

The Acequia Model

**Local Knowledge and Sociocultural Adaptation
In the Northern Rio Grande Watershed Commons**

Global Perspectives Symposium 2013
Las Cruces, New Mexico

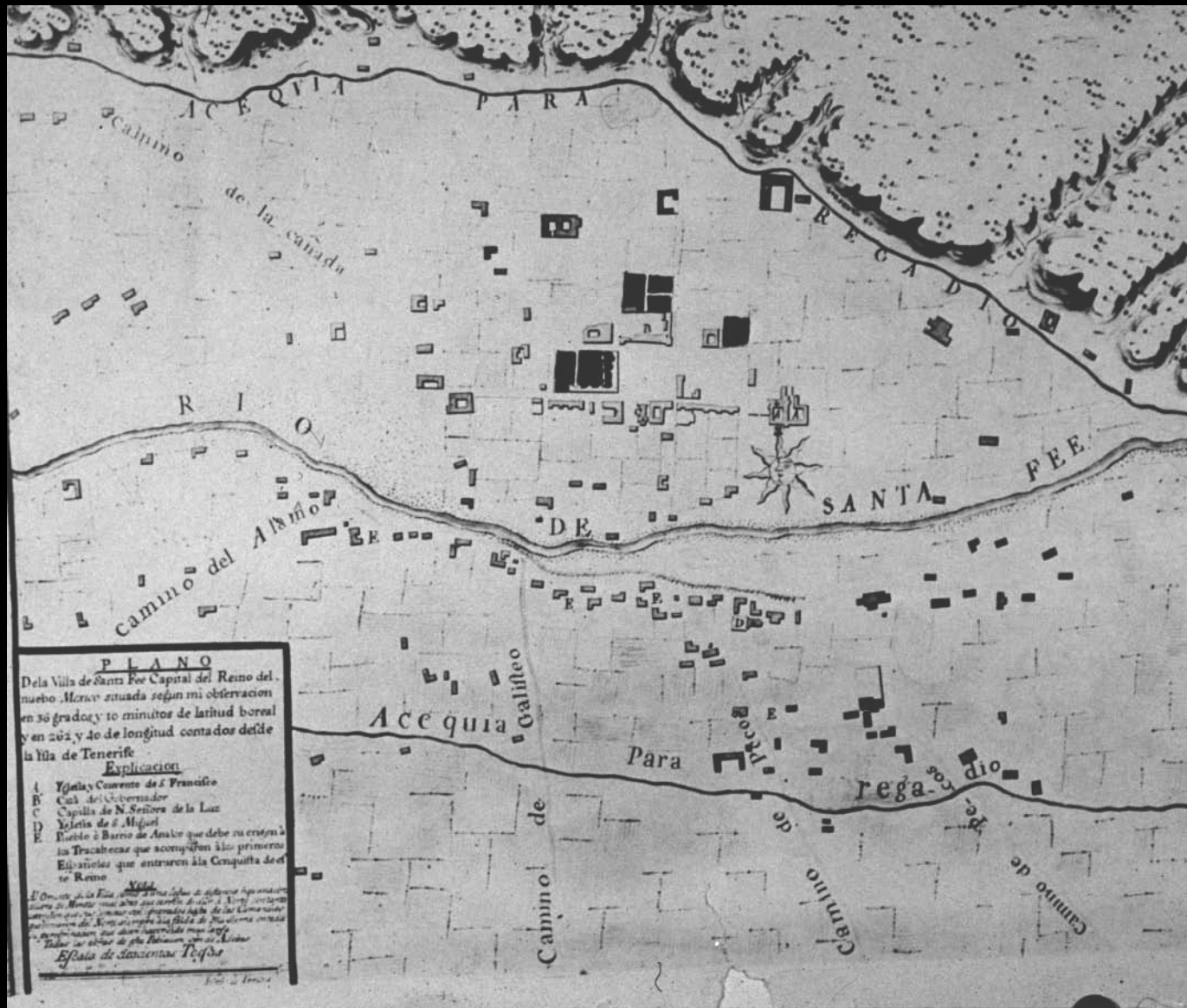


**José Rivera, PhD. Professor
CNH Group UNM**

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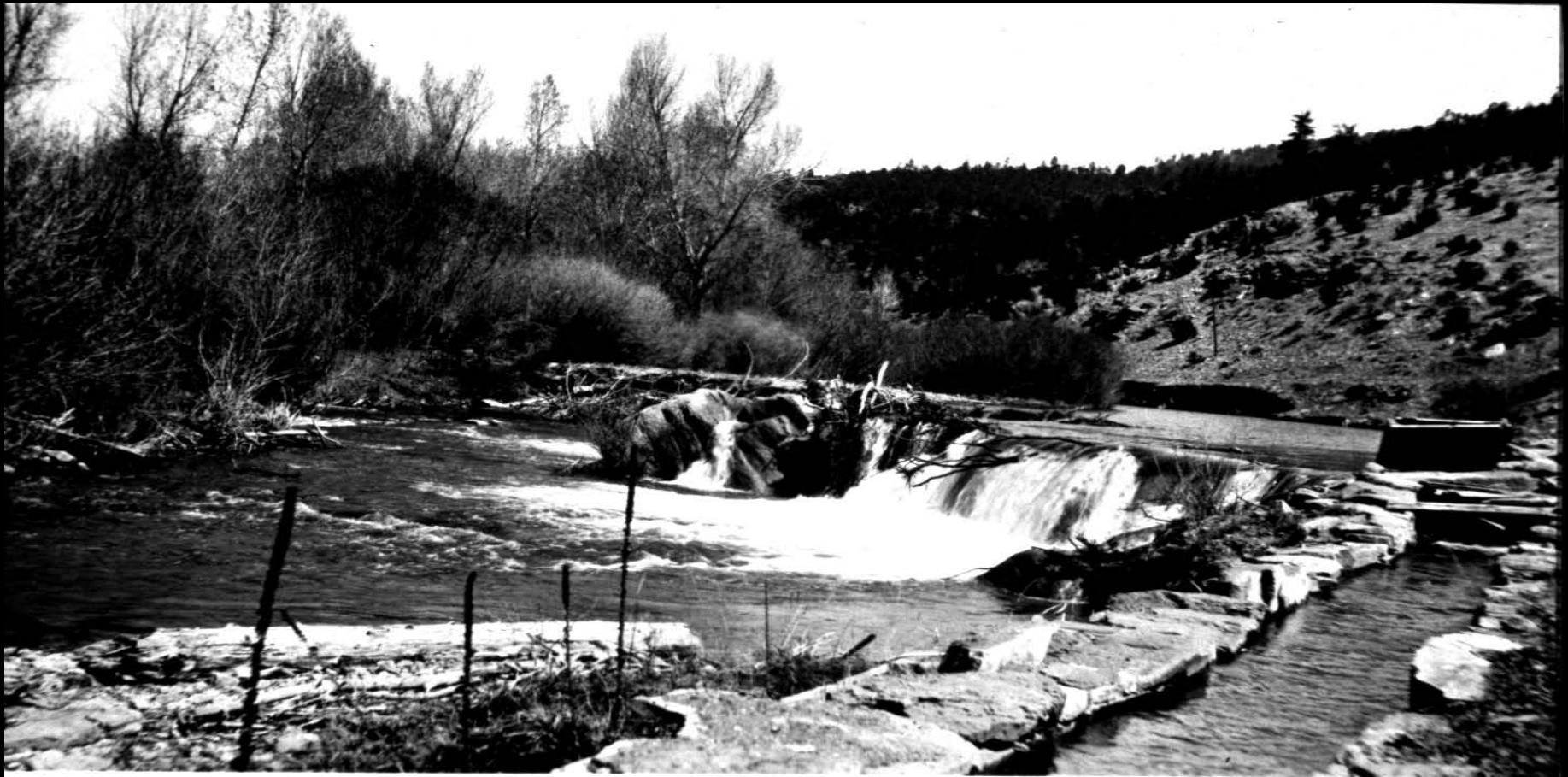
José de Urrutia Map of Santa Fe ca. 1767

Museum of New Mexico Photo

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Presa at Rio Pecos ca. 1917

Museum of New Mexico Photo

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Aerial of Velarde Orchards 1986

Photo by Paul Logsdon

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Ditch Cleaning at El Valle 1980

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Ditch Repair at El Cerrito 1998

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Estevan Arellano at Embudo 1995

Photo by Miguel Gandert

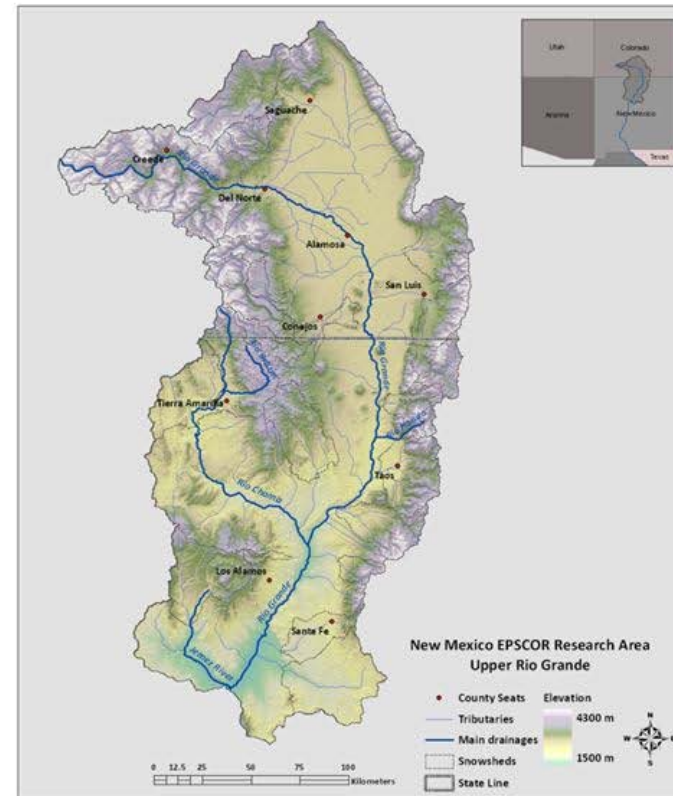
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EPSCoR RII 3 Focus: Climate Impacts on New Mexico's Mountain Sources of Water

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



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Acequia Socio-cultural and agro-economic strategic objectives:

- Document the ancient customs and traditions of acequia systems in two tributaries of the Rio Grande
- Determine hydro-socio-economic response to climate variability
 - Social components of resilience
 - Climate change effects on human adaptation
- Increase resolution of hydro-economic model for northern New Mexico



Mural located in Espanola, NM painted by Alejandro Lopez of Santa Cruz, NM



Rio Hondo Valley, July 21, 2010



Aires Acequia diversion off El Rito

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NSF Dynamics of Coupled Natural and Human Systems : Acequia CNH Project

- **Characterize acequia cultural resilience, adaptability and responses to stress**
- **Input acequia social and cultural variables into the CNH System Dynamics Model**
- **Develop research monograph and mapping inventory of the Rio Chama and tributaries as a case study of society at a regional scale**
- **Partner with acequia associations to address socio-economic impacts of changing hydrologic conditions on traditional water management practices at three study sites: Alcalde, El Rito, and Rio Hondo**

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7th Annual Congreso de las Acequias

New Mexico Acequia Association

December 2, 2006

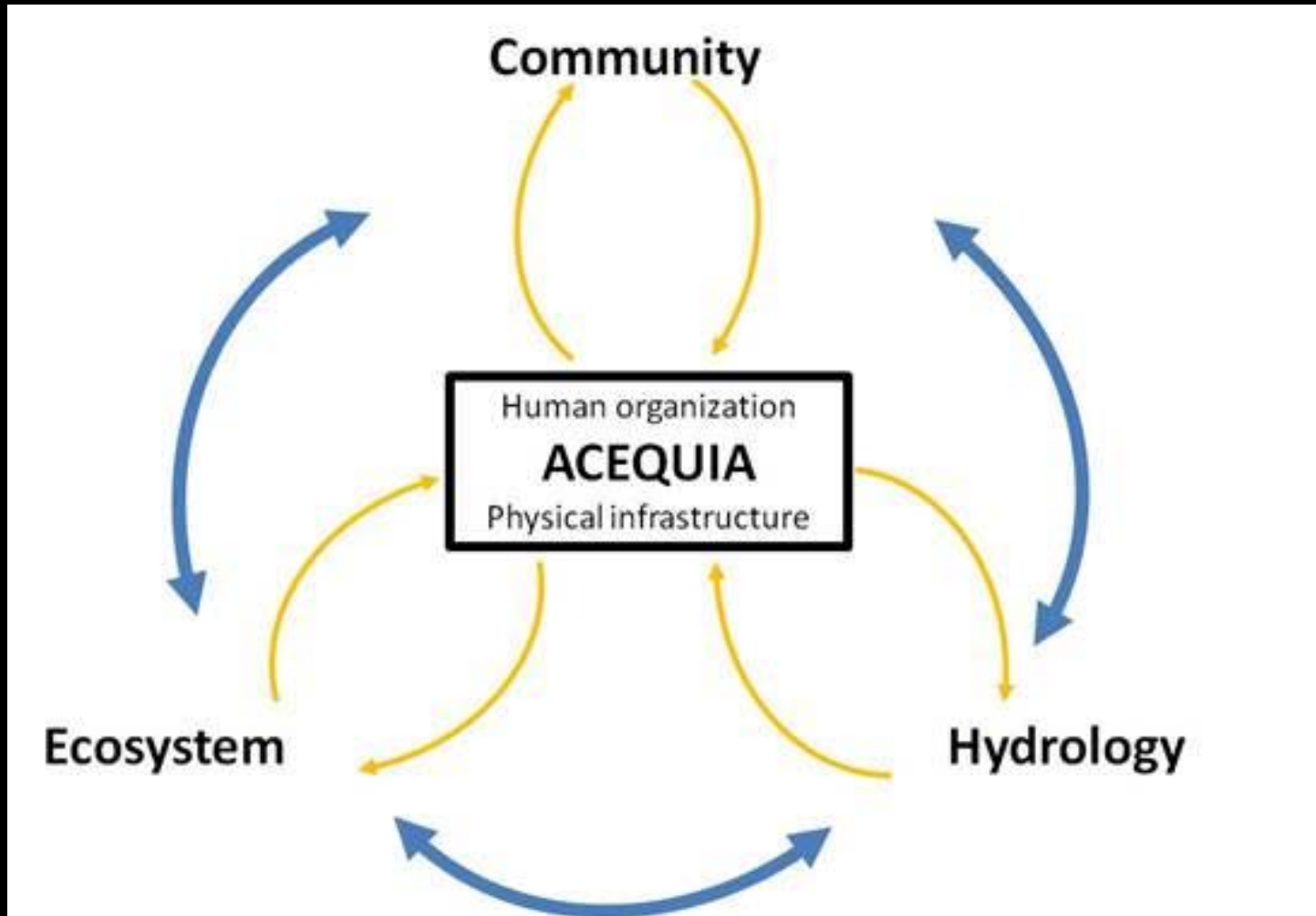


New Mexico Acequia Association: Congreso 2006

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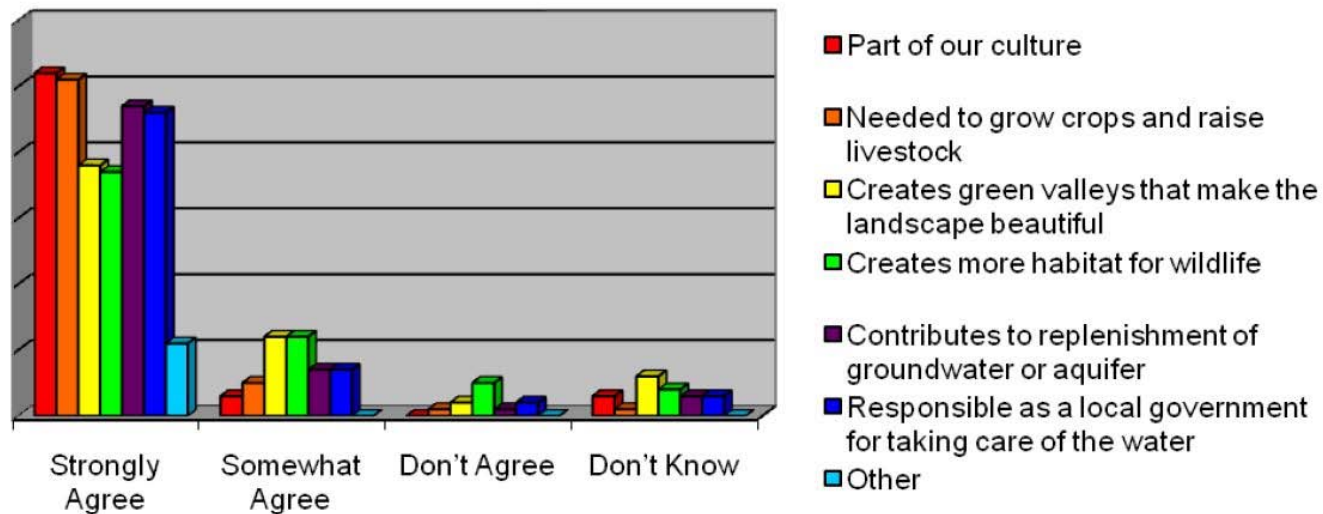
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SOCIAL - Focus groups and surveys

What is your opinion about the following statements about the importance of your acequia to your community?



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CNH Focus Groups

Alcalde, El Rito, Rio Hondo Summer 2012*

- Acequia Governance and Water Sharing Customs
- Food, Seeds and Agricultural Traditions
- Transmission of Local Knowledge
- Mutualism and Social Capital
- Land Ownership and Land Use
- Farming and Crops
- Livestock Ranching Traditions and Grazing

*NMAA (Quita Ortiz), UNM José Rivera and Sylvia Rodríguez

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Acequia Community Resilience

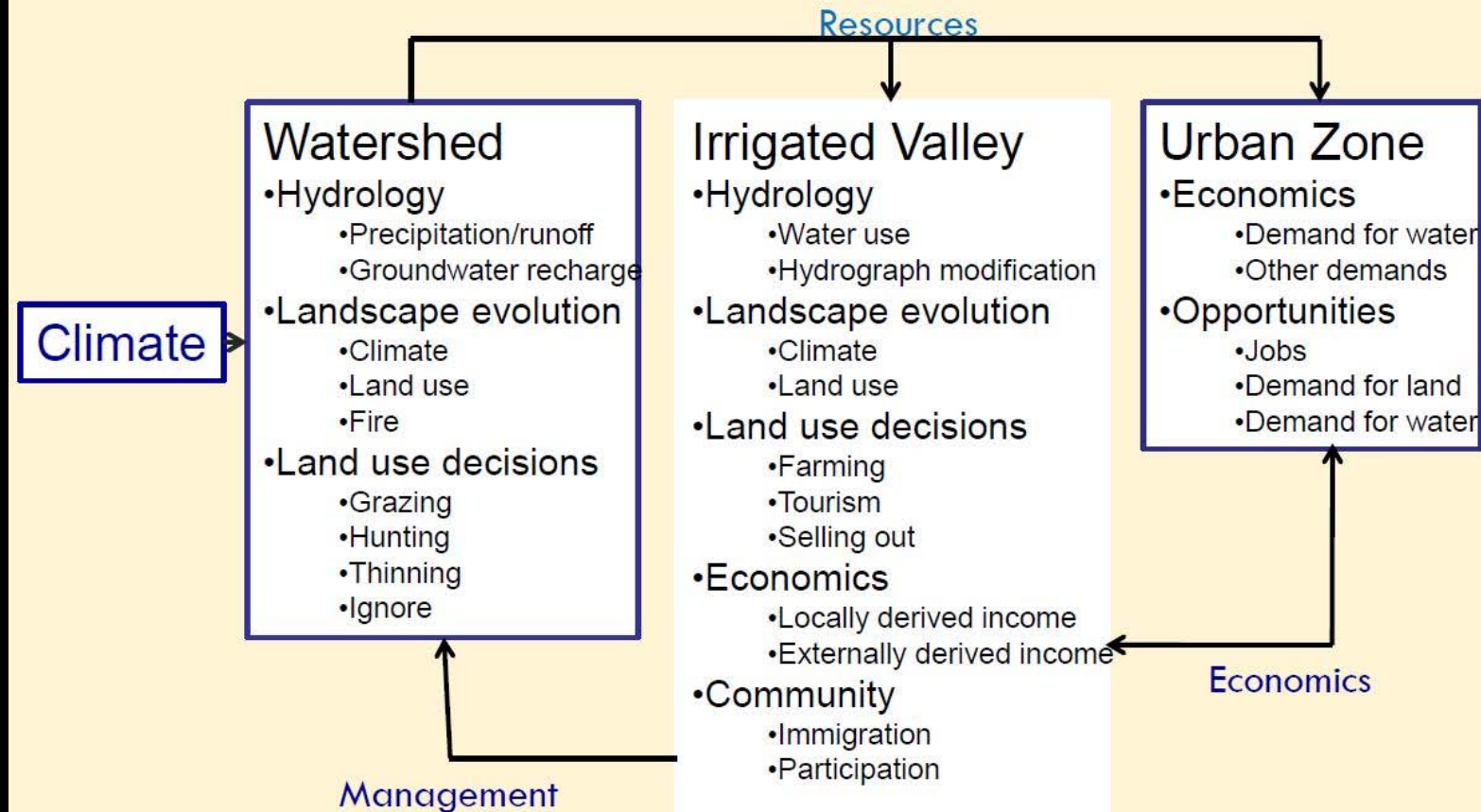
- Attachment to Land and Place: Collective Identity
- Mutual Networks and Social Density
- Leadership of Key Individuals: Mayordomo Role
- Social Memory Embedded in the Culture
- Ecological Knowledge of Local Conditions
- Local Control of Resources
- Autonomy of Decision Making Structure
- Tipping Points and Adaptive Capacity to Renew

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Key Integrated Systems

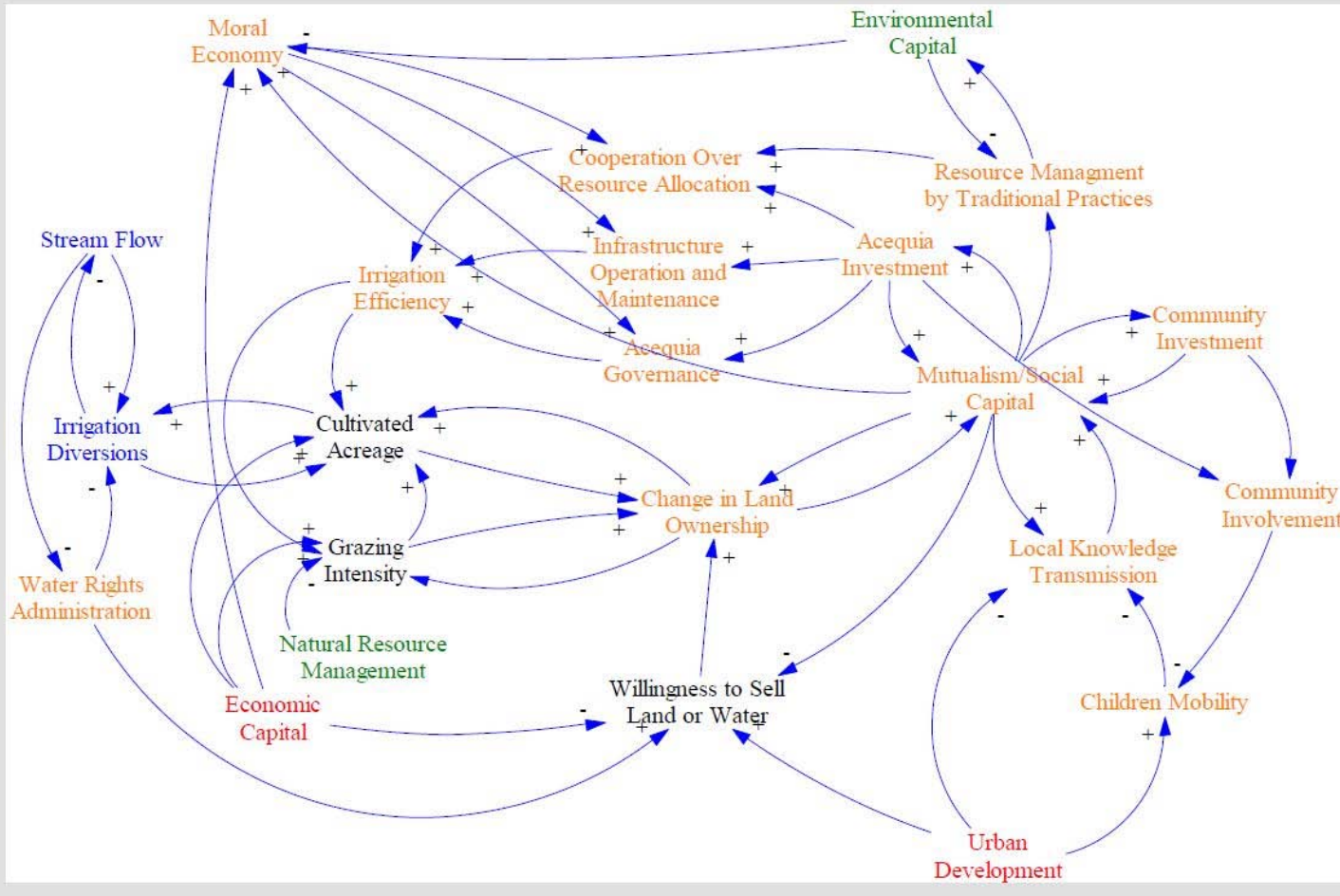


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SOCIAL – PARTICIPATORY CAUSAL LOOP DIAGRAM



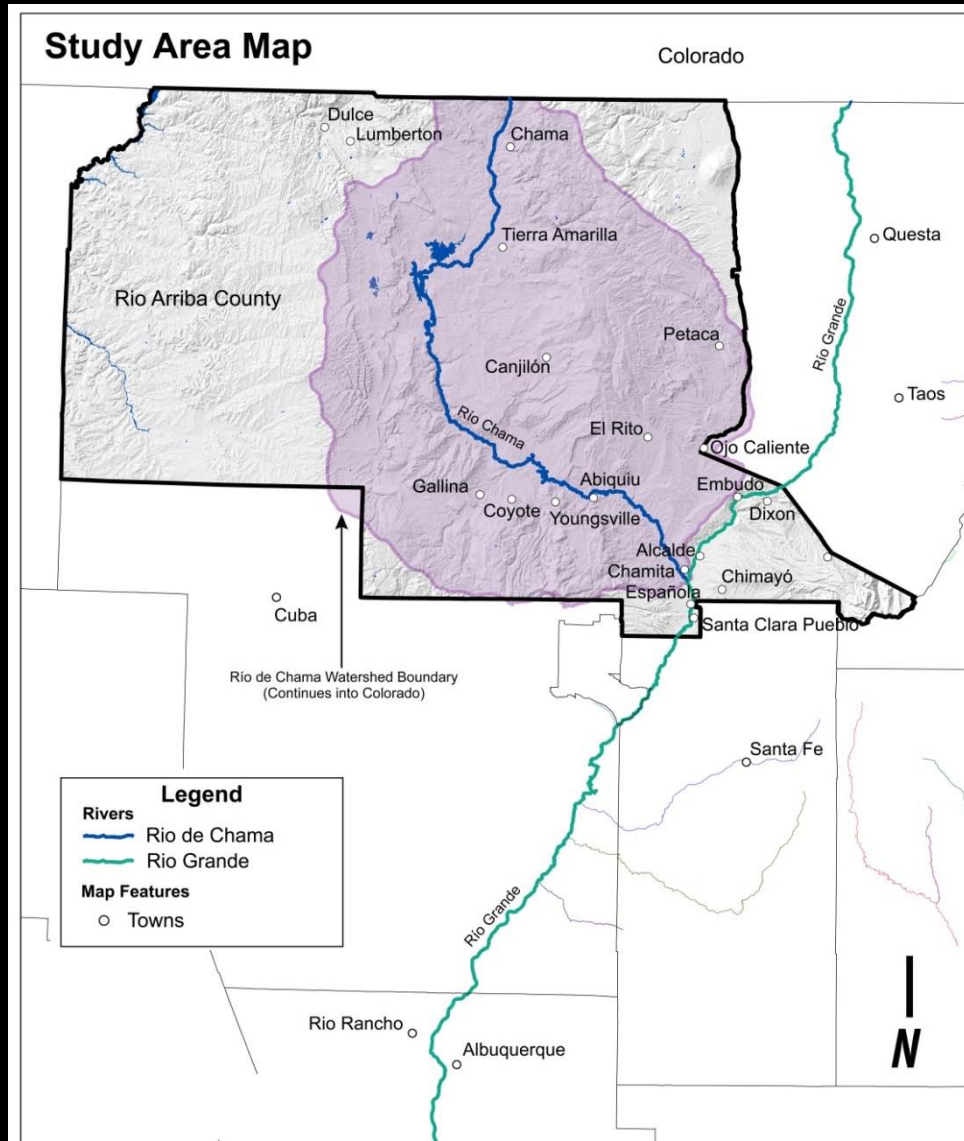
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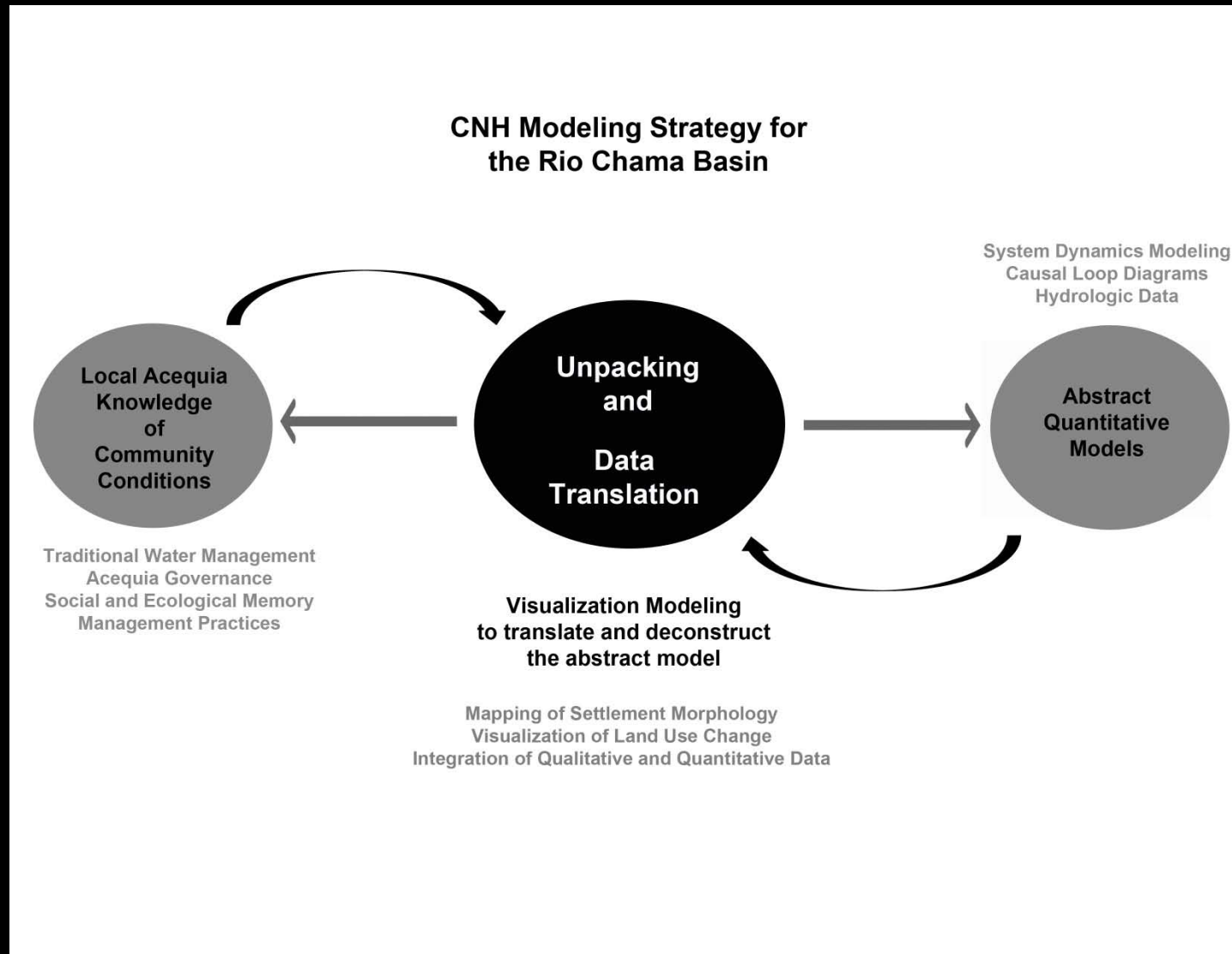
Qualitative Analysis and Visualization Methodology

- Public records, ethnographic histories, secondary theoretical literature
- Archival repositories: primary source documents, archeological surveys, sociological reports, historic maps and cartography of the region
- Field-based ethnographies: participant observation, focus groups and interviews
- Questionnaires and surveys: new or existing data
- Census data and population projections urban and rural
- GIS analysis of land use and the built environment
- Geo-spatial modeling of natural systems
- Modeling of landscape and human settlement morphology at multiple scales
- Visualization tools and technology to analyze land use alternatives

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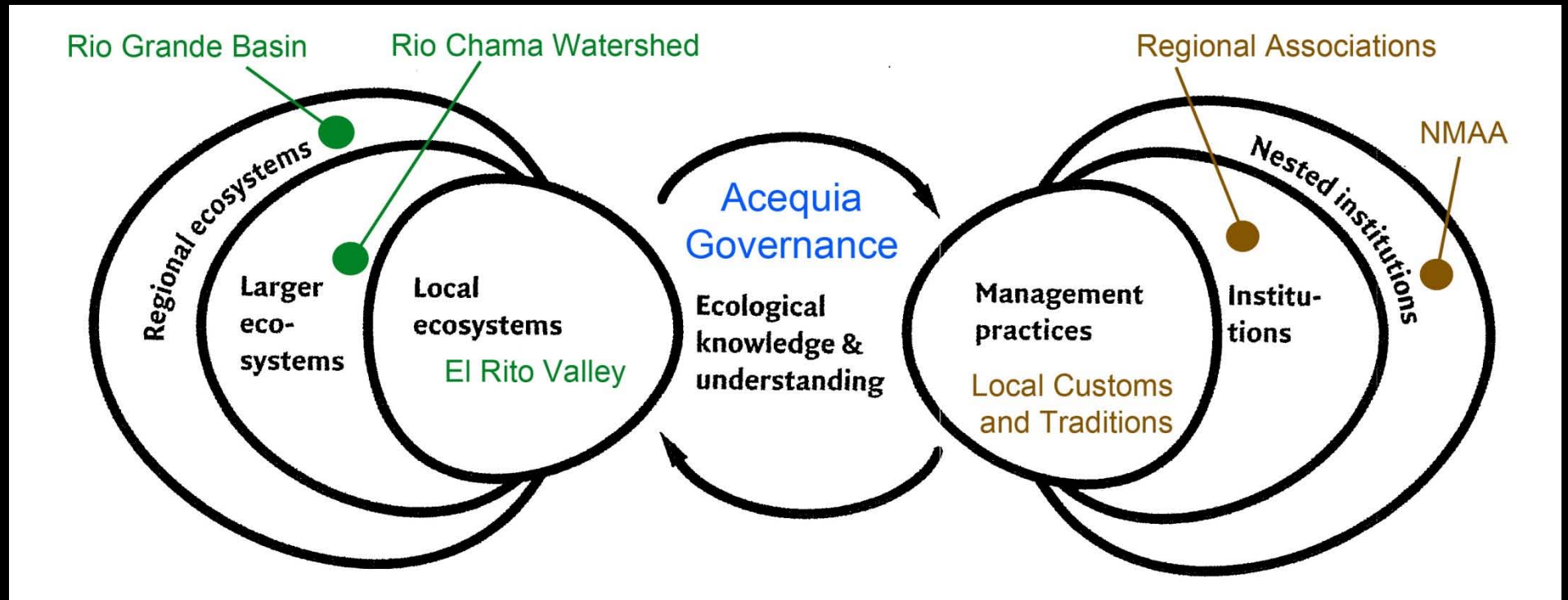
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Adapted from Berkes, F., J. Colding, and C. Folke (Eds), 2003. *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*

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El Rito Valley



TERRAIN MODEL
GOOGLE SKETCH UP

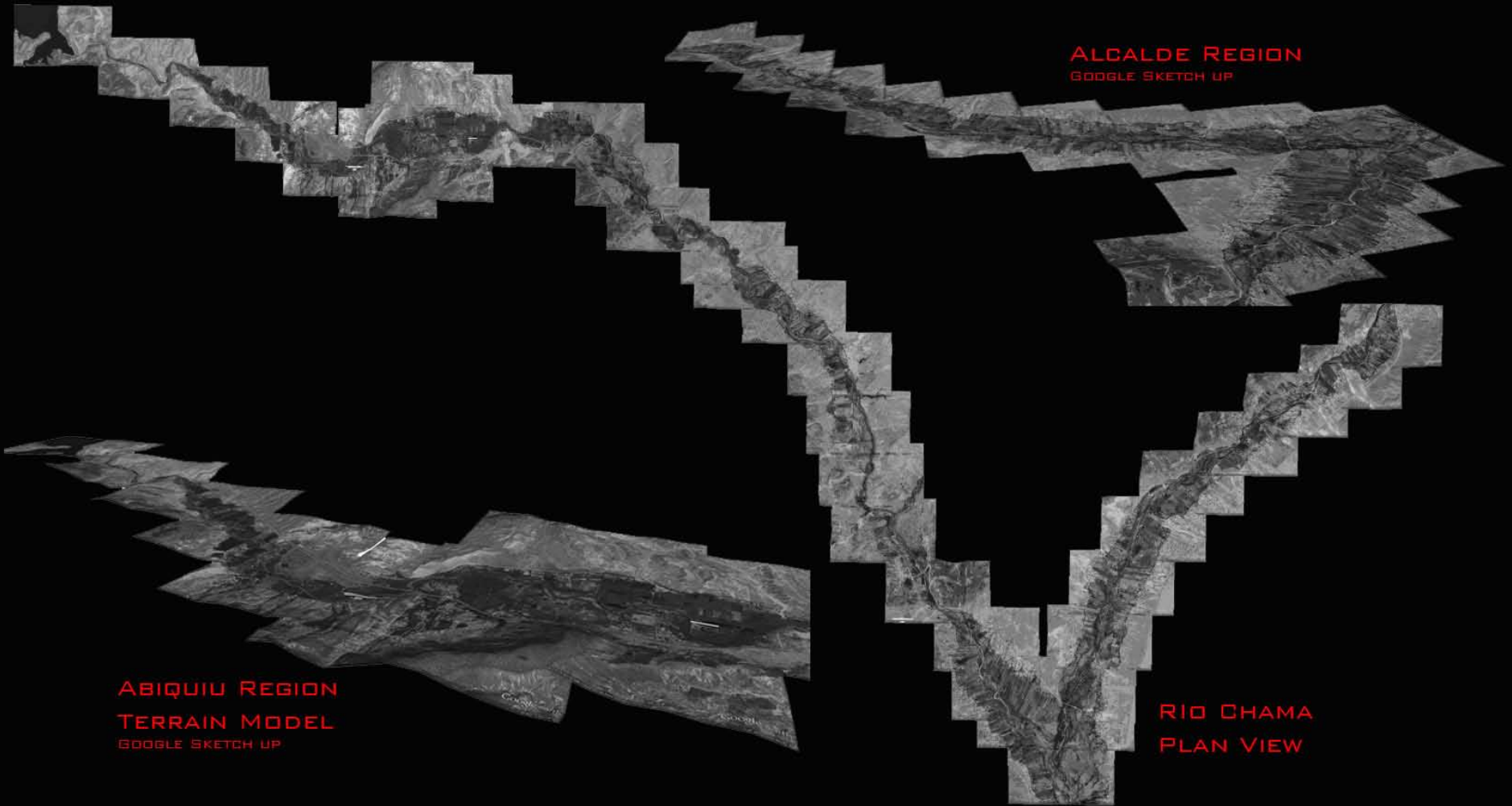
AERIAL PLAN VIEW
GOOGLE EARTH

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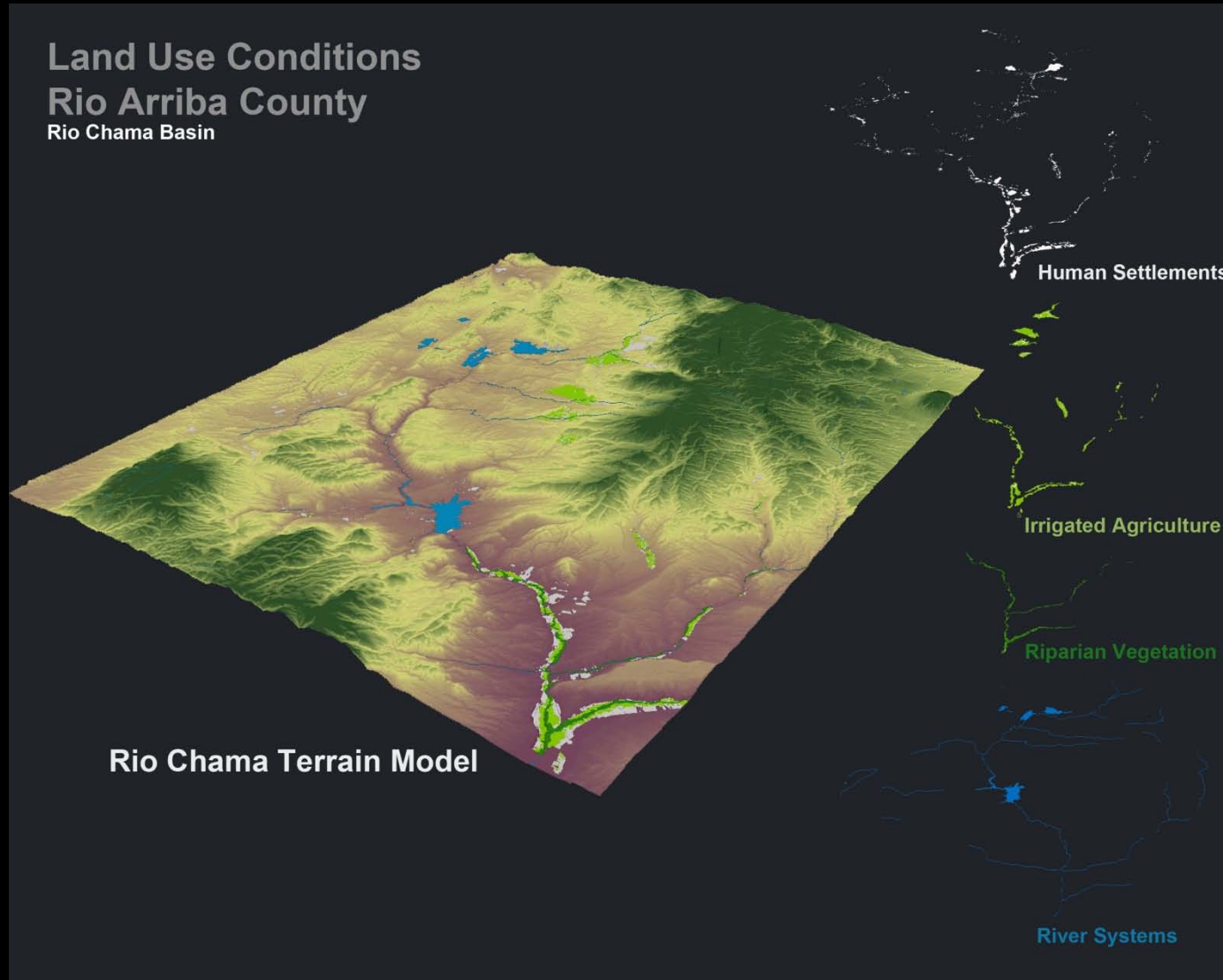


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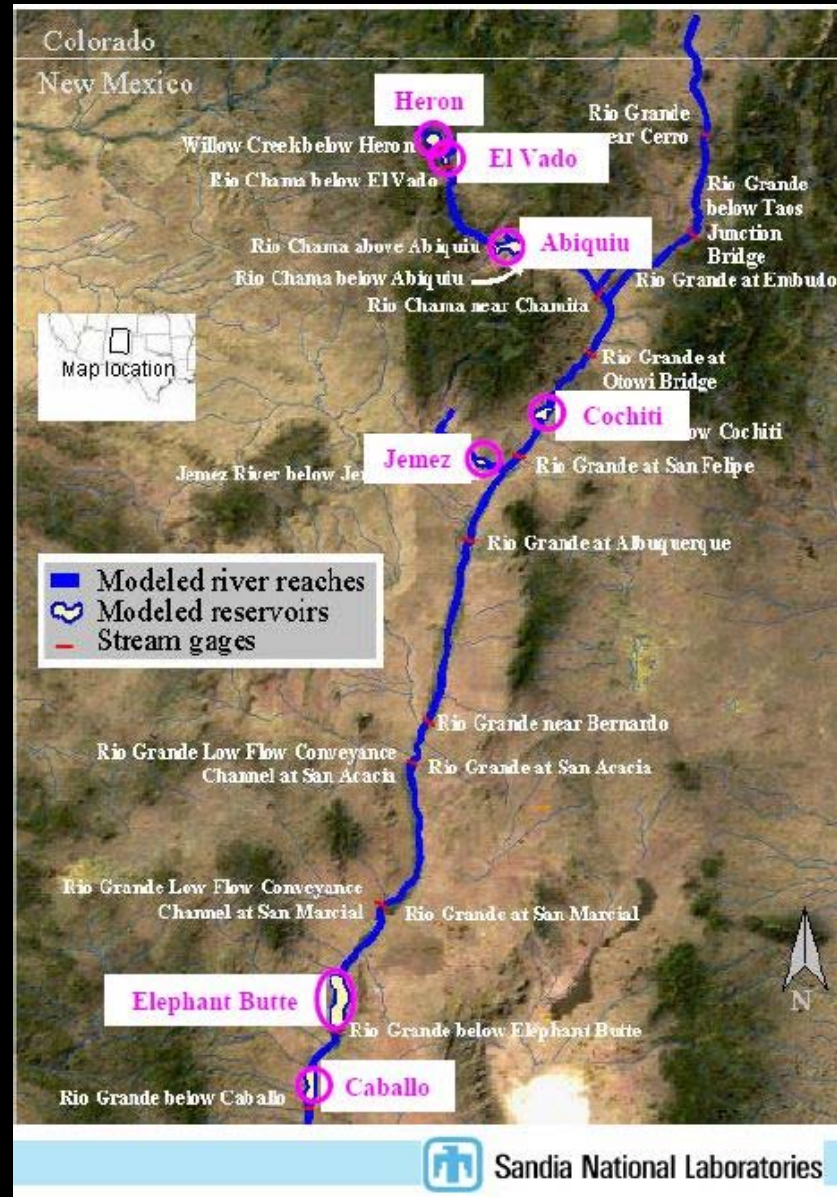


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Acknowledgments

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National Science Foundation NM EPSCoR Award #0814449

Collaborators

New Mexico Acequia Association

Sandia National Laboratories

Universities

New Mexico State University

University of New Mexico

New Mexico Institute of Mining and Technology

University of Concepción, Chile

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Terrain Models: CNH Group UNM

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