

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

**June 5-7, 2012**

The Division of Environmental Biology (DEB) expresses its sincere appreciation to the members of the Committee of Visitors (COV) for their incisive observations and constructive recommendations. It was evident that all the members of the COV were deeply interested in the welfare and development of the diverse programs in the division and the science communities that are served by these programmatic activities.

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 current activities and practices.

BIO is particularly appreciative of the CoV's view of the importance of DEB to BIO and of the current efforts to manage a 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. Finally, the CoV's emphasis on DEB's need to focus on the management of our investments in young investigators is both important and timely.

### **Progress since the 2009 COV Report**

BIO thanks the COV for its positive evaluation of DEB's responses to the 2009 COV report while acknowledging the persistence of several issues beyond the scope of DEB to address alone: " DEB has responded effectively and thoughtfully to recommendations of the 2009 COV that were within its control, particularly given the increase in the number of proposals submitted to the core programs and the decline in funding rates during the review period (as reported in the DEB self-study; see Figure below). However, many of the concerns raised by the 2009 COV relate to increasing proposal workloads, erosion of core programs from top-down initiatives, lack of stability in hiring of staff, limited opportunities for postdoctoral investigators to develop independent research, and reductions in funding that constrain travel budgets, which are not under DEB's control."

DEB is committed to continue working on the issues raised by the 2009 COV and reiterated by the 2012 COV. DEB continues to take steps to address those issues locally and capitalize on opportunities to advocate for comprehensive responses.

## SUMMARY RECOMMENDATIONS

### (1) New Program Initiation and Development

**Recommendation 1: (Page 3)** A more effective, direct, and transparent way to determine program priorities that fully engages the DEB scientific staff should be developed.

**Response:** BIO recognizes the importance of input from scientific staff in proposing programmatic priorities. The Leading Edge process provides an open, BIO-wide forum for such input which is incorporated into annual budget requests. BIO OAD will continue to work with the Divisions to improve staff engagement while fulfilling its responsibility for implementing the administration priorities as communicated through the Office of Management and Budget and approved by the Congress.

**Recommendation 2: (Page 3)** Innovative and proactive steps are needed to engage a broad spectrum of scientists to capitalize on the unique research opportunities that NEON will provide.

**Response:** BIO concurs with this statement. The Macrosystems Biology program and Science Engineering and Education for Sustainability (SEES) portfolio both seek to engage a broad spectrum of scientists to answer fundamental biological questions. BIO expects to continue providing new opportunities as NEON is constructed and welcomes additional specific suggestions for capitalizing on the research opportunities of the NEON platform.

**Recommendation 3: (Page 3)** New programs and initiatives increase the administrative burden on DEB and reduce the ability of staff to support the research community. Without additional funding, these new initiatives may compromise support of the core programs that are the “heart and soul” of the Division.

**Response:** BIO recognizes the COV's concern regarding the administrative costs of new programs. New programs, especially cross-directorate programs, can provide access to new funding to support the DEB research community. However, BIO has avoided committing resources to efforts which scientific staff have indicated are tangential to the interests of the research community and would be unlikely to successfully leverage BIO funds.

### (2) Innovations in the Review Process

**Recommendation 4: (Page 4)** DEB may need to explore qualitatively new practices to complement the standard panel. For example, as video-conferencing technology improves, it may be possible to run small virtual panels (e.g., 5-7 people) with targeted goals.

**Response:** BIO recognizes this need across the directorate. The preliminary proposal process represents one such exploration in accordance with previous DEB COV recommendations. BIO/DEB has begun expanding use of virtual panel and meeting technology. The experiences of programs in DEB thus far are consistent with the COV's thoughts on the current limitations of virtual panel technology with respect to participant numbers. BIO continues to encourage use of new practices and technologies to increase efficiencies in the review process.

### (3) Opportunities for Young Investigators

**Recommendation 5: (Page 4)** The 2012 COV strongly supports the recommendations of past COVs (2009, 2006) to develop opportunities for postdoctoral funding in DEB, and across the BIO Directorate. Reallocation of funding within DEB and BIO could be used to support independent postdoctoral opportunities that would strengthen the next generation of scientists. Opportunities for coupling some of these opportunities with NEON and other interdisciplinary programs that address research challenges identified by the Foundation should be identified and promoted. In addition, DEB POs and Directors should be encouraged to explore partnerships with other federal agencies with shared research interests (e.g., U.S.G.S., U.S. Forest Service, National Park Service, U.S. Fish & Wildlife Service, the Smithsonian Institution, and USDA) to promote postdoctoral opportunities of agencies and DEB.

**Response:** BIO concurs with the need for funding postdoctoral fellowships; because of the high proposal pressure and resulting low success rates, it is difficult to justify reallocating funding from core programs for this purpose. However, BIO will take this recommendation under consideration and explore opportunities for partnerships or new efforts to support a postdoctoral opportunity.

#### **(4) Prospects for International Collaboration**

**Recommendation 6: (Page 4)** [R]ecent management decisions above the Divisional level make funding of international research more difficult for DEB Program Officers. The creation of the Global Venture Fund added a level of bureaucracy that slows the funding process and limits opportunities for co-funding.

**Response:** BIO thanks the COV for this recommendation for improving support for international research and will forward them to the appropriate office for consideration.

#### **(5) Constraints to Programmatic Improvement and to the Fulfillment of Scientific Capacity**

**Recommendation 7: (Page 4)** However, many of the concerns raised by the 2009 COV relate to increasing proposal workloads, erosion of core programs from top-down initiatives, lack of stability in hiring of staff, limited opportunities for postdoctoral investigators to develop independent research, and reductions in funding that constrain travel budgets, which are not under DEB's control. This COV perceives the need for substantive two-way communication between the BIO leadership and DEB Program Officers as the BIO directorate and DEB grapple with pending challenges.

**Response:** See Recommendations 1 through 6 above. BIO shares these concerns and has put in place several mechanisms for substantive, transparent communication between BIO and its component divisions including regular Town Hall meetings, lunch with the BIO AD and bi-weekly reports which are shared with the NSF Director.

#### **(6) DEB Management- No recommendation**

#### **(7) Leveraging DEB Program Officer Knowledge**

**Recommendation 8: (Page 5)** Senior Management in BIO should offer and promote informal opportunities to include DEB and other POs in discussions of how their expertise can be tapped to serve the communities of scientists that they support. Without routine dialogue among the DD, AD, and all

DEB POs (both permanent POs and rotators), opportunities to maximize the positive impact of new initiatives and facilitating partnerships across the Division and between BIO Divisions will be missed.

**Response:** BIO concurs with this recommendation but acknowledges that such dialogue must be open to POs from all of BIO if such partnerships are to be fostered. Town Hall meetings provide a regular forum for these discussions. Working group assignments within BIO provide opportunities for POs to contribute substantially to activities that align with their individual interests and expertise.

## **INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT**

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

**Recommendation 9: (I.1, Page 6)** Travel funds, both for panelists to attend meetings at NSF, and for rotating POs to travel home, to academic conferences, and to other institutions, are critical for the basic functioning of the NSF Directorates. This funding stream needs to be protected if NSF is to carry out its basic mission effectively.

**Response:** BIO recognizes the importance of travel for the achievement of critical activities but acknowledges that this issue reaches beyond the scope of BIO.

**Recommendation 10: (I.1, Page 6)** Particular attention should be paid to the fate of new investigators in the preproposal process.

**Response:** BIO concurs with this recommendation. Programs are currently monitoring the outcomes of the process with respect to early career investigators.

**Recommendation 11: (I.1, Page 6)** The COV strongly encourages DEB leadership and POs to consider ways to restructure panels or to investigate the use of virtual meetings to reduce the costs of panel meetings. However, the existing technology for effective virtual conferences is not adequate, and does not allow for caucusing of smaller groups of panelists, widely acknowledged as one of the most important panel activities. For now, virtual meetings should be investigated for very small panels addressing specialized topics. Alternative panel and proposal evaluation formats could also be explored.

**Response:** See response to Recommendation 4.

**Recommendation 12: (I.2, Page 7)** [I]t should be made clear to reviewers and panelists that each Program has the flexibility to fund *any* proposal that has exceptional intellectual merit even if its broader impacts are not exceptional. The COV believes that clarifying this distinction will reduce the confusion that we perceive to exist among colleagues and will help to streamline panel discussions. The COV suggests that the instructions to the reviewers should be updated to reflect the spirit of the NSB recommendations and to reduce the potential for confusion. Moreover, it would be helpful to provide greater clarity regarding what qualifies as "good" vs. "exceptional" broader impacts. Currently, there is no community consensus as to how to evaluate broader impacts in the proposal or how to evaluate the success of previously proposed broader impacts. There are a number of different ways to generate consistency and transparency in the evaluation of the Broader Impacts. These include at least three possibilities:

- 1) Ask reviewers to restrict their use of the categorical scores to their evaluation of intellectual merit and then to provide comments only (no score) on the broader impacts.
- 2) Instruct reviewers and panelists how to weight the two categories (intellectual merit vs. broader impacts).
- 3) Ask reviewers to provide two separate scores, one for intellectual merit and the other for broader impacts.

**Response:** BIO thanks the COV for these suggestions but acknowledges that these questions reach beyond DEB. The BIO-AC would be well-positioned to consider and advise on an interpretation of the NSB report.

**Recommendation 13: (I.2, Page 8)** Finally, it would be useful to have a mechanism for mining annual reports to assess how broader impacts were fulfilled. A summary of these impacts could potentially be used to leverage more funds for particular programs.

**Response:** BIO thanks the COV for these valuable recommendations and will forward them to the appropriate office.

**Recommendation 14: (I.2, Page 8)** While recognizing that the development of broader impacts is an important component of DDIG proposals, the COV suggests that this aspect of the DDIG proposals is receiving undue scrutiny and criticism by advisory panels.... DEB should ensure that the DDIG advisory panels are well briefed about role of broader impacts in DDIG evaluation.

**Response:** BIO recognizes the COV's concern but acknowledges that these questions reach beyond DEB. The BIO-AC would be well-positioned to consider and advise on this issue.

**Recommendation 15: (I.2, Page 8)** The COV recommends that DEB cap the amount of direct costs and let the IDC float depending on the requirements of the institution.

**Response:** BIO/DEB concurs with this recommendation. A revised DDIG solicitation was released on July 31, 2012 which incorporates a direct cost cap of \$13,000 with floating indirect cost.

**Recommendation 16: (I.3, Page 8)** Panelists might be offered examples of high-quality panel summaries at the outset of each panel. Similarly, it might be helpful to provide *ad hoc* reviewers with redacted models of exemplary reviews, including examples of both negative and positive reviews, at the same time that they are given access to the proposal they are requested to review.

**Response:** BIO concurs with the spirit of this recommendation but notes that it is unlikely to receive authorization to widely release even redacted versions of actual reviews. DEB will explore development of model panel summary and review examples for reviewers.

**Recommendation 17: (I.5, Page 9)** [In the context statement a] brief explanation of how the relative importance of Intellectual Merit vs. Broader Impacts were considered by the program when making the funding decisions would be helpful.

**Response:** BIO appreciates the COV's attention to this item. NSF policy does not specify relative weighting of Intellectual Merit and Broader Impacts. Such a consideration would reach beyond DEB. Please see the response to Recommendation 12.

**Recommendation 18: (I.6, Page 9)** To assist in the construction of complete, consistent, and helpful panel summaries, the following field could be added:

"Panel assessment and comments on *ad hoc* reviews": Adding this (or a similarly worded) section would encourage the panel to emphasize important reviews (both positive and negative), and to let the PI know that inappropriate or erroneous review statements or comments in a review were ignored by the panel and did not affect their decision.

**Response:** BIO/DEB thanks the COV for this suggestion and will work to incorporate improvements to the panel summary template that ensure complete, consistent, and helpful panel summaries.

## **II. Questions concerning the selection of reviewers.**

**Recommendation 19: (II.1, Page 10)** The previous COV report commented on the lack of a reviewer database in which areas of expertise can be identified. This COV supports establishing such a database because of the importance of getting new reviewers into the pool and engaging new investigators.

**Response:** BIO acknowledges the need for associating reviewer contact information with expertise. However, the development of advanced search tools in research.gov should obviate the need to construct and maintain an additional database system.

**Recommendation 20: (II.1, Page 10)** The COV suggests that Program Officers ensure the continuity of reviewers throughout the new proposal submission process.

**Response:** BIO/DEB concurs with this suggestion but acknowledges that the number of panelists and expertise required to provide reviews will differ at the two proposal stages.

**Recommendation 21: (II.2, Page 10)** A growing issue is the reduction of the reviewer pool because of the increasing number of conflicts of interest that accompany the growing number of collaborative activities. Some of the COI criteria may be too stringent, particularly in situations where colleagues have participated in a paper written by multiple authors, of whom they may only have interacted significantly with one or two. Examples of these include (but are not limited to) workshops or society working groups that lead to a published report. It could help to modify criteria such that substantive collaborative relationships could be distinguished from those in name only. PIs would need to make that distinction.

**Response:** BIO shares the COV's concern about the current conflict of interest standards, and BIO has referred this recommendation to the NSF Office of the General Counsel. BIO notes that DEB has practices in place for managing potential conflicts of the types specified by the COV. However, it remains the responsibility of the PI to report all apparent conflicts of interest and the responsibility of NSF to manage the impact of reported conflicts on the review process.

## **III. Questions concerning the management of the program under review.**

**Recommendation 22: (III.1, Page 12)** DEB is understaffed and vacancies must be filled.

**Response:** BIO concurs with this COV recommendation and is working with DEB through the staffing planning process to identify needed resources. DEB is currently conducting searches to fill existing vacancies.

**Recommendation 23: (III.1, Page 12)** The Ideas Lab type of activity could also be a successful mechanism to develop other new initiatives in DEB that can more effectively utilize the Emerging Frontiers programs, particularly those that will support NEON and Sustainability initiatives in BIO.

**Response:** BIO concurs with this recommendation and continues to support the use of Ideas Labs and other Innovation Activities to explore new initiatives.

**Recommendation 24: (III.1, Page 12)** Mechanisms to promote employment stability and staff mentorship should be explored by DEB, BIO, or NSF-wide; efforts to provide mentors for staff are underway in DEB. Administrative staff also expressed that they would welcome more open communication from management (from either DEB or BIO managers) about the progress being made towards filling positions that have become vacant.

**Response:** BIO thanks the COV for this suggestion. BIO has already held sessions with support staff from across the Directorate and discussed these topics in a Town Hall meeting. BIO/DEB is continuing efforts to provide mentoring and growth opportunities for administrative staff.

**Recommendation 25: (III.2, Page 13)** The portfolio of programs and initiatives that originate outside of DEB and that are supported by the Division seems to have grown without concomitant increases in funding. DEB cannot continue to support the core programs that are the “heart and soul” of the Division and also respond appropriately to new initiatives. A more effective and transparent way to determine program priorities should be developed. Of particular concern is the risk that research funding to the core programs may be reduced (or fail to grow, further decreasing the funding rate) to support emerging opportunities that are not initiated by DEB.

**Response:** See responses to Recommendation 1 and Recommendation 3.

**Recommendation 26: (III.2, Page 13)** With NEON coming on-line as a platform to support continental-scale science, the challenge of identifying funding sources that will support this new research potential within DEB and BIO without gutting the core programs must be considered thoughtfully. This provides an important opportunity for discussions between DEB (POs and Directors), other Divisions within BIO, and the BIO/OAD.

**Response:** BIO thanks the COV for noting this concern. See response to Recommendation 2.

**Recommendation 27: (III.2, Page 13)** The Ideas Lab format that was successfully used to develop the priorities for the AVAToL initiative may be an appropriate tool for including the ecological and other research communities in the development of exciting, transformational initiatives that will utilize the NEON platform.

**Response:** See response to Recommendation 23.

**Recommendation 28: (III.2, Page 13)** DEB POs have been strong and effective advocates for proposals in other cross-disciplinary funding venues (e.g., SEES, Dimensions of Biodiversity). This activity is commended and should continue to be promoted.

**Response:** BIO thanks the COV for this recommendation and will encourage DEB to continue their excellent contributions to new and existing cross-disciplinary funding opportunities.

**Recommendation 29: (III.3, Page 13)** DEB has an excellent culture for co-funding that should be commended and encouraged.

**Response:** BIO thanks the COV for this recommendation and supports DEB programs effective use of co-review and co-funding.

**Recommendation 30: (III.3, Page 13)** Whenever possible, DEB program officers should use top-down initiatives as opportunities to design funding competitions that meet program needs and serve the broad DEB community.

**Response:** See responses to Recommendation 1, Recommendation 3, and Recommendation 8.

**Recommendation 31: (III.4, Page 14)** However, many of the most important concerns that were raised in several previous COV reports are not under DEB's control. These are:

- Increasing proposal workloads for staff, program officers, *ad hoc* reviewers, and panelists.
- Potential erosion of resources for core programs from the funding of top-down initiatives.
- Lack of stability in the hiring and retention of staff.
- Scarcity of funding opportunities for post-doctoral investigators to develop independent research.
- Threats to travel budgets that are essential for successfully recruiting panelists and temporary rotators.

The COV appreciates that DEB recognizes these chronic needs and has tried to address them. Perhaps some relief will arrive if proposal loads diminish in the future with the new pre-proposal system. Nevertheless, these problems will persist unless additional resources flow to DEB.

**Response:** BIO thanks the COV for reiterating these concerns and will communicate them to the appropriate offices for consideration.

#### **IV. Questions about Portfolio.**

**Recommendation 32: (IV.2, Page 16)** The COV suggests that an analysis of the frequency and length of no-cost extensions be conducted to provide additional insight into whether the duration of awards is appropriate. The COV notes that the duration of awards has increased over the recent past and that this is indicative of DEB responsiveness to the research needs of the community.

**Response:** BIO/DEB concurs with this recommendation and has posted the task to the DEB Ticket Bank for a future analysis project.

**Recommendation 33: (IV.4, Page 17)** In addition, the self-study describes a pilot program, the "Individual Decision Fund", to support individual/independent funding decisions by Program Officers. Analysis of the success of this program in fostering risky or innovative projects should be forthcoming.

**Response:** BIO concurs with the need to monitor and report on funding for risky or innovative projects. However, the "Individual Decision Fund" is an internal practice, not a program, and only one of several

mechanisms to encourage that aspect of the overall DEB portfolio. DEB will continue to develop metrics for evaluating their portfolio in coordination with BIO-wide and NSF-wide reporting efforts.

**Recommendation 34: (IV.6, Page 17)** [T]he population of different types of institutions throughout the U.S. is unknown.

**Response:** BIO thanks the COV for raising this concern. BIO will raise this concern to the NSF-wide COV coordination group and recommend that national-level statistics for COV demographic questions be made through the National Center for Science and Engineering Statistics in a format comparable to EIS outputs.

**Recommendation 35: (IV.6, Page 17)** Interestingly, the distribution of reviewers among types of institutions deviates significantly from proposal activity and success. Only 33% of reviews come from scientists at research-intensive institutions, whereas 28% are from non-research intensive Ph.D. granting institutions. The COV was curious about whether this pattern is consistent across the Foundation.

**Response:** BIO thanks the COV for raising this question and DEB will ensure that relevant comparisons are made available for the 2015 self-study.

**Recommendation 36: (IV.7, Page 18)** If CAREER proposals were 20% smaller and placed less emphasis on broader impacts, more young investigators could be funded at a critical point in their developing careers.

**Response:** BIO thanks the COV for this suggestion. BIO will submit this suggestion to the NSF-wide CAREER Coordinating Committee for consideration.

**Recommendation 37: (IV.8, Page 18)** Although DDIGs and CAREER awards have the ability to integrate education into research activities if mandated, the COV recommends that to maximize the scientific development of these young investigators, DEB should consider relaxing the requirement that doctoral candidates and young investigators dedicate significant time to broader impact activities that focus on education.

**Response:** BIO appreciates the COV's feedback on this issue. BIO notes that while all proposals are required to address both Intellectual Merit and Broader Impacts, educational activities are only a narrow subset of broader impacts and generally not specifically required in any proposal. With respect to the CAREER program, which does require educational activities, BIO will submit this suggestion to the NSF-wide CAREER Coordinating Committee for consideration.

**Recommendation 38: (IV.9, Page 18)** Based on the COV's discussion with DEB program officers and directors, DEB understands that diversifying the population of researchers is a high priority for NSF and for the Division.

**Response:** BIO concurs with this observation and will continue to encourage DEB to explore means of attracting a more diverse population of researchers to the division.

**Recommendation 39: (IV.11, Page 20)** The Assembling the Tree of Life Initiative (AToL), which began in Emerging Frontiers and in FY2010 was moved to DEB, has advanced our understanding of the processes

as well as the pattern of evolution of all life on Earth. It is one of the most successful NSF initiatives in systematics. The COV recommends that ATOL continue to be well-supported.

**Response:** BIO supports the efforts of DEB to chart the future of this program while responding to administration priorities.

## **OTHER TOPICS**

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

**Recommendation 40: (Page 20)** DEB is involved in several cross-Directorate programs, and should confidently take a leadership role in developing initiatives within the BIO Directorate that cross Divisional boundaries to support new funding for NEON and Sustainability initiatives. Means to coordinate these activities need to be developed in collaboration with the BIO/OAD.

**Response:** BIO acknowledges DEB's ongoing leadership in SEES (which, with NEON, is coordinated by BIO OAD through Emerging Frontiers) but recognizes that new funding may not be readily available for such programs in the near term if the core is to be maintained and grown.

**Recommendation 41: (Page 20)** Interdisciplinary activities or broad-scale research programs can be powerfully enhanced by providing mechanisms for investigators at any career stage to gain new training and expertise that will enhance their existing skills. Such programs would serve at least two goals: (1) to promote individual talent at key career stages (e.g., postdoctoral fellowships; mid-career investigators) or of under-represented groups (women and minorities), (2) to foster interdisciplinary research by individuals rather than requiring the assembly and coordination of large teams.

**Response:** BIO concurs with this recommendation and notes that DEB continues to be at the forefront of exploring and implementing such activities in concert with interdisciplinary and broad-scale research programs exemplified by workforce efforts under Dimensions of Biodiversity.

### **2. Please provide comments as appropriate on the program's performance in meeting program specific goals and objectives that are not covered by the above questions.**

**Recommendation 42: (Page 20)** The COV noted that Dear Colleague letters were not reaching many members of the community. Dissemination could be improved by repeated and broader distribution to listservs (e.g., ECOLOG, Evoldir, Pal-Poll) and current and former DEB PIs.

**Response:** BIO concurs with this recommendation and will work with DEB to pursue additional avenues for information distribution to the scientific community.

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

**Recommendation 43: (Page 20)** The current shift of OISE to a Venture Fund model will change the importance of long-term relationships that have been built between POs of the Research Directorates and OISE, and may discourage program officers from participating.

**Response:** BIO recognizes the COV's concern and will communicate it to OISE for consideration.

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

**Recommendation 44: (Page 21)** The COV sees an opportunity for DEB to take a greater leadership role in the development of the research designed to ensure a more sustainable environment. Humans depend on the sustainability of natural biological processes, inter-specific interactions, ecosystem processes, wild habitats and un-manipulated systems. DEB can and should be providing key intellectual leadership for NSF research related to sustainability.

**Response:** BIO will continue to support DEB's participation in the SEES initiative while keeping mindful of the significant demands on Program Officer time from ongoing commitments to diverse core and interdisciplinary activities.

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

**Recommendation 45: (Page 21)** The following steps by DEB would be helpful to future COVs.

- Consider recruiting a former COV member to be the COV Chair.
- Provide more guidance to the Chair regarding preparation for the meeting.
- Prepare a template letter (that the Chair could modify), outlining the charge of the COV and allocating assignments (reading of jackets and supporting documents) to COV members, which would be sent to the COV members 6-8 weeks prior to the meeting.
- Offer the initial conversation between the COV, the Deputy Director, and the Division Director in a virtual setting (e.g., a webinar) four weeks before the COV.
- Encourage the Chair to instruct COV members to prepare for the meeting by:
  - Becoming familiar with the ejacket webpage.
  - Evaluating a specified number of jackets for completeness, quality of reviews and review analysis, treatment of the two review criteria, quality of the context statement, and scope of research.
  - Reading a specified number of the available reports so that each document has been read by at least three COV members and some documents have been read by all COV members (at the discretion of the Chair).
- Include a session during the COV's visit during which COV members meet with support staff as did the FY2012 COV.
- Provide a "GoogleDocs"-type mechanism that allows simultaneous document-editing by multiple people during the COV meeting.

**Response:** BIO concurs with these recommendations and will assign an Analyst to incorporate them into guidance for future COV preparation.

#### **6.a The division would appreciate the comments of the COV on DEB-relevant opportunities and challenges in the following areas: Continental Scale Science**

**Recommendation 46: (Page 22)** We recommend that MacroSystems Biology be continued or folded (with funding) into DEB at the end of its initial five years, especially given the needed coordination

between DEB research and NEON. We also encourage DEB to consider additional ways to provide incentives for generating new approaches for regional to continental-scale research. Perhaps an Ideas Lab could focus on a priority research topic that is emerging from the community.

**Response:** BIO will take this recommendation into consideration for the development of future budget requests.

**Recommendation 47: (Page 22)** Given that NEON is now in the implementation phase, it is critical that DEB strives to engage the community of scientists to foster excellent science that effectively use of these new observatories.

**Response:** BIO concurs with this recommendation and plans to include NEON in both Directorate and Division outreach and communication efforts.

#### **6.b The division would appreciate the comments of the COV on DEB-relevant opportunities and challenges in the following areas: Integration of research areas across biology**

**Recommendation 48: (Page 22)** Given the diversity of levels of organization within biology, the COV supports efforts to develop research that spans multiple biological levels of organization within BIO as well, and we encourage the development of formal programs that specifically target such projects. These integrative areas can be as “interdisciplinary” as those that link biologists with other areas of natural or social science. Accordingly, the materials in the “leading edge” documents contain compelling ideas about research areas that integrate multiple areas of biology (e.g., genes to ecosystems; from genotype to phenotype; consequences of changes in climate and land cover).

**Response:** BIO concurs with this recommendation and will assemble cross-BIO teams to develop proposals along these lines for future budget requests.

#### **6.c The division would appreciate the comments of the COV on DEB-relevant opportunities and challenges in the following areas: Young Investigators**

**Recommendation 49: (Page 22)** We encourage DEB to track funding rates for pre-tenure vs. tenured faculty members as the program moves forward and to ascertain whether there are any unexpected consequences for junior faculty with regard to funding rates.

**Response:** BIO concurs with this recommendation and notes that DEB is tracking available data to ascertain any consequences for junior faculty as well as other groups.

**Recommendation 50: (Page 22)** We strongly support the development of independent NSF postdoctoral fellowship positions.

**Response:** See response to Recommendation 5.

**Recommendation 51: (Page 22)** While all NSF proposals are required to *address* the two criteria for merit review, the COV questions whether PhD students—who are in the early stages of their scientific development and are under increasing time constraints due to reductions in campus-level funding—should be *funded* based on the broader impacts of their proposals. We suggest that DEB re-visit the instructions to reviewers and panelists regarding how the broader impacts criterion is applied to DDIGs.

**Response:** See response to Recommendation 14.

6.c.2 **Recommendation 52: (Page 23)** We encourage attention to whether the amount and quality of feedback to graduate students can be enhanced, though we recognize this may largely be due to time/panel constraints.

**Response:** BIO concurs with this recommendation. DEB will emphasize the importance of review feedback in panelist instructions and notes that the response to Recommendation 16 may also contribute to positive outcomes.