

**New Mexico EPSCoR Innovation Working Group Meeting
Water, Energy, and Culture through Time in the San Juan Basin:
Understanding Past Patterns, Present Conditions, and Future Best Practices
for Planning and Design**

Jemez Springs, NM, October 21-23, 2012

Participants:

Tony Atkin (Co-Principal Investigator), University of New Mexico and University of Pennsylvania, Atkin Olshin Schade Architects, Santa Fe

Geraldine Forbes Isais (Co-Principal Investigator), University of New Mexico, Albuquerque

Theodore Jojola, University of New Mexico, Albuquerque

José Rivera, University of New Mexico, Albuquerque

Bruce Thomson, University of New Mexico, Albuquerque

Ramsey Seweinyawwa, Navajo Technical Institute, Crownpoint

Kristofferson Martin, Navajo Technical Institute, Crownpoint

Tom Pederson, University of Arizona, Atkin Olshin Schade Architects, Santa Fe

Laura Harjoe, University of New Mexico, Albuquerque

William Stone, Independent Consultant

Emily B. Rudin, Independent Consultant

Caroline Scruggs, University of New Mexico, Albuquerque

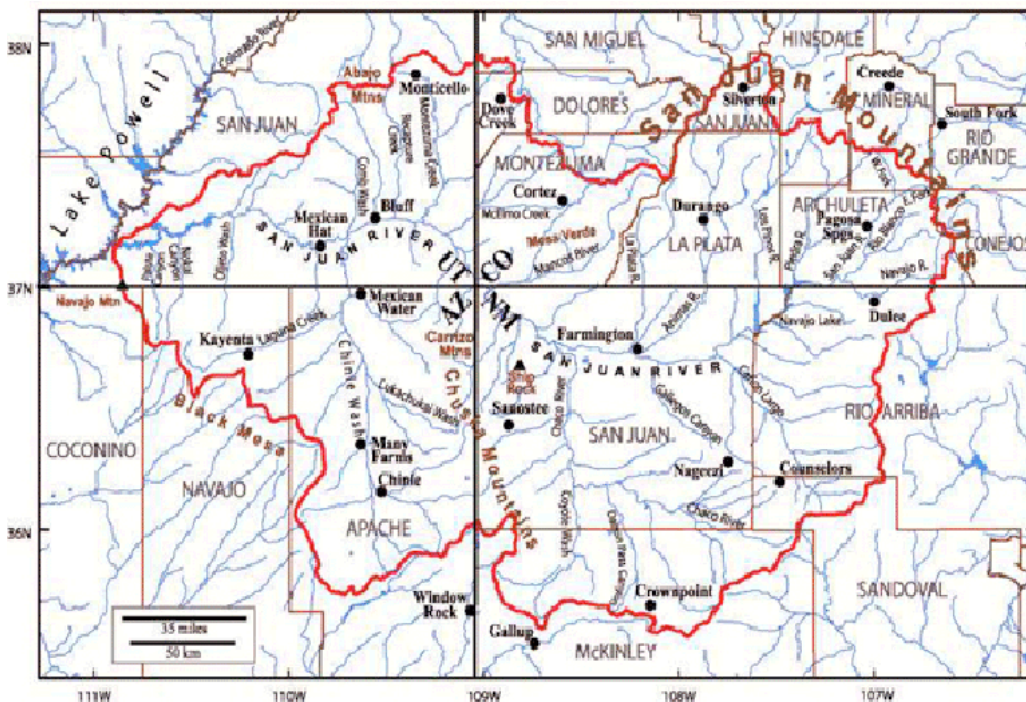
F. Lee Brown, Independent Consultant, Economist, Author



Problem Statement

Water is a key resource in the San Juan Basin and in the arid West. It also has a direct relationship with former, contemporary, and proposed extraction methods of the Basin's rich mineral resources – oil, natural gas, coal, and uranium, among others, as well as a profound relationship with the environment and Native cultures. These resources have been exploited in order to support economic growth at all levels in consolidated metropolitan areas such as Albuquerque/Santa Fe, New Mexico; Phoenix/Tucson, Arizona; Salt Lake City/Provo/Ogden, Utah; and Denver/Boulder, Colorado, as well as national and international economic centers. Little attention has been paid to the effect on the people and the place. Is the San Juan Basin to be considered a rural sacrifice area for metropolitan economies? We propose a broad research and education agenda to highlight the environmental, economic, and cultural issues and the potential for policy, planning, and design to promote understanding and self determination for the region.

The enormous San Juan Basin, Four Corners region is seen as largely empty of population, with a few scattered pockets of inhabitation along river beds and streams, and vast open spaces made up of rock formations, plateaus, canyons, mesas, and distant mountains. The largest Native population is the Navajo, who have historically lived in widely scattered family settlements. The largest New Mexico population lives in the Farmington, Aztec, Bloomfield area, which is the location of the region's largest oil and natural gas deposits. The San Juan basin has long been a place of resource extraction and export with boom and bust economies based on fossil fuels, uranium, and minerals. There is widespread poverty and little political power. The area has also been seen as a tourist mecca, with astonishing natural beauty and ancient archeological sites.



San Juan Basin watershed

Goals and Approach

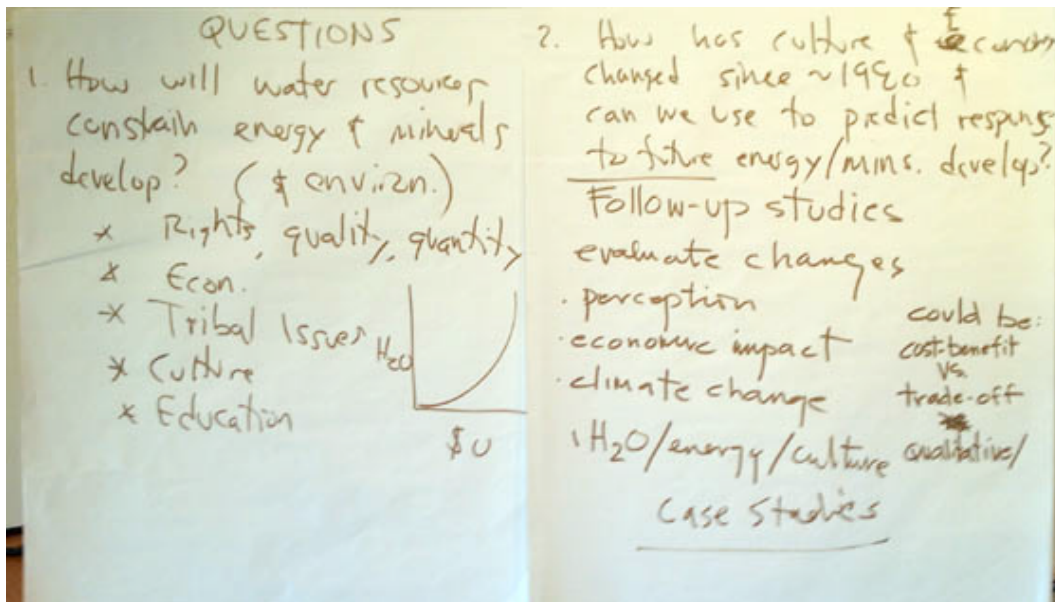
The purpose of the Innovation Working Group is to map out research and education components for the development of grant applications including for the National Science Foundation, based on issues of resource use and development in the San Juan River basin. The economies and ecologies of the region are fragile and susceptible to further exploitation and misuse by national and international interests from outside the region. The grants will propose research involving issues of water use, land and mineral resources, engineering, mapping, and cultural, historic, landscape, and settlement issues, with a priority on education and human development with the region. Outcomes of this Innovative Working Group will be conceptualizations, models, articles, books, policies, and grant proposals to tie these issues to the San Juan watershed and its people, with a primary focus on New Mexico.

Biographical information was exchanged and discussions were held in advance of the meeting. Materials and research were made available in a “drop box” in advance of the meeting. At the start of the IWG, the following research and educational agendas were generated, discussed, and used to form smaller breakout groups, using the expertise of all participants:

- 1 – Water Resources: historic allotments and use, run off and retention, aquifer use and depletion, future priorities
- 2 – Energy and Mineral Resources: development/exportation/exploitation including petroleum, coal, natural gas, uranium, copper, molybdenum, iron, alternative energies
- 3 – Environment: air and water quality, species distribution and habitats, land protection and reclamation, climate change
- 4 – Economy: extraction industries, tourism and scenic resources, farming and grazing, gambling
- 5 – Culture: Native peoples; cultural landscapes and practice; pre-historic, historic and contemporary settlement patterns; local knowledge
- 6 – Statistical and Geographic Analysis: GIS, demographics, projections
- 7 – Education: dissemination of research data, university curricula and cooperation, annual field school
- 8 – Policy: community engagement, sustainability, planning and design

After special presentations on aspects of these topics by F. Lee Brown, Jose Rivera, and Bruce Thompson, and in depth analysis by the breakout groups, the full IWG reconvened to present the development of research and education ideas for discussion. There was a lively interchange around the issues and the development of specific research topics. After

some discussion, it was decided that topics 6, 7, and 8 applied across the board to all the topics 1 through 5. Current and previous research of the participants was also discussed to investigate effective collaboration and study preferences.



Newsprint record of two of many working “easel discussions” carried on during the IWG meeting

Results

F. Lee Brown captured much of the focus of this IWG in his 1981 book with Allen V. Kneese, *Southwest Under Stress*, and his talk to the group provided a strong basis for discussions. He stressed that this topic applies to national and international, as well as local policy. The proposed IWG project and his work in the 1970s and 80s are, in many ways, a follow-up case study to the work of John Wesley Powell, who established the U.S. Geological Survey and created a map of the West (circa 1867), based on his belief that political and resource jurisdiction should be through watershed analysis. He believed that we should not grid the West, because it would destroy resources and confuse the way water resources are allocated. How do we go back to reconsider and recapture these significant ideas? Lee pointed out the supreme irony of water resources from the West that are now used to grow alfalfa (a water intensive plant) to go to markets in China – billions of gallons of water from the arid West embedded in products for sale abroad (see “Parched in the West but Shipping Water to China, “Bale by Bale”, Wall Street Journal, October 5, 2012).

After a great deal of discussion, the IWG agreed on directions for research and the outline for a proposed white paper divided into two parts, hard science and social and economic science, with sections in each part covering the research and education topics that came to the fore. The analogy was made that the paper could encompass the larger agenda by organizing it like a book with sections and chapters that could each be written by a different scholar, forming the basis for subsequent research, writing, and curricula. The sections are listed below, followed by research questions.

Section 1: Water, Mineral, Geological, and Environmental Science

- How will water resources and, to a lesser extent, the environment, constrain energy and minerals development in the San Juan Basin? What are the linkages?
- What can prior studies, including but not limited to Lee Brown's *Southwest Under Stress*, tell us about the effect of mineral extraction and water use in historic times?
- What are the future implications of energy and minerals development? Who benefits? What are the costs in water, environment, infrastructure, socio-cultural well being, and health?
- What are the implications of climate change on water and the environment in the San Juan Basin? How can these be measured?
- What have been the boom and bust cycles of energy extraction and what are the environmental consequences?
- What is the relationship between energy extraction and view sheds, cultural landscapes, and archeological sites?

Section 2: Economy and Culture

- What is the effect of energy extraction and water resources on ancient and contemporary cultural settlements, tourism, and traditional crafts? What are the relationships between natural resources and indigenous rights?
- What has been the effect of water and resource use and development through time in the Basin? How were resources allocated and used by the ancient Chacoans? Navajo nomadic culture? Early Mormon societies? Early twentieth century?
- What will be the economic and cultural effects of the new Navajo water pipeline being built to comply with the recent water rights settlement? What are the cultural impacts for the pipeline not discussed in the Environmental Impact Statement for the project? What are the development implications? What are the cultural, human health, and environmental impacts of the water pipeline?
- What is the impact of early irrigation projects and acequias in the Farmington area? What is their current condition?
- What is the impact of the population growth areas recently defined by the Navajo Nation?
- What is the commodity chain of the extraction of resources from the Basin and where they go? How much returns to the local population?
- What are the best methods for community involvement and education?

After assembling the research questions it was proposed to visit the Basin, and determine which sites and case studies might be used to best demonstrate the issues raised by the IWG. It was also determined to visit the advanced GIS computer lab at the Navajo Technical Institute to discuss ways to mine and organize the appropriate data, recording and presentation techniques, and possibilities for advanced computer modeling and animations for educational and outreach purposes.