

# Response to Recommendations from the Committee of Visitors (COV) for the Division of Environmental Biology (DEB)

June 17-19, 2015

The Division of Environmental Biology (DEB) expresses its sincere appreciation to the members of the Committee of Visitors (COV) for their comprehensive evaluation of DEB operations, and for the clear and thorough report containing constructive recommendations. It was evident that all the members of the COV were engaged and deeply interested in the welfare the programs in the division and the science communities that are served by these programmatic activities. We especially thank the COV for providing a thoughtful consideration of the first two years of the preliminary proposal process and welcome their recommendations for how the review process can be improved.

In general, the Report of the Committee of Visitors is favorable with respect to the operations and management of the various programs and activities of DEB, although a number of important recommendations were given to improve upon the review process of the preliminary proposals.

We are particularly appreciative of the COV's comments on the dedication, creativity, and collaborative work ethic of DEB staff, on the importance of DEB's balanced portfolio that connects DEB to the rest of BIO and NSF, and on the challenges to recruit staff and manage this portfolio of programs on the leading edge of discovery. We will strive to realize emerging opportunities through continued collaborative efforts across all levels of BIO and in concert with the rest of NSF.

## COV Recommendations with BIO Responses

### **Recommendations Concerning Section I: Questions about the quality and effectiveness of the program's use of merit review process.**

#### ***Recommendation 1.***

Ensure that panel summaries are informative and a fair representation of the panel discussion. This is especially important in the pre-proposal stage where PIs receive only panel reviews.

**BIO Response:** We agree with the COV's concern; the crafting of pre-proposal panel summaries is a crucial aspect of the review process, and is where DEB has been focusing efforts to improve the feedback provided to PIs. We note that half of the pre-proposal panel summaries examined by this COV came from the first year of the new pre-proposal process. In that first year, DEB received >20% more pre-proposals than had been anticipated. In order to manage this increase within the constraints of already scheduled panels, review assignments to panelists were larger than optimal and panel time for drafting and reviewing panel summaries was less than desired.

In some cases where review scores were uniformly low, simplified panel summaries were used. In subsequent years, DEB increased the number of panels, decreased average number of proposal assignments per panelist, and insisted that full panel summaries be written for all pre-proposals. Still, we agree with the COV that there is room for more improvement; below under recommendations #2 and #3 we describe new practices that DEB will standardize for all panels.

### ***Recommendation 2.***

Emphasize instructions to panelists and monitor panel summaries in real time as they are being prepared to ensure that they provide documentation for their recommendation, especially in cases of disparate reviews.

**BIO Response:** DEB provides panelists with comprehensive guidance, tailored for review of pre-proposals or full proposals. This guidance is sent by email to each panelist in the form of a pdf that accompanies their proposal assignments. In addition, DEB standard practice is to devote the first hour of panels to instructions on panel conduct, including details on writing of panel summaries. For pre-proposal panels, which are panel only review, we emphasize how pre-proposals differ from full proposals, and stress that panel summaries must clearly justify the panel consensus recommendation. Despite these efforts, not all panelists read or follow our guidance carefully, and we agree with the COV that there is a need for providing “real time” feedback and additional monitoring.

DEB will implement a new, best practice for conduct of panels to place even greater emphasis on achieving complete and thoughtful panel summaries that accurately reflect the panel discussion and justify the panel recommendation. Early on the first day of a panel, but after sufficient proposal discussions have occurred such that all panelists have one panel summary to draft as scribe, panel discussions will be paused to allow time for writing and review of panel summaries. All program officers will participate in reading and providing feedback to panelists on the quality of their panel summary. This will ensure that all panelists start off with a common understanding of what constitutes an acceptable panel summary.

DEB will also establish, as a best practice, scheduled time for writing breaks within the daily agenda of all panels, and will enhance the monitoring of panel summaries written throughout the panel. Rather than relying on a single staff member (typically a program analyst) to review all panel summaries, program officers will also be charged with reviewing all panel summaries for those proposals they are individually managing.

### ***Recommendation 3.***

Consider providing panelists with a panel summary checklist or rubric that re-emphasizes the criteria provided to panelists in advance, including Intellectual merit, Broader impacts, and Results from Prior Research Support.

**BIO Response:** DEB already provides panelists with a template to use in writing panel summaries and all panel summaries include separate sections for Intellectual Strengths, Intellectual Weaknesses, Broader Impact Strengths, Broader Impact Weaknesses, Synthesis and Recommendation. In addition, full proposal panel summaries include sections on Results from Prior Support, Postdoctoral Mentoring Plan, Data Management Plan, and Special Review Criteria (for proposals that fall under special solicitations such as CAREER, OPUS, RUI, RCN, etc.). Guidance is provided under each section of the panel summary template to make clear that the panel should provide synthetic, evaluative statements and not just restate the proposal or independent reviews.

All panel summaries are reviewed by NSF staff to ensure each section has been completed.

DEB will expand the guidance provided in the panel summary template and make it available in hardcopy so that panelists can refer to it when writing panel summaries. In addition, DEB will produce a checklist for use by NSF staff in reviewing panel summaries; this will be added to the training materials for new program officers.

The COV noted heterogeneity among individual reviews in the evaluation of Results from Prior Research and Broader Impacts, compared to that of Intellectual Merit. This reflects NSF policy to let individual reviewers decide for themselves how much weight to apply to each review criterion. Similarly, panelists and their panel summaries vary with respect to the depth of evaluation given to different review criteria. Through the activities noted above and in Recommendation #2 we hope to reduce this heterogeneity and improve the overall balance of attention paid to the different review criteria. However, this does not mean heterogeneity will be eliminated since panelists are allowed to choose their own weighting of review criteria in arriving at a summary recommendation.

**The following recommendations (numbered 4 through 8) pertain to the pre-proposal process.**

***Recommendation 4.***

The COV recommends that DEB consider entirely different models for the first phase of a two-phase annual proposal process. Currently, the pre-proposal is perhaps both too similar to and too different from the full 15-page format. The COV recommends research into alternate formats (e.g., two page summaries focusing on big ideas and research approach; or formats used by other agencies and foundations).

**BIO Response:** BIO's decision to use 4 pages as the length of project descriptions in pre-proposals was based on extensive experience with 1) pre-proposals in special competitions such as FIBR and PIRE, 2) pilots that used smaller, 2-page "big-pitch" pre-proposals, and 3) extensive feedback from panelists. Panelists and program officers alike felt that shorter formats provided insufficient information to do anything other than comment on the ideas/questions being addressed. A shorter format was considered inadequate if panels were charged with providing substantive feedback in their panel summaries (as in COV Recommendations #1-3 above) and for program officers needing to make decisions on which to invite. Our surveys of panelists concluded that the 4 page length was optimal ([DEBrief post](#)). While some private foundations may use a shorter format they also provide very limited feed back to the proposers, are not required by policy to address both intellectual and broader impact merits, and often are judging merit with respect to fit to a particular area of research.

***Recommendation 5.***

To facilitate continuity into full proposal evaluation, DEB might ask panelists to self identify if they are willing to serve on both the pre- and full-proposal panels.

**BIO Response:** DEB provides a uniform level of continuity through the review process by providing the pre-proposal panel summary to the full proposal panel. In this way, the full proposal panelists are made aware of any concerns or strengths noted at the first stage of the review process. In our invite letter, we also instruct PIs to include information in their full

proposal on how they have addressed concerns raised by the pre-proposal panel. Other options to provide continuity of review are few, especially in light of a priority to ensure fairness – treating all proposals in the same way.

The COV recommendation to have the same panelists serve on both pre-proposals and full proposal panels is not feasible. First, we routinely ask this of our panelists but only a very small fraction agree to do so. Second, because many of the pre-proposal panelists may also submit a full proposal to the same program, they are prohibited from serving on the full proposal panels. Finally, we generally only need about 1/3<sup>rd</sup> as many panelists for the full proposal panels as needed for the pre-proposal panels. Hence, even if all could serve on the full proposal panel, it would be logistically challenging to ensure that every full proposal had at least one returning panelist who had reviewed the pre-proposal.

***Recommendation 6.***

We encourage DEB to continue to educate pre-proposal panel members about the very different nature of pre-proposals and full proposals, and to provide a list of “best practices” in reviewing, such as via the DEBrief blog.

**BIO Response:** DEB will continue efforts to inform reviewers and proposers about the different nature and different review guidance used in review of pre-proposal and proposals. Outlets for such information will include DEBrief blog, webinars for panels, and outreach at meetings of major scientific societies relevant to the science that DEB supports.

***Recommendation 7.***

We encourage DEB to increase expectations of the level of detail in the pre-proposal panel summary.

**BIO Response:** See responses to Recommendations #2 and #3, which describe steps DEB will take to improve the quality of pre-proposal panel summaries.

***Recommendation 8.***

We encourage the externally commissioned analysis of the pre-proposal process, including examining the success rates of and career impacts to beginning investigators in the years before and since implementation of the process.

**BIO Response:** The planned external assessment of the DEB and IOS pre-proposal process will include an examination of success rates for various demographic categories, including early career investigators. That assessment is expected to also survey investigators for their satisfaction with the process. Beyond that, metrics of “career impact” for a process that have been in place for only 3 years would be hard to define.

## **Recommendations Concerning Section II: Questions concerning the selection of reviewers.**

### ***Recommendation 9.***

Panel size limitations coupled with the breadth and diversity of scientific disciplines in the DEB mission make it difficult to ensure that the required expertise will be available to fully evaluate all preliminary proposals. We encourage NSF to explore approaches to optimizing the range of expertise brought to bear on pre-proposals, which might include, for example, virtual participation by additional reviewers or ad hoc reviews, when deemed necessary.

**BIO Response:** DEB review panels are already among the largest held at NSF. This is especially true of the pre-proposal panels, which would become unwieldy if made larger, regardless of whether the panelists participated in-person or virtually. Large panels are employed for exactly the reason stated by the COV – the need to ensure broad expertise. Ad hoc review is only used for full proposals, where there is a need for evaluation of the details concerning methodology, experimental design, and study system. Such review details should not be a concern in the evaluation of pre-proposals. Furthermore, program officers are authorized to secure additional review after the panel, if they feel that the panel lacked adequate expertise for a fair review.

### ***Recommendation 10.***

Explore additional incentives that increase the number of panelists who consistently serve on consecutive panels and that encourage all funded scientists to contribute to the review process.

**BIO Response:** We encourage and repeatedly ask all funded scientists, and many others not currently funded by NSF, to serve on panels. Hundreds of individuals are asked by each cluster each summer and winter; at the division level DEB asks several thousand scientists to serve at least once a year. This effort is necessary to secure the >500 panelists DEB utilizes each year. Unfortunately, NSF policies prohibit rewarding reviewers or panelists beyond the compensation given to panelists for each day of panel participation.

## **Recommendations Concerning Section III: Questions concerning the management of the program under review.**

### ***Recommendation 11.***

We encourage DEB to think creatively about how program responsibilities might be shared among personnel in new ways, with the goal of broadening the reach of recruitment efforts and engaging the potential pool to exceptional individuals who are not currently eligible to be program officers. Given that the number of FTEs available to the division is likely fixed, it may be necessary to consider diversifying the seniority level of the program staff, for example, by including one or more Assistant Program Officers or Senior Analysts. DEB should consider widening the pool of senior program staff applicants, and increasing the likelihood of successful recruitment by increased flexibility with respect to specific areas of expertise required, and by facilitating, to the degree possible, spousal hires and opportunities.

**BIO Response:** We appreciate the COV concerns with program officer workload and in the potential value of broadening the staff to include more individuals at a senior analyst or assistant program officer level. This issue is relevant beyond DEB and BIO senior management has recognized and is studying the situation at the Directorate level.

### ***Recommendation 12.***

Outreach to the scientific community via meetings and workshops is critical and should be continued. We reiterate the importance of supporting program officer travel to meetings, and to pursuing diverse ways to solicit input from the relevant research communities, and prioritizing the use of EAGER and RAPID awards to fund creative and emerging research areas.

**BIO Response:** We agree with the COV that outreach is critical and that program officers need to attend scientific meetings to engage with relevant research communities in order to recognize and support emerging research areas. BIO provides travel budgets to each division based fairly on the number of program officers in each division and the total travel allocation given to BIO. Travel for outreach, including attending scientific meetings, is given the highest priority.

### ***Recommendation 13.***

Encourage the scientific community to use workshops to identify emerging areas of research for their field, especially at the interfaces among disciplines. Creative approaches such as Ideas Labs should be considered when appropriate (e.g., to solve recalcitrant problems and generate novel programs).

**BIO Response:** DEB programs do encourage and support workshops and often co-fund workshops on interdisciplinary topics in partnership with other programs at NSF. DEB programs participated in recent Dear Colleague Letter calls for workshops concerning Food, Energy and Water, and synthesis workshops to coordinate use of data products from NEON. DEB organized the AVAToL Ideas Lab during the most recent COV assessment period, and additional Idea Labs are in early stages of conceptualization.

### ***Recommendation 14.***

Identify and pursue opportunities to communicate to the Directorate level emerging areas of research and educational opportunities within DEB areas of funded research.

**BIO Response:** BIO employs several mechanisms by which programs communicate emerging research areas to the Directorate level. The most significant of these is the post panel debriefing and portfolio review in which each program meets with the Division Director and Deputy Division Director to explain funding decisions. In these reviews, program officers discuss not only the panel review process, they also note research trends, new science directions, and highlight risky and potentially transformative projects. These funding portfolio reviews also examine statistics on demographics for PIs and institutions submitting proposals and receiving awards. Information conveyed to the Division executives forms the basis for the Division's annual leading edge presentation to the BIO-OAD. Within DEB, formulation of the Division's leading edge presentation is accomplished with input from all Program Officers. The leading edge presentations are timed to inform the BIO-OAD at the start of the budget process.

Each cluster in DEB is also asked to write an annual report for BIO-OAD. This report follows a set template that specifically asks for emerging science areas. All Division clusters in BIO have produced an annual report since 2010; the DEB reports were provided to the COV and noted in the report as extremely useful.

Finally, Program Officers and clusters are encouraged to look for opportunities where novel funding mechanisms can be effective at making rapid advances in particular areas of science. EAGER, and INSPIRE awards are commonly used for this purpose and are reported on in the cluster annual reports. Additionally, when appropriate, Program Officers can make a pitch directly to BIO-OAD for use of Innovation Funds in the Emerging Frontier Division to sponsor an Ideas Lab.

***Recommendation 15.***

DEB should identify opportunities to facilitate interactions at disciplinary interfaces of core programs as well as in special programs.

**BIO Response:** DEB programs encourage and support interdisciplinary research through frequent co-review of full proposals and co-funding of awards with other programs both within and outside of DEB and BIO. In addition, DEB directly supports interdisciplinary solicitations that encourage more integrative research approaches. These include the Ecology and Evolution of Infectious Disease, the Dimensions of Biodiversity, the Dynamics of Coupled Natural and Human Systems, and DEB participation in special initiatives such as Science, Engineering, and Education for Sustainability (SEES).

These mechanisms of supporting interdisciplinary research were noted positively by the COV; therefore, we interpret this recommendation as primarily referring to the value of greater interaction across the cluster structure of DEB. In recent retreats, DEB program officers have identified a need to better integrate the ecological and evolutionary perspectives that comprise DEB funding programs. Over the next year, DEB will undertake a strategic portfolio review to form the basis for decisions on how review panels and program opportunities can be modified to better support interdisciplinary and integrative research within the Division.

***Recommendation 16.***

DEB should examine how core clusters might incorporate and continue to nurture communities created by special competitions or programs when those programs terminate.

**BIO Response:** Special competitions and new investment areas created by NSF are commonly

motivated by perceived needs not easily accommodated in core programs. Often, the goal is to support more interdisciplinary, integrative, or larger scope projects than would be typical for the core programs or co-review. For this reason, when a special competition ends, it is not always possible to fully support the same type and scope of research simply by re-directing proposals to a core program. However, it is rarely the case that the “communities” created by special competitions are different than the PIs who are supported by our core programs. E.g., PIs who have applied to the Dimensions of Biodiversity and the Macrosystems Biology special competitions are commonly PIs who also submit to DEB or other BIO core programs. New collaborations that are created by the opportunity of a special competition do shape the types of proposals that later come into the core programs after that special competition ends. In this way, special competitions help transform the core programs.

***Recommendation 17.***

The DEBrief blog should be regularly updated with new posts, including those that make available analyses of grant programs and outcomes to help the community understand funding opportunities, program development and performance efforts. DEB should increase efforts to encourage comments on the blog and to ensure that it is well advertised to the community.

**BIO Response:** DEB is proud of the quality and outreach value of its blog posts; the DEBrief blog is now in its third year and has become a model for other BIO blogs. DEB intends to keep up the same pace of posting analyses of our funding portfolio, and will continue efforts to broadly advertise the blog to the research community.

## Recommendations Concerning Section IV: Questions about Portfolio.

### *Recommendation 18.*

Develop strategies to exploit external resources derived from NEON in support of core activities. Ensure that core activities are not relied on to support NEON-related science at the expense of core programs.

**BIO Response:** NEON is designed to enable new environmental biology research; it will allow researchers to address ecological questions on broader spatial and temporal scales than is currently possible. It is likely that NEON capabilities and data products will shape the types of research proposals that are submitted to DEB core programs. When a new telescope is built by the Astronomy Division, it is hoped that proposals submitted to the core Astronomy program will propose to make use of it. This is not viewed as coming at the expense of the core program. It is hoped that NEON will advance and transform research supported by the core ecology programs in DEB. However, to help catalyze this transformation, BIO intends to also provide support for NEON science independent of core programs, as was done recently through a Dear Colleague Letter in support of early NEON science.

### *Recommendation 19.*

Continue to evaluate the small grants program with respect to its impact on the PI community, scientific benefits and outcomes.

**BIO Response:** To be clear, DEB does not have a small grants program; there is neither set-aside funding for small grants nor any unique review process for proposals designated as small grants at the preliminary proposal stage. However, we plan to continue to allow this designation on proposals, and track its use and funding success within DEB programs. We have received strong, positive feedback from PIs and panelists for the use of this designation and have noticed an increase in its use by PIs.

### *Recommendation 20.*

Address aggregate warning signs of erosion of long-term research portfolio.

**BIO Response:** The COV listed 5 concerns that appear to form the basis for this recommendation; however, most of these concerns are unwarranted. The COV stated that LTREB funding has declined over the past three years when it actually has been increasing at a rate faster than other core programs. The COV believed that other directorates had withdrawn support for LTER, but there have been no changes in directorate contributions in the past three years. The COV felt there was going to be a gap in support for an LTER network office with respect to coordination and data curation, but no gaps are anticipated. A new communication office is being established to overlap with the existing office, which will continue to manage data curation until a new process for data management is established. The COV correctly noted that support for two LTER sites is ending, but this is in response to peer review evaluations and recommendations from the community (site visit panels and renewal panels) and does not reflect any reduction in funding for the LTER program. Rather, freed up funds are being used to support other LTER activities while planning is underway for a solicitation to announce a competition to establish new LTER sites. The COV also considered the one-year hiatus in the Macrosystems Biology competition, managed by the Emerging Frontier's

Division of BIO, as another sign of a reduction of support for long term research. Macrosystems Biology has never supported research awards of longer duration than is routinely supported in the core programs; so, it is unclear how it relates to this topic.

## Recommendations Concerning Section V: Other Topics.

### *Recommendation 21.*

The 2015 COV strongly supports the recommendations of past COVs (2012, 2009, 2006) to develop opportunities for postdoctoral funding in DEB, and across the BIO Directorate.

**BIO Response:** BIO supports a large number of postdoctoral scholars through the research awards made in both core programs and special competitions. However, we appreciate the COV's concern for direct fellowship support for individuals at this critical career stage. In past years BIO concurred with the COV recommendation, but was hesitant to add a new funding program for DEB when BIO already supports a BIO-wide postdoctoral fellowship program, managed out of DBI. Furthermore, the increasing proposal pressure and resulting low success rates, make it difficult to justify reallocating funding and staff time from core programs for this purpose. BIO has recently held several discussions on the independent support of postdoctoral funding and the possible costs and benefits in the context of the current grant system, as informed by recent reports and articles on the overall structure of academic research personnel. Since this is the subject of impassioned discussion within the academic community, BIO feels this is an area where the advice of the community through the BIO Advisory Committee would be useful, especially with regard to: the balance between fellowship awards and funding via research grants, managing expectations in light of the trade-offs under limited budgets, and handling the administrative burdens of splitting such support into additional proposals requiring review.

### **Comments on how to improve the COV review process.**

### *Recommendation 22.*

Please link pre-proposal and full proposal jackets, when such are invited, explicitly so that the review can be readily examined through the entire cycle.

**BIO Response:** BIO thanks the COV for this recommendation and we will implement it for future COVs involving preliminary proposal review.

### *Recommendation 23.*

Please provide access to an on-line, group-editing application, such as Google docs, to facilitate preparation of the report.

**BIO Response:** BIO agrees with this recommendation and will forward our endorsement to the Office of Integrative Activities, which oversees policies and tools for conduct of COVs.