

Characterizing Groundwater Resources for Communities in Rio Arriba County

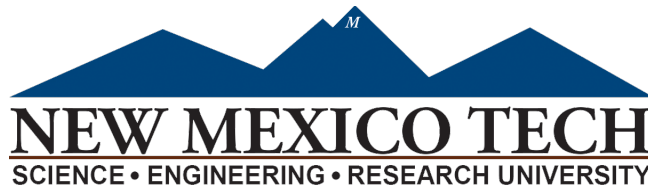
Dr. Talon Newton
Lead Hydrogeologist



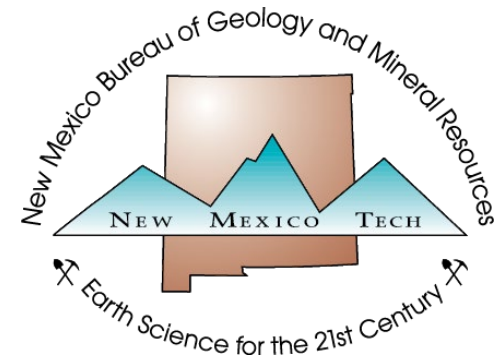
NEW MEXICO
AQUIFER MAPPING

Stacy Timmons
Associate Director, Hydrogeology

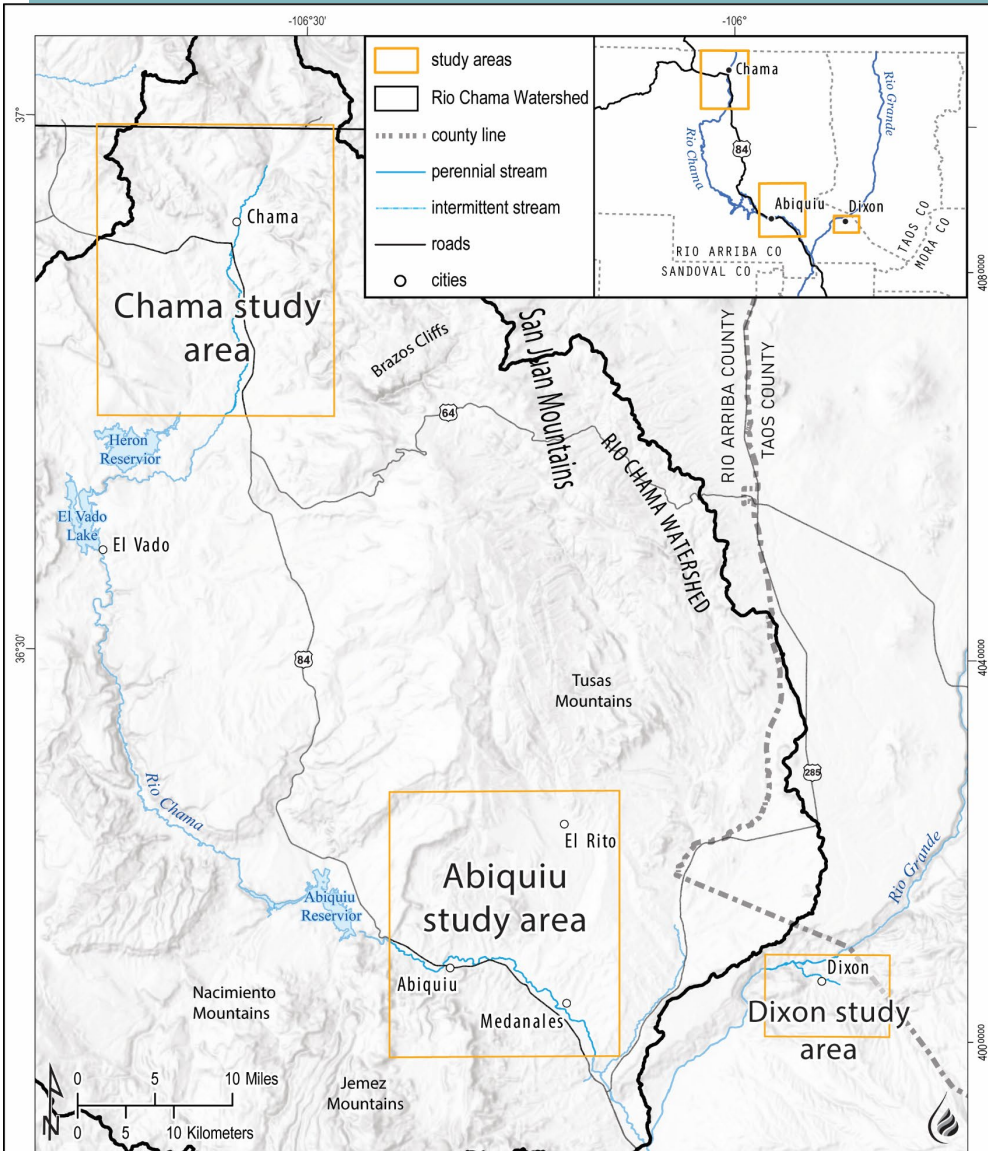
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Aquifer Mapping Program Manager



Supported by:
Jessica Johnston
Aguas Norteñas, LLC



2023-2024 Project Overview



- One-year funding from New Mexico State Appropriation; additional funding in 2024
 - Rep. Susan Herrera
- New Mexico Bureau of Geology and Mineral Resources Aquifer Mapping Program
 - Research and service division of New Mexico Institute of Mining and Technology
- Goal to characterize groundwater in selected areas within Rio Arriba County
 - Chama
 - Abiquiu/El Rito/Medanales
 - Dixon

Current Water Resource Conditions



Groundwater

- Most communities in Rio Arriba County rely on groundwater for domestic and municipal supply
- Deep wells can be unpredictable in quantity and quality
- Shallow wells are prone to drying during drought and subject to surface contamination

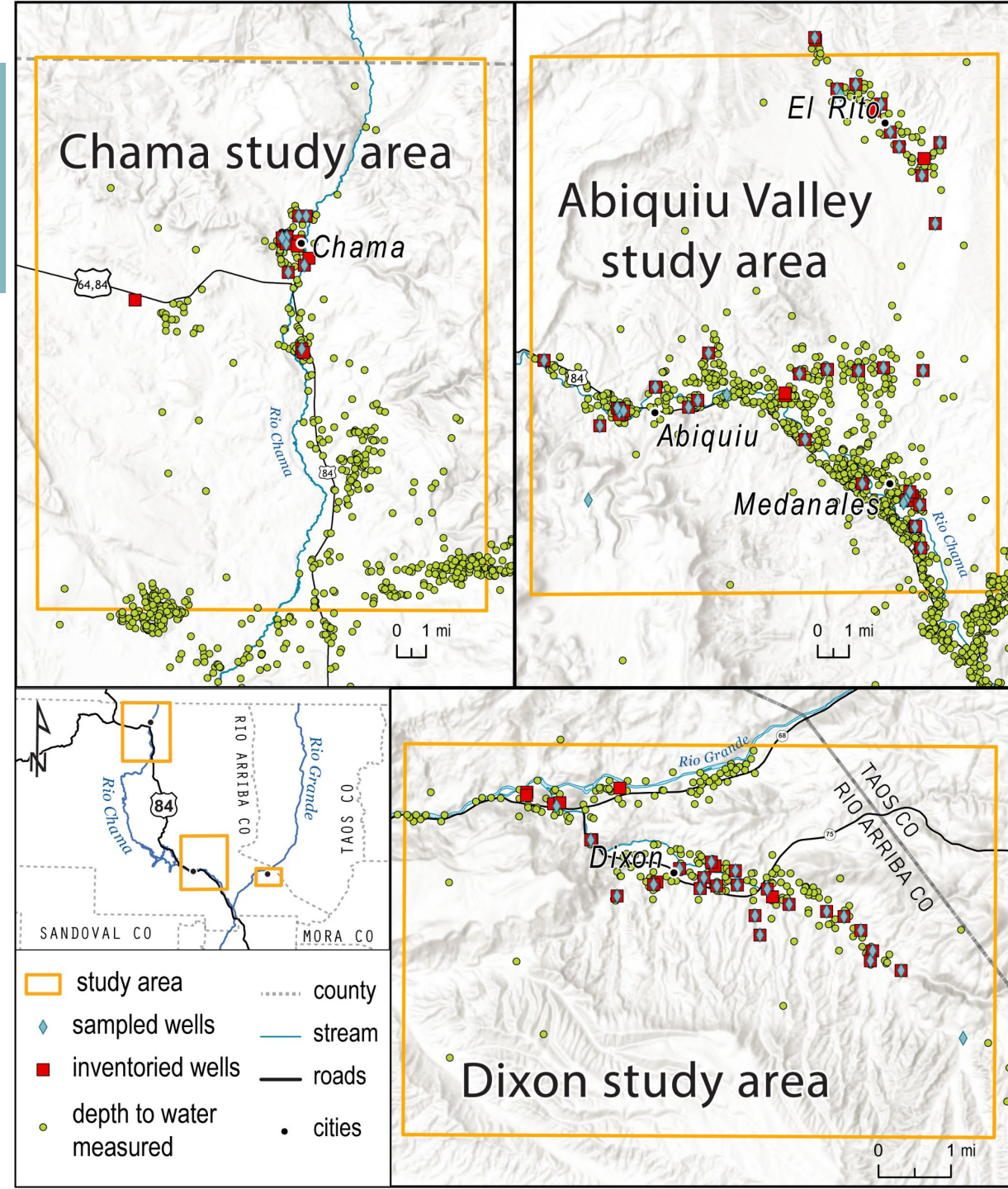
Surface Water

- Surface water is the primary source of agricultural water
- Rivers and streams in the region are highly connected to shallow groundwater

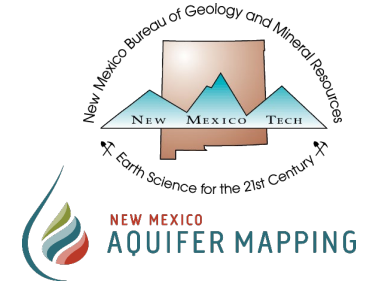
Reliable groundwater is needed for long-term sustainability of communities

Data Collection

- 90 wells measured for depth to water
 - Chama – 16
 - Abiquiu Valley – 43
 - Dixon – 31
- 61 wells sampled for water chemistry
 - Chama - 8
 - Abiquiu Valley - 32
 - Dixon - 21



Data Collection



Hydrogeology

- Review and update existing geologic mapping to identify aquifer units
- Review well drilling logs to understand aquifer depths and thicknesses
- Create aquifer maps from measured water levels

Water chemistry sampling

- Bacteria; E.coli and total coliform
- Major ions; common metals and salts
- pH and total dissolved solids
- Isotopes of oxygen and hydrogen
- Age dating – Carbon 14 and tritium in water

Preliminary results for Rio Arriba communities



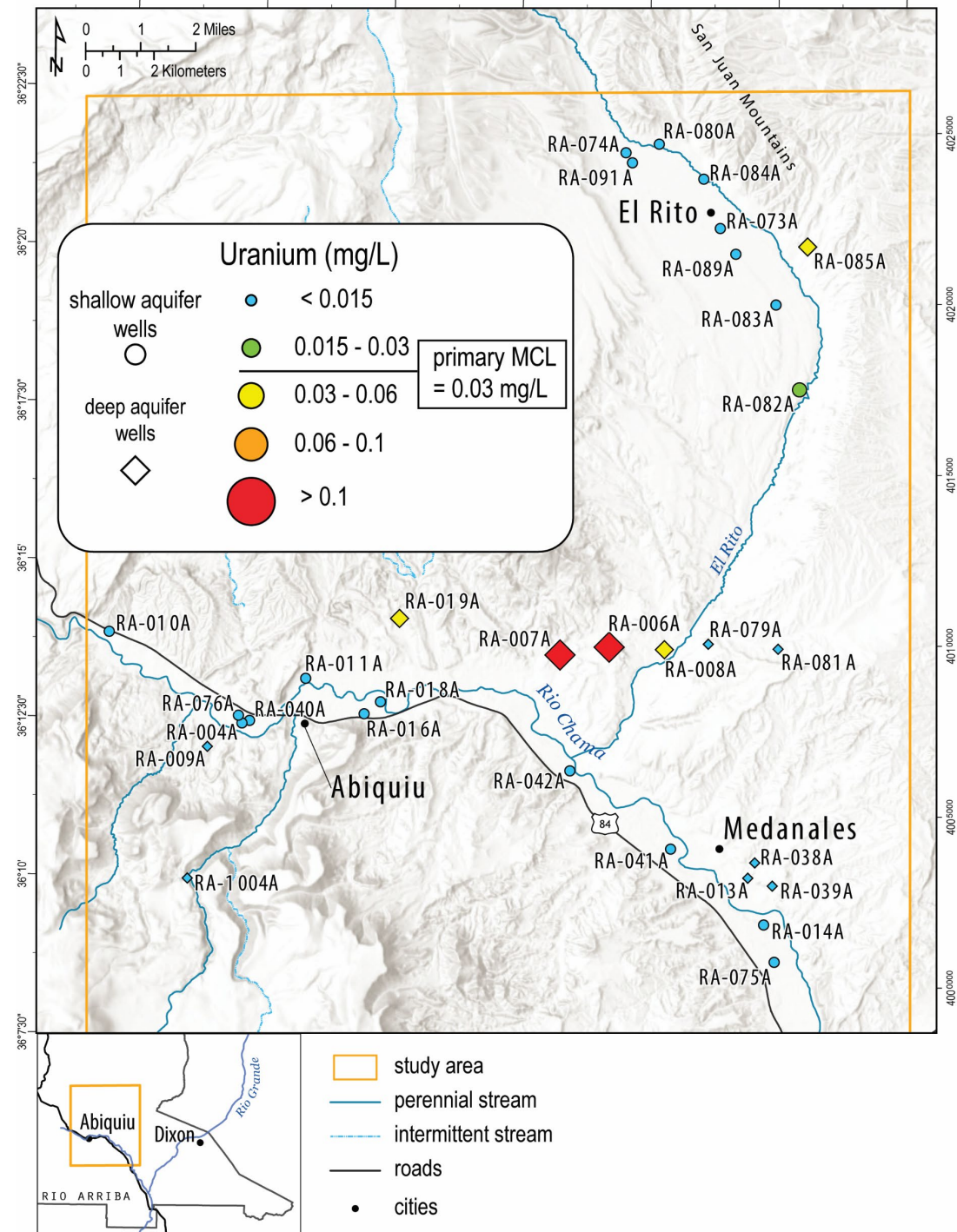
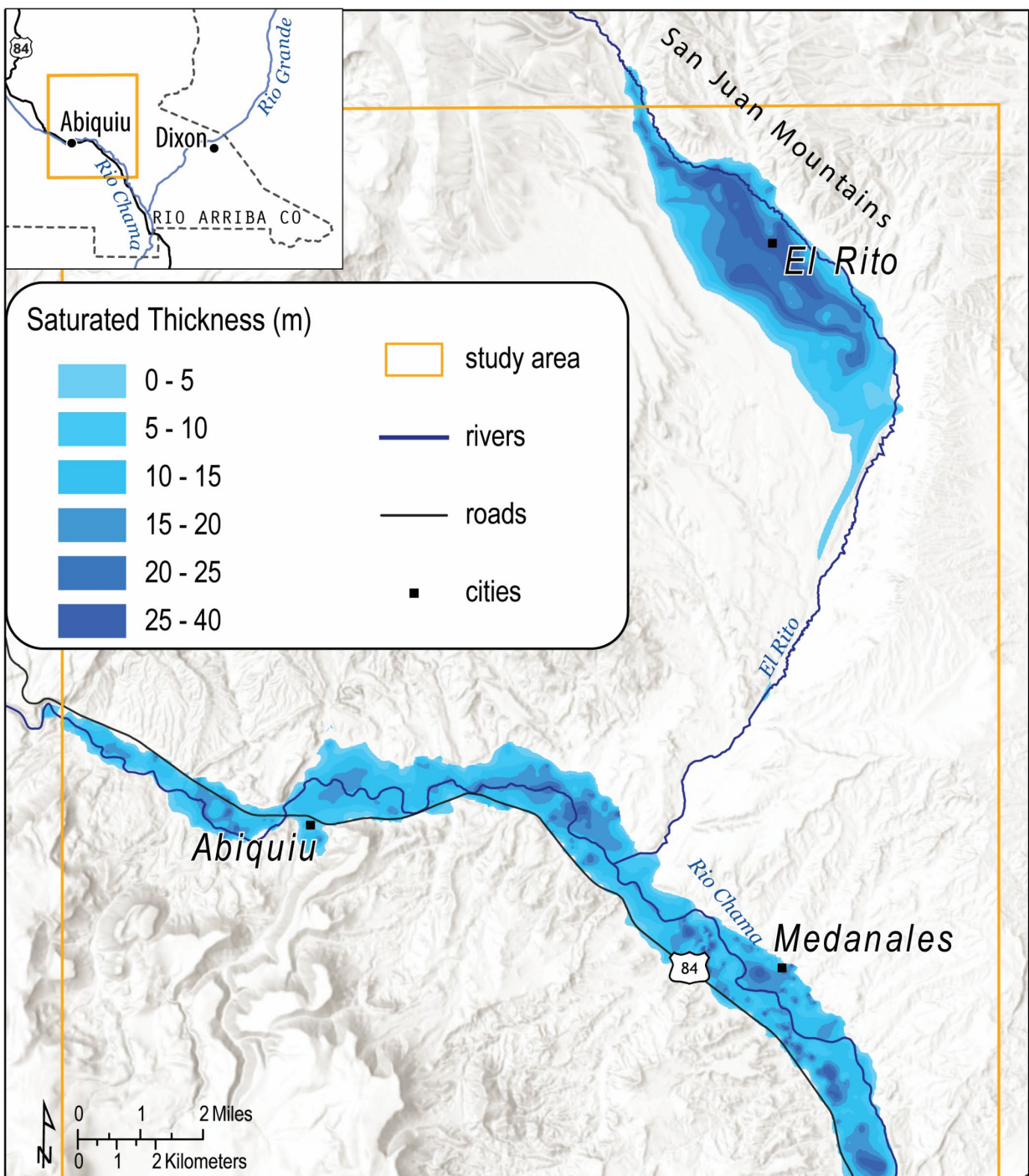
THERE ARE TWO APPARENT AQUIFER SYSTEMS, WHICH ARE HIGHLY CONNECTED, ESPECIALLY ALONG FAULT ZONES

Shallow aquifer systems

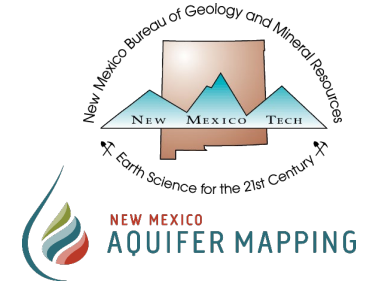
- Small, narrow, shallow sedimentary (alluvial) aquifers
 - 15 to 100 feet deep
 - <500 feet – 3 miles
- Most are < 50 gpm; highest is 80 gpm
- Water quality is good, low TDS
- Several bacterial contamination discoveries
- Wells are highly connected to surface water
- Many more wells in the shallow aquifers; potential impact on each other

Deep aquifer systems

- > 200 feet deep regional aquifers
 - Mancos and Dakota Formations in Chama
 - Santa Fe Group in Abiquiu area and Dixon
- Most are < 40 gpm; Dixon area < 6 gpm
- Longer, deep flow paths – 10 to 30 miles
- Water quality varies, with total dissolved solids concentrations from ~250 mg/L to 10,000 mg/L
- Many wells are not suitable for drinking water (contaminants such as arsenic, uranium, fluoride)
- Some wells produce high-quality water



Aquifer Characterization: Generalized workflow

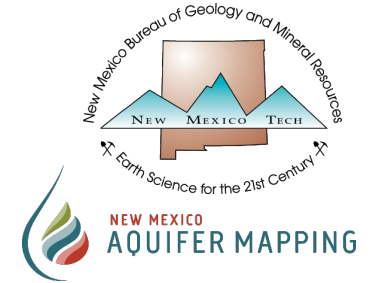


**WE CAN WORK EFFICIENTLY ACROSS THE STATE, REGION BY REGION, WITH
CONSISTENT RECURRING AND NON-RECURRING FUNDING**

1. Identify the regional questions and goals
2. Compile existing data and evaluate* (*i.e. geologic mapping, surface water features, groundwater levels/trends, aquifer properties, geochemistry*)
3. Collect new data to fill gaps** (*i.e. measure water levels, collect samples, drill wells, collect geophysical measurements from land, air and downhole, expanded hydrogeologic mapping*)
 - *Wells drilled for exploration can become long term monitoring sites*
4. Synthesize and interpret data to address questions or goals of project

*Substantial **time** investment in step 2 **Substantial **financial** investment in step 3

Funding goals for Aquifer Characterization and Monitoring



RECURRING BUDGET

- Annual funding acquired: \$800K
- Target request: Additional \$1M for FY2026
- Recurring costs for FTEs, software licenses, data management
- Long term – program shifts from building maps/models to maintaining and updating

NON-RECURRING BUDGET

- Estimate until project completion: \$5M to \$15M annually through 2037 (seeking multiple funding sources)
- Scale up as we learn through the process and build staff
- Largest costs for new data collection includes drilling wells and collecting geophysical data

***New Mexico Bureau of Geology is a division of New Mexico Institute of Mining and Technology
(under Higher Education)***

Further info on Rio Arriba projects



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Results will be published
this fall at the New
Mexico Bureau of
Geology website



Project Webpage

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