

## **Response to Recommendations from the Committee of Visitors (CoV) for the Division of Biological Infrastructure (DBI), September 23-25, 2013**

**Introduction:** The Directorate for Biological Sciences (BIO) would like to thank the Committee of Visitors (CoV) for their efforts in evaluating the management and outcomes of the Division of Biological Infrastructure (DBI) at NSF. BIO is aware of the extraordinary amount of work that the CoV members contributed before and during the meeting and is especially appreciative of their commitment to this important review. The thoughtful reports that emerged from the CoV deliberations are highly appreciated by BIO and DBI.

The CoV report consists of three documents: a completed CoV template for the Human Resources (HR) and Research Resources (RR) clusters; a completed template for Centers; and a "Summary of Issues for Consideration". The CoV report covers DBI activities during the period of June 2010 – September 2013. The end of the report period coincides with a recent change in Senior Management of the Division, and thus the timing is excellent for implementing CoV recommendations. The CoV Report regards as sound and thorough the basic record of review and evaluation of the majority of proposals by DBI during the evaluation period. However, the CoV had recommendations for improving DBIs performance on a number of issues, including the management of Centers in DBI, as well as issues about the organization of the CoV meeting itself. We here respond to specific recommendations provided by the CoV, combining our responses for both the programs and centers (where applicable) even though the CoV provided distinct reports for these activities. The last section of this response will address the specific recommendations of the overarching and thoughtful "Summary of Issues for Consideration" generously provided by the CoV that were not addressed in previous sections.

### **RECOMMENDATIONS AND RESPONSES**

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

**Recommendation:** Overall, the CoV believed that both review criteria were addressed in the review of proposals in the RR cluster. However, "...the evaluation and application of the broader impact review criteria was weak in some reviews/panel summaries..... [and] In some cases proposals were funded despite identification of significant shortcomings in the Broader Impacts which were either not mentioned or explained in the Program Officer Review Analysis."

**Response:** The DBI leadership agrees that the emphasis of broader impacts during the review needs to be enhanced and has taken several steps to do this, some of which include: 1) evaluating and where necessary redefining the ranking categories used during panel review to prioritize proposals by all programs in the division to ensure that proposals with weak broader impacts are not ranked as highly as others of similar intellectual merit; and 2) scrutinizing review analyses to ensure that award recommendations fully address weaknesses and articulate potential strengths of the broader impacts criterion. These types

of oversight are also a major part of the current 'Transparency and Accountability' effort across NSF to better define the role of the Division Director (DD) and Deputy Division Director (DDD) when concurring recommendations made by program officers.

**Recommendation:** Overall, the CoV believed that both review criteria were addressed in the review of proposals in the HR cluster. However, "...one panel summary was missing out of the 11 that were sampled.....[and] In the RCN program, some of the PO analyses for FY10 proposals, the PO used a boilerplate template for the analyses and these lacked sufficient details to understand the rationale for the final recommendation."

**Response:** It is likely that the missing panel summary was due to the CoV reviewing a supplement jacket or a 'not to panel' proposal which occasionally occurs due to a COI. A few of these were included in the set of proposals provided for CoV review; however, all the REU-sites and RCN UBE proposals in the CoV module of eJacket were reviewed by a panel and have panel summaries associated with them. As for boiler-plate text associated with review analyses, DBI has revised its practices with regard to boiler plate text and is eliminating its use as part of any rationale for funding recommendations, except where general issues regarding the issues of portfolio balancing are included.

**Recommendation:** Overall, the CoV indicated that panel summaries provide the rationale for the panel consensus or reasons the consensus was not reached, but "in a few cases summaries were regurgitations of reviews. In other cases the summaries are insufficiently detailed, particularly in declines."

**Response:** We thank the CoV for pointing out these issues. DBI will seriously address the training of panel reviewers for future cycles of proposal review. Beginning in August 2014, the DBI DD and DDD will initiate regular meetings with all program directors, prior to each round of panel meetings, to review and emphasize critical aspects of the panel review process, especially how to train new panelists to prepare high-quality and thorough panel summaries.

**Recommendation:** Overall, the CoV indicated that documentation to the PI provide a clear rationale for the award/decline decision in both the RR and HR clusters. However, "In a minority of cases, when proposals were 'on the bubble' with respect to panel placement, there was insufficient detail in the reviews, context statement, and/or panel summaries to adequately inform PIs. In too many instances there was no record of program officer communication with unfunded PIs."

**Response:** DBI agrees that this is an important aspect of the NSF merit review process and again thanks the CoV for highlighting this issue. One way DBI will address this issue is to ensure that every positively reviewed proposal for which a decline is recommended by a program officer, will have a Program Officer Comment uploaded into eJacket that clearly explains why a positively reviewed proposal was not recommended for funding. This is an

under-utilized component of the eJacket/Fastlane system and DBI will make better use of the PO comment feature in the future. This relatively minor adjustment to the recommendation process can often be achieved by inserting relevant information from the Review Analysis into the Program Officer Comments, which significantly improves the quality of feedback to the PI.

**Recommendation:** In the section on the quality and effectiveness of program's use of the merit review process, the CoV suggested that the RR cluster develop "metrics of program impact on the biological research community..." as a component of its efforts to balance its portfolio.

*Response:* The programs in DBI are the only ones in BIO that make a strong effort to balance their portfolio across the other divisions in BIO to ensure that their investments impact research communities from the molecular and cellular to organismal and environmental sciences. This is a primary topic of review during panel debriefings across all programs in DBI. Developing metrics of program impacts is something DBI continues to discuss internally since many of the impacts of either ABI or IDBR investments, for example, are not realized until years after DBI makes them. DBI agrees that it is important to make every effort to do this despite the difficulty. The IDBR program addressed this issue by sponsoring a PI workshop/meeting entitled, "Making the most of your IDBR award" (May 1-2, 2014) to help the program identify bottlenecks in moving new innovative instrumentation developed through DBI investments more quickly into the research community. In addition, IDBR program directors developed a survey to be administered to the DBI community to gather more information about ways DBI can better facilitate this process. Insights gleaned from these activities are currently being used to help the program focus PI's and reviewers on issues that will enhance the relevance of IDBR investments for the various BIO research communities. Lessons learned from these activities in IDBR are being discussed throughout DBI in order to stimulate similar activities for other programs in the division.

**Recommendation:** In the same section on the quality and effectiveness of program's use of the merit review process, the CoV indicates that "mentors were not identified in the PRFB" program, a problem that persisted from the previous CoV. It was also noted that, "the use of boilerplate review analysis by the PO did not adequately capture the rationale for the recommendation..." The CoV also suggested that DBI better articulates the purpose of the RCN-UBE program.

*Response:* DBI is currently updating the PRFB solicitation and will ensure that it includes a specific section identifying and briefly describing the proposed mentor. With regard to boiler plate text, DBI has reduced its use of boilerplate text in Review Analyses across the division as mentioned above. The RCN solicitation is also in the process of being revised and DBI will edit the text describing the RCN-UBE track to explain more accurately what the expectations are of projects funded through this solicitation.

Recommendation (Centers): In the CoV template focused on Centers, the CoV indicates that, “In general, cognizant PDs did an excellent job of comprehensively summarizing assessments by reviewers and panelists, and providing additional insight into the evaluation of proposals with regard to both criterion 1 and criterion 2.” However, the CoV noted that in the FY10 center competition, 24% of reviews did not address both criterion 1 and criterion 2.

*Response:* Due to their complexity, Centers are typically reviewed by a large number of reviewers with a combined broad set of expertise, each of whom individually often focuses on just a few aspects of the activities proposed in a Center application. We suspect that this aspect of Center review may have been a factor in the high percentage (24%) of reviews that failed to discuss both review criterion 1 and 2. However, DBI agrees that this percentage is too high and will make sure that all reviewers are strongly encouraged to address both review criteria in our next renewal competition scheduled to take place in FY2016 for SESYNC and any future Center competitions.

Recommendation (Centers): While the CoV was positive about the quality and effectiveness of the merit review process for Centers in general, the CoV had several concerns about the merit review process of the iPlant renewal proposal. These concerns included, “...the way in which a significant number of concerns or problems that were communicated in panelist reviews were underrepresented in programmatic review of the i-Plant renewal proposal... [and] In short, the full process of decision-making [with regard to the iPlant renewal] was not transparent and failed to produce convincing rationale in light of the full suite of data available to the program.”

*Response (This also addresses recommendation #4 in the “CoV Summary of Issues for Consideration”):* Since the CoV report, BIO has assembled a highly experienced management team to address issues that arose during the renewal review of iPlant. This group consists of program directors and senior managers with expertise in the subject matter, management of cyberinfrastructure centers, and other large-scale facilities. In accordance with the iPlant cooperative agreement, iPlant also appointed a Scientific Advisory Board to identify five major focus areas for last 5-year award period, in consultation with this newly assembled management group. iPlant then submitted a formal Project Execution Plan (PEP) using a template established by DBI Program Staff. This PEP provides details on project deliverables, organizational structure and management, roles and responsibilities of participants, project management processes and authorization, work breakdown structure, baselines and thresholds, reporting and meeting guidelines, risk analysis, and security concerns. By design, this is a “living document”, subject to continual review and periodic updating. Additional input on the plan was provided by the reverse site-visit team, which met to review the project in June, 2014. This reverse site visit was in accordance with the National Science Board Resolution of May 2013, which granted funding for the project, but called for this review at 18 months to evaluate plans and progress. The NSB’s observations were similar to those made by the CoV when reviewing the iPlant renewal proposal and resulted in a number of new oversight and management steps in order to reinstate the renewal of the iPlant cooperative agreement (including the

aforementioned mandatory site visit at 18 months into the second 5-year funding period). The results of the 18 month reverse site visit were positive, and are the basis for continued funding for years 3-5. This recommendation requires National Science Board approval which is scheduled for November, 2014. It also should be noted that the BIO management team assembled to facilitate management of iPlant is being considered as a “model” for management of potentially transformative cyber-Centers of this nature throughout BIO and the rest of NSF.

**Recommendation (Centers):** Additional concerns the CoV identified with Center management were focused on iPlant’s “complex management issues...; engagement of the whole research and education community; [and] active recruitment of participants from underrepresented groups or from the full spectrum of institution types into the activities of the center”. An additional CoV recommendation indicated that “Management of large complex proposals such as i-Plant should not be the domain of a single individual, but rather should emerge from sustained interactions of a team of PDs.” The CoV recommended “additional NSF staff input concerning the process between panel reviews, SVT, and communication with NSB when funding requires such approval.”

*Response:* These are all extremely important issues, and each of them has been addressed in the PEP described above and through the newly established management team for iPlant. Moreover, in January 2014 DBI hired a Presidential Management Fellow, to oversee the administration of all Centers managed by DBI and to serve as a critical liaison between DBI and BIO staff, SVTs and managing program directors. In addition to the BIO iPlant reverse site visit, BIO also held a reverse site visit for the C-MORE Center on marine microbiology in June, 2014. These reverse site visits were open to all BIO staff and the entire process of renewal and coordinated feedback to the Centers has been made more transparent. DBI is working to ensure that relevant NSF staff and program directors have a voice in the ongoing process of review of Centers managed by DBI.

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

**Recommendation:** In general, the CoV found the selection of reviewers for both the RR and HR cluster to be appropriate and commented that, “POs are to be commended on selection for reviewers”. However, they also indicated that for the RRC, “In some cases the lack of under-represented minority panelists or panelists from MSI/HBCU institutions was evident. [and that] Matching of proposal diversity to panel diversity should continue to be carefully evaluated.”

*Response:* This point is duly noted. DBI will encourage programs in the RRC to reach more broadly for reviewers from under-represented minority groups and from MSI/HBCU institutions. As a first step, DBI has begun to review more carefully panel rosters prior to NSF appointment letters being sent to panelists. Other steps towards this end will include assessing the efforts made by programs to invite reviewers from under-represented groups and MSI/HBCU institutions, and increasing DBI’s outreach to MSI/HBCU institutions.

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

**Recommendation:** The CoV indicated that the programs in both clusters were managed “effectively”, but they did highlight concerns with aspects of two specific programs. First, they disagreed with the decision to review CSBR proposals biennially, and they, “Strongly recommend that annual competitions be re-instituted, especially given the OSTP and NAS directives on the critical importance of bringing the nation’s biological collections into currency for science and society.” Secondly, they suggested that the RCN-UBE program is currently funded on an ‘ad-hoc’ basis, and will benefit from a more permanent funding mechanism housed in DBI.

**Response:** DBI is pleased to report that all DBI programs are now on an annual basis. After consultation with the Office of the Assistant Director (OAD) of the Biology Directorate, John Wingfield, the CSBR program was returned to an annual basis, and the current solicitation has upcoming submission deadlines of August 11, 2014 and July 13, 2015. The RCN-UBE program has wide support within the BIO Directorate and has typically been supported with funds from Emerging Frontiers reflecting the innovative nature of the program and the enthusiasm of the BIO OAD. As RCN-UBE becomes a more stably established in DBI, is likely that its source of funding will be more permanently reflected in the DBI operating plan.

**Recommendation:** With regard to the Responsiveness of the program to emerging research and education opportunities, the CoV indicated that that “All of the programs are responsive, as appropriate to their mission, to emerging opportunities.” However, they recommended that, “Each program should develop metrics to assess their programmatic impacts on and responses to emerging community needs and opportunities as identified by the community itself”. In addition, it was recommended that the RRC “develop outreach programs to engage PUIs, MSI/HBCU, and non-academic institutions and PIs to provide breadth and diversity to the reviewer and PI pools.”

**Response:** The suggestion to develop metrics of impact that are specific to each program is a very good one. Indeed, the need for metrics is recognized across NSF as urgent in the continuing effort to work towards data-driven policy and program management. DBI is used to using metrics with regard to program management and funding portfolio, but has less experience with metrics focused on community impact. DBI will look to the REU-sites program as a model for metric-driven evaluation of program management and portfolio. The REU-sites program has put into practice a program-wide survey focusing on tracking student progress in science experiences and careers. The survey was developed by PIs through a competitive process and is now required annually for all PIs supported by the program. The survey and its utility were shared with PIs during a recent PI meeting held by the REU-sites program near NSF. The combination of PI-driven survey development and requirement or encouragement to use the survey will work well in other DBI programs. In fact, as mentioned above, a similar survey to assess the bottlenecks from development to

assimilation of newly developed instrumentation through the IDBR program was evaluated on IDBR PIs at a recent PI meeting of that program held in May of this year. The development of metrics will be discussed during the upcoming DBI retreat in September 2014. Although metrics are challenging to develop and rarely capture all the nuances of impact, DBI recognizes their importance and will continue to work toward developing and implementing additional metrics in the upcoming year; already underway in DBI are plans to conduct surveys to determine the impact of investments in the support to postdocs funded through the fellowships program, through Centers postdoctoral programs, and as participants on standard research awards.

We appreciate the suggestion of the need for continued engagement of PUIs and the MSI/HBCU communities in DBI programs, particularly for programs in the RR cluster. In the last year the programs in the RR cluster have made a strong and consistent effort to include diverse institution types in all phases of proposal review. Additionally, the RR cluster pays close attention to awards made to PUIs and MSI/HBCU institutions and the distribution of submissions and planned awards to such institutions is an important part of the panel debriefing that takes place two to three weeks after every panel review. The inclusion of PUIs and minority serving institutions extends to DBI's oversight of large programs, including Centers, and outreach events. For example, as a result of a site visit to iDigBio, the organizational and outreach hub of the national digitization efforts funded by the ADBC program, DBI staff encouraged submission and subsequently awarded a supplement to iDigBio to increase their efforts in minority and small institution participation in collections activities. Their response has been outstanding, with immediate impacts on minority student involvement in the collections and digitization enterprise. Several programs in the RR cluster have made outreach visits to PUIs and MSI/HBCU institutions in the past year. Recent visits to Towson, Georgia Southern, and several PUIs in Massachusetts fall into this category. Additional outreach events at national student-centered conferences, such as the Council on Undergraduate Research (CUR), as well as events targeted to PUIs at annual meetings of scientific societies, make for a robust focus on undergraduate and minority institutions by the RR cluster. Another way DBI monitors awards is tracking submissions made by underrepresented minority PIs. For example, a recent query using the NSF database reveals that American Indian PIs who submitted proposals to BIO the past five years have a 34% funding rate which is higher than average. Tracking submissions inform our decision on funding as well as targeted outreach to those who have not been as successful in getting funded. The Division will continue such activities as a priority in all phases of its review and outreach.

#### **Section IV: Questions about Portfolio.**

**Recommendation:** The CoV felt that many aspects of the DBI portfolio, such as award duration and sizes, focus on innovation and interdisciplinary work and balance across disciplines were appropriate (although the CoV found it difficult to determine the disciplinary breadth of some programs due to limitations of the DBI self-study). The CoV also felt that the portfolio included a healthy number of awards to new investigators and integrated research and education, particularly in the RCN-UBE program. One area that the

CoV suggested needing improvement was the geographical distribution of awards. Additionally, the CoV suggested increasing the number of awards to PUIs, 2-and 4-year institutions, non-academic institutions and to underrepresented groups.

*Response:* Some of the CoV concern about geographic distribution of awards was due to limitations of the self-study. For example, it was unclear to the CoV how the number of awards by state scaled with the number of submissions by state. It is indeed true that California and Massachusetts have high numbers of DBI awards across many programs, but these are matched by high numbers of submissions. States such as the Dakotas, Wyoming and Nebraska submit few proposals and therefore receive relatively few awards. These data are reviewed in the panel debriefings for each program. However, the data could be better incorporated into the CoV materials. Overall the geographical spread of programs in DBI is similar to those of other Divisions. For the REU-sites program, there is a full listing of site locations on the NSF web site. Overall we feel that geography is an important variable in our funding decisions and, in addition to providing more detailed information at the next CoV, DBI will remain committed to a geographically diverse portfolio.

The situation with awards to PUIs, 2-and 4-year institutions, non-academic institutions and to underrepresented groups is similar to that for geography. We track this information closely during panel debriefings, but, again, the information was not presented in the CoV packet. The same correlation between number of submissions and awards holds true for PUIs and non-traditional institutions, although the funding rates for these groups is somewhat higher than that for awards to mainstream institutions. So, despite the small absolute number of awards to these institutions, the funding rates are in their favor, and this is monitored in the debriefings and throughout the decision making process by program directors. In summary, these perceived shortcomings in the DBI portfolio are likely the result of inadequate reporting in the CoV self-study.

## **Section V: Other Topics.**

*Recommendation:* The CoV indicated that “Opportunities to enhance effective communication might be helpful within DBI, not only among staff, but also between the divisional leadership and staff. Also, cross-training and facilitating back-up support for programs could avoid the information challenges that arose during the COV when the single individual responsible for Center administrative support transferred and others had to scramble to provide requested data.”

*Response (This also addresses recommendation #2 in the “CoV Summary of Issues for Consideration”):* DBI has continued to foster an environment to enhance communication across clusters, between scientific and administrative staff as well as with DBI leadership. One aspect of communication that was the focus of last year’s DBI retreat was the topic of “respect”. We feel that this discussion improved communication within DBI significantly. As a continuation of these efforts DBI will employ a professional facilitator at our retreat in September of 2014 who will work with our entire staff to develop better and more efficient ways to increase communication within the division. In addition, DBI has inaugurated a

monthly to bimonthly discussion series called “DBI Presents”. The main goal of “DBI Presents” is to engage with other divisions in BIO to think of innovative ways to leverage DBI investments in infrastructure and to raise awareness in other divisions of these investments so as to invest more efficiently. The series has met with enthusiasm and good attendance by all divisions. An example of leveraging DBI investments with other divisions was the Dear Colleague Letter released jointly with IOS in March of 2014 seeking EAGER proposals to promote our understanding of how neural circuits function to produce behavior and cognition. The community elicited an overwhelming response submitting close to 600 two-page project descriptions for potential EAGER submissions. DBI made 11 awards investing roughly \$1.8M through this call as part of the President’s BRAIN initiative; a total of 36 awards were made by NSF for total of ~\$11M invested foundation wide.

**Recommendation:** There was an indication by the CoV that DBI programs are somewhat risk-averse and they suggested that “programs should be encouraged to support innovation and high risk/high payoff projects.”

*Response (This also addresses recommendation #5 in the “CoV Summary of Issues for Consideration”):* DBI leadership through discussions with program officers has been promoting this within the DBI culture. While initially seeking to support only ~4 DBI awards in response to the BRAIN EAGER DCL described above, we believe that DBI’s ultimate support for 11 of these projects is a clear indication that the programs in DBI are beginning to increase their willingness to support high risk/high payoff research. We will continue to support and encourage these sorts of activities moving into the future and as we begin to formulate the plan of action described at the end of this response.

**Recommendation:** Overall there was disillusionment with several aspects of the COV review process itself. The CoV, for example, mentioned that “many parts of the Center proposals/transactions were not available at the start of the COV and thus delayed the progress in the review of these portfolios.”

*Response:* The DBI Division Director sincerely apologizes for the deficiencies in the CoV process. Preparing the self-study and data sets did not begin in earnest until after the appointment of a new DBI Division Director in June 2013. There was indeed some difficulty in communication with the DBI Administrative Staff about sampling of proposals for the self-study, and the level of detail in the self-study desired by the CoV was clearly suboptimal. Specific recommendations for improving the CoV process next time include: 1) full availability of all elements of proposal jackets one month before the CoV meeting takes place; 2) increased detail on program processes and portfolios, specifically showing results on a program-by-program basis, rather than cluster averages; 3) further detail on submissions and awards by state, to aid in understanding investments geographically; and 4) better articulation of the vision for DBI and how DBI is reacting to emerging trends in infrastructure. All of these issues will be taken into account when preparing the next self-study for the CoV in 2016.

**Recommendation:** The CoV felt that Centers were too large and complex to be relegated as part of a larger Division-wide CoV process and suggested that it might be better to separate the review of Center management from the rest of the division.

*Response:* The suggestion to have a separate COV for Centers is worth considering; however, at this time we feel that this may not be necessary to achieve the desired goals of efficiently evaluating Centers during a single COV. The COV expressed frustration, not only at the limited availability of materials on Centers, but also at the sheer size of the task of evaluating Center review processes in addition to those of DBI core programs. We believe that much of this frustration was due to the way in which information was presented and we are confident that changes we are implementing in DBI now will facilitate a much more efficient process in accessing and reviewing the needed materials in order to make useful recommendations. We think that, instead of implementing a second COV, it would be more efficient to add an additional pre-COV webinar three to four weeks ahead of the COV meeting to help deal with the large amount of information associated with the diverse set of programs managed by DBI. In essence, separating our single COV into two would go against the spirit of integration across DBI we are currently promoting; we are discovering that programs in HR cluster can learn much from those in the RR cluster and believe the benefits of leaving Centers as a component of the DBI COV outweighs the disadvantages of the slightly higher workload.

## **SUMMARY OF ISSUES FOR CONSIDERATION**

**Recommendation:** The COV emphasized that they “recognize and acknowledge the important contributions of DBI to the vitality of the biological sciences, particularly with respect to the development and support of a substantial research and human capital infrastructure for the disciplinary domain.” Their “overall assessment is that the work of DBI has been exemplary, particularly with respect to the integrity of the review process and the development of a robust program portfolio.” In the Summary of Issues for Consideration, the CoV offers seven recommendations that emerged from their study of the materials, conversations with DBI and BIO staff at all levels, and general observations over the three days of the site visit. Recommendations #2, 4 and 5 have been addressed specifically in above sections. Recommendations #1, 3, 6 and 7 are addressed below.

*Response:* (Recommendation #1 – for DBI to lead the development of a Directorate-wide process to assess the effectiveness and impact of the “broader impacts” review criterion). Towards this end, we have gained significant momentum over the past year in broadening participation, as well as in increasing interactions between DBI and other divisions and Directorates. We have been encouraging program officers to continue their emphasis in this area when determining funding decisions. Several DBI program directors have emphasized diverse institutions and student groups in their outreach events. DBI plans, as

usual, to have a significant presence at the upcoming SACNAS meetings and other venues targeted towards diverse undergraduate groups. In addition, the DD for DBI is on the NSF-wide working group on broadening participation and has helped raise awareness within DBI and BIO generally about this emerging issue at NSF. DBI is contemplating a number of avenues to increase emphasis on BP in the upcoming year, including a DCL focusing attention on BP and raising awareness of BP practices that have worked in programs such as REU-Sites. In coordination with other efforts across BIO, DBI plans to take a leading role in scaling up BP initiatives in BIO. DBI's commitment to the Broader Impacts review criterion, including broadening participation is manifested in its active participation in SACNAS and AISES conferences. DBI/BIO coordinates a unified presence of NSF at these conferences, so that students and faculty in disciplines supported by NSF are provided relevant information on potential NSF funding and other opportunities. DBI's efforts include participation by the other Directorates, enabling conference attendees to receive information at a single one-NSF booth. DBI has recently lead an NSF-wide effort to support a bold \$2M proposal by AISES to develop Native American faculty in STEM which encompasses a number of assessment approaches. This proposal received support from all directorates across NSF and is being managed like a cooperative agreement, to ensure that adequate progress towards proposal goals are met before new funds are awarded on an annual basis.

*Response:* ([Recommendation #3 – for DBI to lead, perhaps with SBE, the development a robust process to assess the effectiveness of a synthesis center](#)). DBI has considered this and realizes that it would require increased resources to do this effectively. However, to begin the process, we have initiated a process comparing postdoctoral training through three different mechanisms; through individual research awards, through Center-managed postdoctoral programs, and through our postdoctoral fellowship program in order to determine if postdoctoral fellows are better-prepared for their future careers depending on the mechanism used to support their training. Our presidential management fellow is conducting this study and the results should be incorporated into a white paper by the end of the year.

*Response:* ([Recommendation #6 – for DBI to lead the development of Directorate-wide strategies to increase the effective integration of biology research and undergraduate education](#)). Through its support and management of the REU-sites program, DBI has been a leader in supporting the integration of undergraduate education and research. To promote this area further, DBI will continue to support the RCN-UBE program. At the time of this writing, the RCN-UBE program solicitation is being revised and updated for a new competition in 2015. With support of the BIO OAD, this will extend the lifetime of this increasingly popular program for another two years. We anticipate that this program will seed new and creative ways the BIO research community engages undergraduate students in their education. We have articulated the importance of this program to the BIO OAD and have reached out to the community frequently to gauge interest and promote the program. We are hopeful for an increase in the number of proposals this year given our efforts. We have confirmed continued enthusiasm for the program with the EHR Division for Undergraduate Education.

*Response:* (Recommendation #7 – for DBI to develop effective mechanisms through which they will track their progress on the recommendations that emerge from processes such as the COV). DBI recognizes and sincerely appreciates the highly valuable feedback provided by the COV in its completed templates and “Summary of Issues for Consideration”. The manifestation of this feedback will be for DBI to develop a clear plan to implement the action items presented in our response to the CoV’s recommendations. The current DBI leadership will develop such a plan of action and share it broadly across the division in order for DBI to improve its management and oversight of its highly diverse portfolio of programs and activities. For example, with regard to managing the CoV process itself for 2016, DBI will break review data down by individual programs so members of the CoV can more readily see trends that need to be addressed in specific programs and make recommendations accordingly. In addition, the DBI Calendar will be updated with deadlines for generating proposal data and supporting materials six weeks prior to the CoV meeting allowing time for CoV members to review the materials and prepare questions about them at the Webinar which will be 3-4 weeks prior to the meeting. Finally, the Centers data will be separated out in the self-study with charts depicting the various management teams and working groups involved in managing each Center. By implementing the action items resulting from the CoV process, DBI will foster its leadership role in several high priority areas central to the mission of the BIO Directorate, while also focusing on the importance and uniqueness of DBI’s activities within BIO. In this regard DBI will continue its efforts to forge links with the Directorate for Education and Human Resources; will employ the increased use of metrics to measure impact of human and resource infrastructure activities; will improve the management of Centers as well as the evaluation of and implementation of Broader Impacts in the review process. All of the COV recommendations to DBI exhibited the intention that DBI thrive and capture trending opportunities, particularly in the areas of undergraduate education and broadening participation.