AN UPDATE ON WATER PROGRAMS AT NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES

A RESEARCH AND SERVICE DIVISION OF NEW MEXICO TECH

NEW MEXICO AQUIFER MAPPING

NEW MEXICO WATER DATA

NEW MEXICO WATER EDUCATION

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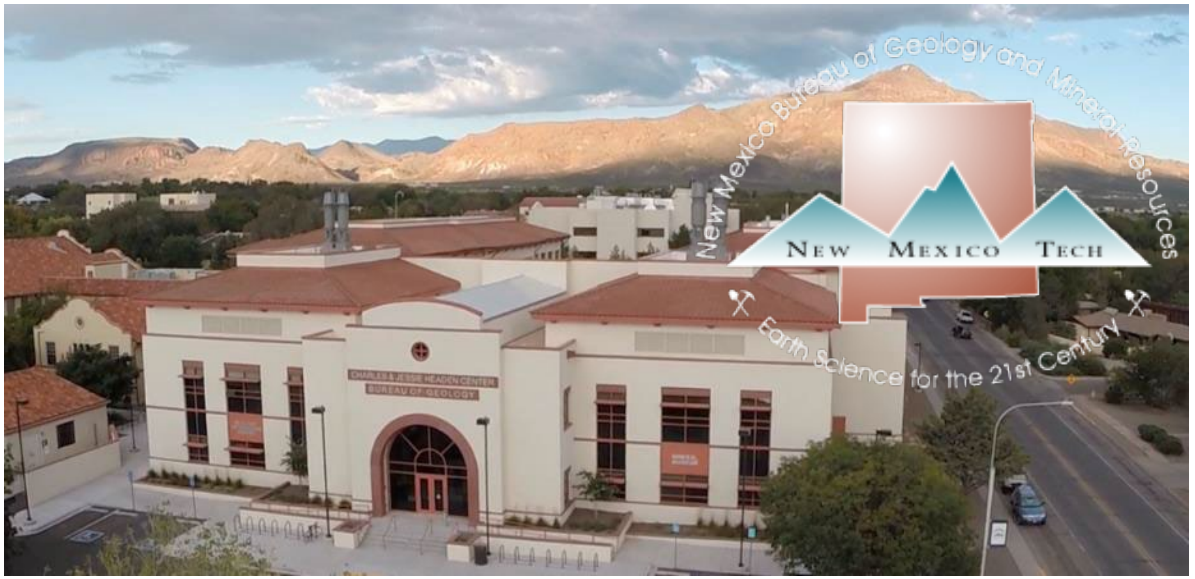
NEW MEXICO TECH
SCIENCE • ENGINEERING • RESEARCH UNIVERSITY

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
Earth Science for the 21st Century

NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES

- Research and service division of New Mexico Tech, in Socorro
- Established in 1927
- Non-regulatory, state geologic survey
- Budget is under Higher Education Department



WATER PROGRAMS AT NM BUREAU OF GEOLOGY

Aquifer Mapping and Monitoring Program

Regional short and long-term hydrogeology studies and mapping water quantity and quality

Groundwater level monitoring (currently funded by philanthropic funds from Healy Foundation)

FY25 budget: $900K annual state funding, plus grants and philanthropic funds

(This is an increase of $600K over FY24)

Water Data Initiative

Began in 2019, after the Water Data Act

Convening the work with multiple state agencies

Working to make NM water data more accessible and usable

FY25 budget: $500K annual, plus grants and philanthropic funds

(This is an increase of $250K over FY24)

Water Education Program

For legislators, staff and state water leaders

Developed following the model of previous Decision Makers Conferences

Focusing on increasing awareness and education on critical water issues in NM

FY25 budget: $250K annual, plus philanthropic funds

NEW MEXICO AQUIFER MAPPING

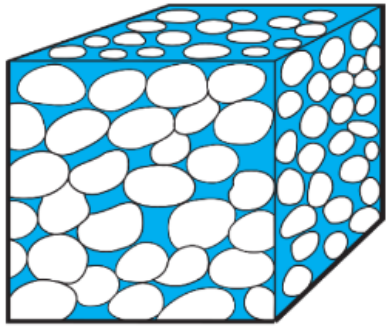
NEW MEXICO WATER DATA

NEW MEXICO WATER EDUCATION

Currently 12 Full-time Staff (3 Managers), 10 Part-time staff.
We have 5 vacancies to fill in FY25

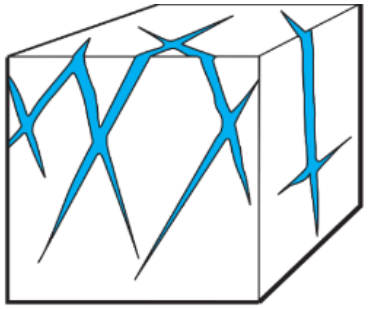
GROUNDWATER BASICS

- Aquifers are rocks that can contain or transmit groundwater
- Unlike rivers and lakes, groundwater is hidden from direct observation making quantification more difficult
- Recharge to groundwater is typically MUCH slower than the it is extracted by pumping
- Changes and impacts to groundwater take time to observe
- Deeper formations are typically tighter (poor production) and may have higher mineral content (brackish/saline, or contaminants)

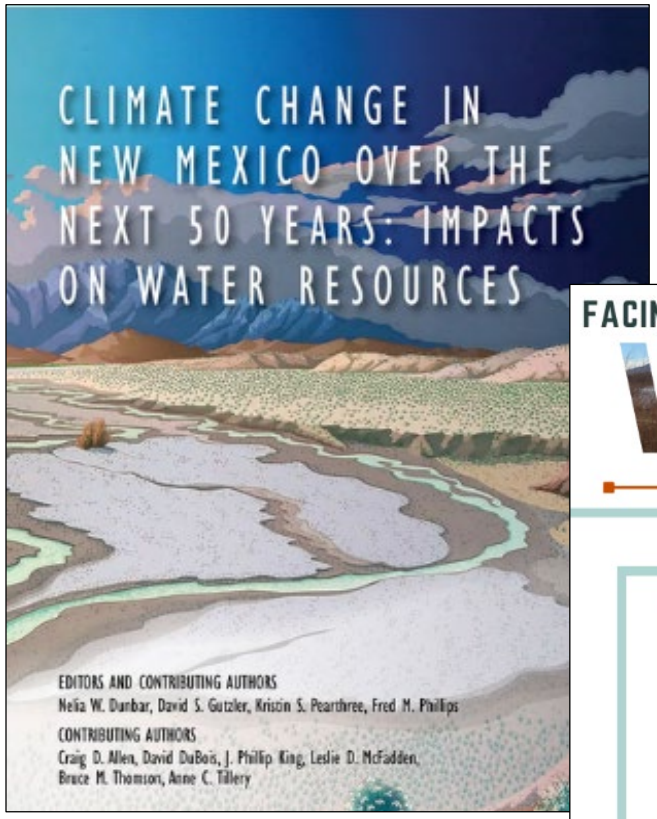


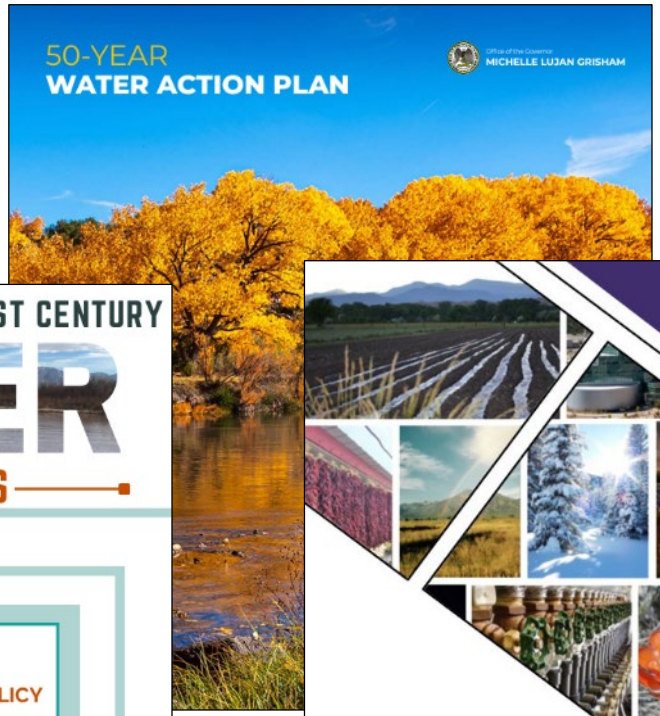
Alluvial (sediment) aquifer

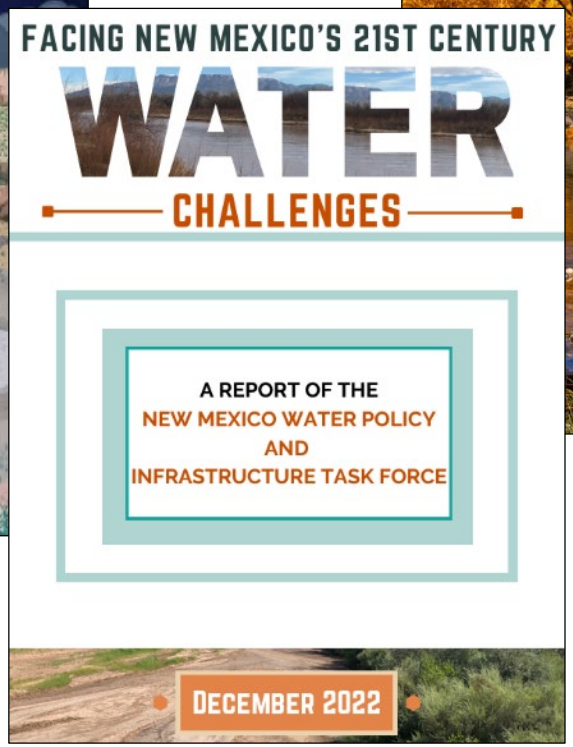
Fractured rock aquifer

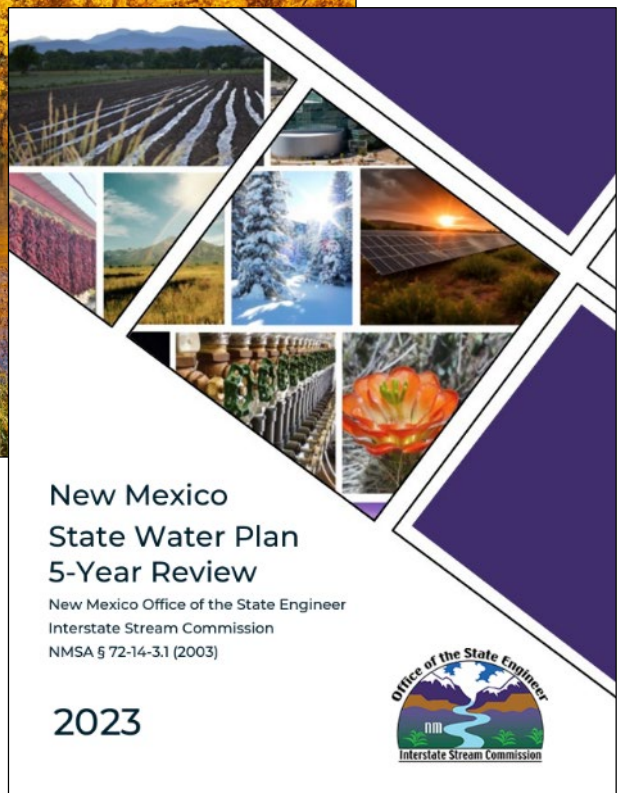


CHALLENGE #1:
OUR WATER SUPPLY IS LIMITED AND FURTHER REDUCED DUE TO CLIMATE CHANGE







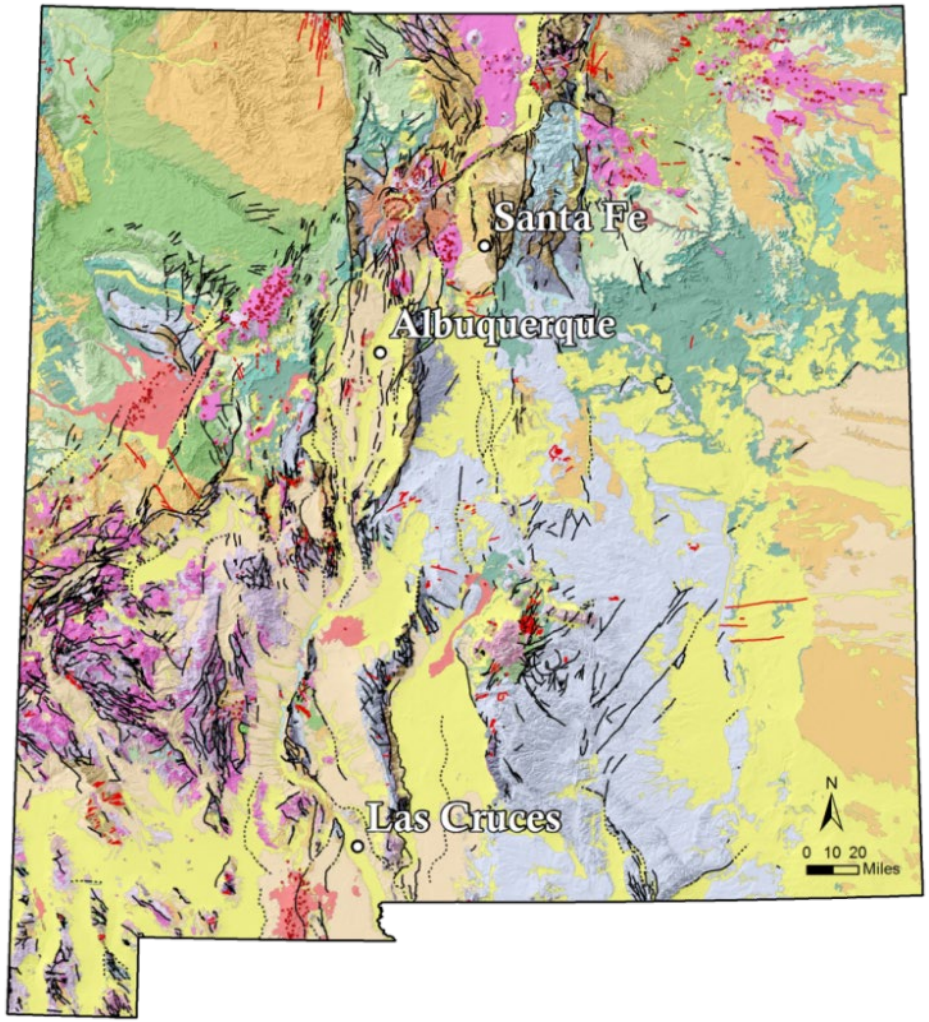


CHALLENGE #2: GROUNDWATER IS NOT EASILY CHARACTERIZED

- New Mexico's geology is complex
- Defining boundaries of aquifers/aquifer systems requires detailed geologic and hydrologic information.

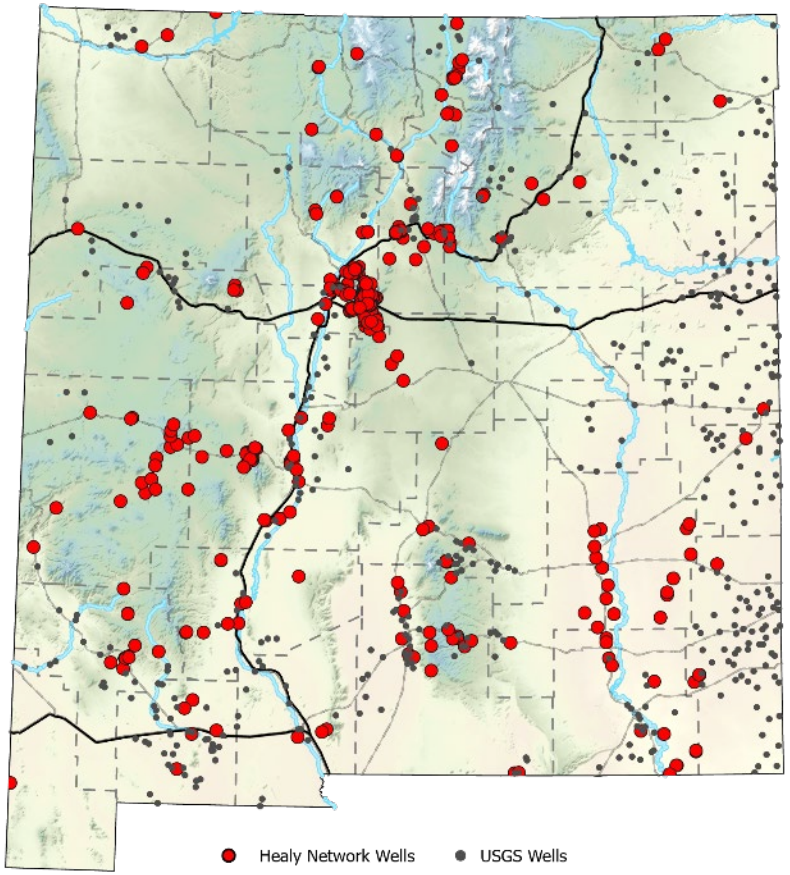
Questions we need to answer:

1. How much groundwater is available?
   Water planning and management
2. What is the groundwater quality?
   Fresh or brackish water
   Contaminants
3. Is there recharge to the groundwater?
   Sustainability
   Connection of aquifers or rivers



CHALLENGE #3:
WE NEED QUICK ACCESS TO GOOD DATA

As we face increasing aridity, less surface water, and more groundwater use, having good data becomes even more critical

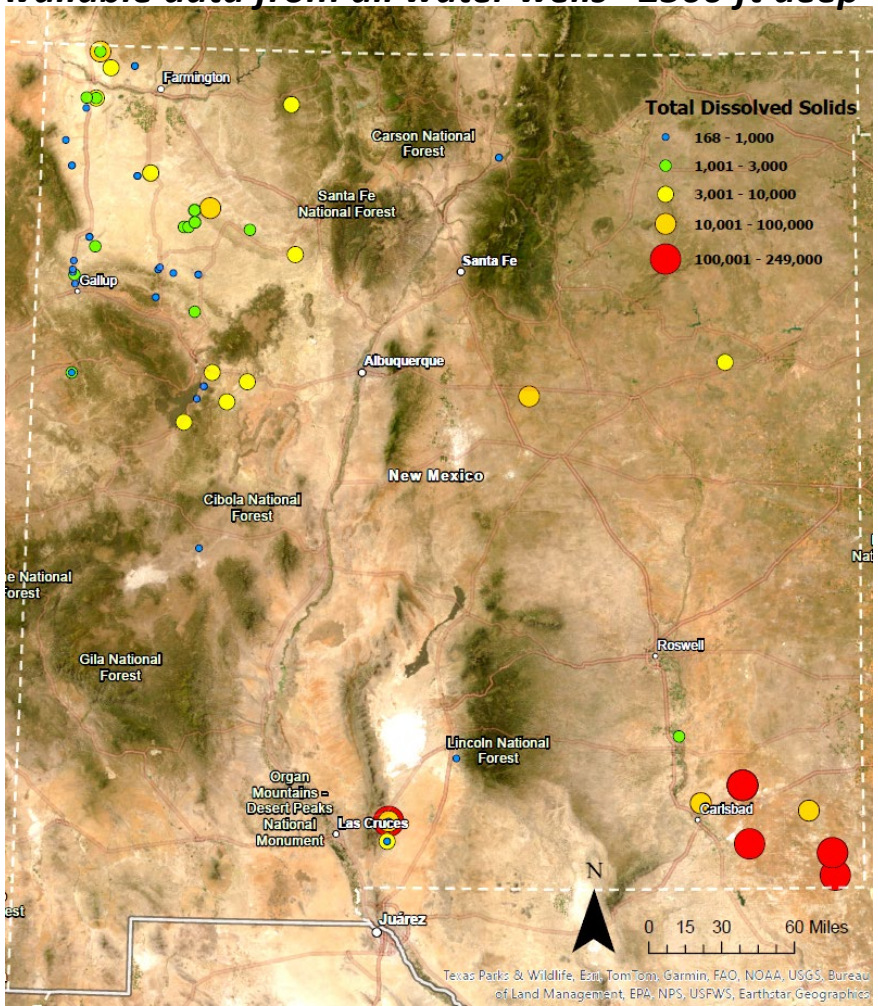


- NMBGMR maintains a network of about 600 wells (funded by Healy Foundation)
- USGS has a cooperative agreement with NMOSE to measure about 600 wells annually
- Significant spatial gaps across the state
- Many sites are not measured frequently enough
- Most sites are "reused" wells – not drilled with monitoring purpose

IN MOST REGIONS, DATA IS INSUFFICIENT TO FULLY CHARACTERIZE BRACKISH WATER

- Chemistry data derived only from existing water supply wells is insufficient to provide a thorough understanding of the distribution of groundwater salinity
- Compiled data are useful for basic regional trends, but we lack data statewide to address many detailed brackish water questions – especially as we consider **deep and non-potable options for water rights** (>2500 ft and >1000 mg/L TDS)
- Region specific studies are needed with exploratory wells focused on characterizing geology, water quality and aquifer properties

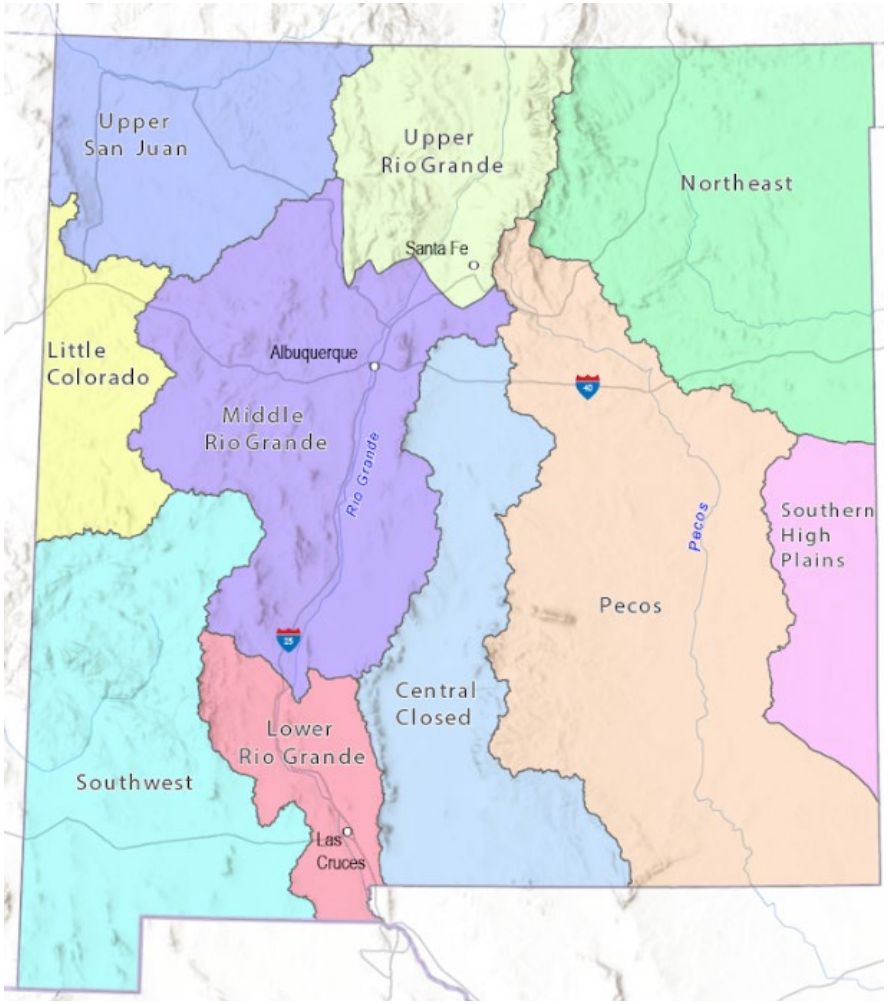
Available data from all water wells >2500 ft deep



THE NM BUREAU OF GEOLOGY IS WORKING TO ADDRESS THESE CHALLENGES IN SEVERAL WAYS

Developing Groundwater Summaries and Fact Sheets (funded by Thornburg Foundation)

- Technical regional review of known groundwater information with maps and graphics based on broad regions (see map)
- Building summary fact sheets for use in water planning and public education
- Year 1 funding from Thornburg Foundation – complete in May 2025



THE NM BUREAU OF GEOLOGY IS WORKING TO ADDRESS THESE CHALLENGES IN SEVERAL WAYS

Building improved understanding of our aquifers

New project:

Improved aquifer boundaries map for state (pending funding from OSE/ISC)

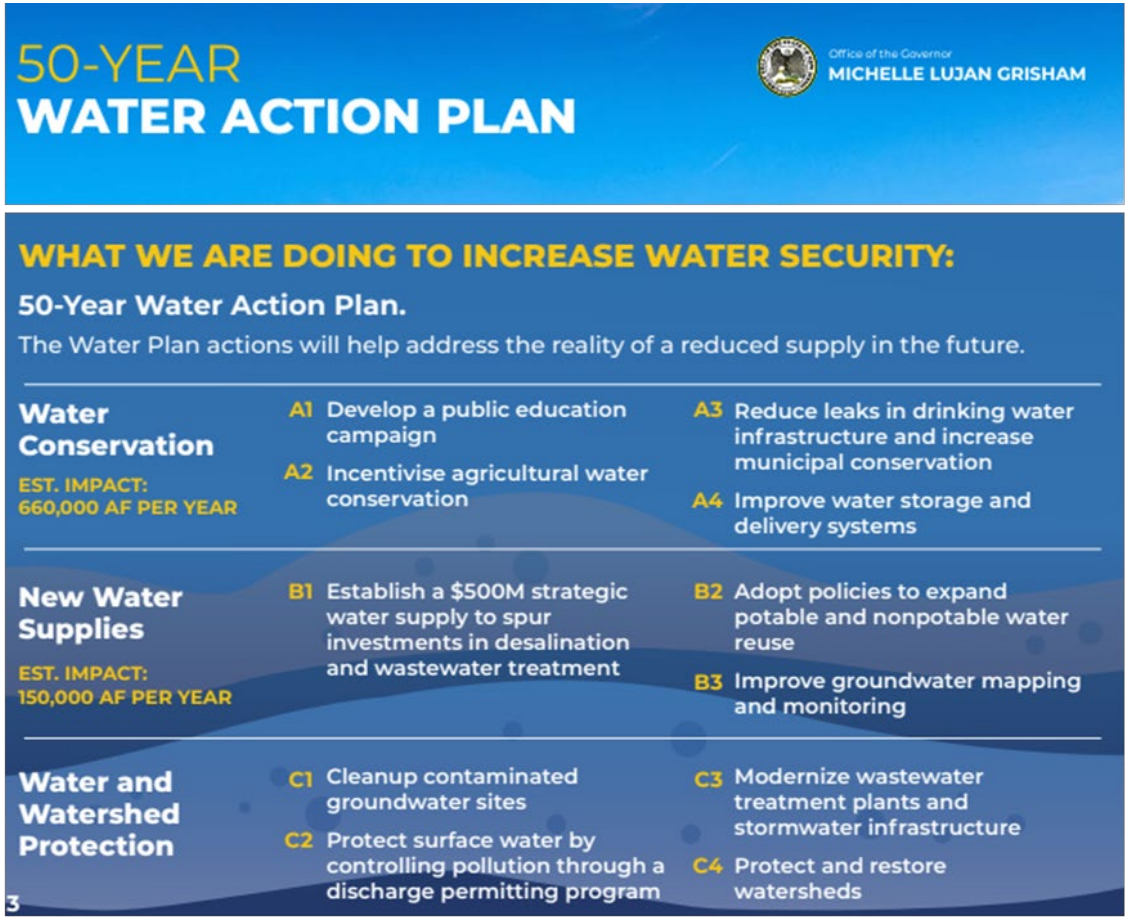
- Using existing well data, reports and geologic information
- Building first complete 2D map of major and minor aquifer boundaries
- Starting point for next phases of complete aquifer characterization
- Will identify key data gaps to address in future studies

USGS national map of aquifers for NM

FROM THE 50-YEAR WATER ACTION PLAN (B3)

Upon fulfillment of funding:

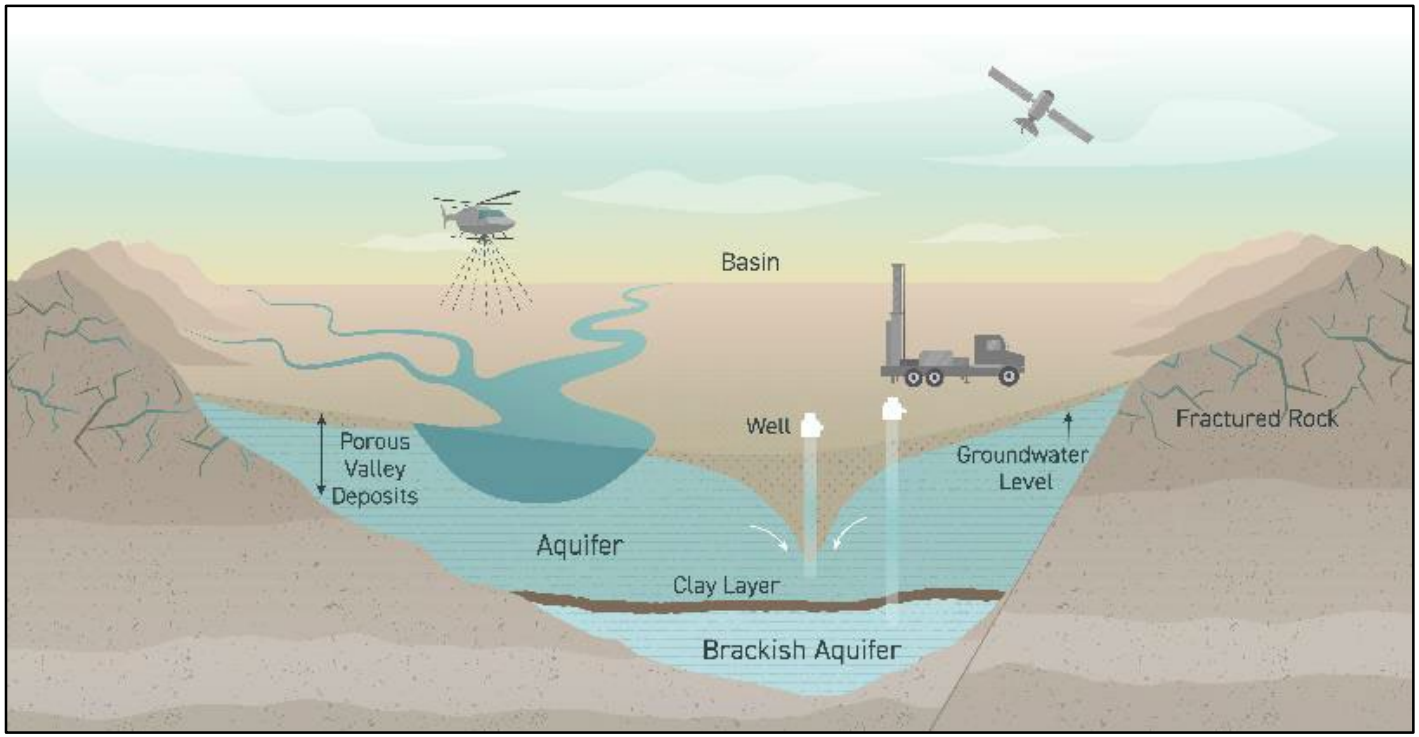
1. Characterize all major and minor aquifers in the state (fresh and brackish)
2. Characterize all major aquifers by 2032
3. Build a statewide groundwater monitoring network with 100 new dedicated wells by 2037



https://www.nm.gov/wp-content/uploads/2024/01/New-Mexico-50-Year-WaterAction-Plan.pdf

CHARACTERIZING AQUIFERS REQUIRES DETAILED INFORMATION FROM THE SUBSURFACE

1. Compile existing data, such as
2. Build initial draft maps/model
3. Fill data gaps
4. Update maps/model
5. Long term monitoring for change



AQUIFER CHARACTERIZATION AND MONITORING: TARGET FUNDING

Goal: Map all aquifers by 2037 with 100+ new monitoring wells for tracking change

Recurring funding:

- Annual funding at $900K (FY25)
- **Additional funding needed: $1.25M**
  - Recurring costs to cover FTEs, software licenses, project/data management
- After 2037, program focus shifts from building / data acquisition to long-term maintenance and updating / improving models

Non-recurring funding:

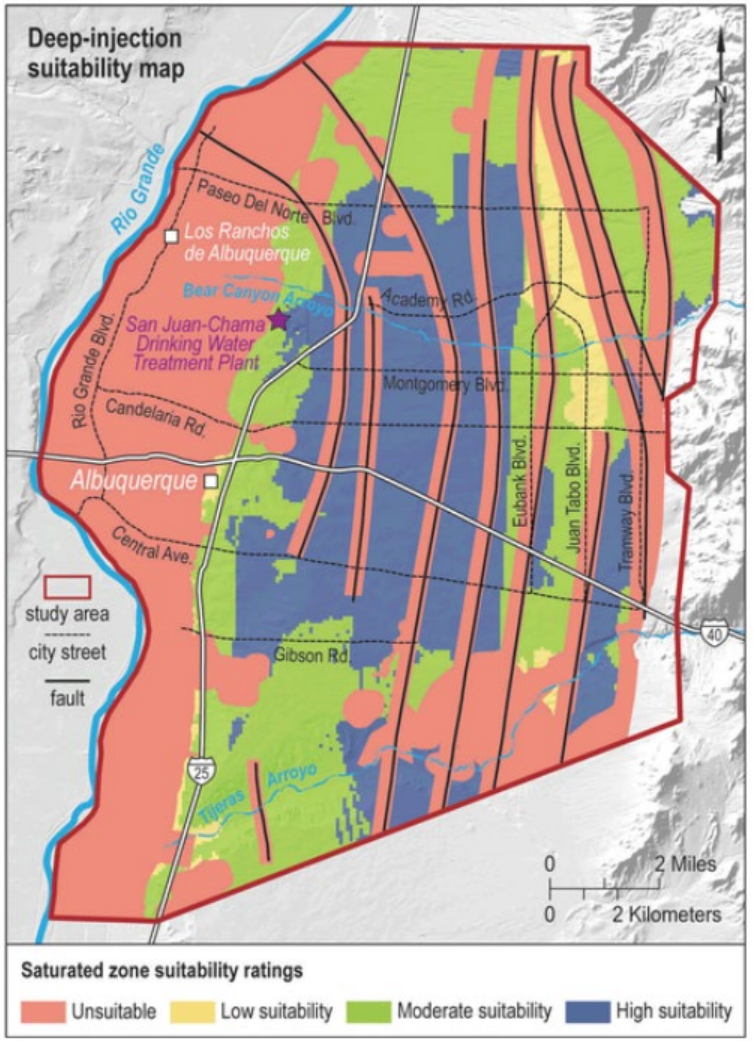
- Estimated funding needed: $175M over 12-15 years
- Annual funding estimates include geologic/ hydrologic mapping, geophysical surveys and drilling wells

ELEMENTS TO EFFICIENTLY ADDRESS AQUIFER CHARACTERIZATION AND MONITORING

- Guidance by a small steering committee to set specific annual regions and goals
- Collaboration with research groups, state, federal, local agencies and others
- Contract with experts for specialized data collection, analysis and modeling
- NM Bureau of Geology staff hydrogeologists coordinate data efforts, interpretations, and maintain monitoring network
- Long term - Build student research programs around this to increase hydrogeology workforce in New Mexico

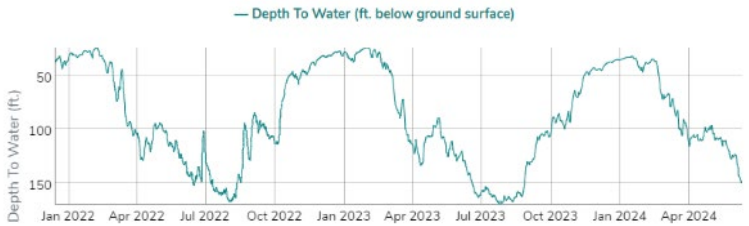
WHY NEW MEXICO NEEDS IMPROVED AQUIFER CHARACTERIZATION AND MONITORING

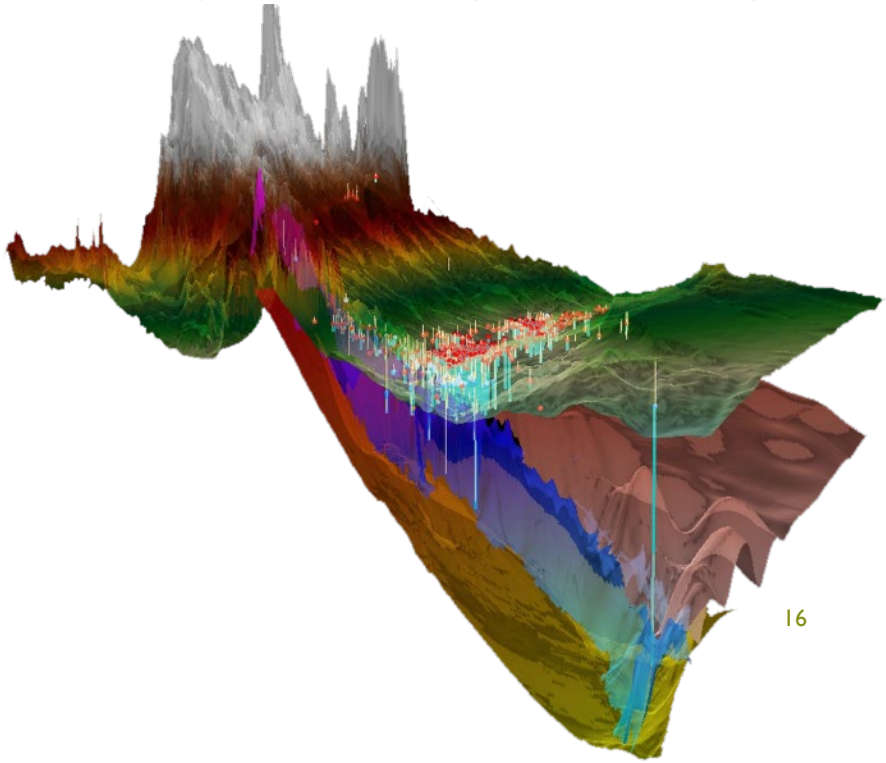
- Protection of groundwater quality
- Climate related hazard mitigation
  - Short and long term water outages
  - Need improved tracking to see declining aquifer trends
- Informed decision making for alternative water resources, desalination options (plus waste disposal considerations) and regionalization
- Identifying potential areas for aquifer recharge



OVERALL OUTCOMES

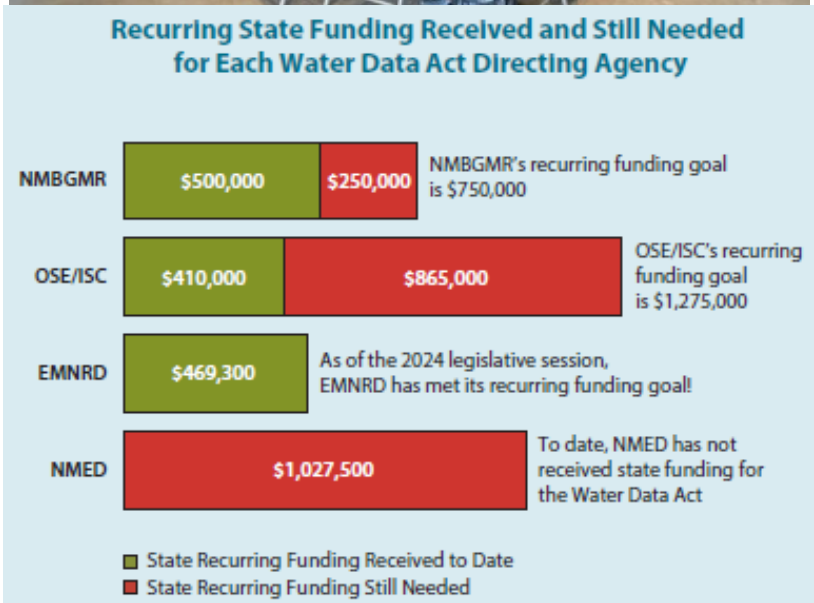
- 100+ well groundwater monitoring network
- Regional and statewide dashboards with groundwater level tracking
- Online, accessible aquifer visuals
- Detailed subsurface data and model layers for groundwater management and planning
- Published best estimates of aquifer boundaries, existing water quality (fresh and brackish), and production potential





NEW MEXICO WATER DATA ACT UPDATE

- Improved coordination between agencies working on water and data (federal, state and local)
- Building data literacy and implementing more modern data sharing practices, with new APIs **that did not exist prior to Water Data Act** at all agencies
- Funding improvements at most of the state directing agencies
- Working toward integrated / combined data sets (in a federated data model) so data users do not have to hunt down siloed data in each agency and reduce data cleaning/ processing needs.



STRIVING TOWARD FUNDING GOALS TO SUPPORT WATER PROGRAMS AT NMBGMR

Aquifer Mapping and Monitoring

- Goal: add $1.25M to annual recurring
- Non-recurring - $175M over the next 12 years (until 2037)
- Add FTEs to build aquifer characterization and a state monitoring program

Water Data Initiative

- Goal: add $250K to annual recurring
- Add new FTEs + operational costs
- Does not include other agency budget needs

NMBGMR budget goal for Water Programs FY2026:

- **Additional recurring budget: $1.5M**
- **Non-recurring budget: $40M for first 3 years, build toward $175M over 12-15 years**

NMBGMR is a division of New Mexico Institute of Mining and Technology

(under Higher Education Dept)

THANK YOU FOR YOUR SUPPORT OF WATER PROGRAMS AT NMBGMR!

Additional handouts available:

- Coming very soon – Water Data Plan 2024
- WATER LEADERS WORKSHOP: Save the Dates April 14-16 (based in Silver City)