**Directorate for Geosciences (GEO)**

**Office of the Assistant Director (OAD)**

**Response to the 2010 Committee of Visitors Report:**

**Geosciences Education and Diversity (GEO E&D) Programs**

**FY 2012 Update**

The Directorate for Geosciences (GEO) would like to provide this update on progress made during FY 2012 in addressing specific concerns raised in the 2010 COV Report, gathered under two main headings: (1) issues of concern which were common across all of the programs reviewed; and, (2) program-specific issues identified in the template. COV Report comments are generally indicated in italics, followed by GEO’s response. Specific sections where comments arose in the COV Report are indicated in parentheses.

# Section 1: Common Issues of Concern

# Outputs and Outcomes (Section 2.2)

*The committee acknowledged that progress had been made since the last COV in getting more engagement of tribal colleges and minority-serving institutions in GEO’s education and diversity programs, but felt that more effort was still needed in this area, particularly with regard to getting two-year college faculty and students engaged in the geosciences and over the barriers that make it hard for them to succeed in the competitive NSF process.*

GEO’s response: GEO has continued its outreach to minority PIs, minority-serving institutions, and tribal colleges (see comments in the GEO Directorate Issues section below) and has begun to take concrete steps toward engaging 2-year and community college faculty. At the end of FY 2009, GEO provided funding to support the travel of community college faculty members (20) and students (7) so that they could attend the 2009 annual Geological Society of America (GSA) meeting in Portland, which was holding a special session on issues in geoscience education in such institutions. In conjunction with this meeting, a special listening session/networking dinner was convened at Portland Community College and attended by J. Karsten. In FY 2010, GEO funded an OEDG Planning Grant to convene a workshop on 2-year college geoscience education programs, which was held at Northern Virginia Community College on June 24-27, 2010. Information about this workshop, which was attended by 36 participants (including L. Patino) and 4 conveners, is available at: <http://serc.carleton.edu/geo2yc/index.html>. The final recommendations from this workshop are pending, but the associated web site continues to operate as a virtual networking site. GEO anticipates providing additional travel support this year to enable community college faculty to attend the 2010 GSA meeting in Denver. GEO program staff members attending GSA also are planning to hold a mini grant-writing tutorial for these participants. Collectively, these workshops and symposia are being used to help GEO conduct a needs assessment for the students and faculty in these types of institutions, so that future solicitations and program funding decisions can be more strategic in addressing those needs.

FY 2012 Update: In October 2011, program officers who manage the Research Experiences for Undergraduate (REU) site programs for GEO convened a first-ever Principal Investigators meeting in conjunction with the annual SACNAS conference in San Jose, CA. The PI meeting focused on effective recruitment and retention strategies for undergraduate students from underrepresented groups and provided an opportunity for PIs to meet directly with a diverse community of students seeking research experiences. GEO feels this meeting was a watershed moment for meaningfully engaging the geoscience community in addressing issues of diversity.

GEO provided funding for the “Unique Research Experiences for two-year College faculty And Students (URECAS)” planning workshop, convened by the American Geophysical Union July 12-13, 2012. The workshop identified existing research experiences for undergraduates attending such institutions, best practices for engaging two-year college students in research, and strategies for overcoming barriers to success. The program seeks to establish a distributed community of two-year college instructors engaged in geoscience research and pathways for such students to transition to the next educational levels. An article describing the workshop and its results was featured in the August 14 issue of Eos. A web site (<http://urecas.agu.org>) has been created to house related resources for this community.

GEO outreach to minority PIs, minority-serving institutions, tribal colleges, and 2-year and community college faculty is on-going. GEO travel grant funding was used to bring 21 community college faculty members to the 2011 GSA meeting in Minneapolis, MN; 24 faculty members from 2-year colleges who were attending the GSA meeting also participated in a special forum on grant funding opportunities in the geosciences. Several GEO program officers participated in that forum.

GEO contributed supplemental funding to support a second Geoscience Alliance conference, held at Salish Kootenai College on March 17-18, 2012. The conference brought together a large community of Native students and faculty and offered workshops on accessing data and using visualizations related to climate change, research using the GLOBE program protocols, and opportunities and resources related to several GEO-supported research initiatives (EarthScope, CUAHSI, LacCore, UCAR). It is worth noting that Salish Kootenai College, which is a partner in a multi-institutional REU site funded by GEO, announced a new Bachelor’s degree program in Hydrology last year.

GEO has initiated an effort to help the Institute for Broadening Participation (IBP), which manages the Minorities Striving and Pursuing Higher Degrees of Success (MS PHDS) program, seek funding to sustain its base operations. Like a research facility, IBP offers a suite of resources and tools for communication, mentoring, and networking that are valuable services for the larger geoscience community. Discussions have been held in the past year with GEO, OPP, EHR, NASA, NOAA, and Office of the NSF Director about how the IBP programs might be supported as “infrastructure”.

GEO has begun internal discussions with other Directorates regarding programs and projects to support Native communities in STEM. This effort is just getting underway, but there is interest in creating an NSF-wide inventory of the existing efforts, in advance of a conversation with the USGS regarding opportunities for collaboration. A conference call to discuss opportunities for inter-agency leveraging of programs focused on increasing diversity in the geosciences (with participation by NSF, USGS, NOAA, NASA, EPA, and DOE) has been scheduled for the first week of October 2012.

**Priority Recommendations**

a) GEO E&D Goals and Strategies (Section 3.1)

*The committee suggested that the program map the GEO E&D portfolio to the new GEO Education and Diversity Strategic Framework by explaining its goals and objectives in program solicitations, requiring PIs to describe how their projects would achieve those goals, asking reviewers to consider how well those goals are served during the review process, and documenting in Review Analyses how well an award project is tied to these strategic priorities.*

GEO’s response: Since the COV met, GEO has begun to include a section in Review Analyses for awards that articulates which goals and objectives of the Strategic Framework are being addressed through the project. This began with the Review Analyses for awards from the FY 2010 GeoEd competition, and will be extended to the OEDG, GLOBE, and GEO-Teach program awards when those competitions have been completed. In addition, the newly revised OEDG program solicitation [NSF 10-599] now specifically identifies the main goals and objectives of the Strategic Framework and asks PIs to describe which goals/objectives they will be working toward. When the OEDG review panel meets this winter, GEO will advise them to consider how well the proposal addresses the Strategic Framework in making their assessment. The next versions of the GLOBE and GEO-Teach solicitations, currently under revision, will also incorporate specific information about the Strategic Framework and which portions of it are intended to be emphasized by that specific program. The current GeoEd solicitation, which is valid through FY 2012, already includes some general comments about GEO’s strategic goals; the program will edit this solicitation as time allows so that it more explicitly describes the specific Strategic Framework priorities.

FY 2012 Update: GEO has continued to document in the Review Analyses for awards which goals and objectives of the Strategic Framework are being addressed through the project. In FY 2012, the only program being competed through a solicitation was the Geoscience Education (GeoEd) program; all of the Review Analyses for awards made through this program documented the strategic goals being served.

In September 2012, NSF issued Dear Colleague Letter (DCL) NSF 12-121 notifying the community about some significant changes being considered to the GEO E&D portfolio and inviting community input on priorities related to the OEDG program. This DCL reflects changes being considered at NSF in all of its STEM education investments and uncertainties in the FY 2013 budget resources. The DCL announced that the GEO-Teach program was being eliminated in FY 2013 and that the FY 2013 OEDG competition, originally scheduled for Fall 2012, was being delayed. GEO anticipates issuing a revised OEDG solicitation by the end of calendar year 2012, for a competition in the spring of 2013. GEO also anticipates that changes will be made to the GeoEd program solicitation, after the Committee on STEM Education (Co-STEM) 5-year strategic plan for Federal STEM education programs has been released and the implementation details for the Expeditions in Education (E^2) initiative originally proposed in the President’s FY 2013 budget request for NSF have been better delineated. The GEO E&D Strategic Framework priorities remain unchanged, but the specific funding opportunities being used by GEO to support these priorities will be adjusted so as to be well-aligned with other funding opportunities being offered elsewhere in the Foundation.

*The committee also recommended that a thorough workforce study be conducted to properly inform activities to be undertaken in addressing the Strategic Framework’s second goal related to “Preparing the Geoscience Workforce”.*

GEO’s response: GEO notes that the American Geological Institute (AGI) released just such a compilation in its 2009 report “Status of the Geoscience Workforce: Report Summary” [<http://www.agiweb.org/workforce/reports/2009-StatusReportSummary.pdf>]. This extensive report provides a summary of major needs and trends within specific sectors that employ persons with geoscience training, as well as data on the educational pipeline. In the next year, GEO will evaluate whether the GEO E&D Strategic Framework needs to be further modified to better reflect the trends revealed in that report. It will also consider to what extent this report may not fully capture the full workforce needs across the broad spectrum of geoscience fields, given the highly interdisciplinary and evolving skill sets required in the marine and climate science sub-fields, in particular. The GEO E&D program lead (J. Karsten) is a member of the AGI Workforce Committee and is thus in a position to engage with private sector representatives and monitor developments regarding the geoscience workforce and make sure the GEO E&D programs are properly aligned with emerging trends.

FY 2012 Update: In conjunction with on-going efforts to assess the status of the geoscience workforce at the newly renamed American Geosciences Institute (AGI), GEO recently provided funding for an AGI project focused on terminal Masters degree programs in geoscience and geography. The project is surveying 50 department programs to determine the types of competencies being taught and seeing how well-aligned they are with respect to the workforce skills identified by AGI and AAG in recent studies. These efforts are helping to strengthen dialog between the non-academic employers and the universities who are training students.

b) Geoscience Teacher Training (GEO-Teach) (Section 3.2)

*The committee felt that the two current GEO-Teach projects had made valuable contributions toward improving geoscience teacher preparation at the regional/local level, but that they had not fully achieved the desired goal of having national impact. The committee felt that the goals of the GEO-Teach program, informed by the new Strategic Framework, needed significant clarification before release of another solicitation. Further, the committee made specific recommendations to: support smaller projects; incorporate the various Earth System Science literacy frameworks now available; encourage partnerships with national/regional professional societies, accrediting organizations, and/or state/regional policy makers; explore regionalization of teacher professional development; and explore the use of GLOBE approaches in some GEO-Teach projects.*

GEO’s response: GEO appreciates the insightful guidance offered by the committee regarding the need to better articulate the goals of the GEO-Teach program before issuing another solicitation and making sure that those goals are aligned with the GEO E&D Strategic Framework and the GEO Vision Report. GEO will consult with both the AC-GEO at its October 2010 meeting and the GEO Education Team, as it prepares to revise the GEO-Teach solicitation for FY 2011, and explore further the merits of the committee’s recommendations regarding a two-track approach, partnerships with professional organizations to help achieve national scale impact, regionalization/customization of professional development programs, and capitalizing on potential synergies with the GLOBE program.

FY 2012 Update: GEO did not offer a GEO-Teach competition this year, but used those resources to co-fund smaller projects submitted through the GeoEd program (or as co-funding to other proposals) that incorporated significant in-service teacher professional development or pre-service teacher training activities that leveraged GEO research or facilities. One example of these efforts is GEO co-funding of an ITEST grant entitled “GLOBE California Academy Program (CAP)”, which is focused on bringing GLOBE resources into the multi-year curriculum of the California green high school academies. The project is developing a model for providing professional development and support to teachers in the practice of science, curriculum integration, and academy development that has strong potential for national replication.

In light of changing interpretations of the No Child Left Behind Act that prompted creation of the GEO-Teach program initially -- as well as evolving STEM education priorities at NSF and budget realities for FY 2013 -- GEO recently decided to terminate the GEO-Teach program, effective October 1, 2012. It is expected that other initiatives under development within EHR and through cross-NSF efforts will be able to address the on-going need to scale up effective models for teacher preparation in the geosciences.

c) GLOBE (Section 3.3)

*The committee feels strongly that GEO should continue its support for the GLOBE program and, in particular, its support for projects that encourage students to collect and use data in ways that inform the community, to carry out an action project, to work with local scientists, and to contribute to high quality global databases. The committee offered a potential model approach that engages local scientists, science-based agencies, teachers, companies, and community colleges in a collaborative process to define locally-significant, place-based research projects of merit that can be addressed using GLOBE protocols and resources. The committee also recommends tracking of GLOBE students to estimate how many of them enter into science (and especially geoscience) fields at higher education and career levels, as well as their demographics.*

GEO’s response: GEO welcomes the focused comments regarding possible next steps in NSF’s participation in the GLOBE program. The proposed grassroots model for developing GLOBE student-researchers and recommendation to build stronger linkages to local communities, local employers, and community colleges are very useful suggestions. As described in the COV background presentations, NOAA has recently rejoined as a co-sponsor of the GLOBE program and OSTP has recommended creation of an Executive Management Board (EMB) to provide strategic oversight of the program. J. Karsten will be attending a site visit at the GLOBE Program Office (GPO) in Boulder the first week of September 2010, where discussions will focus on implementation of the EMB process, a detailed program evaluation that is just getting underway, progress on the new technology systems that will enhance the ability to conduct student research currently being developed, and what each of the funding agencies sees as their main contributions to the GLOBE program. There is a specific agenda item related to the next NSF GLOBE solicitation and lessons learned from the FY 2006 competition from the perspective of the GPO staff. In addition, GEO has recently been involved in discussions with EHR regarding an EHR-GEO collaboration on the next GLOBE competition that could lead to additional financial resources being available for GLOBE-related activities. EHR already receives many GLOBE-related proposals in its core programs on an ad-hoc basis and feels that co-sponsoring the next GLOBE solicitation would allow them to give the PI community more specific guidance regarding the types of GLOBE activities they would like to support. EHR seems particularly interested in proposals to test, evaluate, and scale-up the emerging GLOBE models for student research and models for professional development of GLOBE (and other K-12) educators who oversee the student research projects. A revised GLOBE solicitation will also seek to engage scientists involved with some of the GEO and NSF research priority areas in global climate change and sustainability being supported through the new Science, Engineering, and Education for Sustainability (SEES) portfolio. GEO expects that a draft GLOBE solicitation that reflects inputs from the COV, GPO, and EHR will be available for discussion at the October 2010 AC-GEO meeting, with release in very early 2011. The committee’s recommendation to better track the demographics and fate of students participating in GLOBE is an important goal, but is more of a responsibility of NASA (and now NOAA). It is likely that much of this information will be collected as part of the GLOBE program-wide evaluation activity currently under development.

FY 2012 Update: The past year has been traumatic for the GLOBE Program, but at the time of this update, momentum appears to be in a very positive direction. Tragically, the GLOBE Executive Director hired in June 2011, Dr. Andy Tasker, became ill in early Fall 2011 and passed away a few months later. Although the tenure of his leadership was very short, Dr. Tasker was able to re-invigorate the GLOBE community and GLOBE Program Office (GPO) staff with his vision for the future. A new strategic plan developed through Dr. Tasker’s efforts is serving as a blueprint for subsequent activities. Many of the significant changes to GPO operations that were initiated in FY 2011 have been implemented. A completely overhauled GLOBE web site and data management system was officially launched in July 2012, in conjunction with the annual GLOBE conference held in Minneapolis (July 15-20, 2012); additional visualization capabilities should be in place later this fall. Refreshing the 15-year old IT systems for GLOBE has substantially improved functionality for handling student data; the newly incorporated social networking tools are enabling greater communication and collaboration among the 112 countries participating in GLOBE.

During the past year, in parallel with the technology refresh efforts supported by NASA, GEO has sponsored independent working group reviews of the scientific underpinnings of the GLOBE protocols, the content of the GLOBE Teachers Guide, and the overall governance structure for the entire program. These working groups have concluded that the science protocols of the program are still valid, but identified some upgrades that could be made to the instrumentation and Teacher’s Guide. A proposed governance model that significantly increases the role of the GLOBE community in making strategic level decisions was released during the annual conference and is in the process of being reviewed by the larger community. The current NASA Cooperative Agreement with UCAR to support the GPO ends in February 2014, and NASA will be holding a competition for a new support office in the next six months; the solicitation for that competition is being informed by the GEO-led efforts to review the science and the governance aspects of the program.

For the first time, the 2012 GLOBE annual conference was organized and convened by a GLOBE Partner, instead of the GPO; GEO contributed funding to support some of the expenses associated with this conference. Post-meeting surveys and discussions with NASA and NOAA attendees confirmed that this conference was extremely successful; NASA has agreed that they would like to continue this model for third-party hosting of the conference.

GEO recently held a mini-retreat with NASA and NOAA to discuss priorities for NSF’s FY 2013 funding. A new solicitation to support GLOBE Science Fellows, that would support the engagement of early career geoscientists in GLOBE operations and have them support teachers and students using GLOBE protocols, is under consideration. The NSF-NASA MOU related to GLOBE has been extended by mutual agreement until October 31, 2013.

d) EAR E&HR (Template Section A.4.2)

*In response to GEO’s request, the committee suggested possible options for re-deployment of the funds in this program that previously supported ad-hoc projects. The committee recommended that consideration be given to funding access to EAR research by high school interns, K-12 teachers and students, informal science education institutions, and free choice learners from the general public.*

GEO’s response: GEO agrees with the committee that any future solicitation(s) should focus on reaching audiences that are not currently being served by existing programs. Elementary and secondary school students and teachers and the general public are not primary target audiences in the EAR E&HR programs, and they are only supported by supplements or co-funding opportunities with awards made by the research programs. Solicitations from the EHR Directorate do target these groups; thus, any new solicitation in EAR should be mindful of not overlapping with existing ones. In addition, it is important to consider whether new solicitations should be only within the purview of EAR or should encourage a more systematic approach and include other Divisions within GEO. The GEO Education Team, which includes program staff from both GEO and EHR, will continue to evaluate how best to serve this audience and the proper role for EAR E&HR funding within that equation.

FY 2012 Update: The EAR E&HR program continues to be committed to the engagement of a wide range of audiences in Earth sciences. EAR continues to support the three on-going activities mentioned in the previous updates: (1) encouraging the PI community to engage teachers in their research projects through a Dear Colleague Letter; (2) encouraging REU sites managed by the EAR E&HR program to include in-service teachers in the research experience; and, (3) funding EAR Postdoctoral Fellowships that engage high school students in the Fellows’ research and include participation in teacher professional development activities led by their host institutions. This year’s EAR E&HR program continues to facilitate participation of K-12 teachers and students in research through supplements to EAR awards. In addition, EAR E&HR supported a summit of Education and Outreach managers of facilities and large projects supported by the EAR Division (Tempe, AZ; February 20-21, 2012). At this meeting, the education managers shared information about activities their organizations lead for K-12 and the general public.

**GEO Directorate Issues (Section 4.0)**

*The committee recommends that GEO continue its efforts to attract proposals from across the geosciences community and enhance participation of underrepresented groups and Minority-Serving Institutions (MSIs) in the GEO E&D programs, as well as expand its efforts to encourage proposal submissions (and success rates) from community colleges.*

GEO’s response: As noted above, GEO is already taking steps to help identify some of the unique needs and barriers that exist within the community colleges, raise awareness of funding opportunities within minority-serving institutions, and identify strategies for encouraging more proposal submissions and greater success rates by PIs from these types of institutions.

Subsequent to the COV meeting, GEO was a co-sponsor of the 2010 Joint Annual Meeting of Principal Investigators (JAM PI), supported by programs within EHR’s Division of Human Resources Development (HRD). Many of these PIs are minority STEM faculty or faculty from MSIs. GEO sponsored one of the lunchtime keynote presentations (heard by >1000 attendees), hosted an exhibit booth about GEO’s funding programs (overseen by J. Karsten and L. Patino), and participated in a panel discussion about funding opportunities at NSF. This type of outreach to minority and minority-serving scientists will continue through GEO E&D program staff attendance at the annual Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) and National Association of Black Geologists and Geophysicists (NABGG) annual meetings and upcoming dedicated symposia related to broadening participation in the geosciences. Among these special outreach events this year are an “AfricaArray Forum on Diversity in the Geosciences” (September 29, 2010; Houston, TX), a planning meeting being organized by WGBH at the National Museum of the American Indian (NMAI) (September 16, 2010; Washington, DC), and a special 1-day faculty symposium on inclusion at Penn State University (Invited presentation by J. Karsten, November 10, 2010).

FY 2012 Update: As noted previously, one of the most important activities of the past year was the convening of a Principal Investigators meeting for all GEO-funded REU programs in conjunction with the annual SACNAS meeting. GEO continues to promote the geosciences through outreach at the Joint Annual Meeting of Principal Investigators (JAM PI) for the EHR Human Resources Development programs. J. Karsten participated in a panel discussion on funding opportunities in GEO during this meeting. In the past year (2011-2012), several GEO staff have engaged in outreach about GEO programs at exhibit booths during annual meetings of GSA, AGU, and SACNAS. The 2012 annual meeting of the National Association of Black Geologists and Geophysicists (NABGG) – renamed to the National Association of Black Geoscientists (NABG) – was held in the Washington, DC area, which allowed several program staff from GEO to attend. All three Division Directors for GEO attended the meeting, and a keynote presentation was given by Dr. Michael Morgan (DD for AGS). GEO also worked with the EHR Human Resources Development (HRD) Division program to convene a special webinar for prospective PIs regarding the Alliances for Graduate Education to the Professoriate (AGEP) funding opportunity.

*The committee also recommended creation of a single document that looks across all of the education and diversity elements being made by GEO (both within and outside the GEO E&D portfolio) and identifies what expenditures are being made toward specific goals.*

GEO’s response: Some of this information (e.g., GEO’s IGERT funding) was provided in the background materials for the COV, but GEO agrees that having all of this information compiled in one place would be helpful when making future funding decisions and revising solicitations. The committee has already acknowledged the difficulty of trying to document the budgetary obligations associated with education and diversity activities being supported as broader impacts activities of the GEO-funded research projects. An effort will be made to document some of the major educational investments being made through the larger GEO Science and Technology Centers and facilities that have dedicated education staff and programs. The GEO Education Team will compile this information for the AC-GEO in the coming year.

FY 2012 Update: GEO continues to compile information about how investments within the GEO education and diversity portfolio are being invested in each goal and objective area of the GEO Education and Diversity Strategic Framework.

*The committee raised concerns about whether the partitioning of some GEO education and diversity activities (most notably, the OCE education program, which is not included in the GEO E&D COV review) might lead to less cohesive efforts across the Directorate. The committee asked GEO to consider the rationale for how these activities are placed within the various Divisions and inform future COV’s about this rationale, should the status quo remain.*

GEO’s response: The GEO Education Team will work with the GEO Management Team in responding to this recommendation.

FY 2012 Update: Although the OCE education programs continue to be reviewed separately, there is a strong working relationship between the program officers managing the GEO Education and Diversity programs and the OCE education program. Examples of this collaboration are evident through the participation of OCE REU program PIs in the PI meeting at SACNAS and a joint presentation by J. Karsten and E. Rom on funding opportunities related to broadening participation during a recent workshop on diversity convened by the Centers for Ocean Science Education Excellence (COSEE) program.

*The committee noted the growing importance of professional master’s degree programs as a valuable credential in the applied sciences and recommended that GEO consider whether it should support some targeted professional master’s degree programs that fit within the strategic directions outlined for GEO.*

GEO’s response: GEO notes that a new NSF-wide Science Master’s Program (SMP) was offered in FY 2009 (mandated as part of the American Recovery and Reinvestment Act funding) and managed by EHR. J. Karsten was GEO’s representative on the NSF-wide working group that managed the SMP competition. There is a great deal of interest at NSF in continuing this program in FY 2011 should funds be available when the final FY 2011 budget is appropriated. Should the NSF-wide effort be continued, GEO feels it would be most practical to use the SMP program as the funding vehicle for addressing the COV’s recommendation. The GEO Education Team will continue to explore this issue and whether there is a need for GEO to establish a separate funding mechanism going forward.

FY 2012 Update: As was noted previously, AGI was funded by GEO to study terminal Masters degree programs in geology and geophysics and evaluate how well they address workforce needs. The results of this study will inform future discussions regarding the value of or need for Professional Masters degree programs.

*The committee recommended that GEO consider undertaking a longitudinal study of the long-term effectiveness of its full portfolio of E&D programs, particularly those focused on broadening participation.*

GEO’s response: As part of its contract for OEDG program evaluation, the American Institutes for Research undertook a study exploring the feasibility of carrying out a longitudinal survey of OEDG impacts. There are many requirements related to systematic data collection that must be met for a meaningful longitudinal assessment; without this consistency, significant bias can enter the analysis. The AIR feasibility study (issued June 29, 2009) found that few of the OEDG projects had the necessary baseline data on which to build a meaningful longitudinal study for the OEDG program, and the situation was most problematic for those working at the K-16 grade level populations (which is the bulk of the OEDG projects) because of the lag times involved. The report suggested that a purposive follow-up to collect case studies for OEDG projects working with undergraduate and graduate students might yield valuable insights into effective strategies, but could not provide information on overall impacts of OEDG investments. The GEO Education Team will continue to work with AIR to determine whether following up with such case studies provides insights that cannot be obtained through other means and whether there is potential for a broader portfolio evaluation.

FY 2012 Update: In anticipation of the next COV review of the GEO E&D portfolio, GEO has provided a small grant to Dr. Joan Ruskus, American Institutes for Research, to undertake a longitudinal outcomes review for a sub-set of the OEDG projects. A report on the long-term impacts will be included in the next COV, being held in early 2013.

# Section 2: Program-Specific Comments

This section identifies specific issues that were commented on within the COV Template itself and GEO’s responses to them.

*Inconsistencies in addressing broader impacts in individual reviews and panel summaries; short review comments in individual reviews that lack substance.*

GEO’s response: GEO will continue to educate its reviewer community about the importance of addressing both NSF review criteria explicitly and separately, and to provide constructive feedback to PIs. The program will implement more consistent use of Panel Summary templates that have separate review criteria headings.

FY 2012 Update: The program continues to give explicit guidance to reviewers and panelists about the importance of addressing the two merit review criteria separately, and with substantial and constructive comments. As a matter of routine, comments regarding the two criteria are separately documented in Program Officer Comments (provided to PIs) and Review Analyses for proposals submitted to the Front Office programs.

*Lack of information about reviewer backgrounds; confusion about when panelists are also reviewers.*

GEO’s response: Getting information about reviewer backgrounds other than institution and geography continues to be problematic, given that the information is self-reported and often not provided by the reviewers. For future COVs, the program will take steps to clarify which reviews were contributed by panelists and which were contributed by ad-hoc reviewers. Given present workloads, it would be very difficult for GEO program staff to prepare a short biographical sketch of the reviewers to append to the review, as suggested by the committee, but GEO will examine what other strategies might be useful for providing such information to the committee in the future.

FY 2012 Update: There is no progress to report in this area, but the program intends to be more specific about reviewer background in materials provided to the next COV in early 2013.

*Potential negative bias in having proposals that have been submitted by community college PIs reviewed by 4-year/university college faculty.*

GEO’s response: As a policy, the GEO E&D program has always made sure that proposals submitted by community colleges are reviewed by a panelist from an equivalent institution, so that this perspective is brought to the discussion, so we think this is not a major concern. But, GEO will consider whether additional strategies might be needed to prevent bias in the review process and to level the playing field for community college-based proposals. GEO will also consider steps for helping community college faculty be more effective in their NSF proposals, as discussed elsewhere in this response.

FY 2012 Update: As noted above, GEO continues to support efforts to identify and address the needs of community college faculty, with the goal of improving their ability to support research activities on their campuses. These efforts are helping GEO identify prospective reviewers and panelists who can bring this unique perspective to the merit review process.

*It is difficult to determine the specific impacts or range of impacts resulting from projects funded by the GeoEd program.*

GEO’s response: GEO notes that previous GeoEd solicitations were very broadly written, leading to a very diverse portfolio of funded projects and making it very hard to conduct any type of portfolio analysis of impacts. In the most recent version of the GeoEd solicitation (NSF 10-512), the goals of the solicitation have been narrowed into four topic areas, and there is greater clarification of when proposal topics should be submitted to EHR and not GEO. The GEO Education Team will examine whether it is possible to aggregate information regarding impacts for each of these four program emphasis areas in the future.

FY 2012 Update: The diversity of the GeoEd portfolio makes it very difficult to evaluate impacts at the program-wide level. GEO is exploring other measures, such as documenting how many of the Track 1 proof-of-concept projects lead to additional funding and/or publications in peer-reviewed journals.

*The committee recommended that GEO may want to more specifically address the use of research to inform educative aspects or researching the effectiveness of particular educational activities in projects supported by the GeoEd program.*

GEO’s response: The revised GeoEd solicitation (NSF 10-512) is much more explicit about the requirement for evaluation and assessment activities for all GeoEd projects. Reviews and panel comments from the FY 2010 competition indicate that the most successful proposals did incorporate significant scholarly foundations from education research in the Project Description, as requested in the revised solicitation. Although GEO feels that the FY 2010 GeoEd projects selected for awards have a much stronger foundation in these areas, it will continue to monitor the situation and see if additional steps are needed to address the committee’s concerns.

FY 2012 Update: GEO continues to be satisfied that the proposals being selected for funding have strong foundations in the research on learning in STEM disciplines, as well as effective evaluation or assessment activities. It is likely that integration of research and education will be strengthened even further, as a result of the Expeditions in Education (E^2) initiative proposed for the FY 2013 budget. How the E^2 initiative will be implemented is still being discussed (and NSF is operating under a Continuing Resolution for the first 6 months of FY 2013, so the timing of such activities may be postponed). It is anticipated that the E^2 efforts will eventually subsume many of the activities that have been previously supported through the GeoEd program.

*The committee was concerned about the small Track 1 GeoEd funding levels and whether they were adequate. They also felt there was a need for better monitoring of whether the Track 1 pilot projects succeed in getting additional funding through GeoEd Track 2 or other NSF programs, in order to gauge overall impact of these small awards.*

GEO’s response: GEO did not change the award size for Track 1 or Track 2 projects in the revised NSF 10-512 solicitation, due to very limited resources available for this program ($1.5 M per year for Track 1 and Track 2 combined). Philosophically, GEO feels that incubating many small projects that may be able to demonstrate enough potential to garner additional funding elsewhere is a valuable strategy rather than investing in a few, larger projects. Other programs are available within EHR to support mid-sized and larger efforts. GEO agrees that it should do a better job in tracking how many of these Track 1 projects are able to garner additional funding, and will try to establish more effective strategies for doing so in the future.

FY 2012 Update: There is no progress to report at this time, but GEO anticipates being able to provide more information about the outcomes of Track 1 projects at the next COV.

*The committee suggested that high-risk, potentially high-return projects might benefit from having more post-award monitoring, depending on the availability of program officer time.*

GEO’s response: GEO will consider this issue further in the next year, but there are significant staff workload issues that will likely prevent this.

FY 2012 Update: There is no specific progress to report in this area.

*The committee recommends that GEO conduct training sessions (or equivalent) to help specific underrepresented institution types (MSIs, community colleges) be more successful in pursuing NSF/GEO funding.*

GEO’s response: GEO agrees that it needs to do a better job in deploying web-based resources as a tool for educating prospective PIs about how to prepare a competitive proposal to the GEO E&D programs and will work toward having such resources available by the October 2011 AC-GEO meeting and GeoEd deadline.

FY 2012 Update: This is still a priority for GEO, and workshops offered through GSA and AGU have addressed some of this concern.

*The committee felt there were missed opportunities for encouraging greater industry involvement and private sector commitments that could help with sustainability of NSF-initiated geoscience education and diversity projects.*

GEO’s response: GEO will continue to engage with industry representatives through its networks to seek stronger partnerships in this area and work on developing collaborative activities that may formalize their participation in GEO E&D-funded activities.

FY 2012 Update: GEO can document specific projects that were initiated through NSF funding that have been successful in obtaining private sector funding, as a mechanism for sustaining effective programs. GEO is considering a new program for high school and community college students (for FY 2014) that will include opportunities for student research internships at host institutions that include universities, government laboratories and private industry facilities.

*The committee feels that, with the expanding workload, the GEO E&D program does not have sufficient staff resources and recommends addition of at least one more program officer to the team.*

GEO’s response: GEO recognizes the importance of ensuring high quality and timeliness in the merit review process as well as the accomplishments of the current staff. We will continue to evaluate the staffing needs for the portfolio and the distribution of available resources.

FY 2012 Update: There is no progress to report in this area. In light of current budget constraints, it is unlikely that additional staff can be hired in GEO to address this on-going need.

*2012 COV Response Update – September 24, 2012*