External Advisory Board Review and Guidance
To New Mexico EPSCoR RII3:
Climate Change Impacts on New Mexico's Mountain
Sources of Water

Meeting: November 14, 2011
Final Report – February 2012

External Advisory Board Members:

Elsa Bailey, Director/Principal, Elsa Bailey Consulting, San Francisco, CA
Stephen G. Borleske, Consultant, Borleske Associates, Wilmington, DE
L. Ruby Leung, Laboratory Fellow, Atmospheric Science and Global Change Division, Pacific Northwest National Laboratory
Emily H. Stanley, Professor, Department of Zoology, University of Wisconsin-Madison
Amy Ward, Professor, Biological Sciences, University of Alabama
Mark W. Williams, Associate Professor, Institute of Artic and Alpine Research and Dept of Geography, University of Colorado

Introduction:

This is the final report of the findings and recommendations of the External Advisory Board (EAB), convened by the New Mexico EPSCoR leadership on November 14, 2011. The EAB was asked to give advice, insight, and guidance on the RII3, which just completed Year three of a five year program, identify opportunities, and address challenges. Board members, Bailey, Borleske, Leung, Stanley and Ward attended the meeting.

The overarching goal of the New Mexico EPSCoR RII3 is to enhance research competitiveness through the acquisition of critical climate change research infrastructure and cyberinfrastructure, and through strategic investment in human infrastructure. A second goal is to address a critical state problem of worldwide significance – understanding and forecasting the effects of climate change on water supply and sources in arid regions. The RII3 goals address two major issues critical to New Mexico's prosperity: (1) understanding climate changes that alter processes associated with water supply, critical to sustaining the economy and quality of life and (2) effectively engaging the diverse population (~ 40% Caucasian, 40% Hispanic and 20% Native American) in STEM career options.

Overview:

The EAB highly commends the New Mexico EPSCoR Team for their very significant progress in a very complex and diverse program over the last three years, especially in Year three. The program has methodically put in place the key components for a long term sustainable capability critical to New Mexico's future. Year one was spent acquiring and installing physical infrastructure; Year two built a community of faculty and students, and Year three focused strongly on the science both in research and education. The EAB was particularly gratified to see that the leadership team clearly focused on issues identified in the year two EAB meeting and made very significant progress in articulating the scientific focus and major progress in developing an effective cyberinfrastructure. The leadership team identified some key challenges for the remainder of the grant (e.g., acquiring vast amounts of data in the newly created Data Portal cyber system) and seems to have a strong direction for RII-4.

Key Highlights:

- As presented by Cliff Dahm, the leadership team has done a very good job articulating the scientific focus and the EPSCoR value to New Mexico and beyond. The project now shows tremendous potential benefit to society and New Mexico's problems.
- Major progress has been made in the cyberinfrastructure program by talking and listening to nationwide providers and local users as well as developing a system that interacts nationally and meets local needs.
- The program review on research efforts at New Mexico Highlands University (NMHU) and potentially at Eastern New Mexico University are showing very significant benefits

from catalytic investments and expertise on undergraduate education and underserved populations.

- The Integrated Work Group effort and the All Hands meetings continue to be productive ways to initiate new programs and collaborations.
- The Tristate effort very effectively expands the statewide effort and impact. The RII is strongly integrated with the Track II and C2 grant program and providing a lot of leverage to the RII.
- The work done by the hydrology and water quality groups to install and instrument a network of shallow monitoring wells with continuous water level data-loggers and selected deployment of real-time nutrient and water quality analyzers is very commendable.
- Extending the cyber infrastructure resources to underserved populations through Fast Forward New Mexico (e.g., assisting artisan groups with developing internet capacities) and educating the public through the New Mexico Museum of Natural History and Science are very commendable and significantly expand the RII impact.

Recommendations:

The EAB offers the following recommendations as you enter the final stages of the RII grant:

1. You have done an excellent job articulating the scientific focus and potential value to New Mexico in the leadership team. This vision needs to be more broadly imbibed throughout the New Mexico EPSCoR network. If this is done well, then it will be a major component for ensuring sustainability of the RII initiatives. This can be accomplished through:
   a. Using the scientific focus as the framework and theme for the upcoming annual meeting; ensure that the scientific focus and impact are components of any other major network meeting.
   b. In addition to describing the EPSCoR network by infrastructure category (as currently done on the New Mexico EPSCoR web page), showing how the network, particularly the scientific leaders, align with the science focus (e.g., develop an organization chart using science focus).
   c. Developing a road map of programs organized by scientific focus and impact.

2. Year one focused on physical infrastructure, year two and three focused on achieving collaboration among people who rarely previously worked together and getting the CI engine in place. We recommend that you consider developing a number of formal training opportunities on the systems in place to maximize their full potential. Specifically we recommend:
   a. Training on Data Portal system capabilities
   b. Training for young faculty and grad students on publications

3. Start to develop a road map of sustainability. Define the key RII products; show where they will reside and how they will continue after the current RII is complete.

4. Consider expanding the support for education and outreach (now only 8-10%) building on success at NMHU. One very specific recommendation is to work with the NMHU leadership to find a way to continue/grow support for the research and education efforts developed by Dr. Edward Martinez.

5. The EAB believe that NM EPSCoR is understating the RII impact as demonstrated by grants and publications. These measures should be based on the EPSCoR communities developed through all the RIIs, not just those involved in the current project. We urge you to check, and if appropriate, upgrade the parameters you are using to measure EPSCoR success (e.g., are you claiming credit for grants and publications from RII-1&2 as well as the current RII-3?).

6. The EAB urges the leadership team to place a high value and priority on publication of peer reviewed articles both from the current and previous RII projects.

7. Explore the potential to leverage the value of the mobile water quality analytical lab (Mike Pullin's van) beyond the scope of the current RII project. Does the design have any intellectual property value and ultimately commercial application? Are there other scientific programs that would benefit from this technology?

8. Reorganize and support where possible the programs that are lacking current leadership (e.g., the museum program and the program at Dine College.)

Summary:

Again, congratulations on a job well done. The New Mexico EPSCoR RII3 is an impactful, well organized program with many accomplishments. The first three years have clearly built a human and physical infrastructure that has the potential to serve New Mexico well for many years to come. There are no major issues with the program, and the EAB recommendations provide avenues for continuous improvement rather than major program changes. The EAB looks forward to your continued success.