

# Regional Topics Panel

## Panel Moderator

José A. Rivera, University of New Mexico

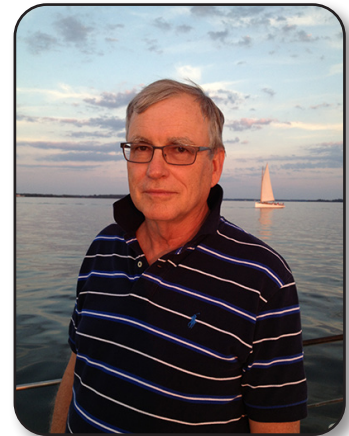
*José A. Rivera is a Professor of Planning at the School of Architecture and Planning and a Research Scholar at the Center for Regional Studies at the University of New Mexico. His teaching fields include rural community development, public policy analysis, and water resources management. His research interests include water management institutions, comparative irrigation governance systems, social and political organization of irrigation, and mutual aid organizations in traditional cultures. José's past and current fieldwork on these topics includes the southern provinces of Spain, the coastal valleys of Peru, Baja California Sur in Mexico, Ilocos Norte in the Philippines, and the American Southwest. In 1991 he co-authored a book titled *Rural Environmental Planning for Sustainable Communities*, followed by a book titled *Acequia Culture: Water, Land, and Community in the Southwest* (1998). José has also served as an expert witness in a number of water rights transfer applications in the State of New Mexico, qualified to present testimony in the areas of economic development, public administration, and acequia culture.*



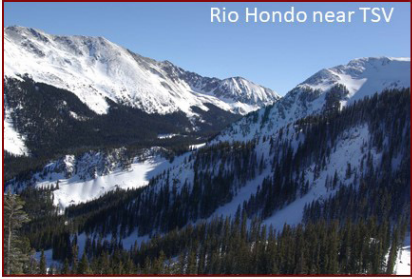
## Mountain Hydrology in a Changing Climate

John L. Wilson, New Mexico Tech

*John L. Wilson is Professor Emeritus of Hydrology and Research Professor of Hydrology, in the Department of Earth and Environmental Science at the New Mexico Institute of Mining and Technology in Socorro, New Mexico. He has a BS from Georgia Institute of Technology, and MS, CE and PhD degrees from the Massachusetts Institute of Technology. He is a current or former member of many professional society, university and government science advisory panels and committees, including the National Science Foundation's (NSF) Advisory Committees for Geoscience, and for Environmental Research and Education, the National Research Council's Committee on Hydrologic Science, and the American Geophysical Union's (AGU) Committee on Fellows and the AGU Council and Board of Directors. He is former Chair of the Board of Directors of the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI), and is Past-President of AGU's 6,000 member Hydrology Section. Wilson is a Fellow of AGU and of the Geological Society of America (GSA), and a former Darcy Lecturer for the National Ground Water Association. He holds the O.E. Meinzer Award from GSA and the Hydrologic Science Award from AGU, awards given once a year for distinguished research in the fields of hydrogeology and hydrology, respectively. In his own work, which is related mostly to groundwater hydrology, Wilson's research focuses on contaminant source identification, karst hydrology, stream-aquifer interaction, including the hyporheic zone, and mountainous-watershed hydrology. This last topic has taken him into related fields stretching from geostatistical precipitation estimation, through land-surface energy balance modeling, to remote sensing.*



# Mountain Hydrology in a changing climate



Rio Hondo near TSV

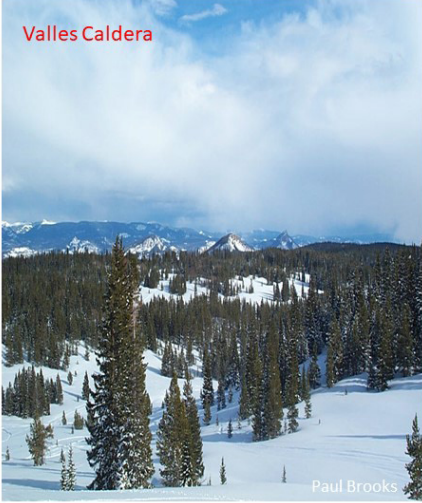
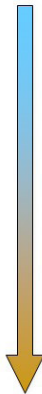
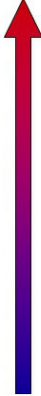
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Can Science Help Us Be Creative and Innovative in Managing Our Water?

Figure 1. Introduction.

## Characteristics above the mountain front (semi-arid)

<b>MORE</b>	<b>LESS</b>
Precip.	PET
Snow	Soil
Veg. LAI	
Actual ET	
RO	
Recharge	



Valles Caldera

Paul Brooks

Figure 2. Characteristics above the semi-arid mountain front.

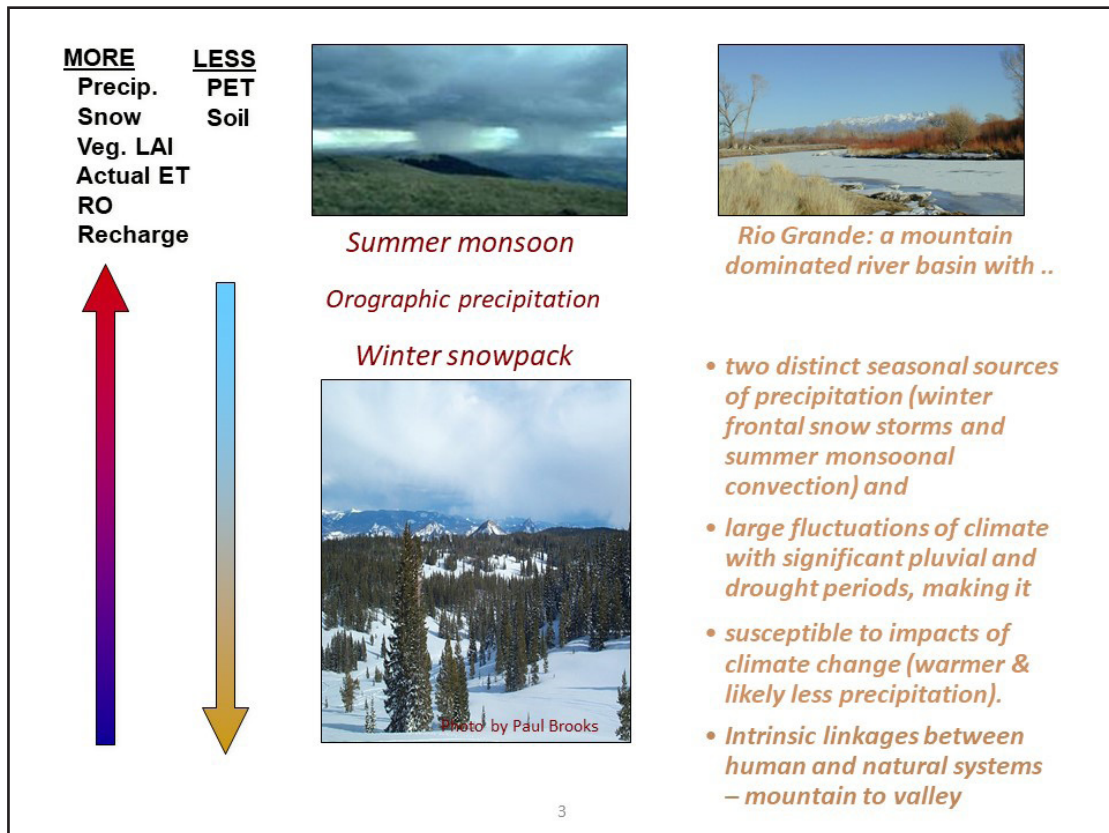


Figure 3. Orographic precipitation.

## Challenging regional water-related issues

- Climate variability and change
  - Increasing temperature leading to ...
    - Greater ET
    - Later snowfall, earlier snowmelt, more winter precipitation as rain, and less SWE (snow water equivalent)
    - Increased propensity for intense storms
      - greater likelihood of severe floods
    - Increased severity of droughts
    - Vegetative change
    - Increased propensity for fire
    - Less (more?) groundwater recharge
  - Less (more ?) annual precipitation
- Growth and development
  - Changing land use and land cover leading to changes in runoff and recharge

Figure 4. Challenging regional water-related issues.

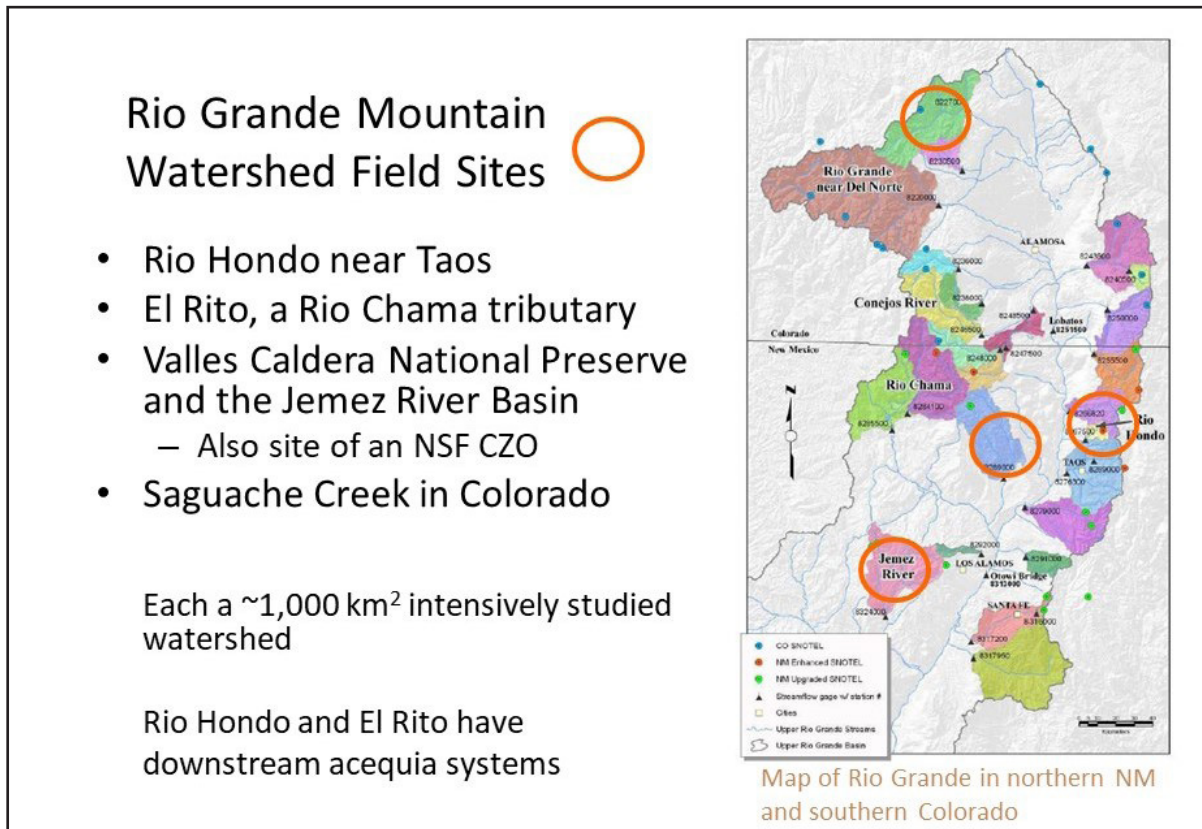


Figure 5. Rio Grande mountain watershed field sites.

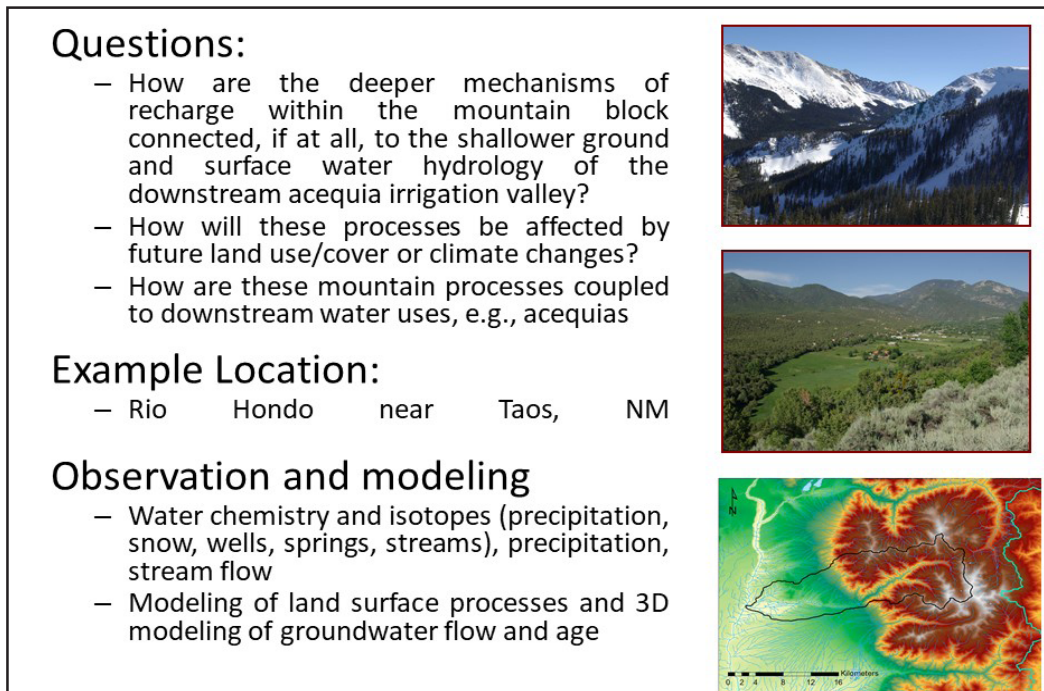


Figure 6. Mechanisms of recharge images.



Figure 7. Future land or climate change images.

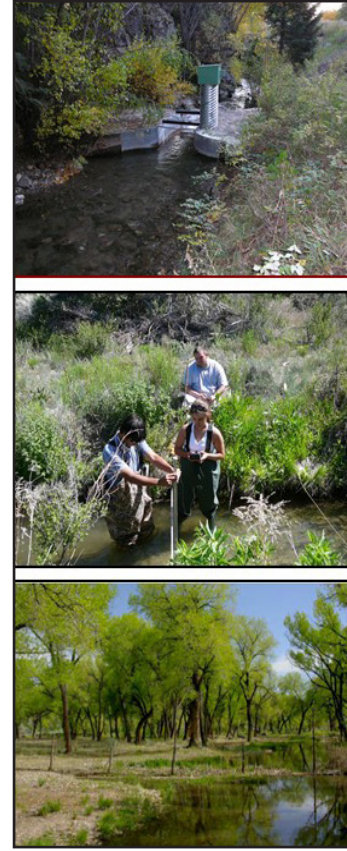


Figure 8. Mountain processes to downstream water-use images.

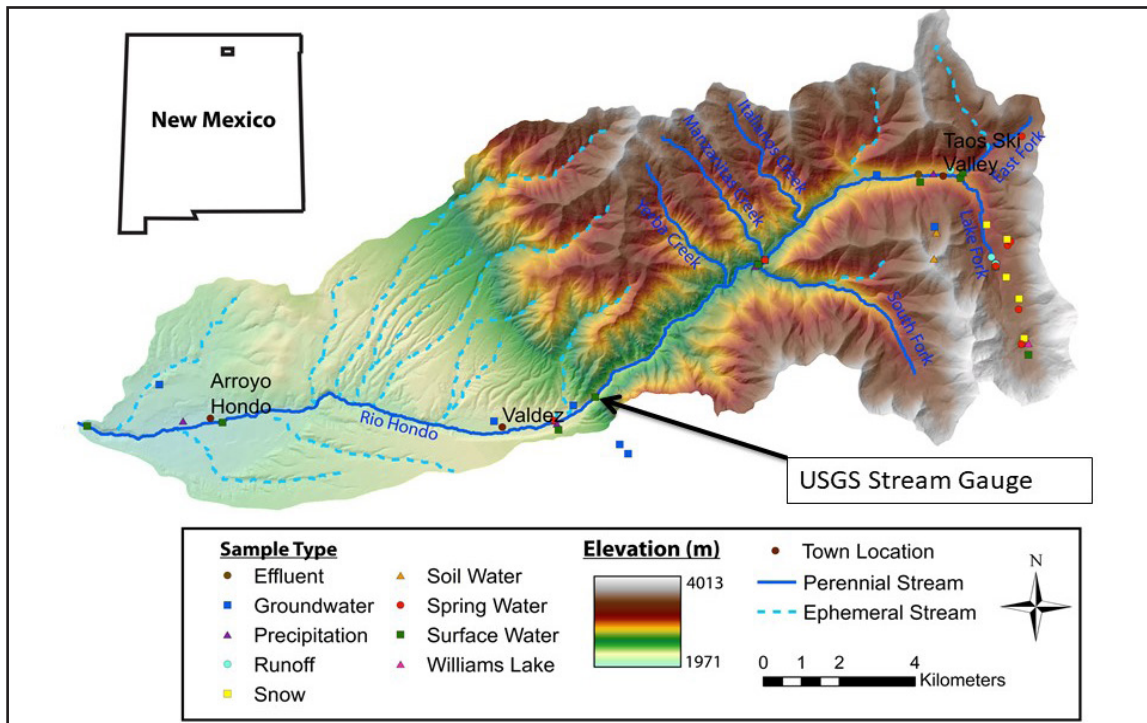


Figure 9. New Mexico USGS Stream Gauge Map.

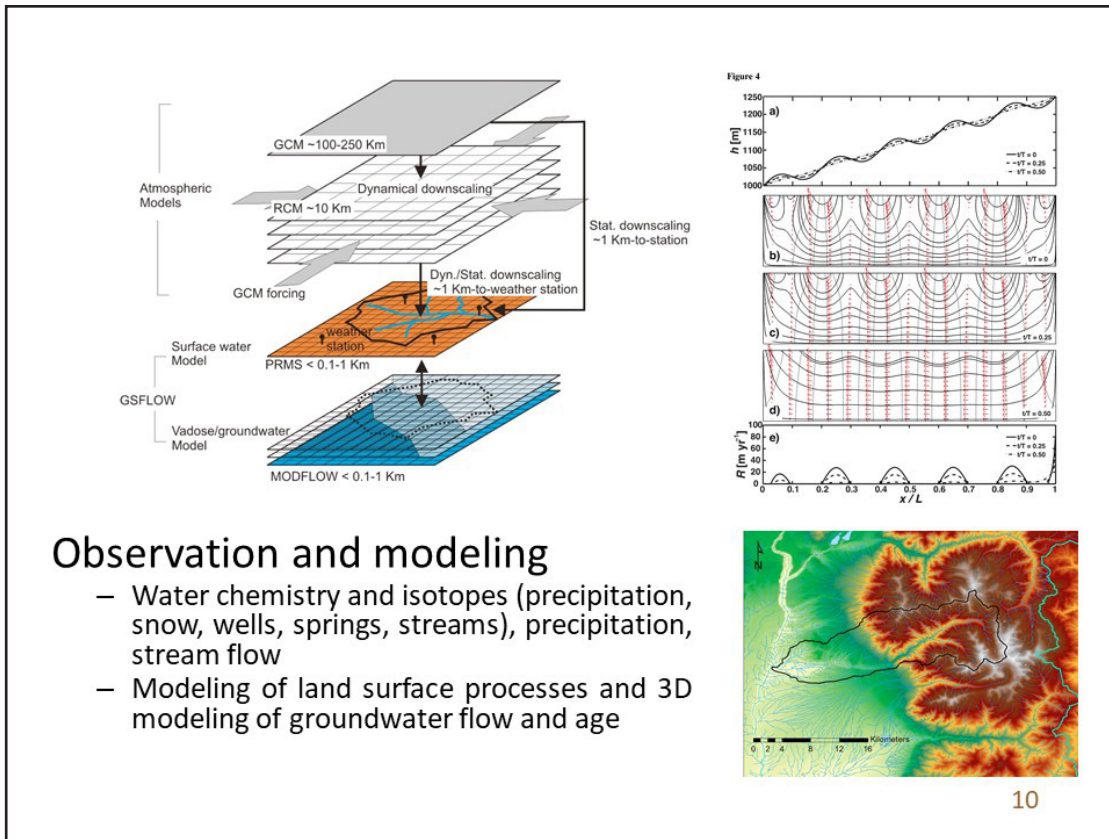


Figure 10. Observation and modeling.

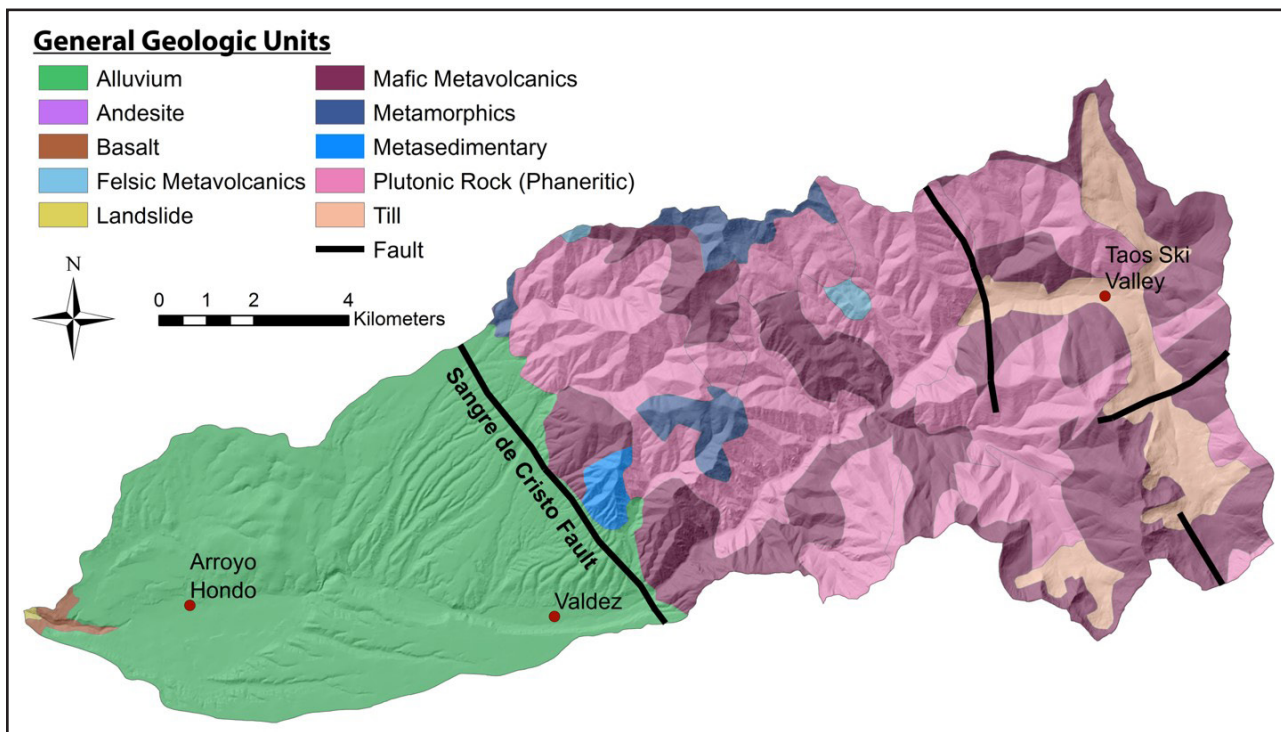


Figure 11. Sangre de Cristo Fault Map.

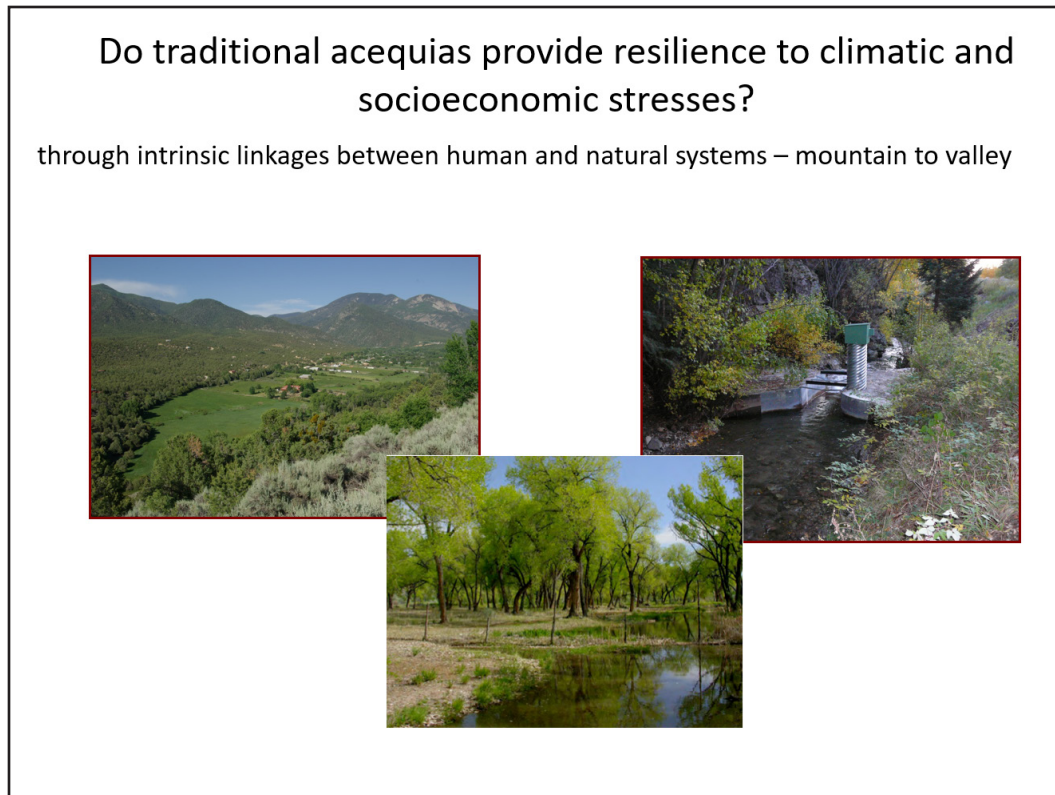


Figure 12. Acequias possibly provide resilience to climatic and socioeconomic stresses.

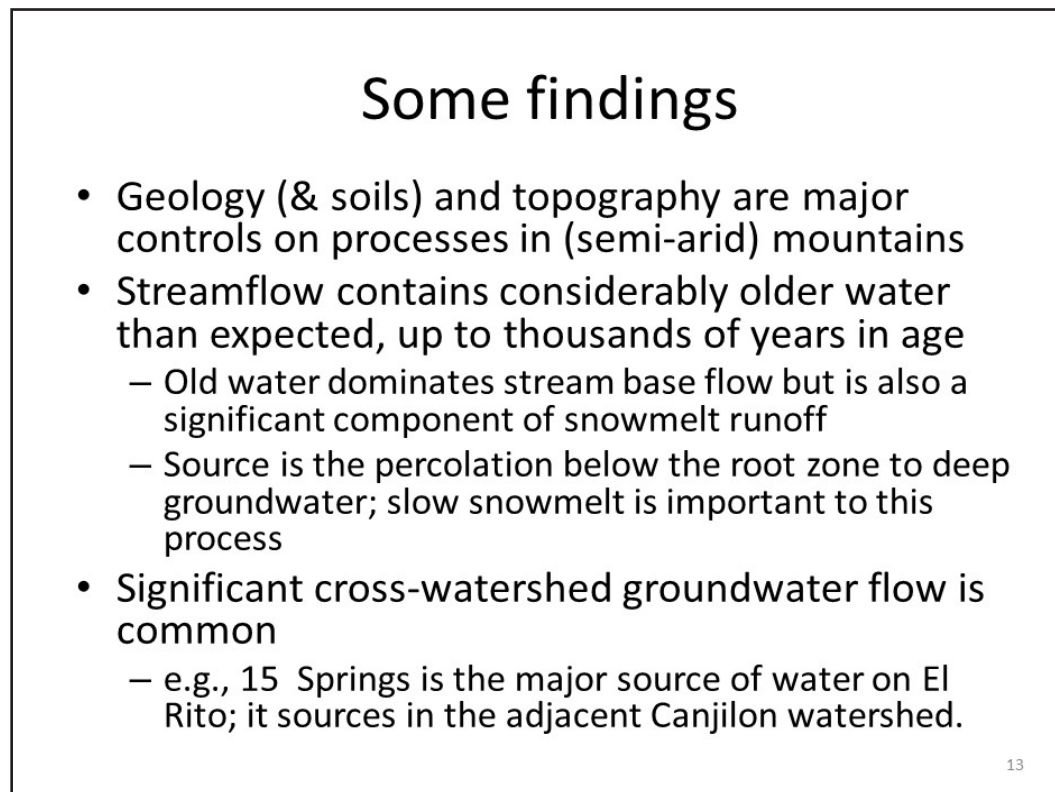


Figure 13. Findings.