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CORE QUESTIONS and REPORT TEMPLATE
for
2023 NSF COMMITTEE OF VISITOR (COV) REVIEWS

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Guidance to NSF Staff: This document includes the set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs starting in July 2023. Specific guidance for NSF staff describing the COV review process is described in the COV Policy (2023 Update) and COV Procedures (2023 Update), available on InsideNSF.

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the NSF. COV reviews provide NSF with external expert judgments on (1) assessments of the quality and integrity of the merit review process and program operations and (2) program-level technical and managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The organizational unit convening the COV ("the organizing unit") may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The organizing unit may add questions relevant to the activities under review. Copies of the report template and the charge to the COV should be provided to OIA prior to forwarding to the COV. To provide COV members adequate time to read and consider the COV materials, including proposal jackets, COV members should be given access to the materials in the eJacket COV module a minimum of four to six weeks before the scheduled meeting of the COV members. Before providing access to jackets, (1) the Conflict of Interest and Confidentiality briefing for COV members must be conducted and (2) the organizing unit has received signed COI and Confidentiality Statements (NSF Form 1230P) from each COV member. The briefing for COV members is also an appropriate time to summarize the scope of the program(s) under review and answer questions from COV members about the template and process.

Suggested sources of information for COVs to consider are provided for each item. As indicated, resources for NSF staff preparing data for COVs include the COV Dashboard in Enterprise Reporting and Enterprise Information System (EIS) –Web COV module. Section 7 of the COV Procedures document on InsideNSF describes other sources of information that may be appropriate for a COV.

For programs using section IV (addressing portfolio balance), the program should provide the COV with a statement of the program's portfolio goals and ask specific questions about the program under review. Some suggestions regarding portfolio dimensions are given on the template. These suggestions will not be appropriate for all programs.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the *processes* related to proposal review. COV reviews do not include assessment or evaluation of the outcomes or long-term impacts of program investments. Discussions leading to answers to the Core Questions will require study of confidential material such as declined proposals and reviewer comments. *COV reports must not contain confidential material or specific information about declined proposals.* The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see https://www.nsf.gov/od/oia/activities/cov/covs.jsp.

2023 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

The information below should be completed by program staff.

Table 1 - Summary Information

Summary Information
Date of COV: June 29 – 30, 2023
Program/Cluster/Section: Ocean and Marine Geoscience Sections
Division: Ocean Sciences
Directorate: Geosciences
Number of actions reviewed: 106 (Lead or Non-collab proposals) Awards: 38 Declinations: 68 Other: 0
Total number of actions within Program/Cluster/Division during period under review: 4,291 **Awards:** 2,084 **Declinations:** 2,185 **Other:** 22
Manner in which reviewed actions were selected: A random selection of competitive actions for the COV to consider was generated by OCE staff through the process described below. A list of competitive actions taken by OS and MGS Programs from FY 2019 – 2022 was downloaded from the NSF Enterprise Reporting System COV Module. Non-lead collaborative proposals that are part of a project were removed because they do not constitute a separate decision (i.e. the decision applied to the lead proposals is generally applied to all non-lead proposals). A random selection of proposals from each Program was made to match the proportions of awards and declines in each Program for each fiscal year. Typically, these random pulls represent 5% of all competitive actions. These projects were evaluated for conflicts of interest with the COV members and were replaced with another random selection if needed. Proposals were also evaluated to ensure the ratio of awards/declines, institutions, and PIs adequately matched that of the total population.

COV Membership

Table 2 - COV Membership

Role	Name	Affiliation
COV Chair or Co-Chairs:	Dr. Carol Arnosti, Chair	University of North Carolina, Chapel Hill
COV Members:	Dr. Amina Schartup Dr. Erika McPhee-Shaw Dr. Mary-Louise Timmermans Dr. Andrew Goodliffe Dr. Peter Raymond Dr. Timothy Herbert Dr. Naomi Levine Dr. Rebecca Vega Thurber	Scripps Institution of Oceanography Western Washington University Yale University University of Alabama Yale University Brown University University of Southern California Oregon State University

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MERIT REVIEW CRITERIA

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An understanding of NSF's merit review criteria is critical to answer some of the questions on the template. Reproduced below is the information provided to proposers in the Grant Proposal Guide about the merit review criteria and the principles associated with them. Also included is a description of some examples of broader impacts, provided by the National Science Board

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.

- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These broader impacts may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.

- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities. These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of two National Science Board-approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (NSF's Proposal and Award Policies and Procedures Guide provides additional information for use by proposers in development of the Project

[Description section of the proposal](#).) Reviewers are strongly encouraged to review the criteria, including [PAPPG Chapter II.D.2.d](#), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit**: The Intellectual Merit criterion encompasses the potential to advance knowledge; and

- **Broader Impacts**: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

3. Examples of Broader Impacts

The National Science Board described some examples of broader impacts of research, beyond the intrinsic importance of advancing knowledge ([NSB-MR-11-22](#)). "These outcomes include (but are not limited to) increased participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education at all levels; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a globally competitive STEM workforce; increased partnerships between academia, industry, and others; increased national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education. These examples of societally relevant outcomes should not be considered either comprehensive or prescriptive. Investigators may include appropriate outcomes not covered by these examples."

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES
AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, returns without review, and withdrawals) that were *completed within the review period (generally the prior four fiscal years)*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process.

Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

Table 3 - Quality and Effectiveness of the Merit Review Process

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, *ad hoc*, site visits) appropriate? Comments: The COV was uniformly impressed with the high quality of the merit review process, the excellence of the POs, and the dedication of the OS/MGS staff. We also recognize that during this most recent review period, the POs and the entire OS/MGS staff have had to deal with unprecedented challenges due to the Covid-19 pandemic. Their efforts and actions have ensured that the OCE-funded scientific enterprise, to the greatest extent possible, has continued to move forward despite many and varied problems related to the pandemic. The COV commends the Programs for their unceasing efforts in this regard. Our most substantial concern is that the program officers and program assistants are overcommitted, and their time is fragmented. The COV is concerned that many of the additional items that are suggested below would add additional time-management-stress to the programs and thus should be balanced by finding ways to remove tasks from the POs and staff where possible. The combination of ad hoc and panel reviews – and especially the review analyses by the program officers – provided thorough evaluation of the proposals. The COV was impressed by the strong commitment of program officers to ensuring that projects were reviewed in a thorough and thoughtful manner. The process and pathway by which decisions were reached was clearly documented in the review analyses. **Recommendation 1:** Having overworked, overcommitted POs affects the science mission of NSF and the community at large. The COV sees a strong need to hire additional staff – or absent new hires, a close examination of efforts related to task forces or other initiatives should be conducted in order to identify activities that could be pruned in order to free up time. Data Source: Enterprise Reporting, COV Dashboard, Question 6	YES

1. Are both merit review criteria addressed	YES

  a) In individual reviews?
Comments:

Ad hoc reviews extensively addressed the intellectual merit criterion. However, ad hoc reviewers' comments on broader impacts often lacked in detail. Some reviewers appeared uncertain when it came to identifying or evaluating appropriate activities for broader impacts. In particular, the COV noted that reviewers often prioritized novelty, while effectiveness was often not discussed. Moreover, some reviewers focused primarily on activities near the top of the broader-impacts list (broadening participation, improving public science literacy and engagement, aka "outreach") but were perhaps unaware of, or de-emphasize in merit review, other activities further down the list (e.g., global workforce development, increased partnerships, US economic competitiveness). However, the review process, especially at the panel and PO level, is highly effective at filtering opinions that were not focused on major issues, with respect to both intellectual merit and broader impacts.

Recommendation 2: The COV realizes that the instructions associated with the review process are standardized across a broad range of NSF divisions. Nonetheless, we recommend that OS/MGS provide some additional guidance to ad hoc reviewers related to how to evaluate broader impacts. One possibility is that the paragraph from the National Science Board, as listed above in this report, could perhaps be added to PO emails asking for ad hoc reviews; other creative ways to send the message to the community could also be developed.

  b) In panel summaries?
Comments:

The panel summaries explicitly addressed broader impacts as well as intellectual merit.

  c) In Program Officer review analyses?
Comments:

The COV thought that the POs' review analyses were incredibly helpful, thoughtful, and informative; they addressed both criteria.

Recommendation 3: The COV found the review analyses to be far more thorough than the summaries currently released to PIs. We recommend that the majority of the review analysis be released to PIs to provide more feedback. Issues with respect to reviewer confidentiality could be addressed, for example, by referring to 'reviewer A' or 'reviewer #1' rather than using names in the review analysis.

The COV found it encouraging that approximately half of the PIs whose proposals are declined reach out to the POs for discussion about their projects.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
However, the COV is concerned that the barrier is higher for some PIs particularly early career PIs and PIs less familiar with NSF. Providing more extensive written information would be especially valuable in such cases. Data Source: Jackets	
3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? Comments: Ad hoc reviewers usually provided detailed and thoughtful comments about proposals. However, a fraction of reviews was overly terse, or simply repeated the main objectives of the proposal. These non-substantive reviews were sometimes noted in panel summaries and were often mentioned by the POs in their review analyses as not contributing towards the decision. As recommended above, it would be helpful to see this level of clarity in the information released to PIs so that they have an understanding of the extent to which outliers affected the evaluation of their proposals. Data Source: Jackets	YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: Most panel summaries reviewed by the COV provided a good synthesis of the ad hoc reviews and the highlights from the panels' discussion. In some cases, summaries did not clearly explain why a proposal received an unfavorable rating. However, in such cases, the review analysis provided the underlying rationale. Data Source: Jackets	YES

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
5. Does the documentation in the jacket provide the rationale for the award/decline decision? [Note: Documentation in the jacket usually includes a context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.] Comments: The COV was extremely impressed with the POs' summary of reviews and the panel discussion and found that the rationale for the award/decline decision was clearly provided in the review analysis. The COV also heard that in some places within NSF, the review analyses are being converted to 'check box' statements for proposals that did not review well. In such cases, apparently no detailed review analyses are generated. **Recommendation 4:** The clear, detailed review analyses are at the heart of the merit review process, and the COV strongly advocates for maintaining this process. Particularly in the case of early-career PIs or PIs from institutions that do not strongly support research, obtaining detailed feedback from POs about proposals is extremely important. Given that the programs include rotating POs, in the absence of these notes, it would be impossible to provide detailed feedback in cases in which a PO is no longer with NSF. As noted in Recommendation 3, we strongly suggest that more of the review analysis text be released to PIs. Data Source: Jackets	YES

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
6. Does the documentation to the PI provide the rationale for the award/decline decision? [Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written in the PO Comments field or emailed with a copy in the jacket, or telephoned with a diary note in the jacket) of the basis for a declination.] Comments: The documentation provided to PIs provided the rationale for decisions, but the COV noted that the PO review analysis more clearly articulated the rationale for the award/decline decision. Data Source: Jackets	YES
7. Additional comments on the quality and effectiveness of the program's use of merit review process: Comments: The COV believes the review process is functioning well. There were no major "red flags" and the quality of funded projects is high. From reviewing the eJackets, the COV noted that many strong projects are not being funded due to the competitiveness of the process. Combining both panel and ad hoc reviews proves to be an effective approach for maximizing the depth of insight and evaluation of proposals. These two sources complement each other and enable the efficient filtering of opinions that may not reflect important issues with a given proposal. **Recommendation 5:** Despite the overall effectiveness of the process, aspects of the panel review process are an unknown for a fraction of the community. In response to this observation, the COV believes that some additional training could be offered, which may be particularly helpful for early-career scientists. To help all PIs better understand the review process, the COV suggests that the programs make available a zoom recording of a mock panel review (using an imaginary proposal, if necessary) to de-mystify the process, provide training for new panel members, and help PIs understand the process by which their proposals will be evaluated.	YES

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

Table 4 - Selection of Reviewers

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: The reviewers displayed a commendable level of expertise in evaluating intellectual merit-related aspects of proposal, demonstrating a strong grasp of the subject matter. However, a notable amount of variation was observed in the assessment of broader impacts. For example, some reviewers focused primarily on broader impacts activities near the top of the list (for example broadening participation, improving public science literacy and engagement, aka "outreach") but were perhaps unaware of, or de-emphasize in merit review other activities further down the list (e.g., global workforce development, increased partnerships, US economic competitiveness). This discrepancy can be attributed to the limited expertise of many ad hoc reviewers when it comes to effectively evaluating and assessing the broader impacts aspects of proposals. The COV realizes that decisions about definitions and training are often made at higher administrative levels of NSF. However, we suggest that additional support and training to enhance reviewers' understanding of broader impacts and their ability to evaluate broader impacts accurately is made available to ad hoc reviewers (see Recommendation 2). By investing in targeted guidance, NSF can work towards reducing the variation in broader impact evaluation and ensure a more consistent and comprehensive review process that appropriately considers the broader societal implications of research proposals. In the interim, POs can take proactive measures to ensure that, to the best of their ability, some of the ad hoc reviewers have a proven track record of engaging in and valuing broader impact activities. This point – lack of expertise in evaluation of broader impacts – was particularly evident in ad hoc reviews from abroad. Data Source: Jackets	YES

SELECTION OF REVIEWERS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
2. Did the program recognize and resolve conflicts of interest when appropriate? Comments: Conflicts of interest were clearly noted and individuals involved were not part of the review process for the proposals in question. Data Source: Jackets	YES
3. Additional comments on reviewer selection: Comments: The COV discussed the point that it would be helpful for early career scientists to get feedback about the quality of their reviews. We learned from the POs that some early career scientists in fact ask for such feedback. If PO workload could be reduced (see Recommendation 1), it would be great if POs could provide feedback – as in a brief email note – also to PIs who have not proactively reached out. This point is particularly important because anecdotally, a notable portion of the early career community is very hesitant to reach out and contact POs.	

III. Questions concerning the management of the program under review. Please comment on the following:

Table 5 - Management of the Program Under Review

MANAGEMENT OF THE PROGRAM UNDER REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Management of the program. Comments: The COV unanimously admired the exceptional quality and diverse range of responsibilities managed by the programs, particularly considering recent resource reductions (e.g., fewer science assistants). The COV was also enthusiastic regarding the numerous new cross-division programs in which OCE was involved. However, there was concern about the increased time and additional responsibilities that these new programs imposed, stretching the POs too thin and potentially diverting attention from core responsibilities. **Recommendation 1 (repeated):** The COV identified the primary issue for program management as understaffing and excessive workload faced by the current staff. To address this issue, we strongly encouraged investment in future hiring, as well as a thorough examination of workload distribution. By adequately staffing the program and ensuring an appropriate balance of responsibilities, POs and program assistants will be in a position to carry out some of the recommendations (e.g., greater outreach to early career PIs and PIs at under-resourced institutions) in this report.	YES

MANAGEMENT OF THE PROGRAM UNDER REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
2. Responsiveness of the program to emerging research and education opportunities. Comments: Conversations with program officers revealed their receptiveness to emerging research and educational prospects, leading to numerous new initiatives by NSF that have proven beneficial for OCE community. However, it was observed that maintaining this level of responsiveness places a significant time burden on the POs. Consequently, while these new initiatives are advantageous for the OCE community, the COV acknowledges that there is an unquantifiable cost that could not be fully assessed. The COV also recognizes the considerable challenges faced by the programs during the review period due to the COVID-19 pandemic and its resulting disruptions. The POs exhibited commendable dedication in addressing a wide range of issues, including cancellations and delays of fieldwork, and problems arising from laboratory closures and restricted lab access. Initially, the POs prioritized ensuring continued funding for researchers and supporting early career individuals. From the self-study and discussions with the POs, it is evident that the impacts of the pandemic persist, such as the backlog of funded research cruises, particularly for larger vessels, and the challenges faced by individuals striving to compensate for lost time and missed opportunities. The COV commends the POs for their diligent efforts in responding to these significant challenges. The COV expects that the COVID impacts will continue to reverberate for many years and hopes that the impacts on the POs and the OCE community will continue to be evaluated and alleviated.	YES
3. Program planning and prioritization process (internal and external) that guided the development of the portfolio Comments: As commented in the self-study, the programs' portfolios are developed with consideration of external reports (e.g, Sea Change), in response to community initiatives, and as an outcome of the projects that are put forward by individual PIs. Discussions with POs also provided examples of the manner in which priorities are balanced and decisions are made at the program level.	YES

	YES
4. Responsiveness of program to previous COV comments and recommendations. Comments: The OS/MGS programs were responsive to many recommendations of the 2019 COV, with some of the most important actions related to efforts in broadening participation. The programs did not take action on all requests. For example, some recommended actions were already in the works; a recommendation to have more panels in hybrid format coincided with an NSF-wide shift to encouraging all programs to consider virtual and hybrid panels and provide infrastructure for doing so. In other cases, recommendations were for changes at a policy level over which OS/MGS has no control. We note that the pressures of Covid and decreased personnel meant that some recommendations were initiated but not fully completed; data collection for COV analysis improved considerably and met many of the last COV's suggestions, but likely was not everything the committee had asked for. The 2019 COV put forth numerous recommendations. Rather than addressing each separately we note that most could be roughly characterized within a broad grouping of recommendation topics, and discuss the programs' responsiveness to the following set of topics: (1) efforts to promote diversity and inclusion (broadening participation), (2) handling of the COV process, (3) function and logistics of review and panel process. Topic (1). Promoting diversity and inclusion in the Geosciences. The 2019 COV brought up several recommendations to enhance diversity throughout the report, perhaps best encapsulated by *Recommendation III.1.6: The program should prioritize any institutional effort to enhance diversity because women and people of color continue to remain significantly underrepresented in the ocean sciences*. NSF prioritizes enhancing broader participation in the geosciences, and GEO created a BAJEDI (Belonging, Accessibility, Justice, Equity, Diversity, and Inclusion) internal committee tasked with creating ways to better achieve NSF's diversity and inclusion mission statement. The COV has more comments on these efforts in section IV. The previous COV recommended NSF work on including a diverse group of panelists and reviewers, including a better balance between national vs international experts, and recruiting more panelists from HBCUs. It seems these actions have been prioritized, although this is not always easy to accomplish given the difficulty of finding reviewers. Topic (2). Improving data distribution to the COV A few 2019 COV suggestions were related to data provision for COV analysis of portfolio distribution. Examples include *Recommendation IV.1.2: We encourage the use of existing tools in other NSF directorates (e.g., DEB), such as the use of key words; text mining, or PI- supplied) to help codify proposals, and keep sufficient metrics that can be used to describe portfolio as it stands, with the opportunity to set future goals.* And *Recommendation IV.1.3: We recommend that there be a more quantitative metric for balance and that these be provided to the next COV.*	

MANAGEMENT OF THE PROGRAM UNDER REVIEW	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
In response, OS/MGS's 2023 Self-Study Report included graphics with Lingo4G text-mining and mapping analyses of submitted and awarded proposals, and a table breaking out proportions of awards by a series of subdisciplines. These new analyses were helpful for the current COV assessment. The Self-Study (and the supplement provided to the COV by OS/MGS staff) included many other examples of specifically requested data, such as data provided on geographic distribution of proposers and awards, and data on EAGER/RAPID submissions/awards. The overall take-home message is that the programs have done a great job with the two Self-Study Reports, the first of which was done for the 2019 COV after being requested by the 2015 COV, and we appreciate this ongoing commitment to consistency and improvement throughout the COV process. Topic (3): Function/logistics of review and panel. The previous COV had various recommendations for changing the logistics of how review and panel processes worked. These ranged from a level of specificity such as "require four reviewers for each proposal," which contradicts NSF-wide policy and thus could not be implemented, to more general advice (discussed above) to recruit more diverse & inclusive viewpoints in ad-hoc reviews and panels. The last point is being addressed by NSF. The previous COV had a few recommendations related to improving communication between POs and reviewers (for example including implicit bias training to improve reviews) and between POs and proposers. Some of these are being addressed, some are not due to time constraints on NSF personnel. The 2019 COV mentioned concerns about reviewers and panels not adequately understanding nor assessing the strengths and weakness of broader impacts of a proposal. While NSF has been working to address these recommendations for improvement, this is still a concern for the current 2023 COV and is addressed in section I	

IV. Questions about Portfolio. Please answer the following about the portfolio of awards made by the program under review.

Table 6 - Resulting Portfolio of Awards

	RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE

1. Does the program portfolio have an appropriate balance of awards across disciplines and sub-disciplines of the activity? Comments: The previous COV answered this question as "DATA NOT AVAILABLE" and recommended the use of text mining or key words for proposals to provide quantitative metrics on the program portfolio. In response, a Lingo4G (text mining and topic clustering) map and metrics were provided in the Self Study (Fig. 11, Table 6) which was helpful in providing a perspective on the broad focal points of proposed and awarded projects. These analyses provide a useful perspective and encompass the full range of projects/awards (beyond those given in the eJackets). However, the interpretation of the clustering was not as straightforward as for many of the other graphs and figures provided, which were easily understood. While the Self Study described the clustering technique reasonably well, it would have benefited from a text description interpreting the output. Further, the limitations to the technique should be recognized and contextualized; for example, frequent term sets in one discipline may relate to motivation rather than the specific topic under study. Overall, the COV commends the use of text mining and categorizing and recommends continued use of such techniques to assess the portfolio balance of awards, and track its evolution over time, as long as the output is interpreted and contextualized. Without further interpretation provided, it was difficult for the COV to draw its own conclusions with respect to the clustering analysis. Success rate by program (i.e., number of awarded projects divided by the number of proposed projects) and other metrics provided indicate a consistent balance of awards between disciplines. Discrepancies between programs can be accounted for by a range of factors such as co-review and funding with other programs within and outside of OCE, as was expressed in the Self Study and by the POs. In addition to the information provided by the quantitative metrics, discussion with POs helped the COV understand their process in ensuring a well-balanced portfolio. Most of the POs' balancing work occurs in decisions about awards that are not clearly at the top of the list, but rather in the middle. For these proposals, POs balance a range of other factors (including discipline) relevant to the overall portfolio of funded awards. The process seems thoughtful, fair and effective. The quantitative and qualitative information provided suggests a broad balance of funded projects and it appears that awards were appropriately divided across program, discipline, and subdiscipline. **Data Source: Enterprise Reporting, COV Dashboard, Question 8**	APPROPRIATE
2. Are awards appropriate in size and duration for the scope of the projects?	APPROPRIATE

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE
Comments: The COV found no specific issues with size and duration of projects. During the COV on-site meeting there was a discussion regarding the duration of the projects in general and the commonality of three-year projects. The COV recommends that POs, in their outreach to the community, make it clear that the commonality of three-year projects is not an expectation from NSF, but rather a long-time tradition. POs indicated that they would be open to other durations being used more frequently as long as a clear and achievable project plan is always presented in the proposal. Data Source: Enterprise Reporting, COV Dashboard, Question 4	
3. Does the program portfolio include awards for projects that are innovative or potentially transformative? Comments: The program portfolio includes awards for projects that the COV found were innovative or potentially transformative. Data Source: Jackets	APPROPRIATE
4. Does the program portfolio include inter- and multi-disciplinary projects? Comments: OCE programs are inherently interdisciplinary and so projects commonly cross programs (or even divisions). For example, even if a project is only reviewed within MGG, it is not uncommon that the proposal crosses the boundaries between geology and geophysics. The portfolio of proposals shared with the COV committee clearly showed proposals that crossed the boundaries between OCE programs and bridged to programs outside of OCE. In these situations, co-reviews with other programs were clearly shown. Data Source: If co-funding is a desired proxy for measuring inter- and multi-disciplinary projects, the Co-Funding from Contributing Orgs and Co-Funding Contributed to Recipient Orgs reports can be obtained using Enterprise Reporting, COV Dashboard, Question 7	APPROPRIATE

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE
5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators? Comments: The COV found no issues with the geographical distribution of Principal Investigators. The data presented showed that the proposal awards by state were in line with the population of that state. Although North Dakota and West Virginia did not receive any awards, there were no proposals submitted from institutions in those states during the COV period. **Data Source: Enterprise Reporting, COV Dashboard, Question 2**	APPROPRIATE
6. Does the program portfolio have an appropriate balance of awards to different types of institutions? Comments: NSF currently does not collect sufficient data to answer this question. For example, there are no data on awards to R2 institutions. Through extra effort, the CO/MGS programs were able to provide us with additional data, but even after this effort, approximately 1/3 of proposals and awards were not identifiable with respect to institution type. The COV additionally was told that the Excellence in Research initiative (EiR) is now administered by GEO, and therefore no longer within OCE. (The COV reviewed eJackets from previous years that pertained to the EiR initiative.) In any case, OS/MGG should continue to strive to find ways to encourage submissions from HBCUs and non-R1 minority serving institutions and to fund them. **Recommendation 6:** The COV recognizes that data collection of this type is determined by NSF policy at a higher administrative level. We nonetheless strongly recommend that proposals and awards be tracked by NSF at a much more granular level by institution type (R1, R2, MSI, HBCU, etc.). **Data Source: Enterprise Reporting, COV Dashboard, Question 3**	DATA NOT AVAILABLE

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE
7. Does the program portfolio have an appropriate balance of awards to new and early-career investigators? NOTE: A new investigator is an individual who has not served as the PI or Co-PI on any award from NSF (with the exception of doctoral dissertation awards, graduate or post-doctoral fellowships, research planning grants, or conferences, symposia and workshop grants.) An early-career investigator is defined as someone within ten years of receiving his or her last degree at the time of the award. Comments: Success rates of early-career PIs were comparable to non-early-career PIs, suggesting there is no bias for or against new or early career PIs. The COV was reassured to hear that approximately half of all PIs whose proposals were declined reached out to talk with POs. However, the COV was concerned that some early career PIs may be hesitant to reach out, thus missing an opportunity to receive valuable feedback and connect directly with POs. **Recommendation 7:** To the extent possible, the COV suggests that POs continue and expand their efforts to proactively reach out to early career PIs and PIs at institutions that do not have a strong record of research support to help ensure that these individuals can build funded research programs. However, we recognize that such a recommendation would add considerably to PO workload; it could only be carried out if Recommendation 1 can be acted upon. **Data Source: Information on new PIs available via Enterprise Reporting, COV Dashboard, Question 6**	APPROPRIATE
8. Does the program portfolio include projects that integrate research and education? Comments: Many of the projects demonstrated strong integration of research and education, especially as part of the broader impacts. **Data Source: Jackets**	APPROPRIATE

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE
9. Does the program portfolio have appropriate participation of underrepresented groups[1]? Comments: We recognize that higher education, STEM, and health fields more generally continue to have significant issues in advancing diversity, equity, and justice, and that self-reporting of demographics is complicated. However, the COV believes that there is space for OS/MGS to do more to engage underrepresented PIs and students and to include their work into its portfolio. The geosciences, oceanography, and marine science remain far behind other sciences in representation. Improving the current situation should be a very high priority. The COV was excited and heartened to see the recent work by the BAJEDI working group which has taken several creative initiatives at multiple levels to help in this regard, through workshops, mentoring programs, and the revised and re-envisioned postdoc program. **Recommendation 8:** The initial work of the BAJEDI working group should be continued, and expanded. The POs and programs should continue to work to enhance training, mentoring, and funding of PIs who come from underserved communities, institutions, and fields of study. An additional suggestion is for NSF/GEO/OCE/OS/MGG to exercise caution when introducing additional required documentation, even with good intentions. As exemplified by programs like EMBRACE, GRANTED, and EiR, an excessive number of administrative requirements can create barriers for institutions and PIs with limited resources, many of whom are URMs (or URM serving). These programs aim to facilitate capacity development and transition towards core programs and standard grants. However, increasing requirements simultaneously would hinder progress towards this goal. It is important to strike a balance by minimizing unnecessary administrative burdens, thereby ensuring equitable access and opportunity for all institutions and PIs, particularly those with limited resources and from underrepresented backgrounds. Data Source: Enterprise Reporting, COV Dashboard, Question 5	NO

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[1] NSF does not have the legal authority to require principal investigators or reviewers to provide demographic data. Since provision of such data is voluntary, the demographic data available are incomplete. This may make it difficult to answer this question for small programs. However, experience suggests that even with the limited data available, COVs are able to provide a meaningful response to this question for most programs.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE
10. Is the program relevant to national priorities, agency mission, relevant fields, and other constituent needs? Include citations of relevant external reports. Comments: Generally, the COV found that the programs funded a portfolio of projects matching the 'Ocean Science Priorities for 2015-2025' laid out within the Sea Change 2015-2025 Decadal Survey of Ocean Science, while at the same time maintaining flexibility to fund innovative ideas outside of the constraints of this document. Program managers as a group are aware of emerging topics and adjust the portfolio accordingly. These last points are important, since NSF's ability to fund new ideas identified by individual researchers and the community is core to its mission. Data Source: Jackets	APPROPRIATE
11. Additional comments on the quality of the projects or the balance of the portfolio: Comments: Evaluation of ad hoc and panel reviews demonstrated that many proposals that were declined obtained strong support in the form of one or more "Excellent" or "Very Good" ratings from expert reviewers. These ratings indicate a strong portfolio of submitted proposals and the very high quality of those that can be funded. Discussions with program officers indicated that thematic balances are carefully considered in the final award process. Data Source: Jackets and discussions with NSF staff as part of the COV process.	APPROPRIATE

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

-      The COV noted that while the training video for panelists regarding implicit bias was helpful, additional training for new reviewers could further strengthen reviews, in particularly with respect to broader impacts assessments. Specific training for new panelists could also be helpful; we learned from POs that some programs have a zoom meeting to answer questions and provide orientation for all panelists prior to the start of the panel. This seems like a very useful practice.

-      The COV noted that many of the programs had data repositories to assist PIs with data management (e.g. BCO-DMO for Biological and Chemical Oceanography and MGDS for MGG) but that Physical Oceanography does not have a similar program. We noted that this could place an additional burden on PIs, especially on PIs from non-R1 institutions. We also noted that there are often data management gaps where it is not clear how to comply with NSF mandates, such as how to make model output available.

2.   Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

The COV was glad to hear that POs in some programs (e.g., BO) are now requiring that annual and final reports specifically report on the results of broader impact activities, and have even returned reports to PIs when these elements were not included. Holding PIs accountable for broader impact activities helps underline the importance of this aspect of funded projects. We recommend that this approach to ensuring accountability be adopted OCE wide and that additional mechanisms to ensure PIs are carrying out their Broader Impacts become common practice across the Division.

3.   Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

See Recommendation 1: Understaffing and overloading of program officers and program assistants is a major concern. Many of the activities that could be done to further reach underrepresented members of the community, including those at HBCUs, and to support early career PIs, are time-intensive; adding to an already very large workload is problematic. Although the COV thinks that cross-directorate initiatives are important, we suggest that participation on task forces and working groups be closely examined to determine whether time could be freed up from them to devote to other core activities.

4.   Please provide comments on any other issues the COV feels are relevant, bearing in mind that COV reviews do not include assessment or evaluation of the outcomes or long-term impacts of program investments.

5.   NSF would appreciate your comments on how to improve the COV review process, format, and report template.

The COV found that the OS-MGS self-study was extremely helpful for the review process. The self-study provided context and background that enabled members of the COV to better understand the more granular perspective obtained by reading individual eJackets. The self-study should definitely be retained for future COVs. Additionally, we recommend that a formal presentation of the findings with a question-and-answer session be delivered to the COV early in the process in order to on-board COV members more quickly.

Having more than 6 weeks for the COV process would be extremely helpful. In particular, the COV would have liked to have had more opportunity to discuss and organize its work prior to the meeting at NSF. The very tight timing – and our collectively very busy schedules – precluded any meetings of the full COV at the same time prior to the COV meeting at NSF.

Recommendation #9: We suggest that in the future, members of the COV are informed that there will be biweekly to monthly (self-organized) meeting for approximately 3 months prior to the 2-day COV meeting, and that individual reviews of eJackets will need to take place during this time period. A three-month time period would be helpful in order for the COV to progress from procedural issues (how to actually access the information; reporting additional conflicts of interest to NSF) to beginning to discuss the fundamental issues associated with the review (e.g., observations and discussions of specific issues relevant to various aspects of the review process.)

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SIGNATURE BLOCK:

Carol Arnosti

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GEO/OCE OS & MGS 2019 – 2022 Committee of Visitors
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