

**New Mexico
Experimental Program to Simulate Competitive Research
Program Year 2 Evaluation Report**

September 1, 2009 to August 30, 2010

**Prepared for:
NM EPSCoR State Office**



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Introduction

NM EPSCoR RII3 is funded by the National Science Foundation (NSF) and is designed to fulfill the foundation's mandate to promote scientific progress nationwide. The EPSCoR program is directed at those jurisdictions that have historically received lesser amounts of NSF Research and Development (R&D) funding. Twenty-five states, the Commonwealth of Puerto Rico and the U. S. Virgin Islands currently participate. Through this program, NSF establishes partnerships with government, higher education and industry that are designed to effect lasting improvements in a state's or region's research infrastructure, R&D capacity and hence, its national R&D competitiveness.

This report will attempt to assess the status of the project by linking the data reported with the project's Strategic Plan, which was developed in January, 2009. The metrics will focus around the following categories:

- People: Participant demographics of faculty, postdocs, undergrads, K-12, collaborators, institutions, and diversity of all the above;
- Material Infrastructure: Equipment purchased & installed, models developed and cyberinfrastructure acquired (number, type, use, results);
- Knowledge generation: presentations, publications, proposals and awards, products and patents
- Discovery Learning: data collected, observations and research (number, type, kind, availability)
- Knowledge generation: presentations, publications, proposals and awards, products and patents
- Outreach/Public Dissemination: Scientific literacy and outreach efforts, curriculum development, public outreach, public presentations, policy and policy makers impacted

Background

NM EPSCoR RII3 was funded in September, 2008 for a period of five years and for \$3million per year. The overarching goal for NM EPSCoR RII3 is to enhance research competitiveness through the acquisition of critical research infrastructure and cyberinfrastructure, and through strategic investment in human infrastructure. Secondly, the goal is to address a critical state problem of worldwide significance of the effects of climate change on water supply and sources in arid regions. Five specific research infrastructure improvement programs are designed to significantly benefit and enhance competitiveness of the NM academic research and education enterprise. These are:

- Major research infrastructure that fills critical infrastructure gaps in monitoring and analyzing climate and hydrological conditions in northern NM;
- Innovative in situ hydrological sensing infrastructure;
- Climate change infrastructure seed grant program;
- Multi-scale and multi-disciplinary model development; and
- Innovation working groups

A focus on improving the cyberinfrastructure (CI) to support these efforts is also included in NM EPSCoRs plans to stimulate innovative uses of CI including:

- Development of efficient data acquisition, processing, and storage models;
- High performance computing;
- Interoperable data discovery and delivery through interfaces based upon open standards;
- Deployment of collaboration tools that facilitate both synchronous and asynchronous knowledge exchange; and
- Development of a project portal that provides a single point of access for project products, services, and information.

Finally, NM EPSCoR RII3 proposes to enhance the human infrastructure in NMs academic and scientific research enterprise with three plans focused on education and outreach. These are:

Education Plan

- Summer Institute focusing on middle school teacher professional development in northern NM;
- Undergraduate Research Opportunities for students at NMs regional non-PhD granting institutions;
- Research Training Group Program that provides interdisciplinary training and develops modeling skills for MS/PhD students;
- Junior Faculty Leadership Training; and
- Informing faculty throughout NM about funding opportunities via NSF Days and other NSF outreach activities.

Outreach and Communication Plan

- Climate Change Exhibit (incorporating Science on a Sphere) to reach 230,000 annual visitors;
- Climate Change Seminar Series to bring nationally recognized experts to the large municipalities throughout the state;
- Science Cafs to communicate climate change science to citizens in rural northern NM;

- Town Hall meeting to provide a forum for scientists, business leaders, and concerned citizens to build consensus and develop practical, actionable solutions; and
- Climate Change Web Portal to provide easy access to news, project information, documents and publications, data and services.

Diversity Plan

- Place-based science education will reach out to community members and provide teachers with locally relevant science for their classrooms.
- Students with diverse backgrounds will be incorporated into all research opportunities through targeted recruitment.
- Faculty and staff will receive training on diversity inclusion in teaching and learning with a diverse student body.
- Diversity will be a theme of the program, addressed with workshops and through outside experts, and reflective study programs.
- Partner with other diversity programs in NM and nationally.

According to the strategic plan developed in October, 2008 and submitted to NSF in January, 2009:

*The overarching **vision** for the NM EPSCoR Program is to enable:*

“An environment in which New Mexico scientists and educators are fully competitive in climate change research and education.”

*NM EPSCoR RII3 is designed to enhance research competitiveness through investment in three strategic areas: (1) critical Research Infrastructure, (2) Cyberinfrastructure, and (3) Human Infrastructure. These investments will help establish NM as a laboratory for climate change research, and as a model for science-based public policy. The multi-disciplinary, multi-scale effort is envisioned to transform climate change science and policymaking in NM by providing the tools required for quantitative, science-driven discussion of difficult water policy options facing the State in the 21st Century. These goals are articulated in the NM EPSCoR **mission**:*

“Provide the critical gap infrastructure, computational support, and education and outreach opportunities to foster excellence in climate change research and education.”

The remainder of this report will examine the data reported for the Year 2 Annual Report and the status of the activities proposed. In this evaluation report and the companion reports on the 14 program areas, the term "component" will be used as opposed to the term "strategic objectives" in the strategic plan. Although the term "strategic objective" is not wrong, it could be confusing when used in an evaluation report where goals and objectives have very different meanings.

People (Human Infrastructure, Collaboration and Diversity)

Diversity and expanding the involvement of women and underrepresented minorities in the sciences is one of the objectives of NSF, EPSCoR and NM EPSCoR. New Mexico had a population of 1.8 million in the 2000 census; 46% White/Anglo, 42% Hispanic, 10% Native American, 2% African American and 1% Asian. NM is a minority majority state, with 54% being a member of a non-Caucasian ethnic group. This section will explore the degree of involvement of different racial groups of participants by level of participation, component, participant role and participating institutions. The role of collaborators and the nature of their collaborations with the project will also be presented.

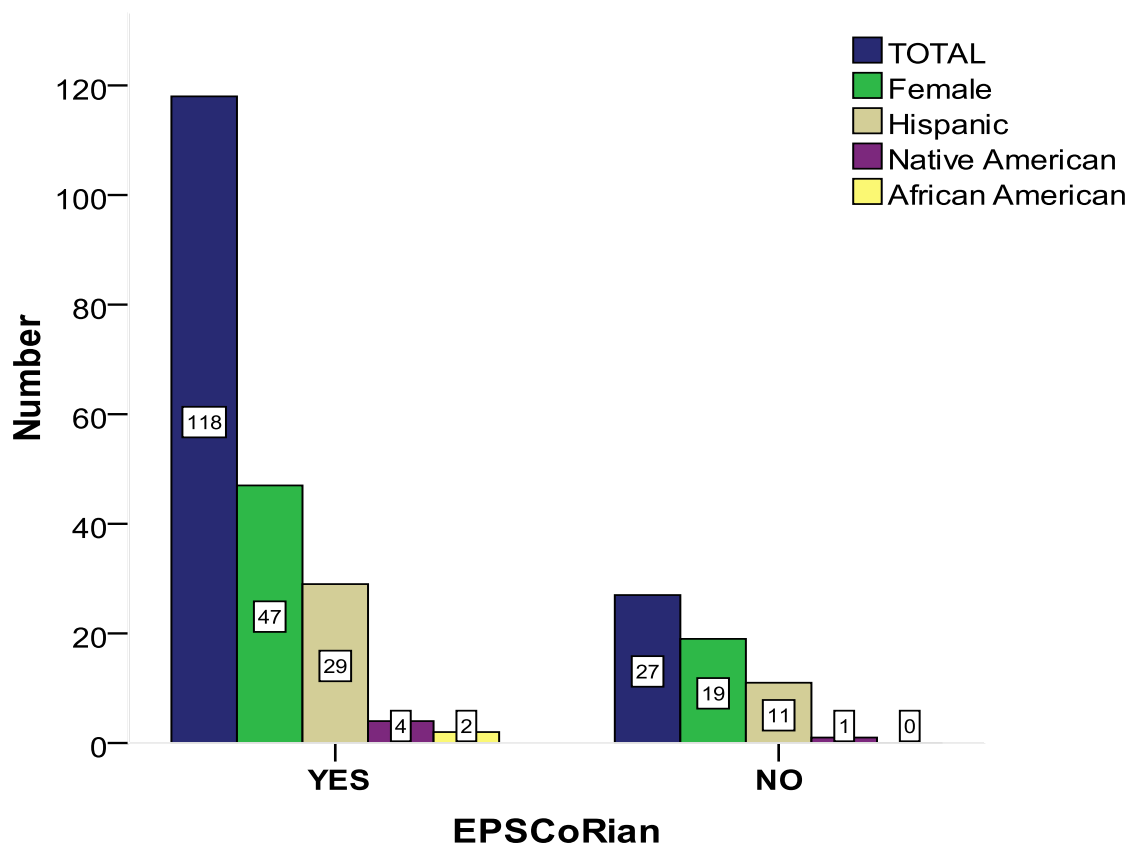
The definitions of participant and collaborator in this report differs slightly from that in the Annual Report submitted to NSF. In that report, participants were defined as those with 160 or more hours of involvement, while those with less than 160 hours were considered collaborators. In this report, participants are defined as those directly contributing to accomplishing the goals of EPSCoR either in one of the three research areas, human infrastructure or cyberinfrastructure, regardless of the number of hours involved. This would also include members of the advisory committee and project management personnel. These participants will be referred to as EPSCoRians. Another type of participant are those that have participated in EPSCoR programs; such as K-12 Teacher Professional Development and Junior Faculty Leadership Program. These participants have received services from the project, but were not direct contributors to accomplishing NM EPSCoR goals.

In this evaluation report, the FastLane definition of collaborators is used. These are scientists, engineers, educators and others who have had significant contacts with EPSCoRians to further the NM EPSCoR goals. Collaborations can be internal to NM EPSCoR where EPSCoRians from two institutions in the state are conducting research together or one can be external to EPSCoR, where an NM EPSCoRian is consulting with a non-EPSCoRian, either within or outside NM.

Participants by Type of Involvement

There were 145 individuals who participated in one or more project activities during the first program year. Figure 1 shows how many of these are female, Hispanic, African American, Native American for EPSCoRians (those directly contributing) and non-EPSCoRians (those receiving services).

Figure 1
Number of Female, and Underrepresented Minority by
Type of EPSCoR Participant (n=145)

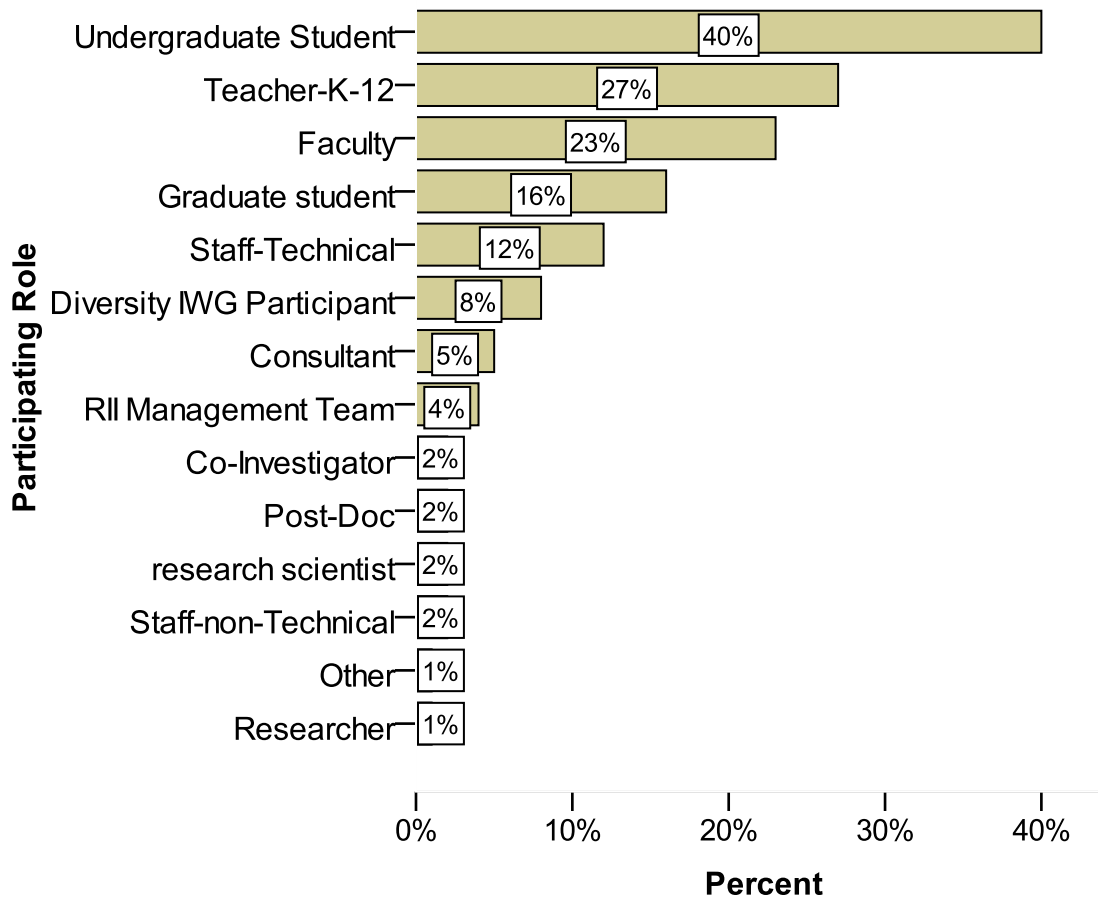


One hundred and eighteen (81%) of all participants were EPSCoRians, directly contributing to the goals of NM EPSCoR during Year 2, which is an increase of 37 individuals from Year 1. Of these, 47 (40%) were female, 29 (25%) Hispanic, 4 (3%) Native American and 2 (2%) African American. Twenty-seven (19%) of the participants were non-contributing participants, either K-12 teachers or junior faculty participating in workshops organized by EPSCoRians. Of these, 19 (70%) were female, 11 (41%) Hispanic and 1 (5%) Native American.

Participants by Role in EPSCoR

Figure 2 shows the percentage of participants in NM EPSCoR by role.

Figure 2
Role In New Mexico EPSCoR



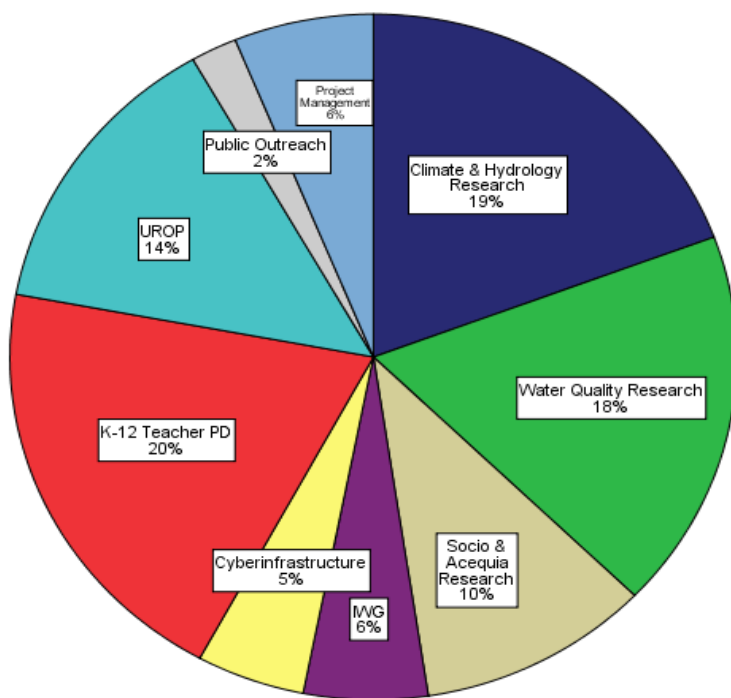
Undergraduate students represent the largest segment with 4 out of 10 participants or 40%, followed by K-12 teachers (27%), faculty (23%), and graduate students (16%).

Participants by Component

NM EPSCoR has 14 components ranging from Climate and Hydrological research to Public Outreach. Figure 3 shows the number of participants involved in NM EPSCoR by component for Year 2.

Figure 3
Percentage of Participants by Component
(N=145)

Not all components are funded at this time. For instance, NSF Days is an objective in Year 3, and hence there are no participants at this time. This pie chart includes both EPSCoRians (those directly contributing to EPSCoR goals) and those receiving training and professional development. It does not include collaborators, which for some components are heavily relied upon. Almost half (47%) of the Year 2 participants were involved in one of the three research components: Climate and Hydrology (19%), Water Quality Research (18%), and Socioeconomics and Acequia Research (10%). Education and public outreach combined amount to about one-third (36%) of the program participants: Junior Faculty Leadership training (17%), K-12 Professional teacher development (20%), Undergraduate Research Program (14%) and Public Outreach (2%). Lastly, Project management (6%) completed the areas that participants were involved in during Year 2.



Each component is at a different stage of development at this time and therefore comparisons of participant demographics, including gender, ethnicity/race and role may be premature. However, it also may be helpful for component leaders to examine these data and set goals for the involvement of members of underrepresented groups as the project matures.

Figure 4 presents the demographic data of all 145 participants from Year 2 by component, institution and role in the project. These data do not include collaborators or others who may have been involved with the project but not reported as participants.

Figure 4
Year 2 Participant Demographics by Component, Campus and Role

Component	Organization	EPSCoR Role	TOTAL	Female	URM	African American	Hispanic	Native American	
1-Climate and Hydrology Research	New Mexico Institute of Mining and Technology	Faculty	1	0	0	0	0	0	
		Graduate student	1	1	0	0	0	0	
		Post-Doc	1	1	0	0	0	0	
		Undergraduate Student	5	0	1	0	1	0	
		Total	8	2	1	0	1	0	
	New Mexico State University	Faculty	5	2	1	1	0	0	
		Graduate student	2	0	0	0	0	0	
		Other	1	0	0	0	0	0	
		Undergraduate Student	7	1	4	0	4	0	
		Total	15	3	5	1	4	0	
	University of New Mexico	Faculty	1	0	0	0	0	0	
		Graduate student	1	1	0	0	0	0	
		Post-Doc	1	0	0	0	0	0	
		Staff-Technical	1	0	0	0	0	0	
		Undergraduate Student	1	0	1	0	1	0	
		Total	5	1	1	0	1	0	
	Total	Faculty	7	2	1	1	0	0	
		Graduate student	4	2	0	0	0	0	
		Other	1	0	0	0	0	0	
		Post-Doc	2	1	0	0	0	0	
		Staff-Technical	1	0	0	0	0	0	
		Undergraduate Student	13	1	6	0	6	0	
		Total	28	6	7	1	6	0	
	2-Water Quality Research	New Mexico Highlands University	Faculty	1	0	1	0	1	0
			Graduate student	2	1	1	0	1	0
			Undergraduate Student	5	3	4	0	4	0
			Total	8	4	6	0	6	0
		New Mexico Institute of Mining and Technology	Faculty	1	0	0	0	0	0
Graduate student			5	3	2	0	1	1	
Undergraduate Student			3	2	1	0	1	0	
Total			9	5	3	0	2	1	
University of New Mexico		Faculty	2	1	0	0	0	0	
		Graduate student	3	2	1	0	1	0	
		Research scientist	2	0	0	0	0	0	
		Undergraduate Student	2	1	0	0	0	0	

Component	Organization	EPSCoR Role	TOTAL	Female	URM	African American	Hispanic	Native American
		Total	9	4	1	0	1	0
	Total	Faculty	4	1	1	0	1	0
		Graduate student	10	6	4	0	3	1
		research scientist	2	0	0	0	0	0
		Undergraduate Student	10	6	5	0	5	0
		Total	26	13	10	0	9	1
3-Socioeconomics and Acequia Research	New Mexico Acequia Association	Staff-Technical	1	1	1	0	1	0
		Total	1	1	1	0	1	0
	New Mexico State University	Faculty	3	0	0	0	0	0
		Staff-Technical	2	0	1	0	1	0
		Undergraduate Student	1	0	0	0	0	0
		Total	6	0	1	0	1	0
	Sandia National Lab	Faculty	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	University of New Mexico	Co-Investigator	2	0	1	0	1	0
		Graduate student	1	1	0	0	0	0
		Researcher	1	1	0	0	0	0
		Undergraduate Student	2	1	1	0	1	0
		Total	6	3	2	0	2	0
	UROP	Undergraduate Student	1	1	1	0	1	0
		Total	1	1	1	0	1	0
	Total	Co-Investigator	2	0	1	0	1	0
		Faculty	4	0	0	0	0	0
		Graduate student	1	1	0	0	0	0
		Researcher	1	1	0	0	0	0
		Staff-Technical	3	1	2	0	2	0
		Undergraduate Student	4	2	2	0	2	0
Total		15	5	5	0	5	0	
5-Diversity IWG	Eastern New Mexico University	Diversity IWG Participant	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	New Mexico Highlands University	Diversity IWG Participant	1	1	0	0	0	0
		Total	1	1	0	0	0	0
	New Mexico Institute of Mining and Technology	Diversity IWG Participant	1	1	0	0	0	0
		Total	1	1	0	0	0	0

Component	Organization	EPSCoR Role	TOTAL	Female	URM	African American	Hispanic	Native American
	New Mexico State University	Diversity IWG Participant	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	Northern NM College	Diversity IWG Participant	1	0	1	0	1	0
		Total	1	0	1	0	1	0
	Santa Fe Community College	Diversity IWG Participant	1	1	1	0	1	0
		Total	1	1	1	0	1	0
	University of New Mexico	Diversity IWG Participant	2	1	0	0	0	0
		Total	2	1	0	0	0	0
	Total	Diversity IWG Participant	8	4	2	0	2	0
		Total	8	4	2	0	2	0
7-Cyberinfrastructure	University of New Mexico	Consultant	1	0	0	0	0	0
		RII Management Team	1	0	0	0	0	0
		Staff-Technical	5	1	1	0	1	0
		Total	7	1	1	0	1	0
	Total	Consultant	1	0	0	0	0	0
		RII Management Team	1	0	0	0	0	0
		Staff-Technical	5	1	1	0	1	0
		Total	7	1	1	0	1	0
9-K-12 Professional Teacher Development	Northern NM High Schools	Consultant	2	1	1	0	1	0
		Teacher-K-12	27	19	12	0	11	1
		Total	29	20	13	0	12	1
	Total	Consultant	2	1	1	0	1	0
		Teacher-K-12	27	19	12	0	11	1
		Total	29	20	13	0	12	1
10-Undergraduate Research Opportunity Program	Dine College	Undergraduate Student	2	1	2	0	0	2
		Total	2	1	2	0	0	2
	Eastern New Mexico University	Undergraduate Student	2	1	2	1	1	0
		Total	2	1	2	1	1	0
	Navajo Technical College	Undergraduate Student	1	0	1	0	0	1
		Total	1	0	1	0	0	1
	New Mexico Bureau of Geology and Mineral Resources	Faculty	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	New Mexico	Faculty	5	0	1	0	1	0

Component	Organization	EPSCoR Role	TOTAL	Female	URM	African American	Hispanic	Native American
	Institute of Mining and Technology	Graduate student	1	0	1	0	1	0
		Staff-Technical	1	1	0	0	0	0
		Total	7	1	2	0	2	0
	San Juan College	Undergraduate Student	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	Santa Fe Community College	Undergraduate Student	2	2	1	0	1	0
		Total	2	2	1	0	1	0
	University of New Mexico	Faculty	2	1	0	0	0	0
		Total	2	1	0	0	0	0
	Western New Mexico University	Undergraduate Student	2	2	0	0	0	0
		Total	2	2	0	0	0	0
	Total	Faculty	8	1	1	0	1	0
		Graduate student	1	0	1	0	1	0
		Staff-Technical	1	1	0	0	0	0
		Undergraduate Student	10	6	6	1	2	3
Total		20	8	8	1	4	3	
14-Public Outreach and Communication	New Mexico Museum of Natural History & Science	Consultant	1	1	0	0	0	0
		RII Management Team	1	1	0	0	0	0
		Total	2	2	0	0	0	0
	University of New Mexico	Consultant	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	Total	Consultant	2	1	0	0	0	0
RII Management Team		1	1	0	0	0	0	
Total		3	2	0	0	0	0	
16-Project Management	New Mexico EPSCoR	RII Management Team	2	1	0	0	0	0
		Staff-non-Technical	2	2	1	0	1	0
		Staff-Technical	2	1	0	0	0	0
		Undergraduate Student	3	3	0	0	0	0
		Total	9	7	1	0	1	0
	Total	RII Management Team	2	1	0	0	0	0
		Staff-non-Technical	2	2	1	0	1	0
		Staff-Technical	2	1	0	0	0	0
		Total	9	7	1	0	1	0

Component	Organization	EPSCoR Role	TOTAL	Female	URM	African American	Hispanic	Native American
ALL COMPONENTS	Dine College	Undergraduate Student	2	1	2	0	0	2
		Total	2	1	2	0	0	2
	Eastern New Mexico University	Diversity IWG Participant	1	0	0	0	0	0
		Undergraduate Student	2	1	2	1	1	0
		Total	3	1	2	1	1	0
	Navajo Technical College	Undergraduate Student	1	0	1	0	0	1
		Total	1	0	1	0	0	1
	New Mexico Acequia Association	Staff-Technical	1	1	1	0	1	0
		Total	1	1	1	0	1	0
	New Mexico Bureau of Geology and Mineral Resources	Faculty	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	New Mexico EPSCoR	RII Management Team	2	1	0	0	0	0
		Staff-non-Technical	2	2	1	0	1	0
		Staff-Technical	2	1	0	0	0	0
		Undergraduate Student	3	3	0	0	0	0
		Total	9	7	1	0	1	0
	New Mexico Highlands University	Diversity IWG Participant	1	1	0	0	0	0
		Faculty	1	0	1	0	1	0
		Graduate student	2	1	1	0	1	0
		Undergraduate Student	5	3	4	0	4	0
		Total	9	5	6	0	6	0
	New Mexico Institute of Mining and Technology	Diversity IWG Participant	1	1	0	0	0	0
		Faculty	7	0	1	0	1	0
		Graduate student	7	4	3	0	2	1
		Post-Doc	1	1	0	0	0	0
		Staff-Technical	1	1	0	0	0	0
		Undergraduate Student	8	2	2	0	2	0
		Total	25	9	6	0	5	1
	New Mexico Museum of Natural History & Science	Consultant	1	1	0	0	0	0
		RII Management Team	1	1	0	0	0	0
		Total	2	2	0	0	0	0

Component	Organization	EPSCoR Role	TOTAL	Female	URM	African American	Hispanic	Native American
	New Mexico State University	Diversity IWG Participant	1	0	0	0	0	0
		Faculty	8	2	1	1	0	0
		Graduate student	2	0	0	0	0	0
		Other	1	0	0	0	0	0
		Staff-Technical	2	0	1	0	1	0
		Undergraduate Student	8	1	4	0	4	0
		Total	22	3	6	1	5	0
	Northern NM College	Diversity IWG Participant	1	0	1	0	1	0
		Total	1	0	1	0	1	0
	Northern NM High Schools	Consultant	2	1	1	0	1	0
		Teacher-K-12	27	19	12	0	11	1
		Total	29	20	13	0	12	1
	San Juan College	Undergraduate Student	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	Sandia National Lab	Faculty	1	0	0	0	0	0
		Total	1	0	0	0	0	0
	Santa Fe Community College	Diversity IWG Participant	1	1	1	0	1	0
		Undergraduate Student	2	2	1	0	1	0
		Total	3	3	2	0	2	0
	University of New Mexico	Co-Investigator	2	0	1	0	1	0
		Consultant	2	0	0	0	0	0
		Diversity IWG Participant	2	1	0	0	0	0
		Faculty	5	2	0	0	0	0
		Graduate student	5	4	1	0	1	0
		Post-Doc	1	0	0	0	0	0
		research scientist	2	0	0	0	0	0
		Researcher	1	1	0	0	0	0
		RII Management Team	1	0	0	0	0	0
		Staff-Technical	6	1	1	0	1	0
		Undergraduate Student	5	2	2	0	2	0
		Total	32	11	5	0	5	0
	UROP	Undergraduate Student	1	1	1	0	1	0
Total		1	1	1	0	1	0	
Western New Mexico	Undergraduate Student	2	2	0	0	0	0	

Component	Organization	EPSCoR Role	TOTAL	Female	URM	African American	Hispanic	Native American
	University	Total	2	2	0	0	0	0
	Total	Co-Investigator	2	0	1	0	1	0
		Consultant	5	2	1	0	1	0
		Diversity IWG Participant	8	4	2	0	2	0
		Faculty	23	4	3	1	2	0
		Graduate student	16	9	5	0	4	1
		Other	1	0	0	0	0	0
		Post-Doc	2	1	0	0	0	0
		research scientist	2	0	0	0	0	0
		Researcher	1	1	0	0	0	0
		RII Management Team	4	2	0	0	0	0
		Staff-non-Technical	2	2	1	0	1	0
		Staff-Technical	12	4	3	0	3	0
		Teacher-K-12	27	19	12	0	11	1
		Undergraduate Student	40	18	19	1	15	3
		Total	145	66	47	2	40	5

Involving participants in NM EPSCoR from diverse backgrounds is an important goal for EPSCoR, both from a programmatic perspective of creating a more diverse workforce and for strengthening the research by including investigators with different life experiences who can observe and interpret data from different perspectives. The goal of NM EPSCoR is a 50% involvement in all its components of female and underrepresented minorities.

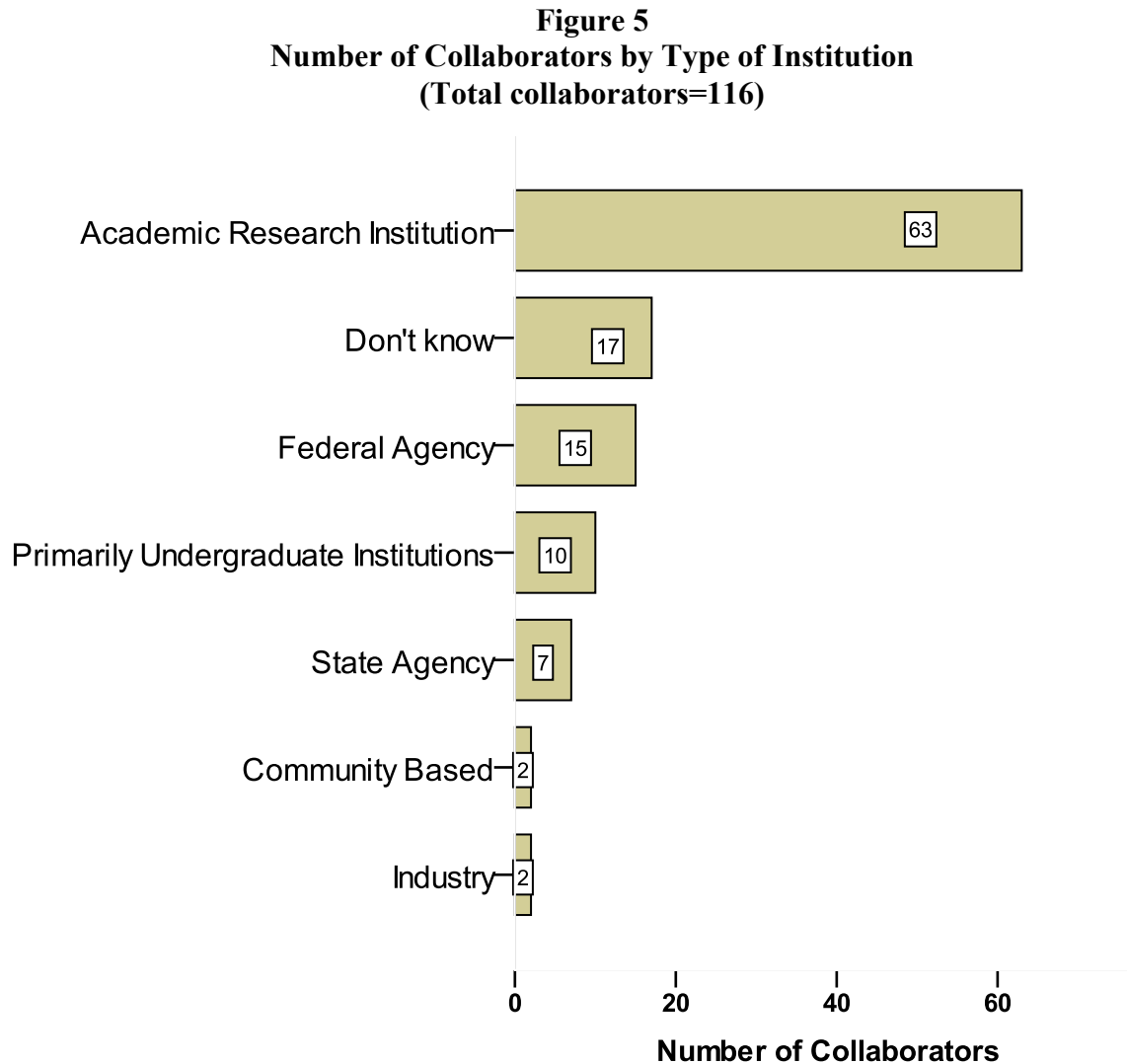
The project wide results from the table above show that slightly less than half (46%) of the participants are female, and about one-third (32%) are members of underrepresented minorities (African American: 1%; Hispanic: 28%; and Native American: 3%). This is a good start, as many of the components have not been fully implemented and researchers need specialized training and education to become productive members of the project.

Geographic and institutional diversity is also an important goal of NM EPSCoR. The project involved participants from 11 institutions of higher education, including PhD and non-PhD granting institutions. This is an increase of 4 institutions from Year 1 and include an involvement of Western NM University, Navajo Technical College, Dine, and Santa Fe Community College.

Geographically, the participants come from across the entire state. There may be a slight bias towards northern NM, which is understandable given that the snow pack under investigation is in the north. However, as this El Nino year has shown, even the Gila in southwest NM can be the recipient of a significant snow pack, which can impact the research.

Collaborators

Recognizing that for NM EPSCoR to be successful in improving its research infrastructure and funding, it must maximize the collaborations between researchers within and outside New Mexico. Figure 5 presents the number of collaborators across NM EPSCoR components by the collaborator's institution type.



As expected, about half (54%) of the collaborations were with faculty at academic research institutions, although 13% were with individuals working at a Federal agency and another 6% who were working at a state agency. This shows that EPSCoR is involving employees from both Federal and state government in their work, not as participants but as collaborators. There were only 2 (2%) of the collaborators who were associated with industry or a for-profit company. The state of New Mexico has historically suffered from a lack of for-profit business enterprises, especially in the area of basic research.

Figure 6 presents the collaborators that have been involved with NM EPSCoR researchers and components, along with a short description of the nature of the collaboration that occurred. Those collaborations that are between NM EPSCoRians within New Mexico have been highlighted with shading.

Figure 6
Collaborators in Year 2 by Component, Campus and Researchers

Component	#	Researcher Organization	Researcher	Collaborator Organization	Collaborator	Description of Collaboration
.-k-12 Professional Teacher Development	1	NNET	Martinez	New Mexico Highlands University	Martinez, Ed	NMHU Graduate Students and preservice
1-Climate and Hydrology Research	1	NMSU	Bleweiss	Consultant	Kite, Geoff	Developer of the SLURP Model.
	2	NMSU	Bleweiss	NMSU-Physical Science Laboratory	Stein, William	Assisting in the SLURP Model development
	3	NMSU	Rango	Consultant	Martinec, Jaroslav	Developer of the SRM Model
	4	NMSU	Rango	USDA-NRCS	Scheffe, Kenneth	Assisting in the set up of SCAN and SNOTEL Sites
	5	NMSU	Rango	USDA-NRCS	Sleep, Wayne	Assisting in the set up of SCAN and SNOTEL Sites
	6	NMSU	Rango/DeMouche	Elephant Butte Irrigation District	Esslinger, Gary	Assisting in the maintenance of the EBID Weather Stations
	7	NMSU	Rango/DeMouche	University of Arizona	Garfin, Greg	Assisting in the set up of Navajo Nation Weather Stations
	8	NMSU	Rango/DeMouche	Middle Rio Grande Conservancy District	Gensler, David	Assisting in the set up of Weather stations
	9	NMSU	Rango/DeMouche	USDA-NRCS	Gillespie, Mike	Snow Survey Supervisor - Assisting in the set up of SNOTEL sites
	10	NMSU	Rango/DeMouche	Navajo Nation	Leeper, John	Assisting in the set up of Navajo Nation Weather Stations
	11	NMSU	Rango/DeMouche	U.S. Fish & Wildlife Service - Southwestern Region	Maxwell, Chuck	Assisting in the set up of RAWs upgrades
	12	NMSU	Rango/DeMouche	USDA-NRCS	Schaefer, Garry	Assisting in the set up of SCAN sites
	13	NMSU	Rango/DeMouche	USDA-NRCS	Tolsdorf, Tony	Assisting in the set up of SCAN sites
	14	NMSU	Steele	University of Notham, UK	Hann, David	Assisting in the Imaging Analysis of canopy cover.
	15	NMSU	Steele	National School of Surveying, University of Otago	Sirguy, Pascal	Assisting in the Imaging Analysis of canopy cover.
	16	NMSU	Steele	University of Idaho	Smith, Alistair	Assisting in the Imaging Analysis of canopy cover.
	17	NMT	Wilson	University of Arizona	Brooks, Paul	Hillslope, stream and watershed research at the Valles Caldera
	18	NMT	Wilson	University of Texas, Austin	Cardenas, Bayani	Hyporheic zone research at the Valles Caldera
	19	NMT	Wilson	University of Arizona	Troch, Peter	Hillslope, stream and watershed research at the Valles Caldera
	20	UNM	Galewsky	University of Colorado	Noone, David	Large scale water vapor dynamics
	21	UNM	Galewsky	Columbia University	Sobel, Adam	Large scale water vapor dynamics
	22	UNM	Galewsky	Jet Propulsion Labs	Worden, John	Large scale water vapor dynamics
2-Water Quality Research	1	NMSU	Martinez	University of New Mexico	Dahm, Cliff	n/a
	2	NMSU	Martinez	Valles Caldera National Preserve	Parmenter, Bob	Development of research projects for the summer 2010 season
	3	NMSU	Martinez	New Mexico Institute of Mining & Technology	Pullin, Mike	n/a

Component	#	Researcher Organization	Researcher	Collaborator Organization	Collaborator	Description of Collaboration
	4	NMSU	Martinez	University of New Mexico	Van Horn, David	Data analyses of samples collected during summer 09
	5	UNM	Hafich	n/a	Fernald, Sam	two meetings, field trip, data exchange
	6	UNM	Sherson	n/a	Gomez, Jesus	collaborative planning and installation of water monitoring wells in the Valles Caldera.
3-Socioeconomics and Acequia Research	1	NMSU	Fernald	New Mexico State University	Archuleta, David	Local help and contact establishment in the study sites
	2	NMSU	Fernald	Taos-Rio Hondo community	Arguello, David	Community contact in the Rio Hondo site
	3	NMSU	Fernald	New Mexico State University	Boykin, Ken	Technical advise and collaborator in additional proposals submitted
	4	NMSU	Fernald	New Mexico State University	Cowley, David	Technical advise and collaborator in additional proposals submitted
	5	NMSU	Fernald	Taos-Rio Hondo community	Garcia, Cloro	Community contact in the Rio Hondo site
	6	NMSU	Fernald	Taos-Rio Hondo community	Garcia, Herbert	Community contact in the Rio Hondo site
	7	NMSU	Fernald	El Rito Regional Water and Waste Water Association	Garcia, Juan	Community contact in the El Rito site
	8	NMSU	Fernald	New Mexico State University	Herrera, Estevan	Assists with instrumentation and flow measurements
	9	NMSU	Fernald	Taos-Rio Hondo community	Kaplan, Solomon	Community contact in the Rio Hondo site
	10	NMSU	Fernald	Taos-Rio Hondo community	Lacombe, Moises	Community contact in the Rio Hondo site
	11	NMSU	Fernald	Taos-Rio Hondo community	Martinez, Palemon	Community contact in the Rio Hondo site
	12	NMSU	Fernald	Taos-Rio Hondo community	Patterson, Eric	Community contact in the Rio Hondo site
	13	NMSU	Fernald	New Mexico State University	Steele, Cati	Not reported
	14	NMSU	Fernald	Taos-NMSU County Agent	Torres, Rey	Local contact in Taos, NM
	15	NMSU	Fernald	El Rito Ditch Association	Trujillo, Lucas	Community contact in the El Rito site
	16	NMSU	Fernald	NRCS-Taos	Vigil, Peter	Provided mapping of water levels in the Rio Hondo site
	17	UNM	Chermak	University of New Mexico	Chermak, Robert	System Dynamics (SD) economic-behavioral-physical model
	18	UNM	Rivera and Fleming	El Rito Acequia Association	Trujillo, Lucas	Agreement to collaborate in EPSCoR Acequia Research
7-Cyberinfrastructure	1	UNM	Benedict	Idaho State University	Ames, Daniel	Tri-state CI working group.
	2	UNM	Benedict	University of New Mexico	Brown, Stephen	Tri-state CI working group.
	3	UNM	Benedict	University of New Mexico	Coonrod, Julie	Tri-state CI working group.
	4	UNM	Benedict	Desert Research Institute	Dana, Gayle	Tri-state leadership team
	5	UNM	Benedict	University of Nevada, Reno	Dascalu, Segiu	Tri-state CI working group.
	6	UNM	Benedict	Idaho State University	Dunsford, Ted	Tri-state CI working group.
	7	UNM	Benedict	New Mexico State University	Fernald, Sam	NM EPSCoR Data Production and Integration

Component	#	Researcher Organization	Researcher	Collaborator Organization	Collaborator	Description of Collaboration	
	8	UNM	Benedict	Rensselaer Polytechnic Institute (RPI)	Fox, Peter	NSF CI-TEAM Proposal Preparation and Submission	
	9	UNM	Benedict	University of Nevada, Reno	Frintzinger, Eric	Tri-state CI working group.	
	10	UNM	Benedict	University of Texas at El Paso	Gates, Ann	NSF CI-TEAM Proposal Preparation and Submission	
	11	UNM	Benedict	University of New Mexico	Gawalsky, Joe	Tri-state CI working group.	
	12	UNM	Benedict	University of Idaho	Gessler, Paul	Tri-state CI working group.	
	13	UNM	Benedict	Idaho State University	Glenn, Nancy	Tri-state CI working group.	
	14	UNM	Benedict	University of Idaho	Godfrey, Bruce	Tri-state CI working group.	
	15	UNM	Benedict	University of Idaho	Goodwin, Peter	Tri-state CI working group.	
	16	UNM	Benedict	University of Nevada, Reno	Harris, Fred	Tri-state CI working group.	
	17	UNM	Benedict	University of Texas at El Paso	Kosheleva, Olga	NSF CI-TEAM Proposal Preparation and Submission	
	18	UNM	Benedict	Desert Research Institute	Lancaster, Nick	Reviewer for Nevada seed grant program	
	19	UNM	Benedict	New Mexico Institute of Mining & Technology	Majkowski, Lisa	NM EPSCoR UROP Program	
	20	UNM	Benedict	University of Nevada, Reno	McMahon, Michael	Tri-state CI working group.	
	21	UNM	Benedict	New Mexico NSF EPSCoR	Mitchell, Katherine	Coordinatino with former NM EPSCoR Assoc. Director	
	22	UNM	Benedict	University of Texas at El Paso	Pinheiro da Silva, Paulo	NSF CI-TEAM Proposal Preparation and Submission	
	23	UNM	Benedict	New Mexico Institute of Mining & Technology	Pullin, Mike	NM EPSCoR UROP Program	
	24	UNM	Benedict	University of Texas at El Paso	Roash, Steven	NSF CI-TEAM Proposal Preparation and Submission	
	25	UNM	Benedict	Idaho NSF EPSCoR	Schumaker, Rick	Tri-state leadership team	
	26	UNM	Benedict	New Mexico Institute of Mining & Technology	White, Amanda	NM EPSCoR Data Production and Integration	
	27	UNM	Benedict	New Mexico Institute of Mining & Technology	Wilson, John	NM EPSCoR Leadership team. Data production.	
	9- K-12 Professional Teacher Development	1	NNET	Barnes	University of New Mexico	Barnes, Will	Plant sampling and identification - Valles
		2	NNET	Daniels	University of New Mexico	Parmenter, Bob	Valles Collaboration - Valles
		3	NNET	Flynn	NMSU-Physical Science Laboratory	Flynn, Robert	Soil Analysis Techniques - NMSU
		4	NNET	Hafich	University of New Mexico	Hafich, Katya	UNM Graduate Students
		5	NNET	Jacobi	New Mexico Highlands University	Jacobi, Jerry	Identification of Invertebrates - NMHU
		6	NNET	Martinez	New Mexico Highlands University	Martinez, Ed	NMHU Graduate Students and preservice
	10-Undergraduate Research Opportunity Program	1	NMT	Gomez	New Mexico Institute of Mining & Technology	Gomez, Jesus	NMTECH - Ed Preservice
2		NMT	Majkowski	Eastern New Mexico University	Varela, Manuel	Faculty collaborator for UROP recruiting	

Component	#	Researcher Organization	Researcher	Collaborator Organization	Collaborator	Description of Collaboration
	3	NMT	Pullin	Valles Caldera National Preserve	Anastacia, Steffen	Faculty Mentor for UROP project
	4	NMT	Pullin	University of New Mexico	Benedict, Karl	Faculty Mentor for UROP project, minicourse lecturer
	5	NMT	Pullin	Western New Mexico University	Camacho, Tres	Faculty collaborator for UROP recruiting
	6	NMT	Pullin	Dine College - Shiprock	Carroll, Marnie	Faculty collaborator for UROP recruiting; collaborator on the water quality project; will serve as host for Pullin's sabbatical in year 3
	7	NMT	Pullin	Valles Caldera National Preserve	Compton, Scott	Faculty Mentor for UROP project
	8	NMT	Pullin	University of New Mexico	Crossey, Laura	Faculty Mentor for UROP project; water quality collaborator
	9	NMT	Pullin	University of New Mexico	Dahm, Cliff	water quality collaborator
	10	NMT	Pullin	New Mexico State University	DeMouche, Leeann	Faculty Mentor for UROP project
	11	NMT	Pullin	New Mexico State University	Fernald, Sam	Faculty Mentor for UROP project, minicourse lecturer
	12	NMT	Pullin	Dine College - Tsaille	Klein, Barbara	Faculty collaborator for UROP recruiting
	13	NMT	Pullin	New Mexico Institute of Mining and Technology	Majkowski, Lisa	Program Manager, UROP; minicourse lecturer
	14	NMT	Pullin	New Mexico Highlands University	Martinez, Edward	Faculty Mentor for UROP project; collaborator on Diversity IWG; water quality collaborator
	15	NMT	Pullin	San Juan College	Miller, Eric	Faculty collaborator for UROP recruiting
	16	NMT	Pullin	Valles Caldera National Preserve	Parmenter, Bob	Faculty Mentor for UROP project
	17	NMT	Pullin	New Mexico Institute of Mining and Technology	Pullin, Michael	Program Director, UROP; Faculty Mentor for UROP project, minicourse lecturer
	18	NMT	Pullin	New Mexico State University	Rango, Al	Faculty Mentor for UROP project
	19	NMT	Pullin	University of New Mexico	Sanchez-Silva, Renzo	Faculty Mentor for UROP project
	20	NMT	Pullin	SIPI	Sells, Angie	Faculty collaborator for UROP recruiting
	21	NMT	Pullin	University of New Mexico	Sherson, Lauren	Faculty Mentor for UROP project
	22	NMT	Pullin	Valles Caldera National Preserve	Van Horn, Dave	Faculty Mentor for UROP project
	23	NMT	Pullin	New Mexico Institute of Mining and Technology	Wilson, John	Faculty Mentor for UROP project; minicourse lecturer; water quality collaborator
14-Public Outreach and Communication	1	NMMNHS	Everett	International Year of Planet Earth	,	Partnered to offer a luncheon presentation on "Educating About Our Changing Climate"
	2	NMMNHS	Everett	University of New Mexico	Collins, Scott	Worked with Dr. Scott Collins, UNM Biology Professor and Director of the Sevilleta LTER, on providing a field trip to the Sevilleta LTER to look at current research on climate change impacts on southw

Component	#	Researcher Organization	Researcher	Collaborator Organization	Collaborator	Description of Collaboration
	3	NMMNHS	Everett	Rio Grande Nature Center State Park	Dillingham, Beth	Partnered on offering two BioBlitzes at the Rio Grande Nature Center SP.
	4	NMMNHS	Everett	Environmental Education Association of New Mexico	Garrity, Barbara	Partnered to offer a luncheon presentation on "Educating About Our Changing Climate"
	5	NMMNHS	Everett	Celebra la Ciencia	Gregory, Carolyn	Offered a bilingual family day as part of Hispanic Heritage Month.
	6	NMMNHS	Everett	Community Science Connections	Gregory, Carolyn	Collaborated to design and implement the Earth Hour Family Extravaganza and BioBlitz 2010: Discover Your Bosque.
	7	NMMNHS	Everett	National Oceanic and Atmospheric Administration	Herring, David	Coordinated climate change introductory presentations by David Herring to communities around New Mexico
	8	NMMNHS	Everett	The Planetarium at NMMNHS	Ladwig, Laurel	Collaborated to design and implement the Earth Hour Family Extravaganza.
	9	NMMNHS	Everett	Bosque Ecosystem Monitoring Program (BEMP)	Scheerer, Kim	Partnered on a variety of programs including family field trip from NMMNHS to visit BEMP monitoring sites, an introduction to climate change for upper level UNM students, and presentation of an activi
	10	NMMNHS	Everett	New Mexico Environment Department	Turner, Jill	Presented as part of NMED's Climate Masters program
	11	NMMNHS	Everett	The Nature Conservancy	Wells, Donna	Partnered on offering two BioBlitzes at the Rio Grande Nature Center SP.
	12	NMMNHS	Sapunar-Jursich	University of California, Berkeley Space Science Institute	Frappie, Renne	Participated in NASA-funded Cosmic Serpent program that emphasizes the incorporation of underserved audiences in education and exhibit development.
	13	NMMNHS	Sapunar-Jursich	NSF & Association of Science and Technology Centers	Jones, Monica	Shared resources for all climate change education programming at NMMNHS
	14	NMMNHS	Sapunar-Jursich	Ramapo College, Lyndhurst Meadowlands Environment Center	Rios, Deborah	Participated in NSF-funded workshop that emphasized tools needed to make informal science education programs Accessible

Examples of some of the collaborations that have taken place in Year 2 include: assistance with set up of SCAN sites; RAWS upgrades; working with model developers; field investigations in the Valles Caldera; receiving technical advice and collaborating on proposals; community contacts; tri-state cyberinfrastructure coordination; faculty mentors for undergraduate in research program; and collaborating on how to communicate climate change to the public. Collaborations are occurring both within the state and between NM researchers and those in other states. The tri-state consortium (IA, NM, NV) is helping to facilitate some of the collaborations, although most of these collaborators are involved in the cyberinfrastructure group. However, as the research progresses it is likely that more of the research scientists will also establish collaborations to test their models and verify their findings, as well as determine the most appropriate manner to commonly share their data.

Material Infrastructure (Equipment, Measuring Stations, Models and Cyberinfrastructure)

As the name implies, the Research Infrastructure Improvement (RII) funding is meant to provide jurisdictions with the resources to enhance their research capabilities by purchasing equipment and funding infrastructure necessary for world class research. Figure 7 presents a table of infrastructure purchased during Year 2 by component and institution.

Figure 7
Infrastructure Acquired during Program Year 2

Component	Campus/ Partner	#	Equipment Location	Equipment name	Total Purchases Amount	NSF EPSCoR \$	
1-Climate and Hydrology Research	NMSU	1	South Valley, Albuquerque, NM	5-Weather Stations/ Installation to take place Summer, 2010-2011 in the Navajo Nation & up to 3 s	\$40,000	\$40,000	
		2	Taos Powderhorn manual snow course at or near San Antonio; Tentative location pending field inspection	2-USDA/NRCS SNOTEL Sites; 6 Enhanced SNOTEL Sites	\$120,000	\$120,000	
		3	Throughout NM	Ott Pluvios; Installation	\$99,000	\$99,000	
		Total Sum			\$259,000	\$259,000	
	NMT	1	New Mexico Tech, Dept. of Earth & Environmental Science,	SensorTran Gemini Dual Laser Distributed Temperature Sensing System	77840	77840	
		Total Sum			77840	77840	
	UNM	1	UNM Albuquerque	IMET Upper Air Sounding System	15000	400	
		Total Sum			15000	400	
	Total	Sum			\$351,840	\$337,240	
	2-Water Quality Research	NMT	1	Pullin's Lab at NMT; will be deployed at Valles Caldera later this year	DOC Analyzer	18420	18420
			2	purchased planned this summer	absorbance and fluorescence instrumentation	15000	15000
Total Sum					33420	33420	
Total		Sum			\$33,420	\$33,420	
3-Socioeconomics and Acequia Research	NMSU	1	Rio Hondo	Weather station	5000	5000	
		2	Rio Hondo, El Rito	Flow measurement stations	60000	60000	
		3	Rio Hondo, El Rito	Moisture probe and logger	10000	10000	
		4	Rio Hondo, El Rito	Water level logger	5000	5000	
		5	Rio Hondo, El Rito, Alcalde	Telemetry	30000	30000	

Component	Campus/ Partner	#	Equipment Location	Equipment name	Total Purchases Amount	NSF EPSCoR \$
		Total Sum			110000	110000
	Total	Sum			\$110,000	\$110,000
7- Cyberinfrastructure	UNM	1	Earth Data Analysis Center, University of New Mexico	Silicon Mechanics Quad-node Vmware virtualization platform and related external shared storage devic	24000	0
		Total Sum			24000	0
	Total	Sum			\$24,000	0
14-Public Outreach and Communication	NMMNH S	1	New Mexico Museum of Natural History & Science	LED Projector	1000	1000
		2	New Mexico Museum of Natural History & Science	Magic Planet "Science on a Sphere"	60000	60000
		Total Sum			61000	61000
	Total	Sum			\$61,000	\$61,000
Total					\$580,260	\$541,660

More than half a million dollars, \$580,260, was used from EPSCoR funds to purchase equipment and other infrastructure needed by NM EPSCoR researcher. More than half (60%) was used for purchasing instrumentation by the Climate and Hydrological research component. The instrumentation acquired by this group was for equipment for 5-Weather Stations/ Installation on the Navajo Nation, 2-USDA/NRCS SNOTEL Sites; 6 Enhanced SNOTEL Sites, SensorTran Gemini Dual Laser Distributed Temperature Sensing System, IMET Upper Air Sounding System and Ott Pluvios,

The Socioeconomics and Acequia research group had the second highest expenditures with \$110,000 or 19% of the infrastructure funds. The funding was used for equipment and supplies for installing weather stations, flow measurement stations, moisture probe and logger, water level logger, and purchasing telemetry data for two water sheds.

The Public Outreach and Communication component purchased the "Science of a Sphere" from Magic Planet and a LED project for a total for \$61,000 or 11% of the infrastructure funds expended in Year 2.

The Water Quality Research area, which had the second highest infrastructure expenditures in Year 1, made only \$33,420 or 6% of the total investment in infrastructure. Finally, the Cyberinfrastructure component purchased a silicon mechanics quad-node Vmware virtualization program for \$24,000 to begin storage and visualization of research data being collected.

Discovery Learning (Observing, Data Collecting, Research, Funding Sought)

Data collected, observations or field work, research conducted and proposals submitted and awarded provide an indicator of the outputs obtained through the work of the NM EPSCoR researchers. Figure 8 lists the proposals submitted by component and campus and whether the proposal has been funded as of the end of Year 2.

Figure 8
Proposals Submitted/Awarded

Component	#	Campus	Proposal Status	Funding Agency	Title	PI	CoPIs	Amount
1-Climate and Hydrology Research	1	NMT	Declined	NSF	Dynamically changing hyporheic zones: interfacial exchange in mountain step-pool and riffle-pool seq	Wilson, John		\$504,743
	2	NMT	Submitted	NSF	Dynamic Groundwater Age Distributions: Exploring Catchment Scale Subsurface Systems	Wilson, John		\$423,092
	3	NMT	Submitted	American Geophysical Union	Exploring the Dynamics of sinuosity-driven hyporheic zones: an experimental approach	Gomez, Jesus		\$10,000
								\$937,835
2-Water Quality Research	1	NMHU	Pending Official Award	USDA-CSREES	Focusing Recruitment, Retention and Research Experiences On Increasing Underrepresented Minorities I	Martinez, Edward	Jennifer Lindline	\$299,000
	2	NMHU	Submitted	NSF-GK-12	Research and Education in Conservation and Ecological Restoration in Northeastern New Mexico	Martinez, Edward		\$600,000
	3	NMHU	Declined	NSF S-STEM	The Achieving in Research, Mathematics And Science (ARMAS) Scholarship Program	Martinez, Edward		\$600,000
	4	NMHU	Declined	NSF-Division of Biological Infrastructure	Online consolidation of 8 micro-herbaria at the reestablished Herbarium of New Mexico Highlands Univ	Martinez, Edward		\$676,995
	5	NMHU	Submitted	USDA-HIS	Supporting Agriculture in Science and Education (SASE)	Martinez, Edward		\$300,000
								\$2,475,995
3-Socioeconomics and Acequia Research	1	NMSU	Submitted	NSF	Collaborative Research: WSC Category 2: Breaking the Rules: Testing the Success or Failure of Adapti	Phillips, Fred	John Wilson	\$1,747,865

Component	#	Campus	Proposal Status	Funding Agency	Title	PI	CoPIs	Amount
	2	NMSU	Submitted	NSF	Acequia Water Systems Linking Culture and Nature: Integrated Analysis of Community Resilience to Cli	Fernald, Alexander	Rivera, Tidwell, Wilson	\$1,400,892
	3	NMSU	Submitted	NSF	Collaborative Research: WSC Category 2: Breaking the Rules: Testing the Success or Failure of Adapti	Fernald, Alexander	Collaborative with other institutions - with Fred Wilson of NM Tech taking lead	\$544,677
								\$3,693,434
7- Cyberinfrastructure	1	UNM	Submitted	National Science Foundation	CI-TEAM Implementation: CyberShARE-TEAM- Cyberinfrastructure Training, Education, Advancement, and M	Pinheiro da Silva, Paulo	Olga Kosheleva, Steve Roach, Peter Fox, Karl Benedict	\$999,895
								\$999,895
10- Undergraduate Research Opportunity Program	1	NMT	Accepted	NSF	Exploring Your Future in Science through an Interdisciplinary Undergraduate Research Experience, A S	Pullin, Michael	Lisa Majkowski	\$11,730
								\$11,730
Total	Sum							\$8,036,889

Proposals totally over \$8.0 million were submitted during Year 2 by EPSCoR researchers. One proposal submitted to NSF, as a result of an IWG, has been approved for funding in the amount of \$1.4 million. This was submitted by researchers in the Acequia component in collaboration with climate and hydrology component researchers. As researchers become more collaborative, it is becoming increasingly difficult to attribute results solely to one component. In this case, no less than three researchers included this proposal in their annual reports.

Climate and Hydrology researchers submitted three proposals, two were declined, one accepted pending official notification and two are still under review. The Water Quality researchers submitted five proposals, one was accepted and awaiting an official award, two were declined and two are still under review. The Socioeconomic and Acequia researchers submitted three proposals, one of which was approved for funding, while the other two are awaiting a decision. A proposal to NSF from the Cyberinfrastructure group for almost \$1 million was submitted to support the CI-Team Implementation of Training, Education, Advancement and Mentoring of Hispanic Teachers and Students. Finally, the UROP group was awarded \$11,730 from NSF for a proposal on helping undergraduates to explore their future with interdisciplinary researcher.

Knowledge Generation (Professional Presentations, Publications, Patents)

Professional presentations, posters and invited talks are critical to increasing the visibility and reputations of NM climate change researchers, in addition to disseminating their valuable research findings to their colleagues. Figure 9 lists the presentations by EPSCoR researchers from the Year 2.

Figure 9
Professional Presentations, Posters and Invited Talks

Component	#	Presentation Type	Author	Name of Event	Title of Presentation	Audience Type	Audience Size	Audience Scope
1-Climate and Hydrology Research	1	Invited Paper	Albert, Rango	5th Symposium on Southwest Hyd	Using new methods to improve snowmelt runoff forec	Researchers	More than 100	Regional
	2	Paper	Albert, Rango	78th Annual Meeting of the Wes	Infrastructure improvements for snowmelt runoff as	Researchers	More than 100	Regional
	3	Paper	Albert, Rango	American Geophysical Union Fal	Infrastructure improvements for snowmelt runoff fo	Researchers	More than 100	International
	4	Paper	Caiti, Steele	International Geoscience and R	Sensitivity of the Snowmelt Runoff Model to Undere	Researchers	More than 100	International
	5	Paper	Caiti, Steele	American Geophysical Union Fal	An analysis of MODIS fractional snow cover estimat	Researchers	More than 100	International
	6	Paper	Cardenas, Bayani	2010 Summer Meeting, Aquatic S	Fluid dynamic interactions near sediment-water int	Researchers	51-100	International
	7	Poster	Gomez, Jesus	Catchment Science: Interaction	Influence of transient forcings on residence time	Researchers	100	National
	8	Paper	Gomez, Jesus	New Mexico Water Research Symp	Residence Time Distributions and Dynamically Chang	Researchers	100	Regional
	9	Poster	Gomez, Jesus	2009 Summer Institute on Earth	Residence Time Distributions and Dynamically Chang	Researchers	100	National
	10	Paper	Gomez, Jesus	Geological Society of America	Residence Time Distributions and Dynamically Chang	Researchers	More than 100	International
	11	Poster	Gomez, Jesus	American Geophysical Union, Fa	Dynamic residence time distributions of sinuosity-	Researchers	100	International
	12	Poster	Gomez, Jesus	EPSCoR Tri-State Meeting, Lake	Age Distributions and Dynamically Changing Hydrolo	Researchers	51-100	National
	13	Poster	Harding, Jevon	EPSCoR Tri-State Meeting, Lake	An undergraduate project to design, build and ?eld	Researchers	51-100	National

Component	#	Presentation Type	Author	Name of Event	Title of Presentation	Audience Type	Audience Size	Audience Scope
	14	Paper	Jesus, Gomez	2010 Summer Meeting, Aquatic S	Exploring the dynamics of sinuosity driven hyporhe	Researchers	51-100	International
	15	Poster	Nikki, Rendon	2009 SACNAS Annual Conference	Inferring Surface/Subsurface Interactions Using St	Researchers	More than 100	National
	16	Invited Talk	Wilson, John	New Mexico EPSCoR Science Revi	New Mexico Research Infrastructure	Researchers	51-100	National
	17	Invited Talk	Wilson, John	SAHRA Annual Meeting, Tucson,	Residence Time Distributions in Dynamically Changi	Researchers	1-25	National
	18	Invited Talk	Wilson, John	Burges Symposium, University o	Groundwater Science in an Evolving Interdisciplin	Researchers	100	International
	19	Panel	Wilson, John	EPSCoR Tri-State Meeting, Lake	Round Table Discussion – Development of Joint Scie	Researchers	51-100	National
2-Water Quality Research	1	Poster	Desanto, Leona	Tri-State 2nd Annual meeting	Seasonal Variation Influences on phosphorus and ni	Researchers	26-50	Multi-state
	2	Poster	Martinez, Delyn	2009 SACNAS Annual Conference	The Short Term Effects Of Grazing Animal Stream Cr	Researchers	More than 100	National
	3	Poster	Martinez, Delyn	SACNAS Conference in Dallas, T	The Short Term Effects of Grazing Animal Stream Cr	K-12 Professionals	26-50	Multi-state
	4	Poster	Martinez, Estevan	Tri-State 2nd Annual meeting	Seasonal Variation Influences on the Bioavailabili	Researchers	26-50	Multi-state
	5	Poster	Sherson, Lauren	GSA	Geothermal contributions to water chemistry in the			
	6	Poster	Sherson, Lauren	ASLO/NABS Summer Meeting, June	Use of continuous real-time water quality sensors			
	7	Poster	Trujillo, Julie	Tri-State 2nd Annual meeting	Seasonal Variation Influences on the Bioavailabili	Researchers	26-50	Multi-state
3-Socioeconomics and Acequia Research	1	Invited Talk	Chermak, Janie	Lecture Series of theSiera Clu	The Economics Impact of Climate Change on New Mexi	General Public	1-25	Local
	2	Panel	Chermak, Janie	Panel hosted by the Greater Al	The Future of Energy in New Mexico: A discussion o	General Public	51-100	Local
	3	Invited Talk	Chermak, Janie	Meeting of the Radioactive and	Potential Impacts of Climate Change to New Mexico	Policy Makers	26-50	Regional

Component	#	Presentation Type	Author	Name of Event	Title of Presentation	Audience Type	Audience Size	Audience Scope
	4	Invited Talk	Chermak, Janie	9th Annual Meeting of SAHRA, a	Integration of Urban Water Demand Experiments into	Researchers	26-50	Multi-state
	5	Invited Talk	Chermak, Janie	League of Women Voter's Climat	Climate Change will Cost No Matter What	General Public	51-100	Regional
	6	Invited Talk	Fernald, Alexander	10th Annual Congreso de las Ac	Acequia Hydrology	General Public	> 50	Regional
	7	Invited Talk	Guldan, Steve	Junta de Las Acequias y Merced	Acequia hydrology - new findings	General Public	> 50	Regional
	8	Invited Talk	Guldan, Steve	Water and Energy Summit 2010	Acequia Hydrology	General Public	1-25	Regional
	9	Invited Talk	Ochoa, Carlos	9th Annual Española Basin Work	Surface and Groundwater Interaction in Irrigated L	Researchers	More than 100	Regional
	10	Panel	Rivera, Jose	Tri-State Annual Western Conso	Socio-cultural Responses to Climate Change: Acequ	Researchers	26-50	Multi-state
7-Cyberinfrastructure	1	Invited Talk	Benedict, Karl	NM EPSCoR UROP Workshop	Service Oriented Architectures for the Exchange of	Undergrads	26-50	Regional
	2	Paper	Benedict, Karl	Federation of Earth Science In	RESTful Requests for Dynamic OGC Services	Researchers	More than 100	National
	3	Invited Talk	Benedict, Karl	UNR Computer Science Colloquiu	Development of a modern Services Oriented Architec	Grad students	51-100	Local
	4	Paper	Benedict, Karl	ASPRS/MAPPS Conference	RGIS 2.0	Researchers	51-100	National
	5	Invited Talk	Benedict, Karl	New Mexico Geographic Informat	RGIS 2.0	Specific resource users/Stake h	More than 100	Regional
	6	Paper	Benedict, Karl	American Geophysical Union	RGIS 2.0	Researchers	More than 100	International
	7	Poster	Benedict, Karl	Federation of Earth Science In	RGIS 2.0 - An Interoperable, Open Source SOA for G	Researchers	More than 100	National
	8	Invited Talk	Benedict, Karl	Seminar in Interdisciplinary B	Service Oriented Architectures for the Exchange of	Grad students	1-25	Local
	9	Invited Talk	Benedict, Karl	CyberShARE Distinguished Lectu	The development of standards-based geospatial appl	Researchers	26-50	Local
	10	Invited Talk	Benedict, Karl	iEMSs 2010 Conference		Researchers		National

Component	#	Presentation Type	Author	Name of Event	Title of Presentation	Audience Type	Audience Size	Audience Scope
	11	Invited Talk	Benedict, Karl	Federation of Earth Science In		Researchers		National
10-Undergraduate Research Opportunity Program	1	Invited Talk	Pullin, Michael	2009 SACNAS Annual Conference	Exploring Your Future in Science through an Interd	Undergrads	26-50	National
Total	N	48	48	48	48	48	48	48

Forty-eight professional presentations, posters and invited talks were reported by NM EPSCoR researchers. Seven researchers from the Climate and Hydrology group reported making 19 presentations at national and international conferences. Five researchers from the Water Quality group presented their work at national and multi-state meetings/conferences. Five researchers from the Socioeconomics and Acequia group reported making ten presentations, most of which were invited talks at local and regional meetings/conferences. Karl Benedict of the Cyberinfrastructure component made 11 presentations at local, regional and national venues. Finally, Mike Pullin was invited to give a talk at the national SACNAS conference to undergraduates on exploring your future in science through interdisciplinary undergraduate research.

Publications

Dissemination of the knowledge and research findings by EPSCoR researchers is an important outcome of the project. Figure 10 lists the presentations by researchers for each component.

Figure 10
Professional and Community Publications

Component	#	Source	Researcher	Citation	Status	Type of Publication	Date Published
1-Climate and Hydrology Research	1	NMSU	Rango	Ashraf N El-Sadek, M. Bleiweiss, M. Shukla, A. Fernald, and S. Guldán. 2009. Hydrology Modeling of the Mimbres Watershed Using Precipitation Data from Several Different Sources. New Mexico Water Research Symposium held in New Mexico Tech Campus, Socorro, NM. August 11, 2009.	Submitted-under review	Journal Article	
	2	NMSU	Rango	Rango, A., Hurd, B., Gutzler, D.S., and Vivoni, E.R., 2009. Effects of Climate Change on Mountain Hydrology and Water Management in the Upper Rio Grande Watershed: Assessment Methods and Strategies, Climate Research, 32pp. In review	Submitted-under review	Journal Article	
	3	NMSU	Rango	Smith, A.M.S., Falkowski, M.J., Hudak, A.T., Evans, J.S., Robinson, A.P. and Steele, C.M.(2009) Comparing field and remote estimates of forest canopy cover, Canadian Journal of Remote Sensing 35 (5) 447-459	Published	Journal Article	1/2/2009

Component	#	Source	Researcher	Citation	Status	Type of Publication	Date Published
	4	NMT	Wilson	Cardenas, M B; Cook, P L; Gerecht, K E; Jiang, H S; Markowski, M S; Nowinski, J D; Sawyer, A H; Swanson, T E; and Wilson, J L. 2010. Fluid dynamic interactions near sediment-water interfaces in aquatic and coastal environments, 2010 Summer Meeting, Aquatic Sciences: Global Changes from the Center to the Edge, Joint Meeting with ASLO & NABS, Abstract 6544.	Published	Abstract	4/1/2010
	5	NMT	Wilson	Gomez, J D; Wilson, J L; and Cardenas, M B. 2010. Exploring the dynamics of sinuosity-driven hyporheic zones, 2010 Summer Meeting, Aquatic Sciences: Global Changes from the Center to the Edge, Joint Meeting with ASLO & NABS, Abstract 7321.	Published	Abstract	4/1/2010
	6	NMT	Wilson	Gomez, J. and J.L. Wilson, 2010. On residence time distributions in dynamically changing hydrologic flow systems, Water Resources Research, in submission	Submitted -under review	Journal Article	
	7	NMT	Wilson	Gomez, J.D. and J.L. Wilson, 2010, Exploring the dynamics of sinuosity-driven hyporheic zones, Geophysical Research Letters, in submission.	Submitted -under review	Journal Article	
	8	NMT	Wilson	Gomez, J.D. , M.B. Cardenas, and J.L. Wilson, 2010, Hyporheic exchange and residence time distributions in sinuous streams, Water Resources Research, in submission.	Submitted -under review	Journal Article	
	9	NMT	Wilson	Gomez, J.D. and J.L. Wilson, 2009. Residence Time Distributions and Dynamically Changing Hydrologic Systems: Exploring Transient Hyporheic Flow Systems, Abstract 164889, Geological Society of America, Abstracts with Programs, 41(7), 348.	Published	Abstract	10/1/2009
	10	NMT	Wilson	Gomez, J.D., J.L. Wilson, and M.B. Cardnas, 2009. Dynamic residence time distributions of sinuosity-driven hyporheic zones. American Geophysical Union. Abstract H51G-0848, Fall Meet. Suppl., Eos Trans. AGU, 90(52).	Published	Abstract	12/1/2009
2-Water Quality Research	1	NMT	Pullin	Michael J. Pullin, Andrea M. Higdon, Eric S. Osantowski, and Patrick E. Sims. Colorimetric Flow Injection Analysis of Iron(II) and Total Iron in Natural Waters at the Nanomolar Level, In press in Analytica Chimica Acta	Accepted Awaiting Publication	Journal Article	8/1/2010
3-Socioeconomics and Acequia	1	NMSU	Fernald	Fernald, A. 2009. Mitigation of climate change impacts by hydrologic and cultural components of traditional acequia irrigation systems. Eos Trans. AGU 90(52).	Published	Poster	5/1/2009

Component	#	Source	Researcher	Citation	Status	Type of Publication	Date Published
Research	2	NMSU	Fernald	Ochoa, C., A. Fernald, S. Guldan. 2009. Characterizing water flows in irrigated valleys of Northern New Mexico. Eos Trans. AGU 90(52).	Published	Poster	11/1/2008
9-K-12 Professional Teacher Development	1	NNET	Powell	"Rim to River": The Valles Caldera Field Experience Manual for High School Teachers	Published	Technical Report	6/1/2009
Total	N	14	14	14	14	14	14

A total of 14 articles, reports and conference proceedings were reported for Year 2. The Climate and Hydrology group reported 10 articles or abstracts submitted. Five were reported as being published, while the other five are under review. Primary authorship of the ten articles are distributed among five different researchers. Water Quality researchers reported one publication accepted and awaiting publication in *Analytica Chimica Acta* on the development of the colorimetric flow injection analysis of iron in natural water at the nanomolar level. The Socioeconomic and Acequia research group reported two posters published in *Eos Trans*.

Patents

There were no reports of any patent applications submitted or awarded during Year 2.

Outreach/Public Dissemination (Scientific Literacy, Public Presentations, Policymakers, Education)

Increasing the scientific literacy and understanding of scientific research at all levels of society is important to increasing the diversity of the scientific workforce. This includes the general public, undergraduates, graduate students, junior faculty, K-12 teachers and others. Each group needs different strategies and approaches which is evident from the education and public outreach activities conducted by the different component teams. Figure 11 lists the activities, types of activity/audience, and the actual/estimated numbers of participants involved by component.

Figure 11
Education and Public Outreach Activities

Component	#	Campus	Activity Contact	Type of Activity	Activity Name	Actual # or estimated # of Participants	Actual # or estimated # of Female Participants	Actual# or estimated# or Black, Hispanic, Native American Participants
1-Climate and Hydrology Research	1	NMSU	DeMouche	Community event	White Sands Missile Range - Earth Day	150	50	100
	2	NMSU	Steele	Summer Academy	Water Related Issues and Changing Climate	30	10	20
						180	60	120
2-Water Quality Research	1	NMSU	Edward Martinez	PD workshop	Instrument Use	6	2	5
	2	NMSU	Edward Martinez	PD workshop	Instrument Use	6	2	5
	3	NMSU	Edward Martinez	PD workshop	Instrument Use	6	2	5
	4	NMSU	Edward Martinez	PD workshop	Instrument Use	7	3	5
	5	NMSU	Edward Martinez	PD workshop	Instrument Use	7	3	6
	6	NMSU	Edward Martinez	Instrument use in Limnology Co	Instrument Use	4	1	3
	7	UNM	n/a	Community event	NM State Legislature	100	0	0
	8	UNM	n/a	REU	REU on Hyporeic Zone	2	.	.
	9	UNM	n/a	REU	REU on Hyporeic Zone	2	.	.
					140	13	30	
3-Socioeconomics and Acequia Research	1	NMSU	Fernald	REU	UROP	7	3	5
	2	UNM	Rivera	Community event	Acequia Hydrology Symposium	80	30	65
					87	33	70	
7-Cyberinfrastruct	1	UNM	Benedict	REU	UROP Workshop Presentation	30	15	8

Component	#	Campus	Activity Contact	Type of Activity	Activity Name	Actual # or estimated # of Participants	Actual # or estimated # of Female Participants	Actual# or estimated# or Black, Hispanic, Native American Participants
ure	2	UNM	Benedict	Community event	Federation of Earth Science Information Partners	125	60	20
	3	UNM	Benedict	Community event	UNR Computer Science Department Colloquium	70	25	10
	4	UNM	Benedict	Community event	New Mexico Geographic Information Council	150	70	20
	5	UNM	Benedict	Community event	ASPRS/MAPPS Conference	60	20	10
	6	UNM	Benedict	Community event	American Geophysical Union	200	100	10
	7	UNM	Benedict	Community event	Federation of Earth Science Information Partners	125	50	10
	8	UNM	Benedict	Community event	Seminar in Interdisciplinary Biology and Biological Sciences (SiBBs)	15	5	3
	9	UNM	Benedict	Community event	CyberShARE Distinguished Lecture Series	30	12	20
	10	UNM	Benedict	Community event	iEMSs 2010 Conference	.	.	.
	11	UNM	Benedict	Community event	Federation of Earth Science Information Partners	.	.	.
	12	UNM	Renzo	REU	UROP	2	2	0
						807	359	111
9-K-12 Professional Teacher Development	1	NNET	Powell	PD workshop	Wind River Ranch Followup	18	12	5
	2	NNET	Powell	PD workshop	Valles Followup	14	8	7
	3	State Office	Daniel	Summer Academy	Teacher Summer Institute	19	10	7
						51	30	19
10-Undergraduate Research Opportunity Program	1	NMSU	Edward Martinez	REU	Instrument Use/Sample Analyses	2	2	5
	2	NMT	Majkowski	REU	Eastern New Mexico University UROP Recruiting Visit/Presentation	52	30	8
	3	NMT	Majkowski	REU	Northern New Mexico College UROP Recruiting Visit/Presentation	5	2	3

Component	#	Campus	Activity Contact	Type of Activity	Activity Name	Actual # or estimated # of Participants	Actual # or estimated # of Female Participants	Actual# or estimated# or Black, Hispanic, Native American Participants
	4	NMT	Majkowski	REU	Southwestern Indian Polytechnic Institute UROP Recruiting Visit/Presentation	3	1	2
	5	NMT	Majkowski	REU	Eastern New Mexico University UROP Recruiting Visit/Career Fair	15	10	4
	6	NMT	Majkowski	REU	New Mexico Highlands University UROP Recruiting Visit	10	8	5
	7	NMT	Majkowski	REU	Northern New Mexico College UROP Recruiting Visit	1	0	1
	8	NMT	Majkowski	REU	Southwestern Indian Polytechnic Institute UROP Recruiting Visit/Presentation	40	10	39
	9	NMT	Majkowski	REU	Navajo Technical College Field Trip	4	1	4
	10	NMT	Majkowski/Pullin	REU	Southwestern Indian Polytechnic Institute UROP Recruiting Visit/Presentation	40	10	40
	11	NMT	Pullin	REU	Dine College UROP Recruiting Visit/Presentation	25	25	50
	12	NMT	Pullin	REU	San Juan College UROP Recruiting Visit/Presentation	5	25	50
	13	NMT	Pullin	REU	New Mexico Highlands University UROP Recruiting Visit/Presentation	20	10	15
	14	NMT	Pullin	REU	Dine College Shiprock UROP Recruiting Visit/Presentation	30	.	.
	15	NMT	Pullin	REU	Dine College Tsaille UROP Recruiting Visit/Presentation	35	.	.
	16	NMT	Pullin	REU	San Juan College UROP Recruiting Visit/Presentation	25	.	.
						312	134	226
13-Junior Faculty	1	UNM	n/a	PD workshop	Faculty Leadership workshop	25	15	5

Component	#	Campus	Activity Contact	Type of Activity	Activity Name	Actual # or estimated # of Participants	Actual # or estimated # of Female Participants	Actual# or estimated# or Black, Hispanic, Native American Participants
Leadership Training						25	15	5
14-Public Outreach and Communication	1	NMMNHS	Everett	Community event	Event - BioBlitz at the Rio Grande Nature Center SP, citizen science event	150	75	75
	2	NMMNHS	Everett	Community event	Activity - "What's for Lunch?" presented at NM MESA Day	.	.	.
	3	NMMNHS	Everett	Community event	Family Field Trip - BEMP monitoring sites	4	1	0
	4	NMMNHS	Everett	PD workshop	Teacher Workshop - "New Energy Future"	35	25	12
	5	NMMNHS	Everett	Community event	Field Trip - Sevilleta LTER, led by Dr. Scott Collins	12	8	6
	6	NMMNHS	Everett	Community event	Activity - Science and Technology Day at the NM State Fair	1000	500	700
	7	NMMNHS	Everett	Community event	Seminar - "Hot Topic: Dialoging About Climate Change"	40	20	5
	8	NMMNHS	Everett	Community event	Seminar - "Hot Topic: Dialoging About Climate Change"	50	20	5
	9	NMMNHS	Everett	Community event	Seminar - "Hot Topic: Dialoging About Climate Change"	0	0	0
	10	NMMNHS	Everett	Community event	Seminar - "Hot Topic: Dialoging About Climate Change"	60	30	10
	11	NMMNHS	Everett	Community event	Activity - Hands-on family activities about climate change for Hispanic Heritage Month Celebration:	1100	600	800
	12	NMMNHS	Everett	Community event	Curator's Coffee- "Searching for Answers About Climate Change"	11	2	1
	13	NMMNHS	Everett	Community event	Activity - "What's for Lunch?" presented at Green Trails Conference	60	35	20

Component	#	Campus	Activity Contact	Type of Activity	Activity Name	Actual # or estimated # of Participants	Actual # or estimated # of Female Participants	Actual# or estimated# or Black, Hispanic, Native American Participants
	14	NMMNHS	Everett	Community event	Presentation - An introduction to climate change to upper level UNM students	22	11	15
	15	NMMNHS	Everett	Community event	Presentation - "Educating About Our Changing Climate"	55	32	20
	16	NMMNHS	Everett	Community event	Presentation - "Educating About Climate Change" to Climate Masters	30	18	10
	17	NMMNHS	Everett	Community event	Discussion - Tour and discussion of water resource managers from Turkmenistan	8	2	0
	18	NMMNHS	Everett	Community event	Event - Earth Hour Family Extravaganza	451	230	300
	19	NMMNHS	Everett	School field trip	Activity - "What's for Lunch?" presented at Diversity Day at Albuquerque Academy	15	9	8
	20	NMMNHS	Everett	Community event	Presentation - An introduction to climate change to upper level UNM students	18	10	20
	21	NMMNHS	Everett	Community event	Event - BioBlitz 2010: Discover Your Bosque	.	.	.
	22	NMMNHS	Everett	Community event	Lecture - Eric Blinman on "The Rear View Mirror: 2000 Years of People and Climate Change in the Sout	.	.	.
	23	NMMNHS	Everett	School field trip	Activity - Climate change activity presented at BEMP/Watershed Watch Student Congress	.	.	.
	24	NMMNHS	Everett	Community event	Presentation - Curator's Coffee presentation on climate change to NMMNHS volunteers	.	.	.

Component	#	Campus	Activity Contact	Type of Activity	Activity Name	Actual # or estimated # of Participants	Actual # or estimated # of Female Participants	Actual# or estimated# or Black, Hispanic, Native American Participants
	25	NMMNHS	Everett	Community event	Science Café - Extreme Ice with guest speaker Bill Lipscomb			
	26	NMMNHS	Everett	Community event	Presentation - "Educating About Climate Change" to Climate Masters			
	27	NMMNHS	Morris	Community event	Lecture - Dr. Terry L. Root on "The Impact of Our Fossil-Fuel Addiction on Plants and Animals."			
	28	NNET	Powell	School field trip	Field Work	18	12	18
	29	NNET	Powell	School field trip	Field Work	22	10	4
	30	NNET	Powell	School field trip	Field Work	24	13	19
	31	NNET	Powell	School field trip	Field Work	18	10	2
	32	NNET	Powell	School field trip	Field Work	16	6	16
	33	NNET	Powell	School field trip	Field Work	20	11	2
	34	NNET	Powell	School field trip	Field Work	15	8	15
	35	NNET	Powell	School field trip	Field Work	15	8	15
	36	NNET	Powell	School field trip	Field Work	23	11	11
	37	NNET	Powell	School field trip	Field Work	20	8	17
						3312	1725	2126
Total						4914	2370	2707

Overall, approximately 5,000 participants were involved in one or more educational or public outreach activity supported by NM EPSCoR. It is estimated that about half (2,400) of these participants were female and about, 2,700 were members of an underrepresented minority group in the sciences.

The Public Outreach and Communication group held a variety of community and outreach events, reported reaching 3,000 members of the public. The Northern Network conducted ten outreach field trips with about 200 K-12 students to do hands-on science activities in outdoor classrooms.

Each research component conducted outreach activities that were unique to their research endeavors.

Findings and Recommendations

Any delay in startup that was caused by the late start in Year 1 has been more than made up with the efforts in Year 2. All components, both research and outreach, are on schedule and following the strategic plan developed at the start of the project. There is a lot of integration between and among the research areas and education, which speaks well for creating that critical mass of researchers needed to study the impact of changes in snow pack on climate change. The only concern is whether New Mexico has the depth of researchers to continue the work that has been started. As more and more data is collected, there will be an increasing need for more expertise in the field as well as in the laboratory to analyze the data. The need for well educated and trained people at all levels is critical. The accompanying evaluation reports for each component will hopefully assist the project management team and the component leaders in keeping true to the strategic plan. A summary of the findings and recommendations contained in each of these component reports are presented below.

Component 1: Climate and hydrology

A total of 28 participants were involved in the Climate and Hydrology research, including 7 faculty, 2 post-docs, 4 graduate students, 13 undergrads, 1 technical staff and 1 other. Six (21%) are female, while 7 (25%) are from an under-represented minority. However, 6 of the 7 URM are undergraduate students.

NMSU supported over half (54%) of the participants; 5 of the 7 faculty, 7 of the 13 undergraduates, 2 of the 4 graduate students and the 1 other participant. NMT involved 1 faculty, 1 Post-Doc, 1 graduate and 5 undergraduate students, including 25% female and 13% URM. UNM involved 1 faculty member, 1 Post-Doc, 1 graduate, 1 undergraduate student and 1 staff-technical, including 20% female and 20% URM

Many of the same collaborations from Year 1 have continued in Year 2. The collaborations include assisting with equipment installation in remote areas and working with other researchers on the snow melt models the team is using.

Over \$350k of equipment/sensors were purchased and installed during Year 2. Three-fourths (74%) of the purchases were done by NMSU and included 8 Snotel/Enhanced Snotel Site, Otis Pluvios and 8 weather stations.

An additional \$1.4 million of funding is pending official approval for a proposal submitted to NSF by NMSU Dr. Fernald with co-PIs Wilson, Rivera and Tidwell to study the acequia water systems, linking culture and nature. This was an outcome of an IWG held during Year 2. Four proposals were submitted by NMT and none by UNM researchers

Nineteen professional presentations, papers or invited talks were produced by the Climate and Hydrology Researchers at a variety of venues; including regional, national and international audiences. Ten professional publications were submitted to a variety of peer reviewed journals. Five of which were published.

Two education/outreach activities were led by the NMSU researches reaching approximately 180 participants; two-thirds of which were estimated to be members of an URM group, and one third female.

The Climate and Hydrology research group, especially the NMSU team, appears to be proceeding according to the strategic plan. It is difficult to tell from the information provided whether NMT activities are being accomplished, however. Scientific research is being reported, but the details related to the accomplishment of the strategic plan activities is lacking. Similarly there is no evidence that the UNM milestone are being accomplished. In light of the scientific discoveries made by the NMT research team

on the use of isotopes, they may want to revise the strategic plan to accommodate this finding and its impact on activities, milestones and due dates.

Component 2: Water Quality

Involved 26 faculty, double the number involved in Year 1; including 6 faculty, 10 graduate students, and 10 undergrads. Half (50%) are female and over one-third (38%) are URM. Collaborated with 6 other researchers on Valles Caldera field research and data analysis

Ordered almost \$33K of equipment for NMT, including DOC analyzer and absorbance and fluorescence instrumentation.

Submitted 5 proposals requesting \$2.4million.

Seven poster presentations were reported. One journal article was accepted for publication and should be in print by Fall, 2010.

UNM reported an event with the state legislature, as well as presentations for REU students. NMT researcher, Pullin, manages the UROP program which involves numerous education training for undergraduates, and is reported on under Component 10.

The water quality researchers accomplished their objectives for the year and are working closely with the acequia researchers to measure water quality in the same watersheds. This is a good strategy and can maximize the impact of both research groups. It also provides a safe environment for instrumentation because of the community participation. The research results are also more likely to be understood and acted upon, because of the involvement of the community in the research. The component researchers in Year 3 should begin making the water quality data available to the public and other researchers on the EPSCoR website or data portal, and disseminate their finding at professional conferences and in peer reviewed journal articles.

Component 3: Socioeconomics and Acequia Research

Involved 15 participants, including 7 faculty, 1 graduate student, 4 undergrads, and 3 staff-technical person in the research, including 33% female and 33% URM. Included faculty from 3 NM universities and Sandia National Lab. Collaborated with 18 other researchers and community contacts, almost triple the number from Year 1

Ordered \$110K of equipment for weather stations, flow measurement stations, moisture probe and logger, water level logger and telemetry for the study areas.

Submitted three proposals requesting \$3.6 million, all from NSF. One proposal has been approval, but not formally funded, for \$1.4 million to study the link between culture and nature

The researchers gave 10 presentations to a variety of audiences. Six were to the general public, one to policy makers, and three to researchers. In addition, two posters were published in AGU for professional researchers. Education and public outreach was undertaken by the research included a presentation to REU students and a community event attended by 80 people on Acequia Hydrology..

The component researchers appear to be on track, with equipment being purchased and installed and establishing good involvement with the acequia communities. The process of how this was accomplished could be beneficial for other scientists to learn. It is important to document these activities and report the

success and failures that occur along the way. There is concern that there is no evidence of professional publications in peer reviewed journals. These milestones are critical for dissemination and contributing to the scientific research in this area.

Component 4: Critical Gap Infrastructure for NMHU

Six workshops for students and faculty on instrument use were held throughout the year.

The researchers have made good progress in filling the critical gap in water quality equipment at NMHU. The lab technician hired during Year 1 should be continued and additional training should be provided in Year 3 in the use and maintenance of the equipment. There was no evidence of incorporating the instrumentation in course curricula during Year 2. This is also an activity in the strategic plan for Year 3, as well. Reporting for this component is often intertwined with the water quality component, which is understandable. However, it is important to document the impact of the NMHU equipment, especially as it relates to graduate students and faculty at the institution and how it is being incorporated into courses, research and publications.

Component 5: Innovation Working Groups

There were a total of 35 participants across three IWGs during Year 2. All three EPSCoR NM funded IWGs were highly rated by the participants on their diversity of expertise/disciplines, organization and collaboration. A few absences of expertise were noted by participants of each .

There was a common concern that not all participants attended for the full IWG. This can have significant impact, as the IWG leader includes participants based on their expertise in various areas. When these participants only attend for a limited time, they take with them their expertise and the remaining participants are left to investigate the problem without their input. Future IWGs may want to clarify the expectation that participants are expected to participate in the entire length of the IWG.

The IWGs provide a unique forum for the exchange of ideas. They allow for all levels of researchers to come together and explore a common area of interest. However, the existing relationships between senior faculty, junior faculty, post docs and graduate students do not disappear at the door to the IWG. this has caused problems in at least one of the IWGs and may be something that EPSCoR may want to address. The project may want to consider providing a senior faculty leadership program, similar to the Junior Faculty leadership Program, that focuses on mentoring, diversity and skills needed to support our more diverse students and faculty.

Component 6: Critical Infrastructure Gap Seed Awards

The Year 3 Seed grant RFP was announced and proposals are being solicited from faculty at eligible institutions. The opportunity for seed grants has been announced at various venues. UROP has established contacts at most non-PhD granting institutions in NM and could be a good source for proposals. The proposal review will take place in the early part of Year 3.

While no awards were planned for this program year, the RFP was developed with the help of faculty from the 4-year institutions, as recommend in the Year 1 evaluation report. The time constraints at the undergraduate institutions can be quite different from those at the PhD granting institutions and can vary widely from institution to institution. Reporting on the accomplishments of these seed grants could pose a challenge, as faculty at 4-year institutions tend to have a much heavier teaching load and little experience with NSF style reporting. Onsite guidance by project personnel may be needed by the awardees to ensure that all the outputs and outcomes are reported. The tendency is likely to under-report and not fully recognize the full extent of their accomplishments.

Component 7: Cyberinfrastructure Improvements

Involved 7 personnel, including 1 faculty/RII management team member, 5 staff-technical person and 1 consultant, including 14% female and 14% URM. Collaborated with 27 researchers and technical people from across the tri-state initiative on cyberinfrastructure; 9 of which are involved in the NM project.

A silicon mechanics quad-node Vmware virtualization platform and related external shared storage device was purchased for \$24k.

A proposal was submitted to NSF requesting almost for \$1million to assist the CI-Team with implementation of CyberSHARE-TEAM-Cyberinfrastructure Training, Education, Advancement and Mentoring of Hispanic Teachers and Students.

Dr. Benedict made 11 professional presentations during Year 2, including 7 invited talks, as well as presentations to the REU/UROP students

The cyberinfrastructure component reported excellent progress in Year 2 on establishing the data portal and tools need for ingesting, cataloging, managing and sharing the climate change data being collected by the research scientists. Year 3 will need to start the process of actually importing, storing and sharing the data, so that the information begins to get out to both the professional community and the public.

Component 8: Enhance Diversity

Involved 15 individuals on the Diversity Leadership Team, including 67% women and 20% URM. The team includes 6 faculty, 2 post-docs, 2 grad students, 2 educators, and 3 professionals/administrators.

Conducted an IWG on Diversity attended by 11 people; 36% female and 10% URM. Institutions across the state were represented.

The expanding of the Diversity Leadership Team during Year 2 will help to involve more junior faculty and graduate students. The IWG was a good start, but additional efforts will be need to promote diversity and provide training for faculty, administrators and others on how to increase the numbers of women and underrepresented minorities in the sciences. A second IWG on diversity may need to be held with a greater emphasis on a concrete product, as well as providing more recent data and current strategies on how to include more diversity in the sciences. The inclusion of more Native and Hispanic participants in the Diversity Leadership Team, as well as any IWG on diversity should also be a priority.

Component 9: Professional Teacher Development Program

Nine first time participating teachers were able to attend the summer institute. Seven (78%) female and the other two (22%) male. Seven science teachers, while the other two are math teachers. They are all middle or high school teachers. The participants' ethnic distribution included 5 (56%) White and 4 (44%) Asian.

An analysis of teacher pre-post surveys found the following results:

Skills/Knowledge: The percent of teachers who responded that their skill/knowledge was 'Some' or 'A lot' increased at least 30 percentage points from Pre to Post institute in the following areas: 'Identifying limitation of research methods and design' (Pre: 44%; Post: 78%); 'Conducting field observations for research' (Pre: 33%; Post: 100%); 'Knowing the science content of plants' (Pre: 44%; Post: 100%); 'Knowing the science content of macro-invertebrates' (Pre: 22%; Post: 89%); 'Knowing

techniques used in forest evaluation' (Pre: 22%; Post: 89%); 'Knowing techniques of water testing' (Pre: 22%; Post: 67%); 'Knowing techniques of soil testing' (Pre: 22%; Post: 78%); and 'Incorporating field experiences in my teaching' (Pre: 33%; Post: 100%).

Climate Change: There was little change from pre to post in the percentage of teachers who 'Agree' or 'Strongly Agree' to the statements on climate change. This was mostly because these teachers already understood the impacts of climate change. There was higher percentage of teachers on the post survey that agreed with the statement 'The Earth's temperature has been constant over geologic time' (Pre: 22%; 56%).

Science and Scientific Inquiry: The statements where more than three-fourths of the participants indicated 'Often' or 'Almost Always' occur in the scientific process were: 'Intuition plays a role in scientific inquiry' (86%); 'Scientific inquiry starts with observations of nature' (86%); and 'Scientific investigation follows the scientific method' (86%).

Attitudes/Beliefs about Teaching: These teachers 'Agreed' 100% that 'Students learn math and science best when they ask a lot of questions'. They also responded positively to 'I am excited about teaching' (89%) and 'I try to integrate math and science with other subject' (78%). However, less than half (44%) 'Agree' or 'Strongly Agree' with the statement 'My students take the initiative to observe and question phenomena'.

Increase in Skills Attributed to Institute: The two areas where almost all (88%) participants reported their skills increased 'A lot' or 'A great deal' were: 'Using environment as an outdoor classroom' and 'Your field observation skills'. Three-fourths (75%) of the teachers reported an increase in skill in: 'Integrating science disciplines, math and writing in field work'; 'Developing lesson plans integrating science and math'; '... science content knowledge', '... field observation skills'; 'Skill in water testing' and 'Skill in soil testing'. The one area teachers did not report a substantial increase in skills was 'computer skill'. Computers were not a focus of the institute and in fact are not widely available at the Valles Caldera.

Contribution to Overall Program: More than two-thirds of participants reported all program components contributed 'A lot' or 'A great deal' to the overall institute, except for 'Math Connections with MacAuley' (50%).

Match Your Expectations? Some comments from participants included:

"It is right on with what I expected. Some days, I was not ready to head back to the study center and would have rather stayed out in the field studying more. Other days, it wasn't too long, but seemed like it moved too fast. I enjoyed the days most when we actually got to do the data collection ourselves. I learned the most then."

"Great field work opportunities. Specialists were a great help and the techniques and information was very efficient."

"I learn something about observational research and able to gain knowledge about conducting field"

Most useful parts of Institute? Some comments from participants included:

"The botany and macroinvertebrates along with the forestry. I would also of likes some power point presentations so that I could use them in the classroom. Why reinvent them if someone already has them."

"I found most useful those parts that included activities I can do with my students that don't require expensive equipment that we can make cheaply, and that don't take a long time. I enjoyed the macroinvertebrate study and the plant biodiversity the most. liked the tree coring."

Least useful parts of Institute: Some comments from participants included:

"I found least useful those parts that included testing in the field that had science ideas that were beyond my knowledge base, and more importantly, WAY beyond my ability to teach students and have them actually understand. (some of the soil sampling was too much) I learned from every activity we did, though."

Group interview Feedback: Some comments from participants included:

"Increased confidence in being able to work with students in the field. Use students as co-leaders to help in field work. Need commitment from district to help provide support for field work with students."

"Have scientists provide followup at my school, especially with their expensive equipment, so students can experience. Great to know them and have email contact. Have state agency scientists involved, since they are often closer to the local schools, then the university researchers. "

"To introduce me to new field and techniques. Variant of teaching, Teach in different way. Scientists were good to work with. There was too much work on soils. Sometimes the equipment was not accessible to teachers."

"Invite administrators for one day. So much in so little time. More interaction with fewer scientists. Access to phone service, although that could be a plus."

Recommendations

Program participants found little fault with the program. The design and content of the program appears to be meeting the needs of teachers. However, the number of participants was low and it appears to be harder to recruit different teachers. As opposed to the prior year, there were a good number of EPSCoR scientist involvement in the Institute. Teachers rated the scientists well and appeared to enjoy the field work and working with the scientists. NM EPSCoR scientists were able to include the teacher participants in field work on the Valles Caldera and be able to make the linkage between the equipment use and its relationship with climate change research.

There was more effort made in having teams of teachers participate that was not implemented during the first year. It is still difficult for the program, however, since many of the school in the service area in Northern NM are small, rural schools. Teachers have been creative in how they work together and manage to support each other. The problem of how to influence teachers who are not interested in providing hands-on math and science was discussed during the group interview with the teachers. A possible one day session during the school year to show teachers how to manage an outdoor classroom was one idea that was suggested. The expansion of this program to include the economic and cultural research areas

may be considered in the future, since many of the schools are in areas with acequias and water is the economic life blood of these ranching and farming communities.

Overall, the PDTP program had a very successful year.

Component 10: Undergraduate Research Opportunity Program

UROP involved 8 faculty, 1 staff-technical, 1 graduate student and 10 undergraduates. The faculty/staff/graduate student gender and ethnic breakdown was 20% female, 20% URM, while the undergraduate diversity was 60% female and 60% URM. The undergraduate students were from 7 institutions (Dine College, ENMU, Navajo Tech, SJC, Santa Fe Community college, and WNMU) institutions, almost double the number of institutions from Year 1 .

UROP collaborated with over 20 EPSCoR researchers and mentors, as presenters and mentors for students. These included faculty at research and undergraduate institutions.

A proposal to NSF for \$11k was accepted to "Explore Your Future in Science through an Interdisciplinary Undergraduate Research Experience". Also, a presentation on "Exploring Your Future in Science" was made at the SACNAS annual conference.

Recruitment efforts included outreach to a variety of undergraduate institutions and over 300 individuals participated, including faculty, staff and students. Approximately one-third were under-represented minorities.

Findings

The UROP program ran from May 30 through July 31, 2010. The 10 undergraduate students were paired and two students each participated in one of five research projects with EPSCoR scientists. The students receive four-credit hours in an interdisciplinary science course of their choice (Biology, Chemistry, Earth Science) at New Mexico Tech. They also receive tuition, housing, travel expenses, food allowance and a \$4,000 stipend.

The first week of the program students attend mini-courses focused on climate change and the environment. During the following weeks 2-9 the students formulate a research question, conduct field and laboratory research, collect data and prepare a formal research report/presentation. The program culminated in a research conference held at the Valles Caldera where the students presented the findings from their research.

On response to questions on a pre-survey, it is evident that the students accepted in the program are excellent candidates and ones that should become successful graduate students

Why did you apply for this program? Do you have an interest in climate change?

"I applied to this program because it was a good opportunity to get experience as a New Mexico undergrad. I have a general interest in climate change, but my exposure to the actual science investigating it has been limited."

"I applied for the EPSCoR program because it offered research on climate change, the research was here in New Mexico, and it included all major universities: New Mexico Tech, NMSU and UNM. A major factor in why I was so excited about this research opportunity is because it was environmentally driven. Specifically the research was related to water related issues in New Mexico. I want to be a Hydrologist. I was born and raised here in New Mexico; I want a career that involves water related issues in New

Mexico. I like to do field research and intend on getting as much research experience as I can as an undergraduate to be prepared for graduate school and graduate level research."

"I applied because I have an interest in the earth and the ever changing environment that happens. I am also interested in the water part or it. I see water as a vital thing to the earth and no one really seems to know the impact of the necessity of conserving water for the next generations to come."

What are you hoping to learn this summer?

"I am hoping to learn a lot more about field research and broaden my understanding of our climate. That way i can understand more about how animals are learning to cope with climate change."

"I want to learn as much as I can about water shed in New Mexico and how the research is conducted that is related to New Mexico water. I would like to learn more about hydrologic modeling and how to interpret the data and how to prepare the data for analysis. I am at the same time evaluating the universities and deciding on which school would be the right fit for my graduate studies. If it is possible to apply for this program again, I fully intend on seeking another summer with the EPSCoR program. The level and caliber of the other students, graduate students, advisors and professionals I have encountered during this program thus far have been very impressive. This program so far has far exceeded my expectations and I have learned a lot. EPSCoR has help solidify my aspirations and commitment to my educational and career goals in the field of hydrology and engineering. My deepest gratitude goes to those that have offered their time, professional and personal knowledge to the students like me that are participating in the research this summer"

"This summer I am hoping for a chance to learn how to work in the field, and in laboratories that are not affiliated with my school. I am also excited at the prospect of visiting the campuses of larger in state institutions, to see if they could be places where I might like to come to in the future."

A post survey was administered this year, but less than half of the UROOP students responded. The beginning of school may not be the best time to solicit feedback and a pre and then 6 month followup survey, which was done in Year 1, may be a better feedback model.

Recommendations

The UROP staff has done an excellent job of recruitment in visiting multiple schools around the state and receiving applications from many of the four year, non-PhD granting institutions. The students accepted in the program appear to be good candidates. Additional funding to support more students may be appropriate. Private individuals may welcome a chance to provide money to support a successful program that allows students from their community have an opportunity to conduct research as undergraduates.

Component 11: Graduate Research Training

Faculty from NMSU, NMT, NMHU and UNM have collaborated with LANL Dr. Ringer during Year 2.

The workshop on modeling at LANL will be held during Spring, 2011 and should help in the development of the graduate research training course to be offered in subsequent years. Ensure that graduate students from across the state have ample notice of when the Understanding Climate Change through Modeling and Simulation is offered in Spring, 2011. It has taken longer than anticipated to implement the course, but the complexity of both the course content and the broadcast to multiple institutions present special challenges, as does the process of how to treat the course for credit on each campus.

Component 12: NSF Day

Dr. Daniel of the state office worked with NSF to hold NSF Day on March, 17, 2011. The state office has already begun informing the EPSCoR community about the event and should continue with its outreach efforts to inform as many people as they can regarding NSF Day. It may be especially important to reach out to the 2 and 4 year college faculty.

Component 13: Faculty Leadership Program

The topics and suggestions for improving the training provide a possible solution to the weaknesses identified by the participants. Three of the presentations were not well received: 'Engaging Undergraduates and Graduates (from Diverse Institutions and Background)'; 'The Future of Science and Engineering in NM'; and 'Evaluation and Assessment: Theory and Practice' .

Program staff may want to replace the current evaluation focus with one on teaching effectiveness that incorporates a strong evaluation component. A presentation/activity on mentoring could very well, and should, incorporate the concepts covered in engaging students from diverse populations. The future of science and engineering in NM could better meet the needs of junior faculty by looking at trends nationwide in funding for science/engineering and how to successfully write grants and include faculty from diverse disciplines in proposals. Incorporating these changes would still meet the original intent of the program, but cover the topics from a different perspective.

Participants also made some excellent suggestions for improving the leadership training in other ways. For example: *"Keep program 8-5 everyday", "Keep to time", " Keep an honor system, where participants do not do 'work' during session", "Please make grant writing session longer", " Provide binder, handouts ahead of time". "Fun activity to break up session or evening.", "More interaction during session - or intersperse interaction with lecture more."*

Workshop participants also suggested topics to consider for future workshops:

"How to improve mentoring (of graduate student) as young faculty? (Such as how to build productive relationship between mentor and students)."

"Several young faculty that I visited with seemed to be craving "Teaching Tips," (Tenure Survival Tips). Experts in their field with no teaching training."

"More on how to "successfully" get funding. More on interdisciplinary topics, such as "interdisciplinary topic involving natural science with social science"

"Add a teaching effectiveness section & increase grant writing portion (add handouts & activities)."

"Successful grant application. Cooperation with academics from different backgrounds."

Component 14: Public Outreach and Communication

There were 2 consultants and 1 RII management team member directly involved in providing education and public outreach. However, the museum made good use of other organization's expertise by collaborating with a variety of organizations on design and presentation of events. These included the Rio Grande Nature Center, Celebra la Ciencia, Community Science Connections, Bosque Ecosystem Monitoring Program (BEMP), the Nature conservancy, NSF Association of Science & Technology Centers, as well as others.

The "Science on the Sphere" was purchased for \$60,000 and the exhibit is beginning to take shape. Year 3 should see the opening of the majority of the climate change exhibit at the museum. As part of the design process, a public involvement meeting was conducted to receive feedback on the scope of the climate change exhibit at the museum.

A total of 29 education and public outreach events were conducted by the NMMNHS and the Northern Network. The Network conducted 29 field trips that involved 206 K-12 students in outdoor science activities. The NMMNHS conducted 17 community events involving over 3,000 participants in events ranging in size from 6 to 1,000 participants. It was estimated that two-thirds of the participants in community outreach events have been minorities (African American, Hispanic and native Americans).

The public outreach events are designed to reach different audiences. For example, the BioBlitz event and a hands-on bilingual event to celebrate Hispanic Heritage Month involve more families and children, while seminars and science cafes tend to involve older adults with few children attending.

The following is an excerpt from a report on one of the seminars conducted during Year 2.

Participants

There were approximately 100 individuals who attended the lecture in the Imax theatre at the museum. There was no official recording of participant's demographics and the following reporting of demographics are based on the evaluator's observation. The gender distribution was approximately 50% male and 50% female, while there appeared to be 1 Native American, 5 Hispanics, and 1 Asian. The distribution by age was approximately: 3% less than 20, 10%, between 20 and 40, 10% 40 to 60 and 75% 60 and above.

Participant Feedback

There was no written feedback from the participants, although contact information was collected for a raffle. The following are based on the evaluator's observations prior to, during and after the presentation.

People began arriving about 30 minutes prior to the event. They lined up at the door to the theatre waiting for the 7:00 pm presentation time. Museum employees were around and asking people to complete a form for a door prize, which collected name, address, email, how participant heard of event and suggestions for speakers for upcoming events.

Once the doors opened, attendees found themselves a seat in the theatre and began to settle in for the lecture. The lecture began approximately 5 - 10 minutes later with Dr. Blinman using a powerpoint that was projected onto the screen in the theatre and lectured from the bottom of the theatre. As the title suggests, he presented information from the last 2000 years on the native people in the southwest and how climate change events had periodically interrupted their normal way of life. He was very engaging and knowledgeable of the archaeology of the area. The audience was attentive and engaged throughout the presentation. Data in the form of maps of rainfall and temperature and charts over the centuries were a large part of the presentation. These were well received by the audience and organized and intermixed well with other slides. The presentation lasted approximately an hour, which was followed by 30 minutes of questions and answers.

Findings

Much of the material was interesting and focused on how peoples over the last 2000 years moved as a result of climate change. Admittedly there were instances where there was still gaps in our knowledge base regarding why things occurred, but the presenter did provide economic and social reasons brought

about by changes in climate in the southwest. It was not always clear that Dr. Blinman believed that the current climate change evidence is any different from what has occurred in the last 2000 years, but rather just another cycle that anthropologists will study in the future. Some comments that the evaluator found most interesting, during the presentation, are presented below:

"Monsoon rainfall is where we get most of our moisture for the year."

"Maize germinates with soil moisture but needs monsoon to grow."

"Climate stability for 200 years is rare."

"There is a relationship between temperature and monsoon moisture."

"Need alternatives to growth based economic models."

RECOMMENDATIONS

The component expanded its outreach efforts immensely during Year 2. There has also been progress on planning the Climate Change Exhibit and the science sphere has already been purchased. This is a remarkable achievement, as the museum and others have had to deal with reduced budgets from the state. The use of public feedback on the design of the exhibit is also commendable. The climate change outreach coordinator was able to coordinate and hold a large number of public events and expose a substantial number of people to the issue of climate change in a variety of formats and venues.

It is important to reach out to diverse audience in different ways. Children are not going to be happy attending a seminar, while older adults will not have the stamina to attend a day long outside activity. The museum appears to be providing the appropriate outreach activities on climate change to their different audiences. The next challenge will be to assess the efficacy of the different outreach programs and the exhibit on climate change that will begin its public showing during Year 3.