

**RESPONSE to the TCUP FINAL REPORT
For
FY 2010 NSF COMMITTEE OF VISITOR (COV) REVIEW**

Guidance to NSF Staff: This document includes the FY 2010 Committee of Visitors Final Report of the TCUP Program. The COV followed the specific guidance for the COV review process as described in Subchapter 300 - Committee of Visitors Reviews (NSF Manual 1, Section VIII) at: www.inside.nsf.gov/od/oia/cov.

The COV report provides a balanced assessment of NSF's performance in two primary areas: (A) the integrity and efficiency of the **processes** related to proposal review; and (B) the quality of the **results** of NSF's investments that appear over time. The COV also explores the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future. The COV studied confidential material for Part A of the Core Questions such as declined proposals and reviewer comments. The *COV report does not contain confidential material or specific information about declined proposals*. Discussions leading to answers for Part B of the Core Questions involved the study of non-confidential material such as results of NSF-funded projects. The report is useful in assessing agency progress in order to meet government-wide performance reporting requirements that are available to the public. We understand that material from COV reports may appear in NSF performance reports and may be subject to an audit.

**FY 2010 NSF COMMITTEES OF VISITORS (COV)
PROGRAM REPORT FOR TCUP**

The table below has been completed by program staff.

Date of COV: August 31 – September 2, 2010
Program/Cluster/Section: Tribal Colleges and Universities Program (TCUP)
Division: Human Resource Development (HRD)
Directorate: Education and Human Resources (EHR)
Number of actions reviewed:
Awards: 14 Declinations: 17 Other: N/A
Total number of actions within Program/Cluster/Division during period under review:
Awards: 81 Declinations: 34 Other: N/A
Manner in which reviewed actions were selected:
Random sample of award and non-award actions ending in the numerals “3,” “5,” and “8” at end or second from end of award/decline identification number. The sample includes new, incremental, and supplemental actions other than this methodology to form a representative sample of the portfolio.
<i>Innovation through Institutional Integration (I3) actions may be included in the total number of actions but were not reviewed by this Committee of Visitors.</i>

PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

The COV briefly discussed and provided comments for *each* relevant aspect of the program's review process and management, and based comments on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. We provided comments for *each* program that was reviewed and for those questions that were relevant to the program under review. We used quantitative information to answer some questions, and made constructive comments noting areas in need of improvement.

A.1 Questions about the quality and effectiveness of the program's use of merit review process. Provide comments in the space below the question. Discuss areas of concern in the space provided.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE ¹
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>COV Comments:</p> <p>For the last three years, the review methods used for evaluating applications prior to awards included panel and ad hoc reviews. Site visits were carried out mostly post award. The ad hoc and panel reviews are appropriate methods that allow for selection of the best proposals that could be funded as well as provide insights and feedback on proposals that are considered meritorious but still require revisions. In general there were five reviewers per application who gave varying degrees of critical examination of the applications. The panel review is the most appropriate forum to bring a diverse group of reviewers to look at a spectrum of project types and come to an agreement on the qualities of these proposals.</p> <p>The various types of proposals included continuing grant increments, competitive renewals, new projects, returned/revised applications, supplements, and various other categories.</p> <p>Panel comments were summarized and a recommendation for either funding or declination is made after reaching a consensus. In instances where there were disagreements, the majority opinion may prevail and in some instances final decision is deferred to the program director that included in the review analyses findings/evidence for the funding or declination decisions and a clearly stated rationale for the decisions made.</p> <p>The overall process is appropriate because several parties work to come to final</p>	<p>YES</p>

¹ If "Not Applicable" please explain why in the "Comments" section.

<p>decisions. The process allows for a good flow of feedback to the applicants as they are given supportive critiques.</p> <p><u>Staff Response:</u></p> <p>TCUP staff adhere rigorously to NSF review policies. Consensus decisions by panelists are the normal outcome. However, due to the significant award size, TCUP staff do their utmost to ensure the most exhaustive review possible, which on some occasions involves on-site visits. Typically, at this stage of TCUP's history, the more highly-rated proposals are submitted by institutions that have established track records of success. Pre-award site visits are reserved for newer colleges, first-time awardees, or those institutions whose proposals received mixed evaluations from the panel.</p>	
<p>2. Are both merit review criteria addressed</p> <ul style="list-style-type: none"> a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? <p>COV Comments:</p> <p>In general, both merit review criteria were addressed in the individual reviews, although with varying degrees of assessment. The reviews differed from proposal to proposal in terms of quality and consistency; a lot depended on the panel group - the experience of the reviewers with the process and their understanding of the two merit criteria.</p> <p>Reviewers were not always consistent in their assessment of what constituted intellectual merit or broader impacts; in many cases the reviews simply stated what the applicants wrote without offering any critical judgment or whether they agree or not. This was usually the case with the broader impacts. It is not known what prior training or instructions were given to the reviewers to assist them in identifying and analyzing the broader impacts of the applications. It may help if the reviewers are given further instruction or training before and during the panel review.</p> <p>Although strengths and weaknesses were addressed in some reviews, these do not necessarily indicate whether the applications have strong intellectual merits or broader impacts. Usually in proposals that were recommended for funding, such discussions were limited. Some reviews also had difficulty identifying what would constitute as broader impacts – hence the comments are rather short or lacking substance.</p> <p>The panel summaries reflected the individual reviews and likewise, while the intellectual merit was addressed considerably, the broader impact was rather short or superficial.</p>	<p>YES</p>

<p>The Program Officer review analyses were always helpful in providing more information about the process and how the recommendations or consensus agreements came about. In most instances, the merit review criteria were addressed substantially. There were a few cases, particularly those with declined funding, where the intellectual merit and broader impacts were not identifiable due to the way the proposals were written.</p> <p>The review analyses could include more critical judgment of the reviews given by the individual reviewers and how these all fit into the panel discussion.</p> <p><u>Staff Response:</u></p> <p>TCUP attempts to use a judicious mix of experienced and new reviewers. Some struggle to differentiate between the merit review criteria, while others give broad attribution for broader impacts based only upon the target populations. This is particularly true of reviewers who have limited experience with NSF proposals. The program staff will develop a more explicative briefing for the panelists, and will seek more explanation where reviews are brief on these points. In terms of critical judgment of the reviews, the TCUP staff continues to value the assessment of all reviewers, and finds merit in almost every review.</p>	
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<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>COV Comments:</p> <p>Comments from the reviews varied, but generally provided adequate information to justify or explain their assessment of the proposals. The panel summary and follow up discussions with the program officer supplemented this assessment that helped to understand the rationale for the reviewer recommendations. However, in some cases it appeared that the reviewers either did not have adequate information or were not willing to recommend declining the proposal and would rather defer to the Program Officer.</p> <p>Some reviewers simply had single sentences and also did not provide critical assessment of the approaches and methodologies proposed.</p> <p>In some instances, after the panel discussions, some reviewers changed their assessment of the proposals but failed to update the reviews that finally went out to the applicants. This is rather distressing for some applicants especially if there are so many positive comments and yet the final review and panel summary showed more negative critiques, which led to no funding. It would be helpful if the reviewers could amend their reviews before these are sent out to the applicants.</p> <p><u>Staff Response:</u></p> <p>As mentioned previously, TCUP panels typically include individuals who have not reviewed for NSF prior to their TCUP experience. In many cases these</p>	<p>YES</p>
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<p>individuals are junior professionals or graduate students (who have specific relevant expertise in STEM studies within eligible TCUP institutions), and may be loathe to appear too harsh in their assessments or may be insecure about being too forthright with their assessments in the presence of their senior peers. The program staff will strive to work more closely with junior reviewers to ensure their opinions are stated substantively, and with all reviewers to ensure that the comments received by the proposers are sufficiently clear and helpful to their future submissions.</p>	
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>COV Comments:</p> <p>Generally the panel reviewer ratings were consistent with few exceptions indicating divergent views on the quality of the proposals. In those limited cases, clarification was provided through further discussion or seeking additional information from the proposal writers — or in a few cases conducting a site visit to clarify issues and obtain information for a final decision.</p> <p>The summaries often provided the strengths and weaknesses of the proposals as they pertain to the intellectual merit. These were then used as a gauge of whether the proposal was meritorious or not.</p> <p><u>Staff Response:</u></p> <p>TCUP staff strive to ensure that the panel summaries capture the nature of the discussions around each proposal, rather than being a recapitulation of the individual reviews. The methods to accomplish this are not always clear and straightforward, as each scribe will have a different approach and understanding of the process and the discussions. However, the TCUP staff continue to seek a satisfactory depth in panel summaries, ever aware that the proposers find these documents helpful.</p>	<p style="text-align: center;">YES</p>

<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>(Note: Documentation in jacket usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.)</p> <p>COV Comments:</p> <p>The final decisions were consistent with the panel consensus and the review analyses, and justified by the documentation. The Program Officer supported the recommendation made by the panel and the final decisions were also explained in the context statement, both individual and panel summaries, site visits in limited cases, and the Program Officer analyses and diary notes.</p> <p>The final decisions for all other applications were consistent with the panel reviews.</p> <p><u>Staff Response:</u></p> <p>Although reviews are advisory in nature, TCUP staff strive to achieve a judicious balance of new and experienced reviewers, because experienced reviewers ensure that the recommendations of the panel are realistic and reflect the capabilities of the different proposing institutions. Given the expertise of TCUP reviewers, it is seldom necessary to override a panel's recommendation. Discrepancies between reviewers' and panelists' recommendations and the final program director recommendation are more often a function of limited program funds than of a disagreement over merit.</p>	<p>YES</p>
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<p>6. Does the documentation to PI provide the rationale for the award/decline decision?</p> <p>(Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written or telephoned with diary note in jacket) of the basis for a declination.)</p> <p>COV Comments:</p> <p>Discussion disagreements were well documented and explained.</p> <p>Panel summaries were succinct and addressed the merits of the proposal as well as the weaknesses. The individual reviews, panel summaries and context statements were all consistent with the decisions made. Where there were disagreements, the panel summaries provided further explanation on how the final decisions or consensus were made and supported by the Program Officer's review analyses. The information provided to the proposers,</p>	<p>YES</p>
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<p>particularly the individual and panel summary reviews, made the case for the final decisions.</p> <p>Only in one instance did the reviews appear to be inconsistent with the final decision to fund the proposal. In that case, the Program Officer did explain the reasons for the final decision to be somewhat inconsistent with the reviews. It might have been helpful if the decision were explained further in a diary note.</p> <p><u>Staff Response:</u></p> <p>While it is true that TCUP staff very often concur with panel recommendations and findings, the odd incident of disparity between reviewers' individual remarks and a panel's conclusions should be carefully documented. TCUP staff will make every effort to ensure that this is always the case.</p>	
<p>7. Is the time to decision appropriate?</p> <p>Note: Time to Decision - NSF Annual Performance Goal: For 70 percent of proposals, inform applicants about funding decisions within six months of proposal receipt or deadline or target date, whichever is later. The date of Division Director concurrence is used in determining the time to decision. Once the Division Director concurs, applicants may be informed that their proposals have been declined or recommended for funding. The NSF-wide goal of 70 percent recognizes that the time to decision is appropriately greater than six months for some programs or some individual proposals.</p> <p>COV Comments:</p> <p>Based on the information provided for the assigned proposals, (actual award made, date of DD concurrence for declines, deadline for submissions) the panel thought that the time to decision did not meet the NSF performance goal. However, this conclusion was based only on the sample proposals (which were mostly implementation projects) assigned to each COV panelist and did not include other types of applications. These assigned projects may constitute only a fraction of the whole TCUP portfolio and may not reflect the overall performance of the program in meeting the time to decision. Moreover, as commented upon above, "The NSF-wide goal of 70 percent recognizes that the time to decision is appropriately greater than six months for some programs or some individual proposals." This is likely a factor for the TCUP program, and should be taken into account.</p> <p>Staffing issues (workload, available permanent staff for projects that require constant support and guidance) were likely connected to timing problems and additional permanent program staff may alleviate the situation.</p> <p>On the final day of the COV meeting, we received additional information indicating that the data given to us on time to decision may have been incomplete or incorrect, and that time to decision may actually be within the NSF Annual Performance Goal. Based on that, we feel we cannot make a clear judgment, and since we have been mandated to provide a YES or NO answer</p>	<p>YES</p>

to this question, and NO is in doubt, we have taken the cautious approach by not giving a NO answer that could cause unwarranted concern about program personnel performance that could well be within guidelines.

Staff Response:

TCUP staff is constantly vigilant about dwell time; always aware that proposers, whether they are being recommended for award or for declination, need feedback as soon as possible. In recent years, circumstances such as co-funding decisions and delay of notice of allocations have extended the dwell time of award decisions. TCUP staff have addressed this by moving the deadline for submission back in the fiscal year. This accommodation allows TCUP to accomplish almost all award decisions within six months. However, it is not the best resolution, as TCUP awards are **institutional** in nature, and need to be awarded with sufficient lead time prior to the beginning of the academic year. Unfortunately, many recent awards have been awarded in August or September, which effectively prevents the institution's leadership from starting the project until mid-academic year. TCUP staff continue to strive for a resolution that will address the awardees' needs and maintain customer service standards.

8. Additional comments on the quality and effectiveness of the program's use of merit review process:

COV Comments:

The process for selection of meritorious proposals through ad hoc and panel reviews are very effective, particularly in cases where there are disagreements. The process clearly shows how reviewers with varying opinions can come to an agreement and make final recommendations that are agreeable if not to all, then to the majority of the reviewers including the Program Officer. The additional site visit for some projects may be better if done as part of the review prior to award rather than post award. This may require more time and staffing on the part of the program, which may not be possible if there is only one permanent staff.

Timing and staffing are the two major underlying issues. This is not due to lack of effort on the part of the program staff, but it may be due to the way NSF is configured in terms of hiring permanent staff and rotators and when deadlines are set that sometimes do not coincide with the school calendar resulting in unnecessary but unavoidable delays particularly during school breaks, when it is more challenging to contact the pertinent school officials to complete transactions.

The overall balance of the number of Program Officers in each program needs to be considered when referencing TCUP in particular, because more effort should be put into thinking about the best way to staff for long-term goals. Continuously changing Program Officers is not the best approach in this instance.

We suggest adopting specific timelines to stay on track.

Staff Response:

While the focus of the current COV template is on program management as it relates to new

submissions, it should be remembered that the lion’s share of TCUP management is post-award. The configuration of one long-term permanent program director paired with a rotating program director works well for that management, particularly when the rotator is very familiar with the awards, and with the institutions that TCUP serves. The period covered by this COV review illustrates that fact well — the rotating program director was able to manage normal assignments and site visits, allowing the permanent program director to concentrate on problem and policy areas. The appointment of a rotating program director enriches the field as well, since many will return to serve the TCUP community in a professional capacity. Moreover, short-term fellowships, such as the QEM TCUP Fellowship, will provide assistance with the workload and will enrich the field by sharing his or her experiences during the fellowship.

A.2 Questions concerning the selection of reviewers. Provide comments in the space below the question. Discuss areas of concern in the space provided.

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE ²
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>COV Comments:</p> <p>There was a good mix of disciplines, backgrounds, qualifications, and abilities to look at broad issues that relate to each individual tribal college and university. Reviewers came from fields across the STEM disciplines, with expertise in many different areas.</p> <p>A lot of reviewers from tribal colleges and universities were included, which is very important because they are well aware of what the institutions really need and how to carry out project implementation.</p> <p><u>Staff Response:</u></p> <p>TCUP strives to use a judicious mix of senior and junior STEM and educational professionals in its reviewer pool. While the staff do not typically use Principal Investigators (PIs) from other active projects to review proposals, those professionals whose awards have expired are an excellent addition to the pool, as are retired TCUP professionals</p>	<p>YES</p>
<p>2. Did the program use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups?</p>	<p>YES</p>

² If “Not Applicable” please explain why in the “Comments” section.

<p>Note: Demographic data is self reported, with only about 25% of reviewers reporting this information.</p> <p>COV Comments:</p> <p>There was a good balance of reviewers. The program took care in ensuring that then composition of reviewers was diverse and well balanced — taking into consideration the geography, type of institutions (TCUs, two-year non-Tribal Colleges, Tribal and non-Tribal four-year institutions, research intensive institutions, and independent consultants), gender, ethnicity, and discipline expertise.</p> <p>Having reviewers from HSIs on the panel or even as ad hoc reviewers could have added another perspective to the review outcomes if they were included more often, particularly because many HSIs have a considerable number of Native American students. Also missing in this group are reviewers from Alaska Native and Native Hawaiian-serving institutions. Adding more reviewers from these groups can potentially expand the reviewer pool.</p> <p><u>Staff Response:</u></p> <p>TCUP staff strive to have TCUP’s reviewer slate reflective of the proposing institutions, and therefore the student population, that are being targeted by each competition. This includes an effort to have an Alaska Native or Native Hawaiian reviewer on every panel. Sometimes circumstances intervene to make this impossible — for example, one reviewer from Alaska fell ill immediately prior to the panel. The TCUP staff is very grateful for the offer to help identify a broader reviewer pool from indigenous populations, particularly Native Hawaiians. TCUP staff feel strongly that TCUP has a leadership role in introducing more indigenous reviewers to the NSF process. This recommendation continues to be of high priority and high concern to the TCUP staff.</p>	
<p>3. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>COV Comments:</p> <p>There were no direct conflicts of interest with the reviewed proposals. However, TCUP should expand its reviewer pool so they have more choices of reviewers and “recycle” less. This will help avoid the potential danger of creating conflict of interests, or appearance of COI. The COV panelists believe that there is sufficient number of expert reviewers that can be tapped for this program.</p> <p><u>Staff Response:</u></p> <p>TCUP welcomes the opportunity to expand its reviewer pool to include more STEM professionals from indigenous populations. As the programs targets a fairly small and clearly defined set of institutions, coupled with the experience base of the program staff, the chances of significant numbers of conflicts-of-interest remain small.</p>	<p>NOT APPLICABLE</p>

4. Additional comments on reviewer selection:

COV Comments:

There was a good mix of reviewers and the reviews also varied in style and quality. Although overall there was mostly a consensus among the reviewers when it came to final recommendations, the quality of the reviews varied from substantive and helpful critiques to some non-review (lack of critical assessment but repeats what the PI has written in the proposal). This may reflect reviewers' familiarity with the merit review criteria used as well as with the overall review process. Not all were articulate with the concerns or strengths of the proposals.

Overall, the selection process has come up with a good collection of reviewers, and would not seem to be in any need of serious revision. However, expanding the reviewer pool could help bring new opinions and qualities into the mix of the existing pool of experienced reviewers and avoid potential COIs. This could also assist with the process of building leadership by inviting new or unseasoned reviewers, so they eventually will gain the insights on writing competitive proposals.

A possible source of recommendation for potential reviewers may come from funded projects, and TCUP could stress the importance of recommending panel reviewers for proposals; this may allow the program to recruit more American Indian reviewers, as well as other faculty members that are familiar with TCUs.

Staff Response:

TCUP staff believe in the leadership obligation to expand the reviewer pool, and particularly welcomes suggestions for ideas of identifying more indigenous STEM professionals who are familiar with the TCUP institutions and their needs.

A.3 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE ³ , OR DATA NOT AVAILABLE
<p>1. Overall quality of the research and/or education projects supported by the program.</p> <p>COV Comments:</p>	<p>APPROPRIATE</p>

³ If "Not Appropriate" please explain why in the "Comments" section.

<p>TCUP supports very high quality and competitive projects that are very thoughtful of and relevant to the indigenous culture and educational needs. The projects are very responsive to the national priority of developing a more robust STEM program and pipeline. Through these projects students are provided the opportunities to explore the world of STEM with hands-on research experiences, experiential learning, and development of technical skills. The projects also allow for the development of partnerships with other institutions, which should lead to more interaction and opportunities not only for the students but also the faculty. These projects also allow participating students to pass on their knowledge and enthusiasm as well as share their experiences with the younger generation through service learning in K-12 schools supported by the tribes. Because the projects are tailor-made for the Tribal Colleges and Universities (TCUs) that allow further development of these institutions there is a growing number of degree programs that have been successfully institutionalized and therefore more students will benefit from the TCUP support.</p> <p><u>Staff Response:</u></p> <p>TCUP staff is grateful for the COV panel’s recognition of the crucial role the National Science Foundation’s support has played in the development of the STEM programs of study in these unique and important institutions. NSF has been a partner in STEM development for TCUs for over thirty-five years, and TCUP support is enabling the TCUP institutions to position themselves to win support from other NSF program areas, including R&RAs.</p>	
<p>2. Does the program portfolio promote the integration of research and education?</p> <p>COV Comments:</p> <p>The program solicitation encourages the integration of research and data collection — the tribal colleges and universities that are more advanced are using research and data to foster development of their educational programs.</p> <p>The funded projects integrate research and education, by focusing on engaging and providing students with actual hands-on research activities that promote interest in STEM and increase retention in their degree courses. Opportunities were also given to the students so they can develop additional skills that will be useful as they go into the academic pipeline and into the workforce. The infusion of the native ways of doing and knowing is included in the curriculum and in various courses within a given project.</p> <p><u>Staff Response:</u></p> <p>TCUP staff is grateful that the COV panel recognizes the extent to which the TCUP institutions are embracing undergraduate research opportunities as a way of engaging indigenous students in STEM and enhancing their academic success in STEM studies. The general public would be pleasantly surprised by the extent and degree of research going on at TCUP institutions.</p>	<p>APPROPRIATE</p>

<p>3. Are awards appropriate in size and duration for the scope of the projects?</p> <p>COV Comments:</p> <p>Based on the projects assigned to the COV panelists, the consensus is that the awards made are appropriate in size and duration for the scope of the projects. However, the panelists also recognized that not all TCUs have received NSF funding and the program may have to develop other initiatives in order to address this issue.</p> <p>The ability of the NSF to adequately address the high level of need in the field on Indian education is totally dependent on the annual TCUP program budget. In most cases, funding levels meet the basic needs of the projects on a multi-year basis, which has a limiting effect for potential new projects. As a result some TCUs have not enjoyed the advantage of TCUP funding.</p> <p><u>Staff Response:</u></p> <p>TCUP staff are gravely concerned that the handful of TCUP-eligible institutions that have not received TCUP funding are falling behind their counterpart, but funded, schools in terms of STEM instructional capacity. There is little federal support for STEM programming for TCUP institutions that does not come from NSF. The TCUP staff have attempted several programmatic approaches, and are currently considering new ones as well. The extent to which TCUP can adequately address their needs is partially dependent upon the generosity of co-funding partners such as EPSCoR and ENG.</p>	<p>APPROPRIATE</p>
<p>4. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Innovative/potentially transformative projects? <p>COV Comments:</p> <p>The projects are innovative, cultural, and transformative for their colleges and their communities.</p> <p>The TCUP program allows for the infusion of cultural approaches in the learning environment. This proposition is the foundation for building upon the Native knowledge base of indigenous communities. It also has a stabilizing effect of helping to maintain Native languages and culture that have been ignored over the past decades by the federal government, parochial and the public school systems, and will prove to be transformational for Native education.</p> <p>During the review process, the reviewers were really looking for how the proposed projects included innovative and creative ways of providing</p>	<p>APPROPRIATE</p>

<p>students with holistic learning experiences. Projects that were awarded showed aspects of innovation in pedagogical approaches and instructional deliveries, but also maintained some traditional approaches. There were good attempts in having a balance between Western and native ways of learning.</p> <p>Example of an innovative project:</p> <p>(0803161) University of Alaska Fairbanks Campus - an innovative aspect include bringing STEM opportunities to remote rural locations through technology-based instruction and using Native Elders as a resource to promote interest in STEM careers.</p> <p>Examples of transformative projects:</p> <p>(0803141) Fort Berthold Community College - innovation on approach in teaching future elementary teachers with strong focus on STEM. This is potentially transformative at this institution.</p> <p>(0903612) College of the Menominee Nation - developing a four-year BS degree in elementary education steep in STEM disciplines and use of technology for motivating students and developing model teaching practices.</p> <p><u>Staff Response:</u></p> <p>TCUP staff are grateful that the COV panel recognizes the transformative nature of the projects being accomplished by the TCUP institutions. The program strands at these institutions continue to expand to new horizons.</p>	
<p>5. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Inter- and Multi-disciplinary projects? <p>COV Comments:</p> <p>The program portfolio has a variety of projects with the nature of these projects focusing on STEM discipline; therefore it contains a good balance of inter- and multi-disciplinary projects.</p> <p><u>Staff Response:</u></p> <p>The COV panel correctly recognizes the need to address all discipline areas, depending upon the status of STEM reform at the TCUP institutions. Since many are now implementing BS degrees in STEM, upper division and more focused coursework are often the emphasis of the proposals, but the smaller colleges are still focused on their general STEM programming.</p>	<p>APPROPRIATE</p>
<p>6. Does the program portfolio have an appropriate balance considering, for</p>	<p>APPROPRIATE</p>

<p>example, award size, single and multiple investigator awards, or other characteristics as appropriate for the program?</p> <p>COV Comments:</p> <p>The balance is appropriate considering the above characteristics and the scope and duration of the projects. Additional funded projects that include multiple investigators could be helpful to encourage collaborative efforts.</p> <p><u>Staff Response:</u></p> <p>The new Pre-Engineering Education Collaboratives (PEEC) effort is addressing the area of multi-investigator projects.</p>	
<p>7. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Awards to new investigators? <p>NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant.</p> <p>COV Comments:</p> <p>The TCUP Principal Investigator – as required by the solicitation – should be the chief academic officer of the institution, or other senior academic officer responsible for oversight and management of curriculum and instructional policies for the institution. Thus, given that such people are often called upon to be the PIs for various proposals, it is not surprising that none of the current PIs for TCUP are new investigators. The COV panelists however agree that this is an appropriate requirement for the PIs to ensure that the institutional projects would be successful.</p> <p><u>Staff Response:</u></p> <p>TCUP staff appreciate the understanding of the COV panel for the need to have leadership of these projects centered in upper level college administration. At the same time, TCUP is encouraging more lead faculty to serve as co-PIs or PIs of collaborative projects.</p>	<p>APPROPRIATE</p>
<p>8. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Geographical distribution of Principal Investigators? <p>COV Comments:</p> <p>The portfolio follows the geographical distribution of the TCUs, and because of the concentration of the institutions in specific areas, the geographical distribution is as appropriate as possible in this circumstance.</p> <p>TCUP will have a new initiative, TCU STEM Infusion Projects (TSIPs), which</p>	<p>APPROPRIATE</p>

<p>will encourage new or struggling TCUs to build on their programs and hopefully this will add more balance in the type of PIs and institutions that gets NSF funding.</p> <p><u>Staff Response:</u></p> <p>The COV panel correctly recognizes the limitations of geographic diversity on a program whose awardee community is as tightly defined as it is in TCUP.</p>	
<p>9. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> • Institutional types? <p>COV Comments:</p> <p>This program specifically targets tribal colleges and universities, so by its nature will provide funding for many two-year Native American-serving colleges. In addition, AN/NH institutions are also funded. Given the goals of the project and the nature of the institutions, the balance of institutional types is completely appropriate.</p> <p><u>Staff Response:</u></p> <p>TCUP strives to maintain proportionality across the three institution types.</p>	<p>APPROPRIATE</p>
<p>10. Does the program portfolio have an appropriate balance:</p> <ul style="list-style-type: none"> • Across disciplines and sub disciplines of the activity? <p>COV Comments:</p> <p>The focus of the projects is to develop relevant education materials and academic training based on STEM disciplines. Thus, the program portfolio has the appropriate balance across disciplines.</p> <p><u>Staff Response:</u></p> <p>TCUP staff agree that the TCUP institutions have had significant instructional success.</p>	<p>APPROPRIATE</p>
<p>11. Does the program portfolio have appropriate participation of underrepresented groups?</p> <p>COV Comments:</p> <p>The participation is appropriate because the target audience is Tribal Colleges and Universities or Native American-serving institutions. The mix is not restrictive because TCUs have open-door admission policies and serve the nation appropriately. They serve far beyond the target population.</p>	<p>YES</p>

<p>Although it is likely that not all PIs belong to the targeted groups, there is a very high likelihood that many are Native Americans, thus, it is likely that the portfolio has a very strong representation of underrepresented groups.</p> <p><u>Staff Response:</u></p> <p>TCUP encourages as much diversity as possible among the instructors and administrators who serve leadership roles in TCUP awards.</p>	
<p>12. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports.</p> <p>COV Comments:</p> <p>The program is highly relevant to national priorities. The mission of TCUP is to support the STEM capacity of targeted institutions of higher education and provide them the funding as they develop their programs. The focus on STEM is in line with the national priority and the NSF mission. This is an important priority because of studies that showed the dwindling numbers of students enrolling in STEM disciplines despite the government putting in a lot of money into STEM education programs. One factor that is believed to have contributed to this is the lack of qualified teachers who have the subject-matter knowledge in these areas (Kuenzi, J: CRS Report to Congress, 2008).</p> <p>Therefore, by having programs that support the training of K-12 teachers in STEM might increase interest in STEM careers among younger students, particularly at the K-12 levels. The changing U.S. demographic is another reason to support efforts to train minority groups in STEM. Based on the surveys made by the U.S. Census Bureau (Aug 14, 2008) it is projected that by the year 2050, the U.S. population will be made of more than 50% minority groups.</p> <p>The TCUP is certainly relevant to the needs of an underserved constituent population, American Indians, who wish to establish the direction of their own education and are definitely underrepresented in STEM programs. This has been the law of the land since the 1970s, when three major pieces of legislation, the Indian Education Act of 1972 (P.L. 92-318), the Indian Self-Determination and Education Assistance Act of 1975 (P.L. 93-638), and Title XI of the Education Amendments Act of 1978 (P.L. 95-561) established the principle of educational self-determination for the native peoples of North America. However, the promises of this legislation were only hollow ones until the resources were available to fulfill them. One of the jewels in the crown of Indian educational self-determination has been the tribal college movement, and the TCUP program directly addresses the need for resources to help these colleges succeed.</p> <p>This is the right time to carry out STEM education programs to prepare the next generation of scientists and engineers, and NSF through TCUP is</p>	<p>APPROPRIATE</p>

responding to this call. By allowing TCUs to develop programs that are relevant to their culture while learning the Western science and technology, these institutions are able to provide more meaningful materials to their students.

The current administration has reaffirmed the federal government's responsibility to honor tribal sovereignty by supporting programs to further the development of tribal communities. The TCUP program represents one small but important part of addressing the long overlooked developmental needs of Native students and communities.

Staff Response:

TCUP staff appreciate that the COV panel recognizes the role played by TCUP in general and the STEM Teachers of Excellence Education Projects (STEEP) strand in particular to help broaden participation in the Nation's STEM workforce.

13. Additional comments on the quality of the projects or the balance of the portfolio:

COV Comments:

The overall quality of these projects has had a strong impact on STEM education at the tribal colleges — which have greatly benefited from the help of the program and has allowed more Native Americans to succeed in an area of higher education in which they have been greatly underrepresented.

Overall, the focus on STEM is appropriate since this is an area where there is a very low representation of Native Americans.

Staff Response:

TCUP staff agree that the TCUP institutions have had significant instructional success.

A.4 Management of the program under review. Please comment on:

1. Management of the program.

COV Comments:

The program management structure, designed to implement a layered review process involving peer review augmented by program staff input and oversight, is accomplishing its intended goal — the funding of high quality research and educational projects. Where a project has addressable technical shortcomings but is still worth doing, the program staff has been able to intervene effectively.

A very important part of the program management is the realization that very challenging programs in STEM may attract indigenous students, but having programs that are relevant to the indigenous culture will retain and graduate these students.

In terms of projects, the program maintains a number of continuing grants as well as new projects, and the budget allotment is carefully monitored to ensure that there are sufficient numbers of new projects each year. Review of proposals is done through peer review using ad hoc and panel reviewers and post award monitoring through annual progress reports and sometimes site visits. Project directors are required to attend the Human Resources Development Joint Annual Meeting for grantees; this venue is used by the program to meet all the PIs of TCUP as well as provide reminders and directions for the use of the template for the annual reports.

There is only one permanent program director for TCUP and sometimes additional staffing could be done through IPAs. The program has been steadily growing and may need additional staff to support the many activities and initiatives of the program as well as provide guidance to the grantees.

Staff Response:

In recent years, TCUP has gradually shifted the portfolio of awards away from cooperative agreements and to more manageable continuing grants, which reduces the demands of the program in out-years, providing more time for the crucial monitoring and support functions.

2. Responsiveness of the program to emerging research and education opportunities.

COV Comments:

The program has shown responsiveness to emerging research and education opportunities by continually evaluating the program performance and assessing institutional TCUP projects' annually. As a result, TCUP has put in place several programmatic changes that include encouraging institutions to creatively integrate NSF funded awards with STEM programs, through the Innovation through Institutional Integration (I3) initiative. Moreover, realizing that there is a low representation of Native Americans in the field of engineering, TCUP has partnered with the Directorate of Engineering to develop the TCUP Pre-Engineering Education Collaboratives (PEEC). This initiative provides support for pilot projects to establish or enhance engineering pipelines in TCUP institutions. Initiatives that are less robust (CP) were also discontinued.

The main educational opportunity, to which this program is responsive, is to bring more underrepresented students into the STEM workforce and thus increase our national competitiveness and self-reliance. With national demographics tilting toward groups currently underrepresented in STEM areas, this is an educational opportunity that is of high priority to our nation. This program directly responds to that opportunity in an effective way.

The program increasingly has promoted opportunities to address emerging research issues particularly within the established tribal colleges and universities as well as those in reform of their educational programs. PI meetings, forums, technical assistance, and site visits contribute to this effort.

Staff Response:

TCUP staff appreciate the COV panel's recognition of the program's efforts to remain abreast of the rapidly changing needs and emerging fronts of the TCUP institutions. TCUP staff also express appreciation to the many partners across NSF who provide support for this worthy population of institutions.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

COV Comments:

TCUP provides awards to enhance the quality of STEM instructional and outreach programs at TCUs, Alaska Native- and Hawaiian Native-serving institutions, in order for their students to have better access to, retention within, and graduation from STEM programs. Program planning and prioritization, as laid out in the most recent management plan (for FY 2009-2011), is well thought out and effective. One example is the method devised to handle planning proposals, which are rarely submitted since “most eligible institutions have either received planning funds previously, or chose to by-pass that stage.” Rather than treating the funding of such proposals as a low or nonexistent priority, the program has recognized that they could be important for the few institutions needing them, and handles them on a no-deadline basis with ad hoc review.

The nature of the innovative projects funded by the grant program will often mandate careful formative feedback, so the impact monitoring plan, to assist the awardee institutions in obtaining such feedback, is an exceptionally good aspect. The involvement of the Quality Education for Minorities (QEM) Network is an excellent feature in leveraging outside resources to help projects that may need assistance based on their own and NSF-facilitated formative feedback.

The other components of program planning, support, and prioritization, such as collaboration with other diversity-focused programs, should help the TCUP program remain an effective effort that supports the research and educational efforts of tribal colleges in a substantive way.

Projections for potential funding priorities are made on an annual basis. The number of projects funded each year is contingent upon funds available. Potential applicants are advised and guided by the program director on the possible funding opportunities. The budgets for the projects as well as expenses for program implementation seemed to be well thought through, thus allowing programs to have a good idea on how many projects can be awarded for the following competition based on a projected budget allocation and program expenses.

Overall, the program has developed a well-timed and organized program management plan that seems very feasible and yet flexible to changes that may take place during the fiscal year.

Staff Response:

TCUP staff are grateful for the COV panel's recognition that the program operates on an established and yet flexible annual plan. It is unfortunately the case, however, that future awards will not have such a feasible schedule, due to federal budgeting constraints and customer care policies.

4. Responsiveness of program to previous COV comments and recommendations.

COV Comments:

The response was generally good and useful, and efforts to address or at least respond to all points

were made. In particular, after attempting to address the matter of newly established tribal colleges' relative lack of access to TCUP funding, but having the community be unresponsive, the program has chosen to make another try rather than just saying, "didn't work; sorry," by inaugurating a TCUP STEM Infusion Projects strand.

One area that may still need attention is the time-to-decision. As already noted above under question A.1.7, it is recognized that the NSF 70%-in-six-months goal is an agency-wide target and that some programs may intrinsically need longer (particularly for large awards, as is pointed out in the response to the previous COV). However, it would be useful to take another look to see whether there are any roadblocks that could be removed. Also, as described in the comment in A.1.7, it should be noted that there may have been a problem with the data set provided to the TCUP COV that is the basis for the observations about time-to-decision.

The issue regarding inconsistencies in annual progress reports was resolved by providing the grantees a template which the grantees can use for their reporting. Although this may not result in all reports to be highly consistent, grantees are providing the important information that is requested in the template. The TCUP Annual Report Template is a well structured and developed reporting tool and will be useful in evaluating project impacts.

During the 2007 COV, recommendations were made to increase the travel budget, to provide more technical assistance, add more staffing, conduct more site visits, and fund a greater number of new proposals, but the ability to respond affirmatively is driven by the limitations of the annual budget for the program.

Staff Response:

TCUP staff remain very concerned about the lack of participation by some TCUP-eligible institutions, and are committed to continuing to develop and assess new approaches to close the funding gap. TCUP staff will review dwell time data.

5. Additional comments on program management:

COV Comments:

The co-funding provided from other directorates and programs over the three years being examined, which amounts to nearly \$4,000,000, has been effective in leveraging the limited funds available directly through the TCUP program.

Despite the staffing issues for TCUP, this program has managed to carry out 18 site visits to 16 institutions during this review period, albeit these were done mostly as post award visits. Several technical assistance workshops were also conducted through QEM, as well as leadership development workshops through the American Indian Higher Education Consortium.

Providing Technical Assistance workshops is essential for these institutions, some of which have not received grants from federal agencies and will definitely derive benefits from knowing the application and grants processes.

Outreach is particularly important at smaller institutions.

Staff Response:

TCUP staff agree with the COV panel's suggestion of greater attention to the TCUP-eligible institutions that have not yet been funded, and will develop a plan by which to address this.

PART B. RESULTS OF NSF INVESTMENTS

The NSF mission is to:

- promote the progress of science;
- advance national health, prosperity, and welfare; and
- secure the national defense.

To fulfill this mission, NSF has identified four strategic outcome goals: Discovery, Learning, Research Infrastructure, and Stewardship, although the COV does not review accomplishments related to Stewardship.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes ("highlights") as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 OUTCOME GOAL for Discovery: "Foster research that will advance the frontier of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering."

COV Comments:

All the funded projects do support discovery at the faculty and student level, and the greatest contribution they will make to the research enterprise of this nation is in their fostering of undergraduate research, which should stimulate interest in research that will benefit the nation in the future.

Projects that were featured in the TCUP presentation showed that students are engaged in hands-on research activities either at the home institutions or at partnering institutions. These students also serve as role models to high school and middle school students when they carry out service learning and sharing of their research experiences at a level that these younger students could appreciate. The institutional programs also offer students the opportunities to develop critical and analytical thinking and communication skills. Thus the long-term impact could be the development of the next generation of indigenous scientists, engineers, and educators. The immediate impact is to improve the delivery of materials and courses that are compatible with actual hands-on experiences, engaging the students' interest in STEM disciplines.

Examples of outcomes are:

The Oglala Lakota College conservation biology students (**award number 0903686, PI Charles Tinant**) have been able to extend their study beyond the classroom and into the field. Ms. Alexandra Higa has worked closely with the Oglala Sioux Parks and Recreation Authority (OSPRA) and with Dr. Hugh Quinn (herpetologist) to begin two long-term studies on the biology and ecology of Pine Ridge reservation vertebrates. The first study examines how the reintroduction of the Swift Fox (*Vulpes velox*), a mesopredator, will affect the prey base of small mammals as mice, voles, and prairie dogs, while the second study is focused on understanding the distribution, abundance, and habitat requirements of the Ornate Box Turtle (*Terrapene ornata*) in South Dakota.

Both studies are needed in order to develop effective conservation management plans in our region

as the Swift fox is listed and protected as a South Dakota's threatened species (SD Codified law 34A-8) and the Ornate box turtle designated as one of the state species of greatest conservation need. The Ornate box turtle study is an outcome of Ms. Higa and Dr. Quinn's discovery of an unknown population of turtles in Pine Ridge reservation, while teaching field ecology last summer. OLC student interns have worked closely with Ms. Higa, Dr. Quinn, and OSPRA personnel over the summer to locate, capture, attach radios, and monitor both species movement's patterns. This fall, the students will begin to analyze the data they have collected in their ecology and conservation biology courses.

The Thunder Valley Floodplain Analysis Project is evidence that the TCUP program has moved beyond building capacity in STEM education at Oglala Lakota College (OLC) and into directly impacting the needs of the communities we serve. The Thunder Valley Corporation is soliciting funding from Housing and Urban Development (HUD) to purchase approximately 60 acres of land and to build a center for disenfranchised Lakota youth. The remaining land area will be leased to individuals wanting to build homes and businesses on the Pine Ridge Reservation. Momentum on the HUD funding request was stopped until a 100-year and 500-year floodplain analysis was completed. Faculty and students from the OLC Math and Science Department conducted an initial site investigation in May 2010, which was developed into a semester project by Heath Ducheneaux, undergraduate in Natural Resources, for the Introduction to GIS course.

Charles Jason Tinant, earth science instructor, used the initial site investigation and publicly available geospatial data to develop estimates of the 100-year and 500-year flood volumes and to route the flood volumes using Hydrologic Engineering Center (HEC) River Analysis System (RAS) and HEC-GeoRAS software. The resulting 100-year and 500-year floodplain maps are being made available for public comment. Mr. Tinant will use the Thunder Valley Floodplain Analysis Project to teach open channel flow concepts to students in Fluvial Morphology.

The Gaalee'ya STEM Project from the University of Alaska-Fairbanks (**0803161**) offers a different non-traditional delivery of instructions with a focus on global climate change. Based on the latest annual report, this project collaborates with the INBRE, EPSCoR, and GLOBE projects based at UAF; this provides more resources for students and faculty in the program. Students in this program take most of their courses through distance learning and discussions are carried out through audio conferences. They do have opportunities to carry out research projects and these may cover the areas of engineering, public health, and environmental science. Students are exposed to networking opportunities, provided tutoring either in person or through online discussions, and have other academic support. It appears that this project is able to support interdisciplinary training of students.

HRD award number 0803119 (PI Morris, College of the Menominee Nation) has as one of its objectives "To develop and implement additional STEM student research, internships, and (research) exposure opportunities." The project will provide students with field research opportunities that will not only give them hands-on research experience, but will also allow them to see how scientific research directly benefits their communities.

HRD award number 0903657 (PI Baker-Big Back, Fort Berthold Community College) includes plans to expand the college's undergraduate STEM research opportunities to include environmental science, an area of critical importance to tribal communities as well as the nation (and the globe, as the importance of sustainability and addressing climate change is penetrating further into the public consciousness).

HRD award number 0803166 (PI Henry, Turtle Mountain Community College) will provide many students with undergraduate research experiences directly led by TMCC faculty, but also with such

experiences offered in coordination with faculty at four-year colleges; about 30% of the undergraduate research projects will be such coordinated efforts.

Staff Response:

TCUP staff appreciate the COV panel's acknowledgement of the successful efforts of TCUP institutions to develop undergraduate research opportunities for TCUP students. A critical element in many colleges, it has proven to be a particularly successful technique for recruiting, retaining, and graduating many more students from TCUP STEM programs of study.

B.2 OUTCOME GOAL for Learning: “*Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.*”

COV Comments:

All the funded projects do support learning — many involve students who actually participate in research. STEM literacy is in the forefront of the efforts.

Projects seemed to stand out, particularly in the area of expansion of scientific literacy, by the incorporation of community through community activities. Students are encouraged to do service learning and become role models for young people who can relate. This increases interest in STEM.

Since the inception of TCUP in 2001, the program has supported many developmental and educational projects and because of these, many students would have benefited from these projects. There was also emphasis on sustainability of these projects; hence it is likely that many of the projects could be institutionalized, although this information was not provided in the COV materials. There are no recent reports on the enrollment and retention efforts for 2007-2009, however earlier reports showed an increase of 26% from the first three cohorts in the number of students enrolled in STEM programs. If this will continue in this trajectory it is very likely that a good number of students from these TCUs will have significant contribution in the STEM academic pipeline and the workforce. At the least, there will be a cadre of students who have gained more knowledge and understanding of STEM, and this will be important for future policy and decision making.

TCUs need to continue developing their institutional capacity and infrastructure for research and education; NSF is seen as a partner in this aspect through the TCUP.

Project examples:

HRD award number 0703729 (PI Alice L. Chumrau, Salish Kootenai College (SKC)) A major accomplishment during the second grant year was the graduation of the first student from the SKC BSSE in Computer Engineering degree program. A graduate from the program is needed before the program becomes eligible for accreditation from the Accrediting Board of Engineering and Technology (ABET), so SKC is now in position to proceed forward with the ABET process. In the third grant year SKC is preparing in earnest for the ABET site visit tentatively planned for fall of 2010.

The lack of scientific literacy among the citizens of our nation is going to be a major issue in the

ongoing, highly politicized national conversation on climate change, and more generally on sustainability and other environmental issues. An effort to address this very issue can be found in **HRD award number 0903704** (PI Akipa, Sisseton-Wahpeton Community College). This project will help develop a two-year Environmental Sustainable Studies degree program at the college, obviously increasing STEM literacy in this important area among those in the program, but the project will also revise and expand an environmental study curriculum in three participating school districts (with the intention to expand to others) that was originally funded by the Sisseton Wahpeton Rural Systemic Initiative. Along the way a science – entertainment show will be produced for the college’s television station, with the specific goal of increasing the understanding of STEM and interest in it throughout the communities served by the college.

HRD award number 0903657 (PI Baker-Big Back, Fort Berthold Community College) is also designed to increase scientific literacy in this important area. Part of the project involves holding symposia on environmental science in each tribal community on the entire reservation, allowing each tribe to learn from the college’s Environmental Science Learning Community about the important issues of our time in climate science and sustainability. This will also allow each tribe to offer its own cultural perspectives on the blending of current thoughts in these areas with the historical approaches and imperatives of the tribe.

Staff Response:

TCUP staff is in complete agreement about the significant instructional success practiced by the TCUP institutions.

B.3 OUTCOME GOAL for Research Infrastructure: “*Build the nation’s research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.*”

COV Comments:

Many of the TCUP funded projects have provisions for student and faculty training in both the academic and research areas, however many of the TCUs do not have well developed research capability and infrastructure and may need more support in order to carry out more research projects. Partnering with research institution is one way to develop this capacity and TCUP encourages such partnership.

There were no requests for equipment or scientific instrumentation among the projects assigned to this COV panel. However, the educational materials make use of state of the art technology. By infusing new technology, students will learn new pedagogical approaches and structure through online and distance education; this will help TCUs develop cyber-infrastructure. This will bring new students into the STEM pipeline and will build infrastructure in terms of human capacity.

Project examples:

HRD award number 0903686 (PI Charles Tinant, Oglala Lakota College) In the third year of the TCUP Phase II award, OLC had some initial success with coordinating environmental science service learning projects with Tribal Program needs. In spring 2009, OLC students and adjunct faculty in the NSci 413 Air Quality class, collaborated with OLC Natural Resources Program staff and the Tribal Air Monitoring Support (TAMS) center to locate and install a metrological station at Porcupine Buttes that will provide data of sufficient accuracy to be used in scientific studies.

The following passage is from **HRD award number 0903657** (PI Baker-Big Back, Fort Berthold Community College), which is likely more a comment on infrastructure whose development was sparked or leveraged by TCUP rather than directly funded by it, but it seems that the investment was tied into TCUP grants, no matter how funded: “The Fort Berthold Community College has developed the current STEM infrastructure as a result of the TCUP grants provided by NSF. A second story addition to the Student Center was completed in 2006 and designated the 2nd Floor Science and Technology Wing. The classrooms are state-of-the art and ... technologically current. The Library is undergoing renovation to also accommodate technology. The technology infrastructure has continued to keep pace with the influx of new buildings.”

The proposal narrative for **HRD award number 0803166** (PI Henry, Turtle Mountain Community College) mentions that an earlier HRD award utilized modified teaching strategies and incorporation of more hands-on learning through computer-based mathematics laboratories and other computer-assisted instruction. Though this is not, strictly speaking, an example of investments in infrastructure, it is certainly an example of HRD funding being used to leverage existing infrastructure.

Staff Response:

Many TCUP institutions have been able to leverage support for equipment from other agencies, particularly Department of Defense.

PART C. OTHER TOPICS

❖ TCUP COV COMMENTS

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

Across the Portfolio

- ❖ Intra-agency communication and collaboration between LSAMP and other NSF programs (e.g. REU, STEP, OISE) should be more explicitly emphasized and encouraged.

Staff Response:

The Division collaborates with the Department of Energy to provide opportunities for undergraduate students to participate in cutting edge research at the Nation's laboratories. The opportunity is supported with supplemental funding from NSF/EHR programs, including TCUP. Further, TCUP has active co-funding partners among NSF programs such as EPSCoR. Also, TCUP has partnered with the Directorate of Engineering to develop the TCUP Pre-Engineering Education Collaboratives (PEEC). This initiative provides support for pilot projects to establish or enhance engineering pipelines in TCUP institutions.

Program-Specific

- ❖ The TCUP program is still young and at this stage in its development the real question is how to sustain projects so that TCUP and future projects are able to capitalize on their already established momentum?

Staff Response:

The history of the Nation's Tribally-Controlled Colleges has been marked by phenomenal growth in their capacity and implementation to offer more and better programs of study to their students. Almost no other area has paralleled the capacity growth enjoyed by the STEM programs of study. This growth has been possible almost entirely because of the vision of the college leaders and the support of NSF. Since the TCUs are funded almost entirely by federal support, either through grants or legislation, the Committee rightly observes that future support is critical to maintaining the trajectory of STEM programming at these important institutions.

- ❖ An important piece to meeting the long-term objective of increasing the representation of Indians in the STEM pipeline is to encourage continuation and renewal awards.

Staff Response:

To the greatest extent possible, TCUP encourages maintenance and further growth in the gains made by TCUP institutions. The limitations imposed by funding require that NSF make choices between support of continuation and support of new STEM program areas.

- ❖ The TCUP program needs a better tracking mechanism such that project outputs and outcomes can be reported, shared, and monitored.

Staff Response:

TCUP's mission is capacity-building of the STEM educational infrastructure at eligible institutions of higher education. The TCUP Annual Report Template serves as the appropriate tracking mechanism to measure gains in courses, programs of study, instructional capacity, faculty growth and development, and student enrollment in new STEM educational opportunities. The TCUP Evaluation is using those data obtained from the project reports, verified by the institutions, to measure the program's impact.

- ❖ Do students find job opportunities in their subject areas?

Staff Response:

Although the TCUP faculty have exceptional anecdotal and community evidence of their students' continued successes in academia and the workforce, tracking students post-graduation is beyond the scope of many Institutions of Higher Education (IHE).

- ❖ Do the institutions have partnerships with other universities that enable students to continue their education?

Staff Response:

The Nation's Tribally-Controlled Colleges and Universities are accredited by the same regional accreditation agencies as their state-sponsored and parochial peer institutions. In order to accomplish this, and for the educational well-being of their students, all accredited TCUs have in place articulation agreements with their peer institutions. An immediate example is the Pre-Engineering Education Collaboratives, partnerships between TCUP institutions and mainstream colleges of engineering to implement and expand pre-engineering studies in TCUP institutions and graduate increasing numbers of indigenous engineers at the baccalaureate level. Moreover, as the number of TCUs offering four-year STEM degrees increases, the relationships with other institutions are taking place more at the transition from undergraduate to graduate work.

The other TCUP institutions (in Alaska and Hawaii) are typically part of a university system, in which articulation is a given of that system.

- ❖ Collecting accurate, culturally-sensitive data is an important area in need of improvement. “American Indian Measures of Success” is one example of a data collection packet that has been used. NSF could potentially contribute to this established survey process and add questions to suit NSF’s needs.

Staff Response:

The TCUP staff acknowledges that measuring impact of TCUP projects is crucial. The program evaluation will examine the relevancy and quality of the data reported at the project level.

- ❖ Smaller institutions have insufficient staff and/or time for writing multiple grants and would benefit from a sponsored research program office where grants can be handled directly. Additionally, some project staff require additional training in FastLane.

Staff Response:

While the advantage of this observation is recognized and appreciated by the TCUP staff, it is beyond the scope of the program to require or support this measure in its awardee institutions. One notes, however, that TCUP institutions that have received significant external support typically have implemented such a measure.

C.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.

Program-Specific

- ❖ For TCUs to be successful at meeting program-specific goals, they must make STEM relevant to the communities they serve. TCUs need to have mechanisms in place to gather and utilize valuable input from their communities.

Staff Response:

With few exceptions, TCUs are chartered by a federal recognized tribe, and managed by a Board of Directors or Trustees that are community members and are elected or appointed by the tribal government. It is probable that TCUP institutions are more closely aligned with community needs than are the majority of mainstream institutions.

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

Program-Specific

- ❖ NSF needs to be cognizant of the fact that TCUs are culturally-based and preserve that foundation. TCUs have a valuable and unique perspective to offer in collaborative environments.

Staff Response:

The TCUP staff make every attempt to balance the cultural underpinnings of all TCUP institutions, particularly those that benefit the students in those institutions, with the mandates of preparing the Nation's scientists for the 21st century, and to communicate that to the Foundation as a whole. Fortunately, the projects do an exemplary job of striking that balance on their own, and help communicate that to NSF through annual reports, student research symposia, participation in NSF's cultural observances, and independent publications (e.g., Nature, PRISM articles).

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

Program-Specific

- ❖ To increase the effectiveness of funding, it would be helpful to encourage more collaboration and pooling of resources.
- ❖ It is important that the distinct needs of the program and the IHEs, as well as the IHE's stage on the developmental continuum, be considered when developing program and project implementation strategies and policies.
- ❖ Leveraging external resources to promote BP is encouraged.
- ❖ Increased interagency communication and collaboration could help to maximize impacts and streamline the administrative components of multiple awards at one institution.
- ❖ The COV subpanel for the TCUP program has great concerns about TCUP being absorbed into a larger Comprehensive Broadening Participation of Undergraduates in STEM (CBP-US) program that will cause it to lose its specific identity. The histories and missions of the TCUs differ in substantial ways from those of the HBCUs and HSIs, and because of this the TCUs will not be served nearly as well in a broader program that is not constructed with those histories and missions in mind. There are several interwoven threads to the TCU missions that have their roots in the history of Native education in the Western Hemisphere since first contact with Europeans, as well as in the traditions of the American Indian, Alaskan Native, and Native Hawaiian peoples served by the program. In its nine years of operation the TCUP program has evolved to align itself well with those missions and incorporate a solid knowledge of those missions into its operation. This has been done in close consultation with the tribal colleges, and thus the TCUP program has gained their trust. That is no small feat, considering the distrust many tribal colleges developed for grant

programs in the early years of the TCUs that, frankly, often featured a majority institution showing up on a TCU's doorstep seeking a partnership for some project that would be more attractive to a funder with a TCU partner, then having the majority institution disappear from sight once the funding was secured. TCUP is structured so that this cannot happen, since any partnership constructed through a TCUP-funded project has to have a tribal college as the lead institution, and there is a specific fund set aside to which only the tribal colleges have access. The particular feature of the proposal for a combined program that would allow non-Native institutions to apply for funding once reserved for the TCUs is going to be viewed with particular alarm by the tribal colleges. The main reaction is likely to be, "Here we go again!" It would take a long time for a new, combined program to regain the trust lost through the elimination of TCUP, and, in fact, it is not likely ever to happen.

Before proceeding with any such absorption of TCUP into a larger program, those proposing the consolidation should familiarize themselves with the history of Native education in the Western Hemisphere, perhaps through reading Margaret Szasz's "Education and the American Indian" (Albuquerque, University of New Mexico Press, 1998) and then consulting closely with those who understand that history and thus understand the alarm with which this consolidation of programs will be viewed in the communities TCUP serves. In particular, it is important to understand the purpose of the three major pieces of federal legislation in the 1970s that crystallized the principle of American Indian educational self-determination into law, namely, the Indian Education Act of 1972 (P.L. 92-318), the Indian Self-Determination and Education Assistance Act of 1975 (P.L. 93-638), and Title XI of the Education Amendments Act of 1978 (P.L. 95-561). In particular, this last piece of legislation states flatly that "it shall be the policy of the Bureau (of Indian Affairs), in carrying out the functions of the Bureau, to facilitate Indian control of Indian affairs in all matters relating to education." TCUP is structured not just to respect this legal and cultural principle, but to build upon it by allowing the tribal colleges to structure programs that directly serve them through an NSF program designed specifically for them with people dedicated to understanding the major differences between the TCUs and the other entities that would be served by a combined program.

The biggest fear that the TCUs will have about the combining of the various programs under review in this cycle into one large über-program is that due to the numbers, Native Americans will become effectively invisible in such a combination. We know that those proposing this combination are people of good will who would not intend for this to happen, but in practice it seems that it always does. (We are familiar with presentations in which reference is made to underserved minorities in the U.S. as "African Americans and Hispanics," and we suspect that the reader is also, but we have never seen reference made to underrepresented minorities as, for example, "African Americans and Native Americans." The latter has an omission more obvious to most people, and would generally be questioned and corrected immediately).

In brief, the TCUP COV sub-panel believes that this proposed consolidation is not well thought out and would be harmful to the mission being served effectively by TCUP. We urge that it not be implemented.

Staff Response:

The TCUP staff appreciates the care and expertise that the COV brings to this question.

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

Program-Specific

- ❖ It was a good idea to have an off-site review for parts A & B because this helped to move the discussion along and reach consensus faster.
- ❖ All of the information that was needed was given. Actually, there was more given than necessary.

Staff Response:

The TCUP staff were pleased to provide information helpful to the COV.

SIGNATURE BLOCK:

For the TCUP COV
James Renick
Chair

Jermelina Tupas
Sub Chair