

**Sixth Meeting of the Ocean Exploration Advisory Board
Arlington, Virginia
September 13-14, 2016**

Notification and Availability of Meeting Materials

The sixth meeting of the Ocean Exploration Advisory Board (OEAB) was announced to the public by Federal Register Notification on August 29, 2016, 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

Vice Admiral Paul G. Gaffney II, U. S. Navy (Ret.), Monmouth University, Chair
Dr. James Austin, University of Texas/Austin
Dr. Amanda Demopoulos, U.S. Geological Survey (participated by telephone on September 14)
Dr. Jackie Dixon, University of South Florida
Ambassador Cameron Hume, Consultant
Mr. David Lang, OpenROV
Dr. Darlene Lim, NASA (by telephone on 9/14)
Mr. John Kreider, Oceaneering, Inc.
Ms. Nicolette Nye, National Ocean Industries Association
Dr. Richard Rikoski, Hadal, Inc.
Dr. Dominique Rissolo, University of California at San Diego
Mr. Lance Towers, PE, The Boeing Company

NOAA Management and Staff in Attendance

Dr. Alan Leonardi, Director, OER
Mr. David McKinnie, Designated Federal Officer (DFO) for the OEAB
Ms. Yvette Jefferson, Alternate DFO

Invited Briefers (Briefing material presented is available on the OEAB website)

Dr. Robert Ballard, Ocean Exploration Trust (by telephone)
Dr. Shirley Pomponi, Director, Cooperative Institute for Ocean Exploration, Research, and Technology (CIOERT)
Dr. Deborah Glickson, Deputy Director, CIOERT
Ms. Zdenka Willis, Director, U.S. Integrated Ocean Observing System, NOAA
Dr. Frank Herr, Head, Ocean Battlespace Sensing, Office of Naval Research (ONR)
Dr. Scott Harper, Program Officer, Arctic and Global Predictions, Ocean Battlespace Sensing, ONR
Mr. Craig McLean, Assistant Administrator, NOAA Oceanic and Atmospheric Research (OAR)

Meeting Summary

1. **Meeting Opening.** The Designated Federal Official (DFO) opened the meeting on September 13, 2016 at The Boeing Company offices in Arlington, VA. Minutes of the April 26-26 meeting were discussed and approved. The Chair previewed the agenda and identified a series of issues for Ocean Exploration Advisory Board (OEAB) discussion.
2. **Charter Renewal.** The DFO reviewed the recently signed charter, which renews and extends the OEAB Charter and Balance Plan through July 2026.

3. **Transition Document.** The Board discussed and approved a short paper that outlines the Board's recommendations to the next Administration's transition team. (Attachment 1)
4. **Office of Ocean Exploration and Research (OER).** Dr. Alan Leonardi, Director, updated the Board on the calendar year 2016 expedition season, especially the successes of the NOAA Ship *Okeanos Explorer* in the Central and Western Pacific. He further reviewed the OER FY16 budget execution, *Okeanos Explorer* and other expedition investments, and campaign planning for FY17-19. The Board will discuss the OER strategic plan at its first meeting in 2017 in light of the impending Administration transition.
5. **OER Ocean Exploration Priorities.** Dr. Leonardi outlined his geographic priorities for FY17-19. Extensive discussion ensued among the Board members and with Dr. Leonardi. The following rather tight schedule reflects priorities to be addressed by dedicated ships of exploration and the Federal Funding Opportunity (FFO), and with which the Board agrees:
 - As OER's first priority, the *Okeanos Explorer* will continue its Central Pacific Marine Protected Area exploration expeditions through 2017, as publicly announced by the Administrator of NOAA in Hawaii in September 2016.
 - Ocean Exploration Trust (OET) will continue its coastal U.S. Exclusive Economic Zone (EEZ), moving westward to Hawaii and the Central Pacific, then the Western Pacific over the next several years.
 - Address Arctic priorities with FFO investments.
 - Begin to examine opportunities in the Gulf of Mexico in 2018 and beyond through the FFO process. OER has already had discussions with the National Academies' Gulf Research Program.
 - Add resources, including NOAA ship time, to the multi-agency South Atlantic Bight Ocean Exploration Campaign beginning in 2017. This is the model for multi-agency, multi-performer, multi-parameter ocean exploration campaigns.
 - Engage with North Atlantic partners in planning for a multi-year exploration campaign between North America and Northwestern Europe, with the understanding that additional funding and international resource leveraging will be necessary.
6. **Ocean Exploration Trust.** Dr. Robert Ballard, President, OET, provided an extensive overview of OET's very successful 2016 exploration field season. His presentation included discussions of his recent interactions with AltaSea at the Port of Los Angeles, his wide variety of onboard explorers and VIPs, and new plans to enhance oceanographic and ocean exploration activities at the University of Rhode Island (URI) Graduate School of Oceanography (GSO). The Board has been interested in hearing Dr. Ballard's ideas on marketing and branding of the national ocean exploration program. His field season briefing and the new possibilities with AltaSea and URI/GSO that he presented demonstrated a wide-ranging branding strategy.
7. **CIOERT Experience Aboard the Okeanos Explorer.** Drs. Pomponi and Glickson provided a valuable presentation on their experiences as science co-leads aboard the *Okeanos Explorer* during the 2016 Deepwater of the Marianas expedition. They discussed their experiences with telepresence-enabled exploration with enthusiasm and the value of the connection to scientists ashore. They offered suggestions for

improvements in cruise planning and for expanding the participation of the science community in OER expeditions.

8. **Public Comments.** A public comment session was conducted from approximately 2:45-3:15 on the first day. The OEAB received no comments from members of the public present or over the phone.
9. **NOAA's U.S. Integrated Ocean Observing System (IOOS).** The OEAB Chair briefed the IOOS Federal Advisory Committee in March 2016. In a reciprocal visit, Ms. Zdenka Willis, who directs the IOOS program, briefed the Board on IOOS and related observing systems. This is an interesting topic for both Boards, since exploration and observing are closely related (talent, technologies, areas of emphasis, and data distribution and management). Further, she and the Board discussed potential cooperation in a fledgling program to monitor marine life called the Marine Biodiversity Observation Network (MBON). OER supports MBON financially as a demonstration project with application to baseline characterization; IOOS likewise has a small investment in MBON.
10. **Second Ocean Worlds Conference.** OEAB member Dr. Darlene Lim provided (by phone) a short briefing of the successful Second Ocean Worlds Conference held at Woods Hole Oceanographic Institution in August 2016 (also attended and co-convened by OEAB member Dr. Chris German). She noted the positive synergy between interplanetary scientists interested in ocean worlds and ocean explorers who focus on Earth. NASA is funding a number of oceanographers and ocean explorers working on this planet, in the expectation that their results could have implications for interplanetary exploration.
11. **OEAB Review of the OER Federal Funding Opportunity.** Per the OEAB Charter, Dr. Leonardi briefed the Board on the current FFO solicitation and selection process. The Board offered the following comments, intended to support its view that the process is evolving in positive direction:
 - The process is recurring annually and is open to the community. This is an improvement over some years in the past, when the FFO was not regular, and/or was not as fully available to the community.
 - Both internal review (for assurance of relevance to NOAA and OER stated mission objectives) and external review (for achievement of goals for high quality science) are part of the process.
 - OER allocates a substantial part of its budget (about \$3 million each year) to this activity, with attention to leveraging other contributions, such as ship time. The Board encourages OER to use leveraging as an FFO selection criterion, or at least an important factor when deciding to make awards.
 - OER is funding a substantial percentage of submitted full proposals (over 50% in FY16).

The Board recommends that:

- OER present a summary of the results of FFO investments (e.g. in terms of data collected; peer-reviewed articles submitted/published, presentations made, etc.)

And requests that:

- OER provide the Board annually a breakdown awards by recipient (federal agency, academia, foundation) and by the dollar amount. Presenting such data covering several years will help the Board understand trends in FFO awards.
- OEAB member Dr. Rissolo offered to provide his ideas on creating within the FFO program and subprogram for “micro grants (<\$10K each).”

Attachment 2 is the Board’s letter to the NOAA Administrator certifying a successful review.

- 12. Office of Naval Research Ocean Science and Arctic Programs.** Drs. Herr and Harper briefed the Board on ONR’s ocean science and Arctic programs. A wide-ranging discussion ensued, mostly focused on the technologies ONR develops in pursuing its goals that may be useful to ocean exploration. Further, a brief discussion identified potential synergies between OER and ONR in ocean exploration campaigns and in Arctic science planning.
- 13. International Mapping Campaigns.** NOAA Assistant Administrator (OAR), Mr. Craig McLean, briefed the Board on emerging opportunities for international ocean exploration cooperation in the North Atlantic. The Board is supportive of NOAA engaging in priority international opportunities to gather environmental information and for diplomatic reasons. The Board also understands that diplomatically inspired direction can come from the top levels of government and, if it does, exploration priorities can shift immediately. The OEAB expects that additional resources would be made available by NOAA or other sources when pursuing international opportunities, so that top priorities in the U.S. EEZ are not compromised.
- 14. OEAB Analysis of NOAA Fleet Utilization.** OEAB member Mr. Lance Towers led a discussion of the current rate of NOAA ship utilization and the potential implications of ship utilization data when requesting new ships. His analysis showed that the NOAA fleet is not operating at a level near the Office of Marine and Aviation Operations’ target rate of utilization (or the rate of similar ships in the Navy or UNOLS oceanographic fleets) and that many of its ships are nearing the end of their useful lives, including the *Okeanos Explorer*. This low operational tempo does not argue well for support for investments in new ships. The Board briefly discussed options such as:
 - contracting out all ocean exploration expeditions;
 - the use of the NOAA Ship *Ron Brown* as a capable deep-water platform that could carry out deep ROV operations and other sampling and measurement tasks for ocean exploration, and,
 - the acquisition (or long-term lease) of ships from the offshore oil and gas support industry.

The question of NOAA (and other) ships dedicated to ocean exploration is becoming a central issue for the Board and will be primary issue it will discuss at its first meeting in 2017.

- 15. National Ocean Exploration Forums 2016 and 2017.** Dr. Dominique Rissolo and VADM Gaffney reviewed plans for the next two National Ocean Exploration Forums, scheduled for New York City in 2016 (“*Beyond the Ships*”) and La Jolla, California in 2017 (“*Ocean Exploration in a Sea of Data*”).

16. General Discussion. Other matters of general discussion were:

- The Board recognizes a notable increase in demand for ocean exploration from NOAA offices that desire characterization of existing, or potential new or expanded Marine Protected Areas (MPAs). These offices also see value in emerging international ocean exploration opportunities to help meet their mission. Ocean exploration clearly is a requirement to support NOAA's mission.
- The Board notes the value of exploring unknown or poorly known marine areas to help define new or expanded Marine Protected Areas (MPAs). While ocean exploration is necessary once an MPA is designated--for baseline characterization to inform management plans--it would be preferable to explore and characterize before final MPA boundaries are determined.
- Both Dr. Ballard's presentation and comments by Dr. Leonardi lead the Board to believe it is in the nation's interest to plan new exploration campaigns aimed at understanding issues related to potential deep-sea minerals mining, characterization, including baseline characterizations of potential mining sites and adjacent areas.

17. Letter to the NOAA Administrator. The Board drafted and approved a letter to NOAA Administrator Sullivan citing several positive developments in the national ocean exploration program and urging her support of ocean exploration during the upcoming transition in Administrations. The letter is at Attachment 3.

18. Next Meeting. The Board discussed a next meeting in February or March 2017 in Austin, Texas. Dates and other details to be confirmed. As noted above, the meeting will focus primarily on the question of ships for ocean exploration, drawing on the reports from the Independent Review Team chaired by Mr. Winokur and RADM West, the internal NOAA team identifying program requirements, the results of National Ocean Exploration Forum 2016, and other resources to inform its discussion.

19. Meeting Close. The DFO closed the meeting at approximately 3:45.

Attachments

1. Ocean Exploration and the Next Administration: OEAB Recommendations
2. OEAB Letter to NOAA Administrator Kathryn Sullivan certifying review of the OER FFO process
3. OEAB Letter to NOAA Administrator Kathryn Sullivan noting recent positive developments in the national ocean exploration program

U.S. National Ocean Exploration₁

Discovering half of America's territory ... for the first time

Introduction

Given the importance of the ocean to the welfare of humanity and to the success of our nation, a comprehensive program of ocean exploration should be a primary focus of the new Administration.

Statute (33 U.S.C. § 3401) establishes a national ocean exploration program and assigns the leadership and coordination of that national program to the National Oceanic and Atmospheric Administration (NOAA). Other agencies are expected to participate within their respective missions.

The same statute establishes a national Ocean Exploration Advisory Board (OEAB). This set of simple and achievable recommendations is a product of the OEAB.

Describing America's Oceans

America, like all coastal nations, exerts authority over the resources within approximately 200 nautical miles of its shorelines; the US Exclusive Economic Zone (EEZ). That expansion beyond the US land mass nearly doubles US geography.

There is wide recognition that 95% of the world's oceans are unexplored. A credible claim can be made that the large majority of the US EEZ is neither explored nor characterized well enough to queue scientific, management or resource investment decisions.

Nevertheless, understanding the US EEZ is vital to our economy, safety and quality of life due to the ocean's direct relationship with the food supply, climate variability, shipping, national security, disasters, pharmaceutical sources and natural resources. Contrast this contention with the known investment made in exploring the moon. The moon is 100% imaged to within one-meter resolution; yet there are comparatively few resources, quality of life, transportation or national security attributes on the moon.

Recommendations

1. The US EEZ should be explored in sufficient detail to inform national decision makers as to whether further research, continual observation, sustainable development or regional management proposals should be considered.
 - a. "Exploration campaigns" that bring together multiple agencies over an extended period in deliberately targeted ocean areas should, at a minimum:
 - take physical, chemical, biological and acoustic measurements of the water column from surface to the bottom,
 - map the shape and depth of the ocean,
 - collect samples of new (or unexpected) marine life, geological and chemical phenomena, and
 - image bottom and water column characteristics and archeological/historic items not previously expected.

2. The US has begun to gather detailed information about the shape, depth and geology of the ocean at the edge of the US EEZ. This effort should be completed within the next Administration's tenure so that the US is best prepared to argue successfully for resources to which it has a right beyond 200 nautical miles. This area is called Extended Continental Shelf (ECS).
3. NOAA should actively engage with other agencies, the scientific community, private organizations and industry to develop a prioritized exploration campaign strategy that seeks full characterization of important areas and then marshals the assets from all stakeholders to explore individual, designated areas within the US EEZ, fully, over periods of several years, each. Such joint "campaign planning" expands the impact of NOAA Ocean Exploration program and encourages all interested parties to leverage asset and talent opportunities.
 - a. NOAA does not own, or operate, all exploration assets (ships, remotely operated vehicles, autonomous vehicles, moored/implanted observing tools, exploration telecommunications capabilities, etc.). NOAA should, however, invest in other oceanographic assets when they can be adapted for ocean exploration duties. An example is investing in ocean exploration "telepresence" for all major oceanographic ships.
4. While there is a clear priority to explore America's own undersea territory (US EEZ), requirements and opportunities that may arise to explore parts of the global ocean outside of the US EEZ for resource knowledge, national security, science or diplomatic reasons cannot be ignored. International partnerships can be a side benefit of such exploration investments.
 - a. International campaign plans should explicitly consider the impact of these initiatives on US EEZ campaign priorities.
5. The NOAA Ocean Exploration program should actively and routinely promote technological innovation for exploration measurement, sensing and imaging.
6. The NOAA budget for the core national Ocean Exploration Program should reflect the advice of national blue ribbon panels and routinely be set at approximately \$75M/year for planned, annual ocean exploration campaigns and programs; with additional funding to address "emergent" national requirements, data management and technological capabilities.

1 Note: A definition of Ocean Exploration

Ocean Exploration is the act of going to sea to describe ocean areas, for the first time, from its surface through its sub-bottom. Its goal is initial scientific understanding of oceanic conditions to sustain life therein and our own lives. Therefore:

Characterizing the ocean through imagery, measurement and sampling, from the surface through the water column to the bottom and sub-bottom, in deliberately identified areas not previously completely characterized, to support priority agency requirements, hypothesis-based research, public information and education, and/or jurisdictional claims.

Ocean Exploration Advisory Board
A Federal Advisory Committee Act Committee

September 14, 2016

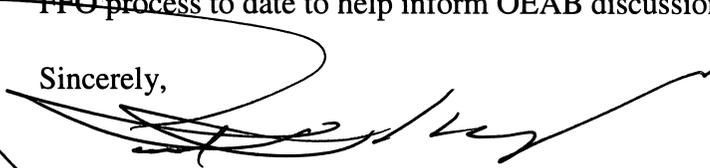
Honorable Kathryn D. Sullivan, PhD
Under Secretary of Commerce and
Administrator, National Oceanic and Atmospheric Administration
1401 Constitution Avenue, NW
Washington, DC 20330

Dear Dr. Sullivan:

The Ocean Exploration Advisory Board (OEAB) is required by its enabling law and by its charter to conduct an annual review of the competitive grant selection process used by the Office of Ocean Exploration and Research (OER) for effectiveness and quality. To that end, OER briefed the Board on its annual Federal Funding Opportunity at our September meeting. The process is the same as that used widely within NOAA. It is akin to the NSF peer review system, but adds a pre-proposal step in the process. The Board voted unanimously (with one recusal and two absentee) to endorse the FFO process OER uses.

The OEAB has asked OER to provide additional information about the nature and results of the FFO process to date to help inform OEAB discussions in the future.

Sincerely,



Paul G. Gaffney II
Vice Admiral, U.S. Navy (Ret.)
Chair

cc: Dr. Richard Spinrad
NOAA Chief Scientist

Ocean Exploration Advisory Board
A Federal Advisory Committee Act Committee

September 14, 2016

Honorable Kathryn D. Sullivan, PhD
Under Secretary of Commerce and
Administrator, National Oceanic and Atmospheric Administration
1401 Constitution Avenue, NW
Washington, DC 20330

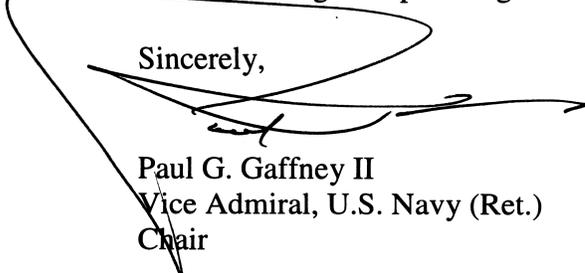
Dear Dr. Sullivan:

The Ocean Exploration Advisory Board has just completed its sixth meeting. We have positive news to report:

- Your important remarks in Hawaii about the value of ocean exploration set up the U.S. as a model. Thank you—and congratulations on the visibility you received.
- The field season for both the *Okeanos Explorer* and NOAA-funded E/V *Nautilus* set new records for valuable information collected, new discoveries, and public engagement.
- Both the NOAA Ocean Service and NOAA Fisheries have explained to us the value of ocean exploration for their respective missions, and we note that 100% of *Okeanos Explorer* days at sea this year met these line offices' requirements.
- The *Okeanos Explorer* completed 195 days at sea in remote regions, thanks largely to the close attention the Office of Marine and Aviation Operations paid to her material readiness and the leadership of her Commanding Officer.
- More than 95% of the Extended Continental Shelf field work has been completed.
- Apparent to us is closer cooperation between OER and other federal agencies, and with the Schmidt Ocean Institute.

Challenges lie ahead for ocean exploration campaigns to meet growing national and international requirements and to address science opportunities. These campaigns will require resource support and new technologies as the aging dedicated ocean exploration ships can no longer fully meet the mission. We hope you will carry this message and the good story of ocean exploration forward during the upcoming transition.

Sincerely,



Paul G. Gaffney II
Vice Admiral, U.S. Navy (Ret.)
Chair

cc: Dr. Richard Spinrad
NOAA Chief Scientist