

**Directorate for Geosciences (GEO)
Office of the Assistant Director (OAD)**

**Response to the 2013 Committee of Visitors Report:
Geosciences Education and Diversity (GEO E&D) Programs**

Date of the COV: May 30 – 31, 2013

The Directorate for Geosciences (GEO) appreciates the 2013 Committee of Visitors (COV) for their time and efforts to review the Fiscal Year 2010 to 2012 activities of the following programs in the Geosciences Education and Diversity (GEO E&D) portfolio: *Geoscience Education (GeoEd)*, *Opportunities for Enhancing Diversity in the Geosciences (OEDG)*, *Global Learning and Observations to Benefit the Environment (GLOBE)*¹, *Geoscience Teacher Training (GEO-Teach)*¹, and the Division of Earth Sciences Education and Human Resources (EAR E&HR) program (which includes the *Research Experiences for Undergraduates (REU)* and *Postdoctoral Fellowship (EAR-PF)* programs). GEO commends the COV for the excellent guidance provided in the report resulting from the May 30-31, 2013 meeting, and acknowledges the substantial amount of work the committee undertook while evaluating the complex portfolio of separate programs which comprise the GEO E&D efforts. GEO appreciates the very positive feedback that the COV provided about the new process used for implementing this COV, noting that GEO's decision to use a pre-COV briefing webinar and provide advance access to supporting documentation was a direct response to the previous COV's recommendations. We are pleased to know that this new implementation method proved to be more efficient and less stressful for the COV members.

GEO is delighted to receive the committee's highly complimentary assessment that the integrity and efficiency of the merit review process continues to be exemplary and appreciates their assessment that management of the GEO E&D programs is exemplary in its professionalism, expertise, and support for a broad-based community. We are especially gratified by the committee's overall finding that the GEO E&D portfolio is innovative and achieving success in its efforts to improve geoscience education and develop a diverse and skilled geoscience workforce. The committee's finding GEO was effectively linking its investments to the education and diversity strategic framework developed by the Advisory Committee for GEO provides important feedback on the new approaches we have put in place since the last COV review. Recommendations to continue GEO's efforts to strengthen connections among geoscientists and educators, as well as continue to engage and support community colleges and minority-serving institutions, provide important focal points for our efforts going forward. Having such clearly identified priorities is especially important, given present uncertainties regarding the level of funding available to support GEO's education and diversity programs after FY 2013.

¹ No competitions for GLOBE or GEO-Teach funding were held during the period being reviewed by the COV. The COV only considered other ad-hoc actions (supplemental funding requests, workshop proposals) and highlights for active GLOBE and GEO-Teach awards.

This Response addresses the specific comments expressed in the COV Report, gathered under five main headings, as defined in the COV template: (1) quality and effectiveness of the merit review process; (2) selection of reviewers; (3) management of the program under review; (4) resulting portfolio of awards; and, (5) other topics. Responses to comments regarding individual programs are included, as necessary.

Section 1: Quality and Effectiveness of Merit Review Process

COV Report: The COV was generally high complimentary about the quality and effectiveness of the review process used by the programs under review, noting there was thorough documentation to support decisions regarding funding, useful feedback to PIs regarding non-funding decisions, and mentoring and encouragement for new investigators. The COV found the review methods (combinations of panel and ad-hoc review, depending on the specific program) to be appropriate. The COV noted some confusion about how to determine the total number and type of reviews requested and received and some inconsistencies in how well the broader impacts criterion was being addressed by ad-hoc reviewers. The committee recommended that ad-hoc reviewers be asked explicitly to address the GEO E&D strategic plan goals and objectives in their reviews. The committee also suggested that inclusion of more specific information regarding the relative ranking of proposals might be beneficial for the PIs who do not get recommended for funding.

GEO's response: GEO greatly appreciates the committee's positive findings regarding the quality and effectiveness of the review processes utilized and the specific recommendations to further improve its review processes. GEO agrees that it is desirable to get more consistent feedback from reviewers regarding how an individual proposal addresses the broader impacts criterion and contributes to the goals and objectives of the GEO E&D strategic plan, and will explore strategies for encouraging reviewers to address these concerns. GEO will also provide the next COV committee with more specific instructions that enable identification of reviewers and their status, as indicated in the Review Record. Although GEO agrees that more information about the relative ranking of proposals would be useful for PIs, our preference is that program officers not provide specific information about the ranking of proposals within a competition.

Section 2: Selection of Reviewers

COV Report: In general, the COV noted GEO's effective use of a diverse and technically qualified community of reviewers for these programs and commended GEO for their dedication in identifying and using reviewers with strong qualifications from a variety of institutions and ethnic/cultural backgrounds. The use of international reviewers during review of the EAR-PF proposals was noted. The COV expressed a desire to have additional information about the expertise and type of institution of the ad-hoc reviewers and encouraged the EAR REU program to expand the pool of reviewers to have more representation from two-year colleges.

GEO's response: GEO is pleased that the COV recognizes the ongoing efforts being undertaken to recruit a diverse, knowledgeable, and representative community of reviewers for the programs in the GEO E&D portfolio. Expanding the reviewer pool – to include representatives from all

categories of institutions, all of the sub-disciplines served by the GEO Directorate, and all of the educational audiences being supported through these programs – will continue to be a high priority for GEO. The use of international reviewers for the EAR-PF program helps GEO to avoid conflicts of interest with the postdoctoral candidates' PhD advisors and host institutions, but also brings important perspectives regarding the status of the evolving global geoscience workforce. GEO will explore strategies for providing additional information about the expertise and credentials of the ad-hoc reviewers being used within these programs, but notes the difficulty in obtaining some demographic information because NSF is only allowed to use self-reported data and many reviewers prefer to not disclose this information. In addition, the NSF system does not request information about disciplinary expertise, only individual demographics and institutional affiliation. The recommendation to expand the number of reviewers from two-year colleges in the EAR REU program is important, and GEO will re-double its efforts in this area during the next three REU competitions.

Section 3: Management of the Program under Review

COV Report: The COV found the planning, prioritization, and management of the programs under review to be highly effective. The committee commended the EAR REU program, noting the novel recruitment strategies for engaging community college students and the careful post-award monitoring ensure that stated goals regarding recruitment and diversity are being achieved. The committee expressed concerns about a decline in the number of REU applications and what might be done to reverse this trend. The committee viewed the flexibility of the GeoEd program to be an important asset, but would have liked to see a bit more justification for some of the decisions being made. The committee recommended that GEO formalize the GeoEd planning grant opportunities and advertise these opportunities more widely, especially among minority-serving institutions. The committee further recommended that EAR consider a new solicitation aimed at involving two-year college faculty as PI's and providing their students with place-based research opportunities.

GEO's response: GEO appreciates the thoughtful comments provided by the committee regarding management of the programs under review and the suggestions regarding specific concerns that GEO should address. GEO will keep in mind the committee's recommendations regarding the GeoEd planning grants and the need for further documentation regarding specific decisions if the GeoEd program is continued past FY 2013. GEO will consult with the REU PI community to investigate possible reasons for a decline in the number of proposals submitted to that program. The Advisory Committee for GEO will be considering revisions to the GEO E&D strategic plan at its next meeting in Fall 2013, particularly in light of the proposed budget changes for the related programs; the suggestion that GEO add a new solicitation for two-year college faculty and students will be considered in conjunction with that renewed strategic planning effort.

Section 4: Resulting Portfolio of Awards

COV Report: The committee found the distribution of projects, in terms of their disciplinary focus, size and duration, potential for innovation or transformative impacts, and demographic

diversity (both PIs and institutions), to be appropriately balanced. The committee was pleased by the multi-disciplinary breadth of the REU and EAR-PF projects, GEO's efforts to leverage other resources (e.g., LSAMP), and successful recruitment and funding of new investigators for the OEDG program. The committee noted that it was difficult to gauge whether some of the smaller GeoEd and OEDG projects were of appropriate size and impact, in the absence of longer term information, but did agree that the larger Track 2 OEDG projects had demonstrated important impacts. The committee recognized that Earth system science and Geology dominated the disciplinary focus in the portfolio of projects funded through these programs, and commented that the atmospheric sciences may be underrepresented in the portfolio. The committee recommended that the GeoEd and OEDG programs consider how to encourage proposal submissions from currently underrepresented geographic regions in the portfolio. They further suggested that information on collaborating institutions be broken out more explicitly so that future COV's can better examine the institutional diversity of the portfolio. Efforts to improve the success rate of minority-serving institution proposals in the OEDG program and to increase the number of proposals being submitted to the REU program by two-year colleges were strongly encouraged. Although the committee noted the low participation of underrepresented groups in the portfolio, they also noted that the participation rate was higher in the E&D programs than in GEO's science programs and commended GEO for its ongoing efforts to encourage proposals from minority-serving institutions and minority PIs.

GEO's response: GEO agrees that a three-year snapshot of the portfolio of projects funded by the GeoEd and OEDG programs – which are only competed on a bi-annual schedule – does not provide an adequate basis for determining the full impact of the projects being supported. As such, GEO will continue to monitor the annual reports and outcomes of currently funded projects in order to evaluate which types of projects have had the most significant impacts. GEO agrees that it must be very proactive and sustained in its efforts to engage underrepresented regions of the country and minority-serving institutions in these programs and will continue to explore additional mechanisms (e.g., partnerships with other NSF programs) that might help us achieve these goals. It is not possible to be more specific at this time because of uncertainties about the status of the GeoEd and OEDG programs after FY 2013. As noted previously, GEO will explore approaches that may be effective in getting two-year colleges more engaged in the REU program.

Section 5: Other Topics

COV Report: The committee offered few comments in this section of the report, but suggested that GEO consider new collaborations between the geosciences and computer sciences that help to develop the workforce needed for an era of “big data”. The committee also emphasized again the desire to find creative approaches to improve the involvement of two-year colleges, minority-serving institutions, and minority PIs, and reiterated their desire to have more information about the individual reviewers used in the merit review process for these programs.

GEO's response: GEO agrees that the emerging priority of “big data” and new initiatives such as EarthCube, which lie at the intersection of the geosciences and computer sciences, is an important area to explore, both in terms of educational opportunities and workforce development. In March 2013, GEO sponsored an EarthCube end-user workshop focused on

education that began to identify some of the grand challenges in both preparing the technologically savvy geoscience workforce of tomorrow and using the complex data and visualization resources offered through EarthCube for broader STEM education and engagement. GEO expects that programmatic planning related to this topic will continue to mature in the coming months.

2013 COV Response – June 28, 2013