NSF Committee Of Visitors Report
Surface Earth Processes Section
Division Of Earth Sciences
June 2-4, 2014

RESPONSE TO THE 2011-2013 REPORT
July 31, 2014

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The 2011-2013 Committee of Visitors (COV) met at the National Science Foundation (NSF) from June 2-4, 2014 to review five programs in the Division of Earth Science's (EAR) Surface Earth Processes Section (SEP). These programs are: *Geobiology and Low Temperature Geochemistry* (GG), *Geomorphology and Land-Use Dynamics* (GLD), *Hydrological Sciences* (HS), *Sedimentary Geology and Paleobiology* (SGP), and *Critical Zone Observatories* (CZO).

INTRODUCTION

The SEP Section would like to thank Dr. Hyndman and the members of the 2011-2013 COV committee for their time and effort in assessing the quality and integrity of program operations and program-level technical and managerial matters pertaining to proposal decisions in the Section. We are appreciative of the COV's comment that "SEP POs are well qualified and dedicated individuals who are doing an excellent job of managing portfolios in challenging times". Some of their recommendations are already being implemented to improve performance of the Section.

As noted in the 2011-2013 COV report, the SEP Section supports rapidly emerging communities in basic research areas with high societal relevance. This growth is clearly demonstrated by increased numbers of geoscience publications in SEP-relevant disciplines as well as increases in dissertation topics supported by the Section, as quantified in the American Geosciences Institute's (AGI) *Status of the Geoscience Workforce 2014* report. Since the reorganization of EAR into Surface Earth and Deep Earth Process Sections, partly in response to future science directions identified in the National Research Council's (NRC) Basic Research Opportunities in Earth Sciences (BROES) report of 2001, SEP Program Officers have advanced their programs to meet the evolving needs of the surface

Earth processes research community. However, the confluence of impacts from sequestration, increasing proposal submissions, and flat or declining budgets has greatly affected SEP programs over the period of this COV. They have created, in the words of the review panel, a "perfect storm" of impacts. These impacts left the committee concerned about the "relationships among available program funding, proposal demand, success rates and award amounts". This theme dominated discussions during the 2.5 days of the COV as demonstrated by their final report.

Despite these challenges, the committee noted, "SEP is doing an outstanding and commendable job of maintaining cogent, focused, and high impact science programs". Discussions during the COV and the contents of the report provide the Section with excellent input to develop and implement actions essential to ensuring continued viability of the research communities supported in SEP.

RECOMMENDATIONS

1. **Recommendation:** Continue to use the existing assessment methods to evaluate proposals including ad hoc and panelist reviews.

   Response: Programs in SEP will continue using a two-tier review system when assessing proposals.

2. **Recommendation:** Ad hoc reviewing would be far easier to manage if reviewers could quickly accept or decline reviews and recommend other reviewers through an improved interface.

   Response: The SEP Section agrees that an improved interface where reviewers could accept or decline the opportunity to review would reduce the burden on reviewers and on Program Officers in tracking responses to review requests. The Foundation is currently experimenting with alternative approaches that may provide this capability for panel review, but this functionality is not ready for implementation with ad hoc reviewers.

3. **Recommendation:** Clarify expectations for the appropriate balance between Intellectual Merit (IM) and Broader Impacts (BI) in solicitations and communicate those expectations explicitly to ad hoc reviewers and panelists. A consistent panel summary template (with additions as necessary for specialized proposal calls) would likely be an important and useful step.

   Response: The Section agrees that the relative weighting between the two merit

review criteria are not consistent across or, in some cases, within programs. The lack of a quantitative weighting is necessary to retain the decision-making flexibility granted to Program Officers to develop portfolio balance. Although there is no section-wide panel summary template, all programs have adopted a program-specific template.

4. **Recommendation:** Consider options to decrease proposal load and increase proposal success rates, which would lower NSF staff and PI workloads. Reducing workloads and increasing proposal success rates may require structural changes, potentially including: reducing the number of submission opportunities, going to calls with no specified deadlines, adoption of pre- proposals, and/or working to change current incentive structures at universities such as expectations for the number of proposal submissions per year. Reduced NSF staff workload would allow more constructive feedback to be given to early career faculty and those whose proposals are declined.

Response: The SEP Section agrees that its current situation requires an assessment of alternative models for proposal submission that could reduce workloads and increase success rates. The SEP Section has discussed this issue and is developing guidelines that should lead to fewer proposal submissions, and therefore increased success rates. We agree that providing constructive feedback to early career researchers is particularly important and we will continue to provide such guidance. Reduced proposal loads should improve our ability to do so.

5. **Recommendation:** Explore new data management platforms. Program analysis, both external and internal, would greatly benefit from the rapid availability of data in formats that can be readily mined to examine trends and areas of need.

Response: The Section shares the frustration of the COV Panel over the difficulty in acquiring essential merit review related data from NSF systems. This situation should improve by the time of the next COV as there are numerous upgrades being planned for NSF data systems over the next three years.

6. **Recommendation:** Strongly support the core programs of the SEP, while also supporting Critical Zone Observatories (CZOs) and other initiatives. At a minimum, it is essential to maintain staff at current levels and to allow staff to travel to interface with the community. Ideally the available grant funding in the SEP section should be significantly enhanced given the societal relevance of the research portfolio.

Response: The Section's priority is ensuring its core programs are healthy. As such, the Section is reacting proactively to develop strategies to reduce declining success

rates as described above. We are confident that staffing will remain at its current level.

7. **Recommendation:** Perhaps in concert with such program changes, NSF POs could directly communicate with universities about the impact to programs of linking hiring and promotion decisions to proposal submissions, and how the current system and its very low success rates hurts new investigators. NSF could potentially leverage its reputation and stature to help reduce the flux of less competitive proposals. NSF should consider expanding its proposal training outreach efforts (perhaps using cyber seminars plus presentations at national meetings), and incorporating information on how to write high quality proposals into graduate curricula. We note that these efforts will require substantial PO time and ability to travel.

Response: Communication with research institutions regarding the negative impacts of linking hiring and promotion decisions to proposal submissions is not within NSF's purview. We agree that it would be beneficial to expand our outreach efforts in regard to proposal writing. We will work with the new EAR Division Director to develop a Division-wide working group to enhance our engagement strategies with the community.

8. **Recommendation:** NSF/SEP should improve its ability to demonstrate outcomes and outputs from funded proposals. Developing a reporting system that allows reporting of papers and other products well after the end of a grant period would be a huge improvement. All programs should be able to show how funded research led to high impact papers and other high profile outlets, and broader societal impacts after the final report is submitted. This could be done without significantly increasing reporting workload. Along these lines, SEP should work with both the geoscience community and media and journalists to ensure that full credit is given to NSF for exciting and high impact research efforts. The public and policy makers need to better understand the immense value added of NSF-funded research; this is likely the only long-term antidote to declining budget trends.

Response: The issue of properly crediting NSF support is not unique to the SEP section and, to the degree that we are able, we are diligent about working with awardees to ensure that credit for support is provided. We are in agreement that the SEP Section and awardees should do more to highlight research outcomes from SEP supported proposals and we will continue to work with our media group in the Office of Legislative and Public Affairs to publicize research outcomes that PIs make us aware of.

9. **Recommendation:** In some cases, where ad hoc reviews consistently indicate the

proposal is non-competitive and the panel concurs, no additional comments were provided to the PI. This was seen as necessary and efficient and a reasonable means to deal with the expanding workload. However, in cases with an early career PI, it would be beneficial for the PO to contact the PI directly when possible to suggest strategies for improving future submissions.

Response: The Section agrees that this feedback is critical and it is current SEP practice to provide written feedback to PIs regarding proposal decisions, even in cases where ad hoc reviews clearly indicate that a proposal is non-competitive. The Section Head will ensure that all decisions are in compliance with this practice.

10. **Recommendation:** In co-reviewed proposals, an additional statement would be helpful to discuss how the different panel reviews were integrated into the final decision.

Response: We agree that this could provide useful information to investigators and would help them better understand the process by which a decision was made on their proposal. We will implement this suggestion in future review analyses.

11. **Recommendation:** The importance of providing constructive criticism that could improve future proposals or the PIs' research should be stressed to ad hoc reviewers and panelists. Perhaps additional language should be added to the panel review template to indicate whether the identified shortcomings can be readily addressed.

Response: We are not convinced that panels should be asked to articulate whether shortcomings in the proposal could be readily addressed. Although they are subject matter experts, on a specific proposal they may not have the in-depth knowledge or understanding of the proposed work to provide such an assessment with sufficient accuracy.

12. **Recommendation:** Most of programs in SEP are doing an excellent job of processing their proposals near the 6- month target window (See Table 1). The GG program has an average dwell time per proposal ranging from 9 to over 11 months. A significant reduction occurred between 2012 and 2013, but additional progress should be made to get this program into closer agreement with the other programs in the section.

Response: As noted by the committee, efforts must continue to focus on this performance goal as only one program in the section is meeting or exceeding current NSF guidelines. Elimination of the need for SEP staff to act in the Section Head role, as was the case for much of the review period, should help in this regard.

13. **Recommendation:** We recommend that budget justifications specifically address program/NSF expectations such as BI activities so that the program and future COVs can better evaluate whether budgets are sufficient as expectations increase.

Response: Although investigators are required to develop budgets and budget justifications that accurately describe the support needed for the work proposed, we acknowledge that there is a real or perceived sense that support requested for data management and broader impacts is often reduced during award negotiations and, therefore, they are often not thoroughly discussed. As we endeavor to increase success rates, we will be attentive to this issue. There remains work to do in the community as a whole to recognize the true cost of broader impact activities in proposals.

14. **Recommendation:** As pointed out in response to the 2008-2010 COV report, "diversity is a consistent programmatic consideration in PO decision awards." The review of proposals indicates that there remains room for improvement. The three pronged approach defined in the response to the 2008-2010 COV report is well defined and we encourage continued pursuit of these goals, with more emphasis given to outreach efforts targeted at inclusion of academic institutions that serve large populations of underrepresented minority groups. PO participation in meetings focused on science in underrepresented groups such as NABGG and SACNAS should be encouraged.

Response: We are continuing to pursue the three-pronged approach discussed in the 2008-2010 COV report. This approach includes engaging with groups internal to NSF that can assist us in our goal of broadening participation, continued emphasis on seeking reviewers and panelists that provide the disciplinary expertise needed for proposal evaluation, and continued outreach to the scientific community to engage investigators from underrepresented groups. We will also encourage PO participation at meetings that are focused on science in underrepresented groups.

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