FY 2017 REPORT TEMPLATE FOR

NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: May 16-17, 2017
Program/Cluster/Section: GEOPATHS, Geoscience Opportunities for Leadership Development (GOLD), GLOBE, Polar Special Initiatives
Division: ICER, Office of Polar Programs
Directorate: Directorate of Geosciences
Number of actions reviewed: 72 **Awards: 32** **Declinations: 40** **Other:**
Total number of actions within Program/Cluster/Division during period under review: 223 **Awards: 90** **Declinations: 133** **Other:**

Manner in which reviewed actions were selected:

Proposals were selected randomly and then assigned to COV members. One member with polar expertise was assigned a few more proposals in the Polar Special Initiatives and no proposals in GOLD or GLOBE. Another member with expertise in social sciences was assigned to GOLD and GLOBE since these programs involve more social science issues.

COV Membership

	Name	Affiliation
COV Chair or Co-Chairs:	**Dr. W. Berry Lyons**	**The Ohio State University**

COV Members:		
	Dr. Douglas Ealey	**University of North Georgia**
	Dr. Victoria Hill	**Old Dominion University**
	Dr. Dionne Hoskins	**NOAA Fisheries**
	Ms. Catalina Martinez	**NOAA Office of Ocean Exploration and Research**
	Dr. Renetta Tull	**University of Maryland, Baltimore County**
	Mr. David Voorhees	**Waubonsee Community College**

COMMITTEE CHARGE

The COV was charged to:

- Review actions taken by GEO programs related to focused ED activities, and Polar programs related to education activities during the last three years (2013-2016)
- Evaluate the products and contributions of focused GEO ED activities and Polar education activities over this period

The programs being reviewed include:

- Improving Undergraduate STEM Education: Pathways into Geoscience (IUSE: GEOPATHS)
- Global Learning and Observation to Better the Environment (GLOBE)
- GEO Opportunities for Leadership in Diversity (GOLD)
- Polar Special Initiatives

With respect to proposal actions during 2013-2016, the COV was asked to examine:

- The integrity and efficiency of processes used to solicit, review, recommend, and document proposal evaluation and actions
- The relationship between award decisions and program goals

The COV was asked to specifically comment on the following aspects of the programs' review processes and management:

- Effectiveness of the programs' use of merit review procedures
- Programs' use of the new NSF Merit Review Criteria
- Reviewer selection
- Resulting portfolio of awards
- Other topics, where appropriate

PROCEDURES

The COV held a virtual meeting via webinar on the 4 April where Program Managers Brandon Jones and Lisa Rom presented material on the COV process. They also reviewed the requirements of committee members to disclose conflicts of interest and to maintain strict confidentially of all materials. Directions to access the materials were also addressed.

The COV met at NSF on 16-17 May. After introductions and opening remarks by a number of NSF staff, the COV was again reminded of conflicts of interest and confidentiality restrictions. Steve Meacham, NSF COV Coordinator reiterated the COV's tasks and overall process. Brandon and Lisa then reviewed the elements of all the Programs under review. Our analysis of the available data, discussions, and information provided through questioning of the Program Managers led to the production of this report.

OVERVIEW OF FINDINGS

The COV found the programs to be very well managed, due in large part to the dedicated program managers and staff. Our review is positive. The COV found that the review methods were appropriate, fair, and, for the most part, the merit review criteria were addressed. The

programs reviewed by the COV consist of a very wide range and breadth of activities that are integrated and support the goals of GEO. The programs are innovative and important to the Foundation's mission. The programs are critical in the recruitment of underrepresented minorities to the field of geoscience, to the development of enhanced teaching outcomes, and increasing the future geoscience workforce. It is a great pleasure to be involved in the review process, and we are grateful for the help of the program managers and staff. We have structured our report by providing a summary of the COV's main observations, followed by a set of key recommendations. The last portion of our report provides answers to the template questions and includes our thoughts and suggestions.

KEY OBSERVATIONS

Quality and Effectiveness of Merit Review Process

Although the methods were appropriate, it was unclear as to how the choice of review process was determined for individual programs. The overall understanding of "broader impacts" by the reviewers appeared to be narrow, and the COV felt more in-depth training was needed prior to panel reviews. The Program Officers were often more detailed in their review analyses than in the individual reviews, and on occasion individual reviews were sometimes lacking detail to support the eventual proposal's ranking. It was found that little-to-no feedback was provided to PI's for many declined proposals, which seemed to be a missed opportunity, especially for PI's with repeat declines. The COV thought that a more standardized protocol was needed for providing feedback to PI's, regardless of whether their proposal was awarded or declined, and also for situations when corresponding with PI's to request additional information during review/negotiations processes.

Selection of Reviewers

The COV was impressed with the broad participation of a diverse set of professionals who served as reviewers. However, there was insufficient information provided to the COV on the expertise of the reviewers, which was also an issue raised during the previous COV. Conflicts of interest were resolved, but in one instance the COV felt that there was a need to provide clearer rationale when a reviewer was allowed to remain on a panel in order to provide specialist knowledge after a conflict was in question.

Management of the Program

As noted above, the COV thought that all the programs under review were very well managed, and the programs were very responsive to emerging opportunities. Overall, the program officers did a tremendous job. A few noted challenges included program prioritization and planning process information not being available to the COV prior to our meeting, and the remaining gap in reviewer demographics that was also experienced by the previous COV.

Resulting Portfolio of Awards

The COV found that there were projects with components that were significantly innovative and transformative. In addition, both the geographical distribution and the institutional variety of the awards were well balanced. With the information presented, the COV was unable to assess the balance of the awards across disciplines, or to ascertain if they were of the appropriate size and/or duration. The COV felt that the language defining inter- and

multidisciplinary projects needed to be less presumptive, and relate directly to co-funding, if indeed, that was the measure.

There was high representation of women, but low participation of underrepresented minorities. There is very good involvement of new investigators, but the manner in which the data was presented, there was no breakdown of Co-PIs from PIs (i.e. currently they are lumped together). There was an integration of research and education by all the programs. There seemed to be a good distribution of awards to a variety of institution types. However, GEOPATHS is not programmatically comparable to other traditional NSF programs, so this was noted. Although many of the programs reviewed by this COV are rather new, it was clear that their impact on education and diversity with the Geosciences Directorate is and will continue to be of great importance.

KEY RECOMMENDATIONS

COV Process:

- The COV recommends that the program officer guidance/information on context, history, process and prioritization of the programs be provided prior to the COV gathering to provide context while proposals are being reviewed.
- The demographic data collection should be improved and shared with the COV.
- Additional information on final proposal decisions should be provided to the COV.
- Access to COV materials should be improved.

Programs:

- Increased training and clarity in Broader Impacts for PIs, reviewers, and panelists are needed. We understand that the Foundation is taking important steps to do this currently.
- There should be continued and expanded efforts to increase participation of underrepresented minorities in all programs. The COV suggests that workshops for underrepresented groups be held to train on best practices, evaluation, and grant writing, so that their participation increases.
- The COV thought that more detailed reviewer guidance was needed to encourage more comprehensive reviews.
- There should be more detailed feedback provided to proposers of declinations.

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.

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:** GLOBE workshops and annual meeting proposals that were exempted from reviews seem appropriate. Other programs were appropriate. **Data Source: EIS/Type of Review Module**	YES
2. Are both merit review criteria addressed? a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses?	2a. Mostly 2b. Mostly 2c. YES

Comments: • Individual reviewers, Panels, and Program Officers (POs) are all part of the analysis. There were clear, but there were acceptable differences between GLOBE, GOLD, Polar, and GEOPATHS in terms of review process and structure. Several GLOBE proposals were not reviewed, some Polar were ad-hoc and panel. • The Broader impacts definition is standardized for NSF. There are five broad criteria that should be addressed, and it is understood that PIs don't have to hit each point. However, in some NSF directorates and programs, NSF's produced materials (e.g., NSF training video, National Association of Broader Impacts) should be provided for reviewers to watch prior to writing the reviews, and prior to panel sessions as guidance. • The broader impacts questions seemed to have much less information in the individual reviews and panel summaries than in the Program Officer's review summaries. It appeared that the understanding of what broader impacts encompasses varied considerably from proposal to proposal, even including evaluation. Program Officer's analysis of broader impacts was more substantial than the individual reviewers in many cases. This information may have come out of the panel discussion and/or the Program Officer's better understanding of Broader Impacts and how it applies to the proposal. It would be useful have delineation between the Program Officer's contribution and the panel's contribution. • The Program Officers' (PO) comments that go to the Principal Investigator (PI) in many cases are much less detailed and not comprehensive when compared to the more extensive "Reviewer Analysis" that the PO provides for the record. **Data Source: Jackets**	

3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? **Comments:**	YES

• Panel summaries and/or individual reviews shouldn't be prescriptive, but should be as descriptive and substantive as the review analyses. This would improve feedback to PIs. • There was a proposal with a dual ranking (G/F), which is not the best choice for the final designation. Written paragraphs for the reviews should support and reflect the reviewer's distinct ranking (either E, V, G, F, or P, but not more than one). Having more than one ranking or a dual (split) ranking can cause the program funding decision to be confusing to the PI. • The comments that seemed as though they would be most helpful to applicants were those that separated out the various points as strengths and weaknesses. The COV suggests that each review metric should be submitted in a separate, required field in the review. This would require reviewers to provide the information and present it to the applicant in a format that would be easier to understand. The recommended example is as follows: Intellectual Merit: *Strengths:* *Weaknesses:* Broader Impacts: *Strengths:* *Weaknesses:* **Data Source: Jackets**	
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? **Comments:**	YES

• The COV found that most of the panel summaries provided this information. However, it was not always easy to understand the rationale for decisions in some cases. Some individual reviewers did a great job with writing their reviews and correlating their assessments to the information that was posted in the program's solicitation. However, other reviewers wrote very little in their reviews, didn't always elaborate on their points, or made comments that were too vague to be instructive. • It is also important for the panel summary to reflect the summaries of the individual reviewers so that the rankings and summaries match. Confusion occurs when high ratings (e.g., E, V) don't have written comments that connect reasons for those ratings, or when the comments are inconsistent with the ratings. Further, when the panel doesn't reach consensus, it is important to provide detailed comments that explain reasons for the panel's differences. **Data Source: Jackets**	
5. Does the documentation in the jacket provide the rationale for the award/decline decision? **Comments:** • YES, however all proposals don't have consistent documentation. Awarded proposals had a lot of documentation, but declined proposals had virtually no (or no) additional information such as email correspondences. Once a proposal is awarded or declined, the PI can access documentation online. • The feedback process appears to be a passive process for declined proposals. If the proposal is declined, the PI is given access to the system for reviews and panel summaries, and in many cases there is no further correspondence initiated by the program officer. The PI may not be formally notified of the access. However, if a project is awarded, correspondence is initiated and feedback is active until the project begins. Successful PIs also have access to the system after the decision, but much of what they need to know is provided in direct correspondence. • In some instances, individual panelist reviews were high, yet the program officer decided not to fund. There were some "disconnects" with individual reviews holding to the guidance of how to choose F/G/E. • Some PIs were given opportunity to provide additional information that may have been missing in the original submission that would be used in a funding decision. While it was acknowledged that program officers may have	Partial YES

discretionary information and legitimate considerations that impact their implementation of the program, at least one proposal drew attention because the funding decision appeared inconsistent with the panel reviews and the correspondence conveyed premature messages of support. In particular, some PIs were told they would be recommended for funding *prior* to submitting missing information. **Recommendation:** Programs should establish a more standardized way to negotiate with PIs when requesting missing information that doesn't state that they are being recommended for funding. Example*: 'Your proposal has been reviewed (favorably), but the panelists have some questions. This correspondence does not convey a funding decision, but is instead a request for more information for further review.'* [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.] **Data Source: Jackets**	

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:** • YES, but there are often inconsistencies in the provided documentation and the final funding decision. The COV felt that the PIs would benefit from more detailed feedback, so that they can have greater opportunity to improve their proposals going forward. These details were often written into the panel summaries, but were then omitted from the PO Comment documents. • See also answers to the question above in Section I.5, *Does the documentation in the jacket provide the rationale for the award/decline decision?*	Partial YES

Data Source: Jackets	
7. Additional comments on the quality and effectiveness of the program's use of merit review process: **<u>Comments:</u>** The variations in the review processes between programs, e.g., GLOBE, GEOPATHS, Polar, were not transparent, but the COV assumes there was rationale for building out programs as they did. The program officers have a suite of review options available and appear to use them based on minimum requirements for review, immediacy of implementation/results, and other internal rationale.	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.

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 information provided to the COV was insufficient to adequately answer this question. It was not possible to determine the sub-disciplines nor regions of interest of the ad hoc or panel reviewers, because the data was not provided and is not required in the reviewer registration system. • COV was pleased to see increased 2-year college presence in individual and panel reviewers and this appears to address previous COV recommendations. • There was no information on the balance of underrepresented minorities as ad hoc or panel reviewers. **Suggestion:** While institution and department demographics were provided for reviewers, research discipline or expertise relevant to the program were not. In order to comprehensively evaluate reviewers the COV would like to have access to comprehensive demographics and sub-discipline/expertise information. **Data Source: Jackets**	YES, for some demographics, and NO for others

2. Did the program recognize and resolve conflicts of interest when appropriate? **Comments:** • YES, but there was one case discussed where a potential COI was acknowledged, and the person was allowed to proceed as a panelist. The rationale for this decision was stated in the Review Analysis, but raised a red flag regardless. The Program Officer cited examples that explained the value of having this person on the panel. The COV understands that within a small community of experts, overlap between a panelist's experience and a program that is being reviewed can occur. It may be helpful to explicitly state in the "Review Analysis" the circumstances under which someone with a perceived COI can remain in the panel to provide specialist knowledge. • It is recommended that program officers continue to carefully examine a panelist's experience and background for conflicts. The GLOBE program is an example of an initiative where conflicts of interest should be carefully scrutinized due to the nature of the participation and involvement of several organizations such as NOAA and NASA. **Data Source: Jackets**	YES
3. Additional comments on reviewer selection: **Comments:** There was broad participation of a diverse set of professionals. Reviewers included social scientists, independent contractors, and a variety of universities and colleges. It was clear that program officers did not restrict themselves to "the usual suspects." The recruitment and inclusion of many different types of reviewers was very impressive.	

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

MANAGEMENT OF THE PROGRAM UNDER REVIEW

1. Management of the program.

Comments:

- Overall, the COV felt that the programs were very well managed. The tasks were clearly daunting, yet the program officers did a tremendous job.

- Program officers are making decisions in a judicious way, even when they are incorporating information that is not transparent to the COV. Through in-depth discussions, we learned that controls are in place and are being applied appropriately to administer the programs equitably, effectively and efficiently.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

GEOPATHS & GOLD are innovative, which is truly setting GEO as a standard-bearer in STEM disciplines by bringing in social scientists and developing creative solutions for diversity challenges. This is also shown by the strong presence of the geoscience education community in a 2012 National Research Council report on Discipline Based Education Research (reference in Section IV, number 10). This bridging of the enormous gaps in understanding and collaboration between GEO and social science communities, provides the geoscience community with proven pedagogies and the reasons why they are effective. Additional funding for these creative and exciting programs is needed. The COV is very impressed and encouraged to see 2-year colleges given opportunities where they normally may not have had them. These two programs are in direct support of the Education and Diversity goal of the Advisory Committee for Geosciences document Vision of 2012, and the GOLD program can provide insight into developing convergent research, as part of NSF's "Ten Big Ideas."

Polar Special Initiatives has supported a diverse portfolio of programs which covers both formal and information education across age groups, providing learning opportunities for students, teachers and research professionals. The specific inclusion of international collaboration, Alaska Natives and minorities in the program is commendable and hopefully will increase the participation of these groups in polar research, which has historically been a struggle.

There appears to be a struggle to increase minority participation in one long-running project, so whatever NSF can do to encourage this is important. New ideas are key.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

Prioritization wasn't transparent in the eJacket. We learned about the subjective nature of final decisions based on programmatic priorities and objectives through in-depth discussions with the program officers, and this appears to be conducted in a logical, equitable manner.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

- The previous COV (2013) was challenged with not having data on reviewer expertise and demographics, and as this 2017 COV experienced similar challenges, it's clear that there remains a gap in this data that should be addressed.

- There has been an exceptional response in the increased involvement of Two-Year college faculty. Continued support and mentoring of Two-Year college faculty is strongly recommended to increase the diversity of geoscience students and to increase students into the pipeline into geoscience careers because Physical Geology is a known gateway class and is very common in 2-year colleges.

- Overall, the previous COV responded to programs that are no longer in existence. GEO commendably seems to have brought forward many of the key recommendations.

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

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:** Sub-discipline data was not provided to this COV, and it's possible that this level of information is not necessary for this COV review. **Suggestion:** Consider how best to acquire and provide this level of data to the next COV, or eliminate this question altogether. **Data Source: EIS/Committee of Visitors Module. From the Report View drop-down, select the Funding Rate module to see counts of proposals and awards for programs. The Proposal Count by Type Report View will also provide a summary of proposals by program.**	DATA NOT AVAILABLE
2. Are awards appropriate in size and duration for the scope of the projects? **Comments:**	DATA NOT AVAILABLE

• Information on the size and scope of projects and the amount awarded to each comes out in the review process and PO analysis. • This was not a question that this particular COV could answer. In order to understand the scope, the COV would need to discuss each individual proposal in its entirety, which takes time away from focusing on the process. That being said, there were a few instances where correspondences associated with a few awarded proposals provided appropriate guidance for the adjustment of budgets. **Suggestion:** Consider re-wording this question in a manner that defines what "appropriate" means. As it is stated, this COV was not in the best position to make these calls. **Data Source: EIS/Committee of Visitors Module. From the Report View drop-down, select Average Award Size and Duration.**	
3. Does the program portfolio include awards for projects that are innovative or potentially transformative? **Comments:** • YES, for GEOPATHS, GOLD, and Polar programs. • Innovative practices in GLOBE included the regional teacher-student partner teams, development of a mobile app, diverse cross sections of participants in leadership teams, citizen-science observation marathons for Earth Day 2015 and the establishment of a "STEM Equity Specialist." **Data Source: Jackets**	YES
4. Does the program portfolio include inter- and multi-disciplinary projects? **Comments:**	YES

• YES. All meet this criteria. • Some programs had co-funding requests in the eJacket that were sent to other programs. These documents provide evidence to support inter- and multi-disciplinary projects. • It would be helpful to have more information on what is meant by inter- and multidisciplinary in this question. When the COV first discussed this question, the consensus was that the target had been met based on the materials in the eJacket alone. This included the reviewers and POs comments/review analysis on the nature of the proposed activity. Cooperative funding was not the primary consideration. However, if this is the measure that NSF prefers, the question could be made more explicit and the requisite data should be provided. **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 the EIS/Committee of Visitors Module. They are available as selections on the Report View drop-down.**	
5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators? **Comments:** • Priorities differ for each program. However, it is often difficult to choose programs that create a geographical balance, particularly in a very small program (like Polar) in which a few specialty programs around the country represent the total professional community for that discipline. • If there are a lot of awards, the PO should be able to demonstrate good geographical distribution. Geographic distribution is one of the criteria used after the panel convenes by the POs in final decisions. It is a nuanced process and could be used as a tie-breaker between projects that are otherwise matched in the two merit review criteria. • Good geographical distribution is also supported by the state data. **Data Source: EIS/Committee of Visitors Module. Select Proposals by State**	YES

from the Report View drop-down.	
6. Does the program portfolio have an appropriate balance of awards to different types of institutions? **Comments:** • There seems to be a good distribution of awards to a variety of institution types. • It is difficult to compare the institutional distribution of GEOPATHS awards in 2015 to all NSF awards for that year. GEOPATHS awarded 22 applicants in 2015 and 27 in 2016. However, 12,016 total awards were given in 2015. Since GEOPATHS is education based and has targeted solicitations (ex. non-R1 schools), this is not a one-to-one comparison across all NSF awards. • The representation of women and minorities in GEOPATHS was far above NSF's average for PIs overall. **Suggestion:** The COV needs more clarification for what NSF considers to be an "appropriate" institutional balance, and more information in the eJacket to consider this question. We are using our POs for assistance and data mining tables that are being provided by request. **Data Source: EIS/Committee of Visitors Module. Select Proposals by Institution Type from the Report View drop-down. Also, the Obligations by Institution Type will provide information on the funding to institutions by type.**	YES
7. Does the program portfolio have an appropriate balance of awards to new and early-career investigators?	YES

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 seven years of receiving his or her last degree at the time of the award. **Comments:** New Involvement is about 30% and is very good, but the tables combine PI/Co-PI data. If NSF wants to capture 'early career' data, this data must be acquired and shared. An applicant can be a new PI to apply for an NSF grant, but may not necessarily be an early career scientist. **Suggestion:** Consider a more effective way to acquire and present this data to the next COV. • **Data Source: EIS/Committee of Visitors Module. Select Funding Rate from the Report View drop-down. After this report is run, use the Category Filter button to select New PI for the PI Status filter or New Involvement (PIs & Co-PIs) = Yes.**	
8. Does the program portfolio include projects that integrate research and education? **Comments:** The integration of research and education is inherent in the nature of the programs. **Data Source: Jackets**	YES
9. Does the program portfolio have appropriate participation of	

underrepresented groups?[1] **Comments:** NSF labels PIs or Co-PIs who are underrepresented minorities (URM) as "PICOMIN" in their database. Using those data, the COV determined that the Polar program has great representation of women (50%), but still very low URM (10%) among those PIs/Co-PIs who volunteered demographic information. Across five years (2013-2017), the GLOBE program only funded one project submitted by an underrepresented minority PI/Co-PI. However, during the same period, 71.43% of the total awards (14) went to women (10). The GEOPATHs proposals funded >33.33% of those submitted by URM and approximately 80% of projects were submitted by women. **Suggestion:** NSF should try to provide more clarity to the community (e.g., current and future reviewers, current and future PIs) regarding why demographic data is important and improve voluntary submission of this important data. Also, when providing data to the next COV, it would be useful if the PI and Co-PI data were separated. **Data Source: EIS/Committee of Visitors Module. Select Funding Rate from the Report View drop-down. After this report is run, use the Category Filter button to select Women Involvement = Yes or Minority Involvement = Yes to apply the appropriate filters.**	
10. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external	

[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.

reports. **Comments:** Yes, and examples are: • NSF's new 10 Big Ideas (one is Arctic): https://www.nsf.gov/about/congress/reports/nsf_big_ideas.pdf • National Academy Reports: National Academies of Sciences, Engineering, and Medicine. 2016. *Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways.* Washington, DC: The National Academies Press. doi: 10.17226/21739. • National Academies of Sciences, Engineering, and Medicine. 2011. *Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads.* Washington, DC: The National Academies Press. doi: 10.17226/12984. • AGI Workforce Reports: https://www.americangeosciences.org/workforce/reports • National Research Council. (2012). *Discipline-Based Education Research: Understanding and Improving Learning in Undergraduate Science and Engineering.* S.R. Singer, N.R. Nielsen, and H.A. Schweingruber, Editors. Committee on the Status, Contributions, and Future Directions of Discipline-Based Education Research. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press. • GeoNeeds : Stakeholder Needs Assessment for Broadening Participation in the Geoscience Workforce, https://d32ogoqmya1dw8.cloudfront.net/files/geoneeds/geo-needs_report.pdf **Data Source: Jackets**	
11. Additional comments on the quality of the projects or the balance of	

the portfolio: N/A	

OTHER TOPICS

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

The programs have the perennial task of attracting strong proposals from Minority Serving Institutions (MSIs) and 2-year schools. One conclusion of the recent GEO-NEEDS meeting (funded by GOLD, http://serc.carleton.edu/geoneeds/index.html), where multiple stakeholders (faculty, administrators, resource agencies and geoscience researchers) were gathered to discuss the barriers and opportunities for enhancing geoscience instruction at 2-year colleges and MSIs was to continue and increase communication and dissemination. This would be in the form of increased workshops, support and development of regional networks of geoscientists, and geoscience career information. These kinds of activities could help generate the level and diversity of proposals to bridge this gap.

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.***

One of the outcomes of these programs is that they generate transferable approaches. Innovative programs such as GEOPATHS and GOLD involving geoscientists and social scientists will hopefully make a difference by providing research supported pedagogies to help Geo scientists become better educators. This is important because these programs provide the reason that these pedagogies are important, rather than description of successful techniques. Continued funding and commitment is important to continue to expand the effectiveness of geoscience education to continue the GEO pipeline from undergraduate to career. As this occurs, resources and outcomes are leveraged across prior funded activities, increasing efficiency and effectiveness through transferable approaches.

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

There should be more consistent training for reviewers and panelists on broader impacts as there often seem to be disconnects between the reviews and program officer's comments. It is suggested that the training video shown to the AC-GEO in the March 2017 meeting and the link to the National Association of Broader Impacts (https://broaderimpacts.net) be provided to potential reviewers and panelists.

NSF might consider hosting workshops at conferences and meetings, within all directorates, with breakout sessions to address best practices, evaluation planning, grant writing, broader impacts, the importance and utility of demographic data, as well as other useful topics. Some of these efforts could target PIs with a history of repeat declines, Minority Serving Institutions, Tribal Colleges, Community Colleges, and other groups underrepresented in terms of proposal submissions/successful awards. The COV references the NSF ADVANCE/Gender in Science and Engineering (GSE) annual meeting as an example, as both current grantees and future proposers participate.

4. Please provide comments on any other issues the COV feels are relevant.

Relevant comments have been provided throughout the report.

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

The introductory presentations that were given by the program officers on the first day of the COV meeting were very helpful because they gave the funding history of the programs and the background on how different initiatives were formed and implemented. This would have been helpful to have at the time of the introductory webinar so that the COV could read the source documents with an understanding of each program's goals and history, as well as with an understanding of how each program was run. Some of the information that was initially provided was in excerpted form in the solicitations, but the level of the detail given during the presentation provided essential background and context that was otherwise not available.

It would be helpful for the COV to have the nuanced information that went into the final proposal decisions, especially if final decisions went against panel recommendations or were regarding proposals in the 'marginal' or 'competitive' rankings. This information is often in the program officer comments, but inconsistent, and the 'big picture' nature of these decisions is not transparent to the COV.

Section IV requires data on Minority PIs, Women PIs, New PIs, New Institutions, Institution type, Co-funding, project size, award amount and award duration. The COV could save much time in session if these data were made available in one pdf query in advance. If these materials were placed in the eJacket at the same time proposal assignments were made, committee members

could complete more work in advance and possibility reduce the in-person meeting time by one day.

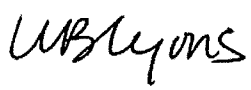
Having all documents available electronically via the eJacket was appreciated. Given that the COV attempts to be thorough with reviewing the process, it would have been helpful to have the ability to download all documents for an eJacket with a single click, as a pdf packet or in some other secure form. It may help to add the option to click boxes to merge all files within categories, e.g., all documents in the "Review" section, all documents in the "Communications" section etc., rather than leaving the COV with a series of links that subsequently connect to additional text files and single pdfs. It was helpful that the reviews could be downloaded as one document, and a process similar to the way that one can "View Entire Proposal" would be appreciated.

There was some confusion regarding the level of understanding of both the PI and the reviewer panel regarding the difference between the GEOPATHS "EXTRA" and "IMPACT" tracks. If a PI submits a proposal that has content that is deemed inappropriate for the designated track, or where the activities don't match the requirements of the track per the RFP, the reviewers' individual comments, and the panel's collective summary should clearly identify the disconnect. The COV was concerned when a mismatch of proposal content for the track was listed in the PO's Review Analysis as the primary reason to deny funding, however the panelists rated the proposal favorably, and neither the individual reviews nor the panel summary explicitly raised any issues with the chosen track. Further, the proposal was reviewed favorably, according to the solicitation's guidelines for the PI's stated track. The recommendation is that when disconnects between proposal content and a track are clear to the PO, those disconnects should be made apparent to the panel for group discussion and mentioned in the panel summary, unless other NSF rules apply.

SIGNATURE BLOCK:

For the COV for the programs comprising the Directorate of Geosciences for Education and Diversity activities, including those activities in Polar programs

W. Berry Lyons



Chair