

**EPSCoR Innovation Working Group**  
**Climate Change, Agriculture, and Water Policy**  
**Professor Denise Fort**  
**University of New Mexico School of Law**  
**Utton Center**  
May 2-4, 2012

**Problem Statement**

Based on existing predictive models, the Southwest is the region of the continental United States most likely to experience the strongest signals of climate change, and is likely to be among the earliest regions to experience measurable impacts. Although agriculture will be affected by those changes very directly, those effects will have ripple effects on the environment and other sectors of the economy. Therefore, the Southwest is an important region in which to evaluate some key questions and tradeoffs regarding the impacts of climate change on agriculture and related economic sectors and communities.

**Goals**

The ultimate goals of this IWG are to submit a proposal to NSF on water policy and to develop other scholarly and academic benefits from our collaboration. To that end, the following were intermediate workshop goals:

- Identify research questions in order to be addressed in upcoming NSF proposals, using the expertise of all present.
- Discuss current/previous research of all participants to determine effective collaborations.
- Create white paper based on previously identified research questions
  - What are the economic, social, environmental and other implications of climate change to agriculture in the Southwest?
  - What data/information is necessary to make sound decisions and to respond effectively to climate change impacts on agriculture, and who is best able to obtain and disseminate that information (including information necessary to confirm or modify key assumptions on which existing predictive models are based)?
  - How can we manage climate change impacts to agriculture in ways that also address related environmental effects?
  - How can we manage socio-economic impacts resulting from climate change impacts to agriculture?
  - Assessing trade-offs and implications of the integration of environmental changes with socio-economic impacts.
  - Synthesis and recommendations.

## **Approach & Results**

University of New Mexico School of Law prepared several research memoranda and bibliographic materials on this topic. Each participant discussed the project with Professor Fort in advance of the meeting. Meeting materials and research materials were made available on a “drop box” in advance of the meeting.

The group met as a whole over a three day period. Very few of the participants had met each other before this meeting and we came from vastly different backgrounds. Self introductions were used to present our own research and observations about the topic. We used a brainstorming approach, with a set of questions, to elicit comments from the participants on the first day.

A climate and forestry ecologist from the USGS discussed climate change’s effect on forests and in particular, on the Valles Caldera Preserve. These conversations provided a useful review of the physical implications of climate change in southwestern forestry. Based on the presentation we agreed that forestry, as a form of agriculture, should be included in our work.

The science director for the Preserve, Professor Bob Parmenter, presented to the group the next morning. His discussion of adaptive management under changing climate conditions gave further material for discussion.

Professor Bob Adler organized our notes into outline form. We then focused on a proposed paper (the white paper) and refined the outline. Each section was dissected and recast, using a screen projection of his text.

After much discussion, we agreed on a draft outline of a white paper and assigned sections for writing. The paper will be submitted to major scientific publications, such as the Proceedings of the National Academy of Sciences. This will entail ongoing work among the group and recruitment of several additional academics.

All of the Co-Principal Investigators will be present at the University Council of Water Resources Meeting in July 2012, “Managing Water, Energy, & Food in an Uncertain World,” which is concerned with this topic.

Professor George Frisvold will convene an additional meeting at the University of Arizona, with these participants and others to further develop these topics.

The University of New Mexico will take the lead in developing proposals to the NSF, NOAA, BOR and other appropriate entities. Our two students will continue to work with us on research, creating web repositories, and writing. Two new law students have joined the effort as well.

## Details of IWG Meeting

The IWG was held May 2-4 at the Valles Caldera National Preserve in Jemez Springs, NM. Half of the participants were from the EPSCoR states of New Mexico and Utah, with additional participants from the non-EPSCoR states of Arizona, California, and Colorado.

Participant	Institution	Area of Expertise
<b>Brief Bio</b>		
Professor Denise Fort	Utton Center, UNM School of Law	Law
Professor Fort has over 25 years of experience in environmental and natural resources law through practice, politics, writing and teaching. She is currently the Director of the Utton Center at the UNM School of Law.		
Professor Brian Hurd	New Mexico State University	Agricultural Economics
An economist for more than 15 years, Dr. Hurd specializes in environmental economics and economic modeling of natural resources. He is currently an Associate Professor at New Mexico State University.		
Professor George Frisvold	University of Arizona	Agricultural Economics
Dr. Frisvold's research interests include domestic and international environmental policy, as well as the causes and consequences of technological change in agriculture. He is currently a Professor at the University of Arizona.		
Professor Reagan Waskom	University of Colorado	Agriculture, Water, Economics
Dr. Waskom currently serves as the Director of the Colorado Water Institute and as Director of the Colorado State University Water Center. He is on the faculty of both Soil & Crop Sciences and Environmental Engineering at CSU.		
Professor Robert Adler	University of Utah	Law
Professor Adler practiced environmental law for 15 years, and now regularly teaches courses in environmental law and water law. He is a Professor of Law at the University of Utah.		
Dagmar Llewellyn	US Bureau of Reclamation	Hydrology, Climate
Ms. Llewellyn is a hydrologist with the Bureau of Reclamation with over 25 years of experience in water resources science and management, focusing on the analysis of the hydrologic impacts of climate change.		
Adrian Oglesby	Middle Rio Grande Conservancy District	Law Practice
Mr. Oglesby has dedicated his career to practicing public interest water and environmental law, serving tribes, pueblos and NGOs, and implementing and managing a river protection program for the Nature Conservancy.		
Susan Wotkyns	Northern Arizona University	Geology, Native American Land Management
Ms. Wotkyns provides training, assistance and educational resources to tribes on climate change issues in her role as Climate Change Program Manager for the Institute for Tribal Environmental Professionals.		
Matthew Heberger	Pacific Institute	Hydrology, Policy
Mr. Heberger is a licensed Professional Engineer, registered as an Environmental Engineer in the Commonwealth of Massachusetts. He is currently a Research Associate with the Pacific Institute's Water Program.		
Michael Cohen	Pacific Institute	Policy
Mr. Cohen's work focuses on water use in the lower Colorado River basin and delta region and the restoration of the Salton Sea ecosystem. He is a Senior Research Associate with the Pacific Institute.		
Sharon Wirth	UNM School of Law	Environmental Law, Ecology
Ms. Wirth has nearly 20 years of experience in landscape ecology, climate change research and the assessment and clean up of contaminated soil and water. She is a 2012 graduate of the University of New Mexico School of Law.		
Jeremy Oat	UNM School of Law	Natural Resources Law, International Law
Mr. Oat is a Mediator, as well as a recent graduate of UNM School of Law, with a focus in International and Natural Resources Law.		

## Pictures



1- R Adler, D Fort, R Waskom, A Oglesby, D Llewellyn, M Cohen, S Wotkyns, M Heberger, G Frisvold



2 - Learning Walk



3 - Group next to burn scar



4 - Caldera history talk group



5 - Long hike



6 - Small working group



7 - Elk running



8 - Viewing the Caldera