

DRAFT Minutes
Tenth Meeting of the Ocean Exploration Advisory Board
Washington, D.C.
16-17 May 2018

Notification and Availability of Meeting Materials

The tenth meeting of the Ocean Exploration Advisory Board (OEAB) was announced to the public by Federal Register Notification, and on the OEAB website at www.oeab.noaa.gov. Background material and presentations prepared for this meeting are posted on the OEAB website.

Ocean Exploration Advisory Board Members in Attendance

Mr. John Kreider, Consultant (Chair)
Dr. James Austin, University of Texas/Austin (Vice Chair)¹
Ambassador Cameron Hume, Consultant (Vice Chair)

Dr. Amanda Demopoulos, U.S. Geological Survey²
Dr. Jacqueline Dixon, University of South Florida
Dr. Christopher German, Woods Hole Oceanographic Institution
Dr. Darlene Lim, NASA³
Ms. Nicolette Nye, National Ocean Industries Association
Dr. Richard Rikoski, Hadal, Inc.
Dr. Dominique Rissolo, University of California at San Diego
Mr. Lance Towers, The Boeing Company

NOAA Management and Staff in Attendance

Dr. Alan Leonardi, Director, OER
CDR William Mowitt, Deputy Director, OER
Mr. David McKinnie, Designated Federal Officer for the OEAB
Dr. Adrienne Copeland, OER
Ms. Katie Wagner, OER
Ms. Yvette Jefferson, OER

Invited Briefers

Ms. Dana Jacob, Ethics Law and Programs Division, Department of Commerce
Dr. Jerry Schubel, President and CEO, Aquarium of the Pacific
Ms. Katy Croff Bell, MIT Media Lab (via teleconference)
Mr. Erik Berkenpas and Mr. Alan Turchik, National Geographic Society
Dr. Mary Voytek, Senior Scientist, Astrobiology; Science Mission Directorate, NASA⁴
Dr. Lance Bush, President and CEO, Challenger Center

Meeting Summary

- 1. Meeting Opening.** The Designated Federal Officer (DFO) opened the meeting on May 16, 2018, at the Morrison-Clark Historic Inn in Washington, D.C.

¹ Dr. Austin participated on the second day

² Dr. Demopoulos participated by telephone

³ Dr. Lim participated in the SUBSEA briefing by telephone

⁴ Dr. Voytek briefed the OEAB by videoconference

2. **Approval of Minutes.** Mr. Towers made a motion to approve the minutes from the 9th OEAB meeting, held in Seattle, Washington. Ambassador Hume seconded, and the Board approved the minutes (see the [OEAB website](#) for Meeting 9 minutes).
3. **Chairman's Remarks.** The Chair reviewed the OEAB discussion at the end of the Seattle meeting about how the OEAB should define success. The group identified four areas to present to RDML Tim Gallaudet where the OEAB thought it might be able to provide useful advice: adaptive technologies, leveraging partnerships, public engagement, and ocean exploration in the Blue Economy. In Seattle, the OEAB agreed to focus on public engagement and technologies at its next two meetings, in May and September 2018 respectively.

The Chair described his meetings with RDML Gallaudet, Acting NOAA Administrator, and RADM Mike Silah, Director of the Office of Marine and Aviation Operations and Director, NOAA Commissioned Officer Corps. RDML Gallaudet is very supportive of ocean exploration and eager to receive advice from the OEAB. He agreed that the OEAB should focus on public awareness and technology. He also stated his interest in increasing the ocean exploration budget over the next few years and to showing the importance of the ocean to the nation.

RADM Silah also stated his support for the ocean exploration mission and noted that he is looking for a strong signal from the ocean exploration community as to their requirements for ships and other platforms. He also told the Chair that OMAO is actively investigating alternatives to the *Okeanos Explorer*, which will be in service only until 2024, and that he recognized the need to improve uptime and availability across the fleet. Mr. Kreider's presentation is posted on the OEAB website, as are all other presentations given to the OEAB.

4. **Mandatory Briefing on Ethics for Special Government Employees.** Ms. Dana Jacob, of the Ethics and Program Law Division of the Department of Commerce, provided the annual ethics briefing for the OEAB. OEAB members are "special government employees" and as such must follow specific ethics guidelines as well as file annual financial disclosure forms and certifications that they are not lobbyists for foreign governments. Her presentation is posted on the OEAB website.
5. **OER Mapping Inside and Outside of the U.S. EEZ.** During its meeting in Seattle, the OEAB requested information from OER about how much of the mapping conducted by the *Okeanos Explorer* was inside the U.S. EEZ. In response, Dr. Leonardi gave a short presentation showing that OER has mapped about 22% of the U.S. EEZ and that over 52% of OER's mapping efforts since 2001 were inside the U.S. EEZ. He also noted the need for NOAA to agree on consistent methodologies for assessing coverage.
6. **National Ocean Exploration Forum 2018.** Ms. Croff Bell described progress to date in organizing the 2018 Forum, now called "All Hands on Deck." A two-page description of the event is posted on the OEAB website.

In discussion, the OEAB considered the Forum process to date and what topics might be appropriate for the 2019 Forum. Given the policy context at the Department of Commerce and RDML Gallaudet's interest in the Blue Economy, the OEAB agreed to recommend that NOAA set the Blue Economy as the 2019 National Ocean Exploration Forum theme.

7. **OER Education Subcommittee Review Update.** Dr. Schubel, subcommittee chair, and Dr. Dixon, the OEAB member participating on the subcommittee, provided an update on the subcommittee's progress to date. Having met in April, a second, and final, meeting was scheduled in May to finalize the report. Dr. Schubel explained that the panel was

converging on recommendations in seven areas: strengthening the ocean exploration education community, increasing the relevance of expeditions to the classroom, reviewing the professional development workshops for effectiveness, improving the education portions of the OER website, improving existing materials, expanding the network of institutions that offer workshops for teachers, and improving reach in underserved communities. He noted that on balance, OER's education programs had achieved much, but can do better. He also noted that given the importance of education, consideration should be given to increasing OER's budget for education over time. Dr. Dixon added that the presence of classroom teachers on the panel was critical and helped clarify the importance of aligning OER education resources to current teaching standards and specifying how OER's investments can best serve educators. Dr. Schubel and Dr. Dixon also stressed the importance of OER working closely with Ocean Exploration Trust and Schmidt Ocean Institute, both of which offer ocean exploration resources for educators.

8. **OEAB Discussion on Public Engagement.** Dr. Schubel introduced key concepts in public engagement, referring to the white paper he prepared for the 2016 National Ocean Exploration Forum, which is posted on the OEAB website as a resource. The OEAB discussed the importance of emphasizing positive messages about the ocean, the need to link space and ocean exploration (rather than attempt to compete with space exploration) and to differentiate among target audiences with specific messages and deliveries. The OEAB noted that the breadth of the ocean and the range of concerns allow for multiple messages relevant to national security, food security, the ocean as life support, and others. Finally, the Board reviewed the critical role media and other private and not-for-profit partners play in conveying appropriate messages about the ocean.
9. **Briefing on the National Geographic Society's Role in Exploration.** Mr. Erik Berkenpas and Mr. Alan Turchik briefed the OEAB on the National Geographic's role in exploration and in particular on new technologies relevant to ocean exploration expeditions. They described a range of tools developed in their laboratories that include broad-area lighting systems, "critter cams" and deep ocean "drop cams" capable of recording images in very low light conditions. They also identified areas of potential partnership with OER and other ocean exploration programs, including technology tests, data management, and citizen science.
10. **OEAB Discussion.** Following these presentations, the OEAB discussed a range of topics that included how NOAA's ocean exploration activities fit within the international framework of initiatives such as Seabed 2030, the Galway Accord, and the United Nations Decade of Ocean Science for Sustainable Development slated to start in 2021; the importance of engaging the private sector in ocean exploration, and leveraging other platforms capable of conducting ocean exploration expeditions. The OEAB also discussed RDML Gallaudet's Blue Economy initiative and how ocean exploration contributes critical elements of the Blue Economy.
11. **Briefing on Systematic Underwater Biogeochemical Science and Exploration Analog (SUBSEA) and the NASA-NOAA-OET Loihi Expedition.** Dr. Darlene Lim (by telephone) and Dr. Chris German provided an overview of SUBSEA for the OEAB. Dr. Lim is the principal investigator and Dr. German the deputy principal investigator for SUBSEA. NASA, NOAA, and the Ocean Exploration Trust (OET) have partnered to use the ocean environment to test different aspects of interplanetary exploration. There are three primary SUBSEA components: using specific ocean environments as analogs for what might be found on Ocean Worlds; testing ocean exploration telepresence as an analog for low-latency telerobotic exploration on Mars, and technology tests of data management and expedition planning and management software. SUBSEA will conduct expeditions to Loihi seamount off the island of Hawaii in August aboard the E/V *Nautilus* that will investigate the seamount as a potential analog for other Ocean Worlds that may

have hydrothermal vent systems. Other aspects of the SUBSEA program include tests of algorithms developed to predict life on other Ocean Worlds and ocean exploration telepresence as an analog for conducting exploration on Mars. (<https://spacescience.arc.nasa.gov/subsea/>). Their presentation is posted on the OEAB website.

12. **NASA and Ocean Exploration.** Dr. Mary Voytek, NASA senior scientist in the Science Mission Directorate, provided an overview of NASA's interest in ocean exploration, highlighting NASA priorities for icy planets far from the sun where chemical metabolism is the only source of energy for life. She noted that NOAA and NASA interests converge in the use of ships and autonomous vehicles, as well as autonomous systems for conducting interplanetary expeditions. Dr. Voytek called for more NASA-NOAA interactions to share information and to learn from each other while being mindful of funding and other commitments. The oceans were important to NASA, she said, because they were, in fact, largely unexplored and hard to get to. Relationships and the appropriate levels in the two agencies would benefit both NOAA and NASA missions.
13. **Briefing on the Executive Order on Strategic Minerals.** At its last meeting, the OEAB had requested OER to prepare a briefing on the status of the Executive Order on Strategic Minerals (E.O. 13817). OER Deputy Director CDR Bill Mowitt presented an update on the Administration's progress in implementing the Executive Order, noting that the Department of the Interior had published a list of critical minerals in February, 2018 and that the Department of Commerce, charged with developing an implementation strategy, was expected to report in mid-August. He also reviewed the roles and responsibilities of the other agencies involved, including the U.S. Geological Survey (USGS), and in particular the requirement that maps be produced to "support private sector critical mineral exploration." He noted the historic collaboration between NOAA and USGS for undersea mapping in the 1980's and the precedent the Extended Continental Shelf mapping and characterization program establishes for interagency collaboration.
14. **Briefing on the Challenger Center and Linkages Between Ocean Exploration and Space Exploration Education.** The Challenger Center mission is to use hands-on exploration simulations to engage students and teachers in Science, Technology, Engineering, and Mathematics fields. Dr. Lance Bush briefed the OEAB on the Challenger Center, its successes in engaging students through simulation and role-playing programs that use both space and ocean environments to teach and inspire. Dr. Bush stressed the importance of reaching students early to spark life-long interest in learning about space, or the ocean. He also described opportunities for collaboration with NOAA and other ocean exploration educators using the Challenger Center approach and infrastructure and Challenger Center plans for the Aquatic Investigators simulation module.
15. **Public Comment Period.** The OEAB invited public comment at 1145 on 17 May. No comments were received.
17. **Next Meeting.** The Board confirmed the next OEAB meeting for 25-26 September at Woods Hole Oceanographic Institution, in Woods Hole, Massachusetts. The meeting will focus on advanced technologies for ocean exploration.
18. **Meeting Close.** The DFO closed the meeting at approximately 2:00 P.M. on 17 May, 2018.