<p style="text-align:center">Charge to Reviewers</p>

<p style="text-align:center">Office of Ocean Exploration and Research Program Review
Graduate School of Oceanography, University of Rhode Island
16-18 October 2019</p>

Purpose of the Review

The National Oceanic and Atmospheric Administration (NOAA) Office of Oceanic and Atmospheric Research (OAR) conducts Program reviews every five years to evaluate the quality, relevance, and performance of the activities its Programs conduct, including operations, technology development, and research. This review is useful for internal OAR/NOAA planning, programming, budgeting, and in helping the Program progress towards its strategic plan objectives. These reviews also ensure that OAR Program activities support the NOAA Strategic Plan, are relevant to NOAA's research mission and to OAR corporate priorities, and are of high quality and high performance as judged by criteria described in this charge.

Scope of the Review

This review will cover the past five years of Program activity and management within the Ocean Exploration and Research (OER) Program. Reviewers are also asked to provide perspective and advice on how OER and NOAA can most effectively position themselves over the next five years to leverage existing and new exploration challenges, partnerships, technologies, data science and visualization, modes of operation, and other trends relevant to the ocean exploration enterprise.

Background

OER is the only federal organization dedicated to exploring our deep ocean, filling gaps in the basic understanding of U.S. deep waters and seafloor, providing critical deep-ocean data, information, and awareness needed to sustain and accelerate the economy, health, and security of our nation. Working with partners, OER uses the latest tools and technology to explore previously unknown areas of the deep ocean, making discoveries of scientific, economic, and cultural value and pushing the boundaries of technological advancements and operations. OER provides opportunities for more people to actively experience and participate in ocean exploration, from scientists on shore, to the next generation of ocean explorers, to members of the public. The data and information collected during expeditions and research supported by OER are publicly available, providing a unique and centralized national resource of ocean information needed to maintain the health of our ocean, sustainably manage marine resources, accelerate our national economy, and build a better appreciation of the value and importance of the ocean in our everyday lives. The Program also actively works with partners to expand the national ocean exploration program.

There are four activity areas and related topics for the review (described in more detail below):

- o   Ocean Exploration: Mapping and Characterization
- o   Technology: Development, Application, and Program Use

- o   Engagement: Reaching the Public[*]
- o   Data and Information: Availability and Access

Description of OER Activity Areas

OER's primary activities fall into four major areas, which are the themes for this review. The activities map to the OER Strategic Plan, which is the primary frame of reference for the panelists to consider in their reviews.

Activity Area #1: Ocean Exploration: Mapping and Characterization

Within this area, OER's primary activities are expeditions to explore unknown or poorly known areas of the ocean, collecting data needed to enhance basic understanding of deep waters and the seafloor through mapping and characterization efforts, with priority given to the U.S. Exclusive Economic Zone and Extended Continental Shelf. OER has evolved a balanced approach over the years to address scientific and management needs and should be reviewed in terms of its ability to use this approach to meet the strategic goal of making discoveries of scientific, economic, and cultural value.

Mapping activities in the Program result in the delivery of high-resolution bathymetric maps and data for previously unexplored areas and are a fundamental component of OER-supported expeditions. OER should be evaluated on the extent that collected mapping data increase our basic understanding and characterization of deepwater areas and the relevance of mapping data in planning or stimulating follow-on expeditions or research.

NOAA seeks to discover, observe, and describe new species, communities of organisms, and resources, both living and non-living. Reviewers should evaluate the Program's ability to discover and characterize new habitats and biological communities, locate and document underwater cultural heritage sites, and identify undiscovered areas of the ocean with potential high concentrations of economic assets.

Activity Area #2: Technology: Development, Application, and Program Use

Today's technologies allow society to explore the ocean in increasingly systematic, scientific, and noninvasive ways. OER strategic objectives include stimulating development of ocean exploration sensors, technology, and methods and coordinating development of ocean exploration technology within NOAA. In addition, the Program works to share technologies with other government agencies and with academia, industry, and the not-for-profit sector. OER work should be evaluated in terms of its performance in advancing ocean exploration, mapping, and characterization objectives through innovative technologies. Program reviewers should also consider the success of OER in developing and applying technologies and systems to document the unknown ocean and OER's ability to transition exploration results to new applications that benefit the rest of NOAA and the nation.

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[*] Note that OER's Education Program will not be addressed, given that the Ocean Exploration Advisory Board Subcommittee on Education reviewed in June, 2018. The outcomes of this prior review will be briefed to the panel.

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Activity Area #3: Engagement: Reaching the Public

Over the years, OER has reached out in new ways to engage and inspire people of all ages about the excitement and importance of ocean exploration, targeting the ocean-interested public, science community, resource managers and decision makers, and educators. The Program does this through the OceanExplorer.NOAA.gov website, social media tools, traditional media, live video feeds and real-time ship-to-shore interactions, and public events. The Program should be evaluated on its use of these outreach tools to improve public understanding of ocean science, resources, and processes. Reviewers should consider OER's ability to reach its target audiences and make data and information about basic ocean exploration results, discoveries, and innovations easily accessible in ways that inspire future explorers, build support for and awareness of ocean exploration, and illustrate the contributions of ocean exploration to the nation. Reviewers should also consider how OER has increased opportunities for individuals in under-represented groups in addition to expanding the Program through its partnerships and outreach activities.

Activity Area #4: Data and Information: Availability and Access
Since the inception of NOAA's exploration program in 2001, OER data management has been guided by the *2000 President's Panel Report* recommendations which prioritized rapid and unrestricted data sharing as one of five critical exploration program components. The Ocean Exploration Act of 2009 (33 USC 3401) reinforced and expanded OER data management objectives, continuing to stress the importance of sharing unique exploration data and information to improve public understanding of the ocean and for research and management purposes.

OER has stated objectives of maintaining information systems that allow for data interoperability and access, distribution of OER and partners' data through open portals, sharing of data management techniques with partners, and reporting discoveries and explaining them to the public. During the review, the Program should be evaluated on its ability to make data *available*—that is, reposed in appropriate archives after it has been processed, quality assured, and annotated with proper metadata. The Program should also be evaluated on its ability to make data *accessible*—that is, easy to locate, relate to similar data, and obtain.

As data management and information is a customer service function, the Program should be evaluated on whether it discharges its responsibilities in a way that meets the needs of the scientific and management communities, engages partners in the sharing and dissemination of data, and develops products to share information about expeditions to broad audiences.

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Information for Reviewers

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Each reviewer will independently prepare his or her written evaluations of at least one activity area and these evaluations will be compiled, but not analyzed, by the review chair in a summary report. Reviewers will be members of the existing Ocean Exploration Advisory Board (OEAB) and subject matter experts from not-for-profit organizations, academic institutions, the private sector, and other federal agencies.

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General Guidance

- Reviewers should focus on only the NOAA portions of the Ocean Exploration Act of 2009 (33 USC 3401) (https://oeab.noaa.gov/sites/oeab/Documents/public-law-111-11-ocean-exploration.pdf).

- Reviewers should refer to the OER Strategic Plan for the goals and objectives against which to measure Program success in its four theme areas.

- Reviewers should incorporate the 2018 review of the education components of the Program into their individual review assessments. The OEAB will provide this review to the panel, and it will be discussed in presentations by OER leadership; however, OER's education program will not be a topic of this program review.

- The Program's general engagement of stakeholders should be considered as follows based on the goals of the OER Strategic Plan:

    - Determine how well the Program is performing in terms of engaging national stakeholders, from both private and public sectors, to set priorities for ocean exploration.
    - Review how well the Program has performed over the past five years in reaching potential international partners to encourage collaborative activities where interests converge.
    - Consider how the Program has designed, along with stakeholders, strategic paradigms for multi-year, multiparty exploration campaigns in priority ocean basins.

Proposed Schedule and Time Commitment for Reviewers:

The review will be conducted 16-18 October 2019 at the University of Rhode Island's Graduate School of Oceanography. Two teleconferences before the review are planned with the OAR Deputy Assistant Administrator for Programs and Administration Ko Barrett, who will serve as the OAR Senior Executive liaison with the review team and for the completion of the report. All relevant information requested by the review team will be provided on the review website at least two weeks before the review.

Each reviewer is asked to independently prepare his or her written evaluations on at least one identified activity area, including an overall rating for the activity area. These evaluations will be provided to the review panel chair with a copy to Evaluation Team Lead Philip Hoffman in OAR headquarters. The chair, Rodney Cluck, will create a report summarizing the individual evaluations. The chair will not analyze individual comments or seek a consensus of the reviewers. OAR requests that within 45 days of the review, the review team provide the draft summary report to Ko Barrett. Once the report is received, OAR staff will review it to identify any factual errors and will send corrections to the review team. Once corrections are accepted by reviewers, OAR Evaluations staff will submit the final individual evaluations and the summary report to OAR Assistant Administrator Craig McLean.

Review Team Resources:
OAR will provide resources necessary for the review team to complete its work, including:

- Information to address each of the Program's activity areas to be reviewed will be prepared and posted on a public review website. A copy of all the information on the website will also be provided to reviewers at the review.

- Travel arrangements for the onsite review will be made by OER and paid for by OAR.

- On-site review team support will be available to acquire and deliver to the team any additional, relevant documents requested during the review to aid in assessing the Program.

Evaluation Guidelines

For each activity area reviewed, each reviewer will provide one of the following overall ratings:

- *Highest Performance:* Program greatly exceeds the Satisfactory level and is outstanding in almost all areas.

- *Exceeds Expectations:* Program goes well beyond the Satisfactory level and is outstanding in many areas.

- *Satisfactory:* Program meets expectations and the criteria for a Satisfactory rating.

- *Needs Improvement:* Program does not reach expectations and does not meet the criteria for a Satisfactory rating. The reviewer will identify specific problem areas that need to be addressed.

NOAA guidance asks reviewers to consider the Quality, Relevance, and Performance of the Program, and to provide one of the overall ratings above for each activity area reviewed. We also ask that, in addition to the overall ratings for each activity area, if possible, also assign one of these ratings for the subcategories of Quality, Relevance, and Performance within the activity area reviewed. Ratings are relative to the "Satisfactory" definitions provided below.

In addition, reviewers are asked to provide perspective and advice on how OER and NOAA can most effectively position themselves over the next five years to leverage existing and new exploration challenges, partnerships, technologies, data science and visualization, modes of operation, and other trends relevant to the ocean exploration enterprise.

1. **Quality:** Evaluate the quality of the Program's activities. Quality is a measurement of effectiveness based on community engagement, planning, operations, and delivery of information to those who need it as represented by results delivered by the Program. Assess

whether appropriate policies and processes are in place to ensure that high-quality work will be performed in the future.

Assess progress toward meeting OAR's goal for programs to support or further preeminent research based on ocean exploration results to advance NOAA or national priorities as listed in the "Indicators of Preeminence." Preeminence is tied to the frequency and level of peer review publications that cite data collected by the Program or partners the Program funds (both as represented by bibliographic citation analyses and general search); the degree to which Program approaches or models are adopted in the community; and similar indictors of preeminence and leadership as this information serves as a benchmark with which to assess the Program's influence in the community.

> **Quality Rating Criteria:**
> *Satisfactory* rating – Program staff and leadership are often recognized for excellence through collaborations, results, and national and international leadership positions. While good work is done, OER staff are not consistently recognized for leadership in their fields.
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> **Evaluation Questions to consider:**
> - Are appropriate approaches in place to ensure that high-quality work will be done in the future?
> - Do Program-supported researchers (including OER, OAR and NOAA federal staff) demonstrate scientific leadership and excellence in their respective fields?
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> **Indicators of Quality:** Indicators can include, but are not limited to the following:
> - A list of technologies transferred to operations/application and an assessment of their significance/impact on operations.
> - A measure (often in the form of an index) that represents the value of either an individual scientist or the Program's integrated contribution of refereed publications to the advancement of knowledge (e.g., Hirsch Index). NOAA librarians recommend percentile analysis as the preferred bibliometric approach.
> - A list of awards won by groups and individuals for program execution.
> - Significance and impact of involvement with patents, invention disclosures, Cooperative Research and Development Agreements, and other activities with industry.
> - Other forms of recognition from NOAA information customers such as decision-makers in government, private industry, the media, education communities, and the public.

> **2. Relevance**: Evaluate the degree to which the Program's activities are relevant to NOAA's and OAR's missions and of value to the Nation. Relevance refers to the value of the Program's activities to users beyond the scientific community, both in terms of hypothetical value and actual impact. It is measured by how well the specific research or activity supports OAR's and NOAA's missions and broader needs. As OAR's Reviews are focused on the preceding five years of operation for each Program, multiple strategic documents and priorities guide Relevance.

The Program operates under its own Strategic Plan, developed in consultation with the Ocean Exploration Advisory Board as is mandated by 33 USC 3405. This Strategic Plan, dated June 2016, will be the primary reference for reviewers.

The NOAA 5-year Research and Development Plan objectives (FY13 - FY18), the NOAA Strategic Plan objectives (FY 14 - FY16), and the NOAA priorities (FY17 – present) will be used for evaluation. The objectives of the NOAA Research and Development (R&D) Plan, which was released with a public comment period deadline of February 8, 2019, may also be considered in this evaluation.

Reviewers are asked to assess whether the Program identifies national and NOAA priorities in setting its own and whether its activities address its goals and objectives identified above, the goals of relevant inter-agency working groups, relevant legislative requirements, and impacts to society at large.

Relevance Rating Criteria:
> *Satisfactory* rating -- The activities of the Program show linkages to its 2016 Strategic Plan, NOAA's and OAR's missions (e.g., through implementation of the NOAA Strategic Plan, NOAA Priorities, OAR corporate priorities, and 5-Year Research and Development Plan) and is of value to the Nation. There are some efforts to work with customer needs but these are not consistent throughout the activity area.

Evaluation Questions to consider:
- Do activities address existing (or future) socially relevant needs (national and international)?
- How well do activities address issues identified in the NOAA strategic plan, NOAA priorities and research plans, or other policy or guiding documents, including inter-agency working group goals and relevant legislative requirements?
- Are customers engaged to ensure relevance of activities?
- What is the quality of outreach products? Does the Program have identified plans, processes, and systems so that information about discoveries and data and information products are provided to the relevant stakeholders?
- Are the activities conducted or funded by the Program relevant to stakeholder needs, including the needs of other Line Offices?
- Are there activities within the Program's mission relevant to national needs that the Program should be pursuing but is not? Are there activities within NOAA and OAR plans that the Program should be pursuing but is not?

Indicators of Relevance: Indicators can include, but should not be limited to the following:
- A list of products, information, and services; how they are distributed; how they are used; and an indication of value to the ocean exploration community.
- Evidence of linkages to objectives in the NOAA strategic plan and NOAA priorities (e.g., milestones completed in the Annual Operating Plan).

- Access to Program products, as demonstrated by counts of hits/usage of and downloads from Program websites.
- Evidence of public outreach, such as participation in Program events, product demonstrations, or local education efforts conducted by Program personnel.

3. Performance: Performance is a measurement of effectiveness (ability to achieve useful results) and efficiency (ability to achieve quality, relevance, and effectiveness in a timely fashion with minimal waste). It refers not only to how well tasks are executed, but also to the adequacy of the leadership, workforce, and infrastructure in place to meet the Program's goals. One of the key criteria of performance is the quality of management: how well Program leadership interacts with stakeholders, articulates its strategic direction, and manages its resources and assets.

Performance therefore is also a measure of accountability: how well the Program manages and directs its own operations and how well those operations adhere to and further the goals of NOAA's and the Program's strategic plans. Programs are judged on how well they plan and conduct their activities. The Panel is asked to evaluate the overall effectiveness with which the Program executes its mission, meets NOAA Strategic Plan priorities, and the needs of the Nation, given its resources.

The evaluation will be conducted within the context of two sub-categories:

a) Research Leadership and Planning
b) Efficiency and Effectiveness

Performance Rating Criteria:
Satisfactory rating --
- The Program generally has documented programmatic objectives and strategies through strategic and implementation plans (e.g., Annual Operating Plan) and a process for evaluating and prioritizing activities.
- Program managers generally function as a team and work to improve operations.
- The Program usually demonstrates effectiveness in completing its established objectives, milestones, and products.
- The Program often works to increase efficiency (e.g., through leveraging partnerships).
- The Program is generally effective and efficient in delivering most of its products/outputs to applications, operations, or users.

A. Research Leadership and Planning: Assess whether the Program has clearly defined objectives, scope, and methodologies for its key activities and projects.

Evaluation Questions to consider:
- Does the Program have clearly defined and documented scientific, technological, and/or policy objectives, rationale and methodologies for key projects?

- Does the Program have an evaluation process for its activities: selecting/continuing those activities or projects with consistently high marks for merit, application, and priority fit; ending projects; or transitioning projects? If so, how well does it adhere to that process?
- How does the Program identify its priorities? How are NOAA and national priorities considered? What is the role of the science community? Are staff required to develop a good plan, execute that plan, and report on it?
- Does the Program have the leadership and flexibility (i.e., time and resources) to respond to unanticipated events or opportunities that require new activities or changes in direction?
- Does the Program provide effective leadership within NOAA and its external community on issues within its purview?
- Does Program management function as a team and strive to improve operations? Are there institutional, managerial, resource, or other barriers to the team working effectively?
- Has the Program effectively responded to and/or implemented recommendations from previous reviews?

Indicators of Leadership and Planning: Indicators can include, but should not be limited to, the following:
- OER Strategic Plan
- NOAA Strategic Plan
- Program/Project Implementation Plans
- Annual Operation Plan performance measures and milestones
- Active engagement with NOAA leadership
- Active engagement with the Ocean Exploration Advisory Board
- Active involvement in NOAA planning and budgeting processes
- Early engagement with internal and external stakeholders
- Implementation of recommendations from previous reviews

B. **Efficiency and Effectiveness**: Assess the efficiency and effectiveness of the Program's activities, given its goals, resources, and constraints and how effective it is in obtaining needed resources through NOAA and other sources.

Evaluation Questions to consider:
- Does the Program execute its activities in an efficient and effective manner given its goals, resources, and constraints?
- Is the Program organized and managed to optimize the planning and execution of its activities, including the support of creativity? How well integrated is the Program's work with NOAA's and OAR's planning and execution activities? Are there adequate inputs to NOAA's and OAR's planning and budgeting processes?
- Is the Program leveraging relationships with internal and external collaborators and stakeholders to maximize results?

- Are human resources adequate to meet current and future needs? Is the Program organized and managed to ensure diversity and inclusion in its workforce? Does it provide professional development opportunities for staff?
- Is infrastructure sufficient to support high-quality results?

Indicators of Efficiency and Effectiveness: Indicators can include, but should not be limited to, the following:
- Nature of partnerships (indicates how well the Program leverages relationships with collaborators to maximize results)
- Ability to meet required deadlines (e.g., reports to Congress)
- Performance metrics of products and services
- Employee satisfaction (e.g., from internal surveys)