

Summary of FY2020 NOAA Ocean Exploration Program Review

On 16 – 18 October 2019, a panel of independent reviewers was assembled to review the NOAA Office of Ocean Exploration and Research (OER). Reviewers were charged to: 1) review the quality, relevance, and performance of OER over the previous five years and 2) assess the strategic positioning of OER going forward. Each reviewer provided a write-up of their own observations, recommendations, and comments to the Office of Oceanic and Atmospheric Research (OAR). Those discrete submissions were compiled into a summary report that was organized across the four goals described in OER’s current strategic plan:

- Ocean Exploration: Mapping and Characterization
- Technology: Development, Application, and Program Use
- Data and Information: Availability and Access
- Engagement: Reaching the Public

[FY2020 OER Review Summary Report](#) presented Ten (10) findings with 22 recommendations. The review committee did not generate “consensus” findings and recommendations. Rather, each member’s individual comments and observations were sorted and consolidated into the final report. The summary nature of the report accounts for a tremendous variability in the scope of each recommendation, with some being clever or innovative project ideas while others amounted to substantial modifications of NOAA Ocean Exploration’s basic operations model.

Below, please find an overview of the themes reflected in the Summary Report as well as a catalog of each recommendation and [OER’s Program Review Response](#).

Key Themes Contained in the Report:

Summary of FY2020 NOAA Ocean Exploration Program Review

On October 16–18, 2019, an independent review panel assessed the NOAA Office of Ocean Exploration and Research (OER). The panel’s charge was to: 1) evaluate the quality, relevance, and performance of OER over the past five years and 2) assess OER’s future strategic positioning. Each reviewer submitted individual observations, recommendations, and comments to the Office of Oceanic and Atmospheric Research (OAR). These submissions were compiled into a summary report based on OER’s four strategic goals:

- Ocean Exploration: Mapping and Characterization
- Technology: Development, Application, and Program Use
- Data and Information: Availability and Access
- Engagement: Reaching the Public

The FY2020 Review Summary Report presented ten findings and 22 recommendations. Instead of consensus recommendations, the report consolidated individual reviewer comments, resulting in varied recommendations, ranging from innovative project ideas to suggestions for significant changes to OER's operational model.

Below is an overview of the report's themes, along with OER's responses to each recommendation.

Key Themes and OER Responses:

1. Strengthening Leadership and Vision

The findings noted OER's successful evolution into a recognized leader in ocean exploration, with increased public trust, funding, and an expanded mission. This transformation was attributed to effective leadership that positioned OER to assume a more prominent role nationally. The recommendations urged OER to build on this progress by adopting a more ambitious vision, taking calculated risks, and leveraging its achievements to guide ocean exploration efforts.

OER Response: NOAA Ocean Exploration developed a comprehensive five-year strategic plan to guide exploration priorities, resource allocation, and program direction, reinforcing its leadership role in national ocean exploration.

2. Planning for a Post-Okeanos Future

The review identified that while Okeanos Explorer had been central to OER's operations, its planned retirement in 2024 presented challenges. The panel emphasized the need for a transition strategy that would allow OER to continue its exploration activities without disruption.

OER Response: NOAA Ocean Exploration agreed with the recommendations and adapted to changes by extending the Okeanos Explorer's operational life and securing the NOAA Ship Discoverer to become operational by 2025, ensuring continuity of exploration capabilities.

3. Incorporating Technological Innovation

The review acknowledged OER's advances in telepresence technology and technology demonstrations but recommended further integration of autonomous vehicles, AI, and advanced sensors to maintain leadership in ocean exploration.

OER Response: OER developed a Technology Roadmap to guide investments in emerging technologies, such as AI, autonomous platforms, and machine learning, and expanded opportunities for technology demonstrations with industry and academic partners.

4. Data Management and Accessibility

The findings highlighted OER's reliance on NESDIS/NCEI for data management but indicated a need for more active engagement in data quality, management, and accessibility. The panel suggested OER become more involved in consuming and analyzing its data, enhancing its strategic value.

OER Response: NOAA Ocean Exploration conducted an internal audit to ensure data assets were open, accessible, and compliant with NOAA's Public Access to Research Results (PARR) plan. Collaborations through the National Ocean Mapping, Exploration, and Characterization (NOMECE) Council further enhanced data interoperability.

5. Expanding Public Engagement

OER was recognized for successful public engagement via telepresence but was advised to broaden its outreach, making ocean exploration more relevant to the general public.

OER Response: NOAA Ocean Exploration developed a strategic communications plan focused on storytelling, telepresence, and partnerships with museums, aquariums, and other institutions to expand public engagement and awareness of ocean exploration.

6. Strengthening Partnerships and Collaboration

The findings noted OER's successful partnerships but suggested expanding collaborations, especially with nontraditional partners, to enhance capabilities and innovation.

OER Response: OER conducted an assessment of existing relationships, identifying opportunities to collaborate with technology firms, educational institutions, and underrepresented communities, establishing long-term partnerships that support diverse exploration activities.

7. Data Science Leadership and Harmonization

The review identified gaps in OER's data workflows and the need for in-house expertise to manage growing data volumes effectively.

OER Response: NOAA Ocean Exploration explored appointing a Chief Data Officer and invested in data management tools and practices, enhancing its capacity to manage exploration data and support scientific and policy objectives.

Recommendations and Responses:

1. Ship Access and Exploration Planning

Recommendation: Ensure long-term ship access as *Okeanos Explorer* nears retirement.

Response: OER extended the operational life of the *Okeanos Explorer* and secured the *Discoverer* for 2025. A new five-year strategic plan will guide resource allocation, with flexibility to use other vessels and platforms.

Takeaway: OER is balancing short-term continuity with future adaptability through strategic asset planning.

2. Coordination Across U.S. Exploration Fleet

Recommendation: Improve coordination across various U.S. exploration fleets.

Response: OER supports coordination through NOMEAC, standardizing operations via procedural manuals for ROV and deep-water missions. This fosters consistency without assuming full management responsibility.

Takeaway: OER focuses on influencing broader collaboration while ensuring internal consistency.

3. Adopting Higher-Risk Approaches

Recommendation: Encourage higher-risk, innovative exploration methods.

Response: OER will implement a risk assessment tool to evaluate new project proposals, supporting high-risk innovations through funding initiatives like SBIR and STTR.

Takeaway: OER encourages innovation but with clear mechanisms for managing potential risks.

4. National Program for Ocean Exploration

Recommendation: Clarify national ocean exploration goals.

Response: OER is contributing to the National Strategy for Mapping and Exploring the U.S. EEZ, working through NOMEAC to implement national objectives.

Takeaway: OER aligns its mission with national strategy, ensuring coordinated, long-term ocean exploration goals.

5. Leveraging Emerging Technology

Recommendation: Use emerging technologies like uncrewed systems and telepresence.

Response: OER is developing a Technology Roadmap, supporting tech demonstrations, and tracking uncrewed system use through performance measures.

Takeaway: OER integrates new technologies through structured planning and evaluation.

6. Data Management and Accessibility

Recommendation: Improve data accessibility, especially for video data.

Response: OER is enhancing data management through AI tools and standardized protocols. It is committed to open access via NOAA's Public Access to Research Results (PARR) plan.

Takeaway: OER's efforts focus on improving data interoperability and accessibility, leveraging AI to streamline processes.

7. Public Engagement and Outreach

Recommendation: Enhance public outreach and engagement through media and telepresence.

Response: OER is developing a communications strategy to improve outreach, using telepresence and enhanced storytelling to engage broader audiences.

Takeaway: OER is strengthening public engagement by focusing on accessibility and storytelling.

8. Formal Mechanism for Evaluating Exploration Architectures

Recommendation: Establish criteria for evaluating new exploration technologies.

Response: OER is contributing to the development of a Standard Ocean Mapping Protocol via the NOMECC Council, which will standardize mapping and exploration methods.

Takeaway: OER is working on clear standards to ensure consistent evaluation of new exploration technologies.

9. Dissolve Data Discovery Stovepipes

Recommendation: Address issues with fragmented data access.

Response: OER is developing the Exploration Variables Technical Memo to identify data gaps and ensure interoperability across platforms and agencies through NOMECC.

Takeaway: OER focuses on breaking down data silos and promoting unified data access across ocean exploration efforts.

10. Improve Searchability and Accessibility of Video Data

Recommendation: Enhance video data management and accessibility.

Response: OER is collaborating on AI-enabled tools for video annotation and improving metadata for video collections to make them more accessible.

Takeaway: OER is leveraging AI to improve video data management, making it easier for researchers to access and analyze footage.

11. Accommodate Increase in Data Volume

Recommendation: Develop strategies for handling large increases in data.

Response: OER is drafting a data principles document and developing IT infrastructure to support growing data needs, ensuring data can be managed effectively.

Takeaway: OER is proactively preparing for a significant data influx by building robust data management frameworks.

12. Realize the Value of OER's Data

Recommendation: Maximize the strategic value of OER's data assets.

Response: OER will audit contracts and agreements to ensure that data is open and available, aligning with NOAA's Public Access to Research Results plan.

Takeaway: OER aims to make its data widely accessible and interoperable, recognizing the strategic importance of open data.

13. Accelerate Telepresence Deployment with Low-Cost Pilots

Recommendation: Expand telepresence capabilities using affordable technologies.

Response: OER is exploring low-cost telepresence options, enabled by cloud computing and commercially available satellite technology, through its partnership with the Ocean Exploration Cooperative Institute.

Takeaway: OER seeks cost-effective solutions to broaden telepresence use, ensuring wider access to ocean exploration.

14. Invest in Data Leadership and Harmonization

Recommendation: Strengthen data leadership and standardize data practices.

Response: OER is committing to harmonizing data practices across agencies, contributing to common data architectures and repositories through NOMECC.

Takeaway: OER is leading efforts to harmonize data practices across ocean exploration communities, ensuring seamless data use and sharing.

15. Create a Standardized Template for Baseline Site Descriptions

Recommendation: Develop a standardized template for site descriptions.

Response: OER will ensure that all data collected are standardized and reported within 90 days of cruises, with templates shared as best practices.

Takeaway: OER emphasizes the need for consistency in data reporting, which supports transparency and data usability.

16. Support Development of AI and Machine Learning Tools

Recommendation: Encourage the use of AI/ML for data management and exploration.

Response: OER will use funding tools to promote innovative AI/ML solutions for managing and analyzing ocean exploration data.

Takeaway: OER is investing in AI/ML to help tackle the challenges of managing vast amounts of exploration data.

17. Master ROV Sensor and Position Reference File

Recommendation: Develop a reference file for ROV sensors and positioning.
Response: OER will explore the feasibility of creating a reference tool for ROV operations to support more efficient data collection and shore-side operations.
Takeaway: OER is working towards better coordination of ROV operations by developing comprehensive reference tools.

18. Build In-House Data Science Capability

Recommendation: Strengthen OER’s in-house data science expertise.
Response: OER will explore designating a Chief Data Officer to coordinate data initiatives and develop an office-wide data principles document.
Takeaway: OER is investing in data leadership to strengthen its ability to manage and leverage its growing data assets.

19. “Make Oceans Matter” to the Public

Recommendation: Engage the public by highlighting the value of ocean exploration.
Response: OER will evaluate and refine its outreach strategies, focusing on raising awareness through engaging content and educational resources.
Takeaway: OER is enhancing its public outreach efforts, ensuring ocean exploration remains relevant and accessible to the broader public.

20. Improve Media and Outreach Products

Recommendation: Make media products more accessible to a wider audience.
Response: OER will develop a strategic communications plan to guide outreach efforts, focusing on impactful storytelling and content creation.
Takeaway: OER is focusing on improving how it communicates its work, using media to engage diverse audiences.

21. Build on Partnerships

Recommendation: Expand partnerships with underserved communities and educational institutions.
Response: OER will conduct an inventory of partners and stakeholders and increase its engagement with underserved communities through professional development and educational programs.
Takeaway: OER is broadening its network, targeting underserved areas and fostering greater collaboration with educational institutions.