(s) they would like to join. Ms. Silva assured the panel that she will establish a clear process for subgroup communication using Google Docs.

Adjourn

Viviane Silva (DFO) & Joe Fillingham (Alt DFO); ORAP Co-Chairs

Ms. Silva discussed plans for future consideration, including the scheduling of the February ORAP meeting, compiling key reports, and planning subgroup meetings. She expressed gratitude to the co-chairs, members, and staff.

Ms. Silva and Mr. Fillingham adjourned the meeting at 12:42 p.m.