New Mexico Bureau of Geology and Mineral Resources

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BUREAU OF GEOLOGY AND MINERAL RESOURCES

New Mexico Bureau of Geology and Mineral Resources

We are a research and service division of New Mexico Tech (under Higher Education). We serve as the state geological survey.

Hydrogeology

Hydrogeology is the study of groundwater – it is sometimes referred to as geohydrology or groundwater hydrology.

Hydrogeology deals with how water gets into the ground (recharge), how it flows in the subsurface (through aquifers) and how groundwater interacts with the surrounding soil and rock (the geology).

https://iah.org/education/general-public/what-is-hydrogeology

BUREAU OF GEOLOGY AND MINERAL RESOURCES

Hydrogeology in New Mexico

Frequently asked water questions

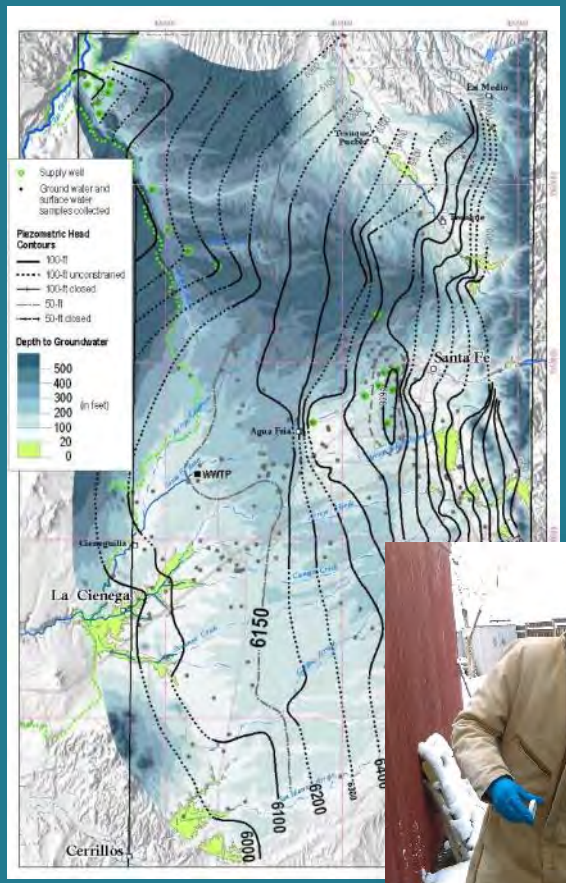
- Where is the groundwater?
- How much is there?
- What is the water quality?

Answers require understanding of the **complex geology** of our state. We can address issues using many of our in-house NMBGMR resources:

- Geologic mapping
- Drill hole data
- Geophysical surveys
- Hydrologic data
- Geochemistry
- ArcGIS and graphics

Aquifer Mapping Program: Working around the state to characterize New Mexico's aquifers

- Groundwater-level monitoring and mapping
- Water data management and compilation
- Water quality characterization
- Groundwater-surface water interactions
- Groundwater movement and recharge
- Brackish water aquifer assessment
- Water quantity and aquifer lifetime estimation
- Water science outreach and communication



geoinfo.nmt.edu/resources/water/amp

Aquifer Mapping Program

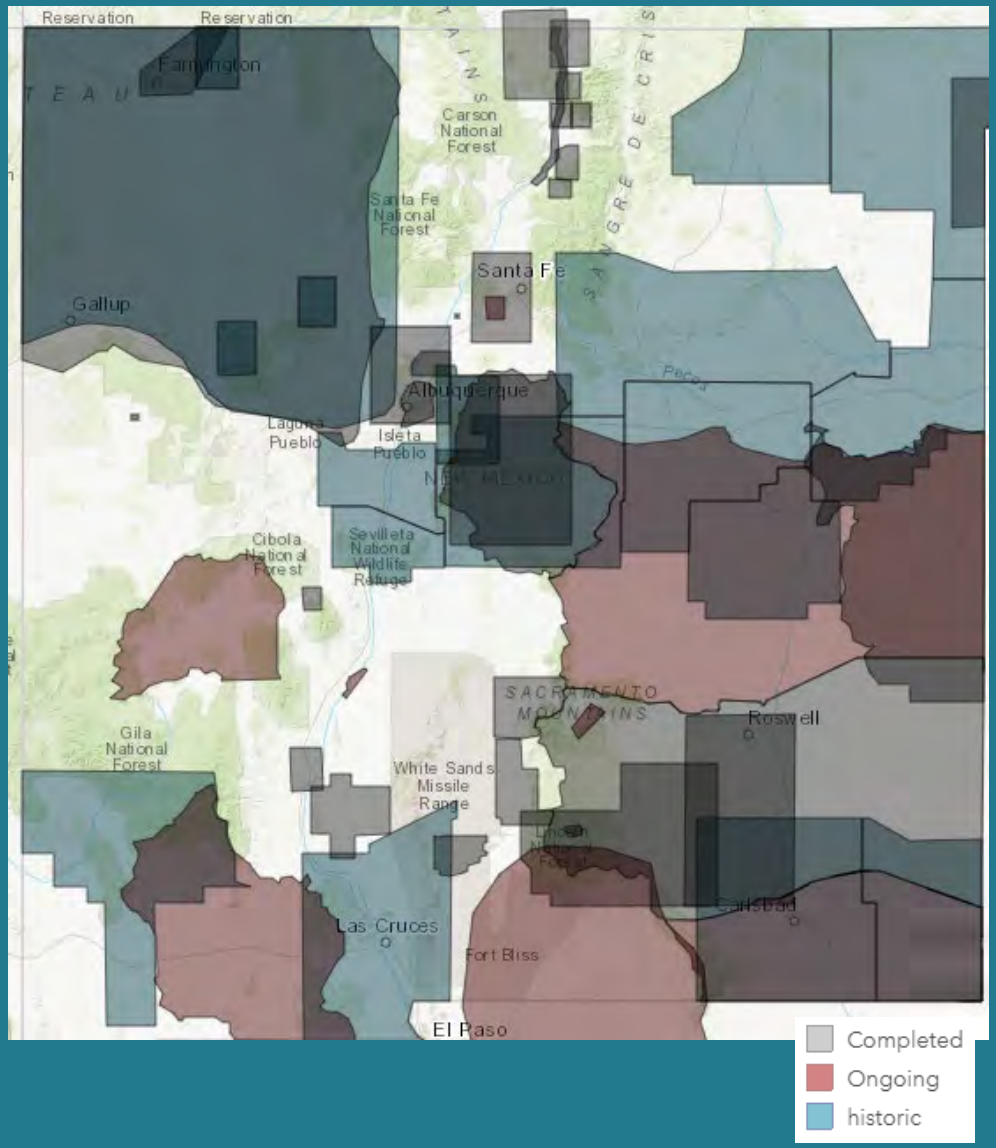
REGIONAL PROJECTS

STATEWIDE PROJECTS

- utilize collaborations, existing data, and regional reports/maps

All projects have some external funding

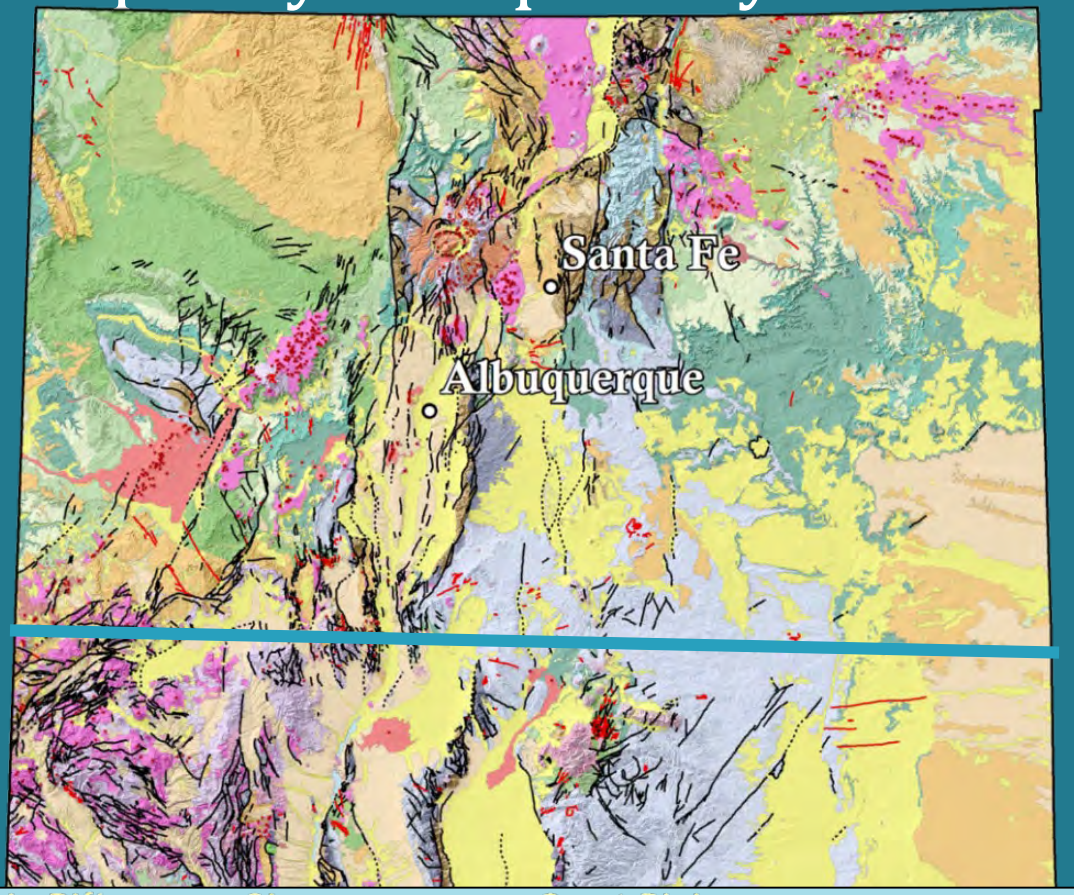
- Municipalities
- Small communities
- Legislative – state funds
- Counties
- State agencies
- Private donations
- Federal funding



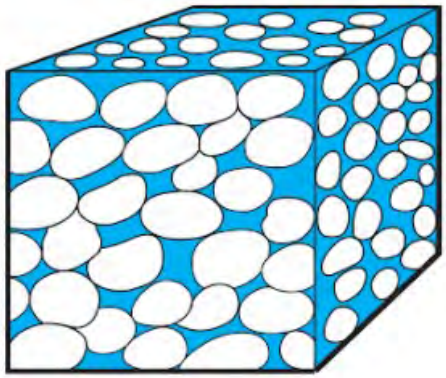
geoinfo.nmt.edu/resources/water/projects

Geology of New Mexico determines our water resources – water quality and quantity

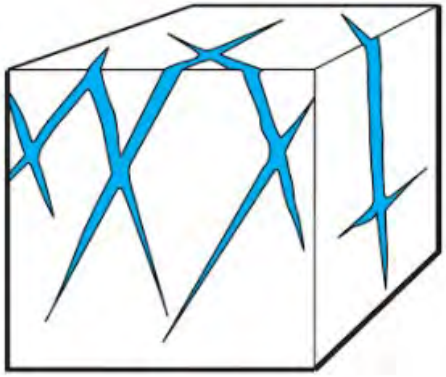
- Distribution of water quality (spatially and vertically)
- Depth to groundwater
- Volume of water available
- Productivity of aquifer
- Connections between aquifers and surface water



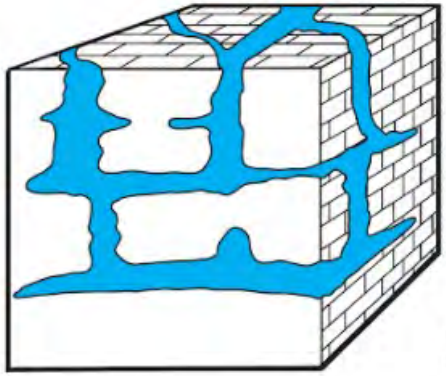
An **aquifer** is a body of water-saturated rock, rock fractures or unconsolidated rock material in which water can move readily



sediment aquifer



fractured rock aquifer

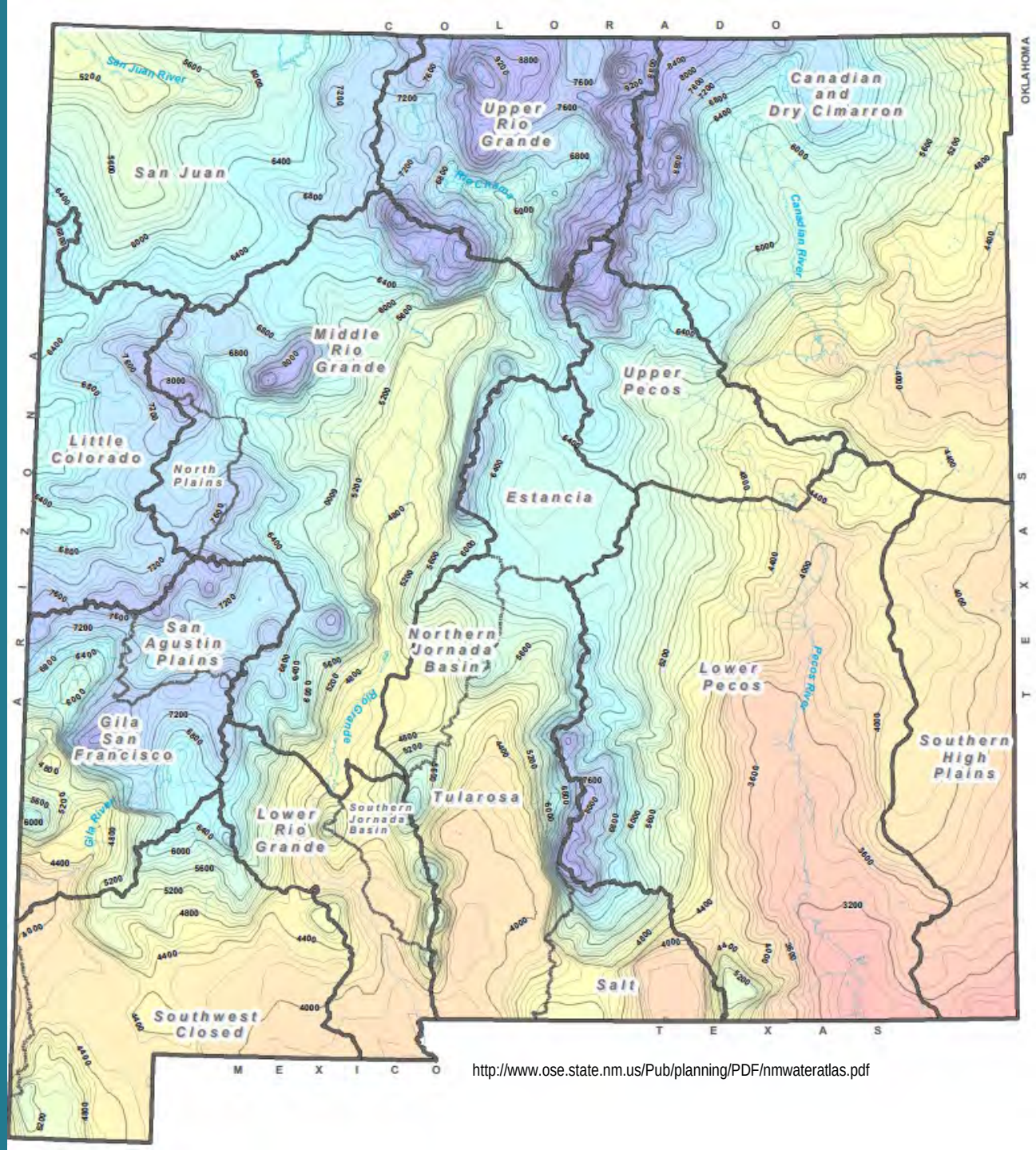


karst aquifer

Photo credits:
Fractured rock: Colin Cikoski
Karst aquifer: Peter Scholle

Groundwater flow is generally downhill (gravity driven)

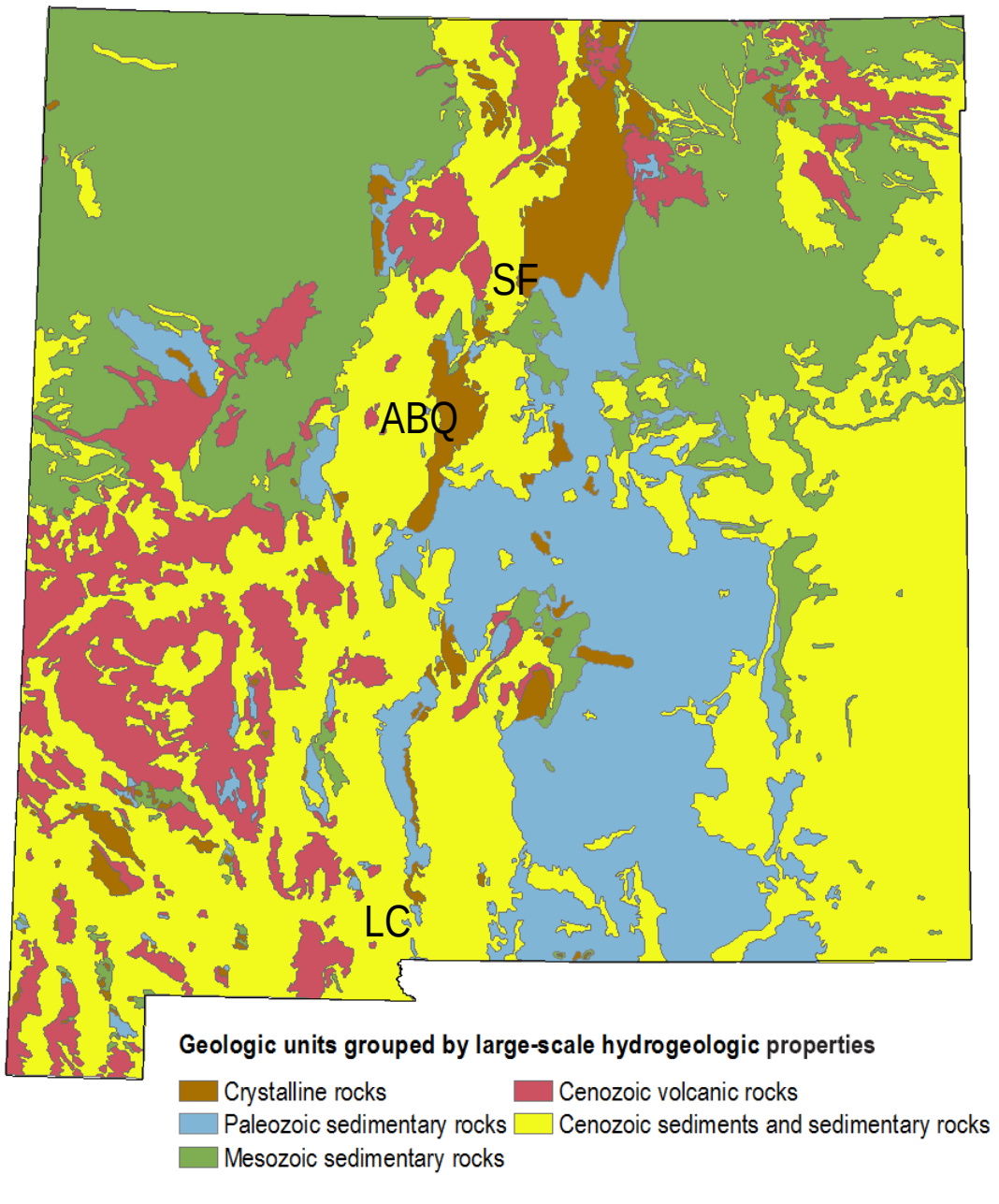
Map from NM Office of State Engineer shows lines of equal elevation of groundwater



http://www.ose.state.nm.us/Pub/planning/PDF/nmwateratlas.pdf

New Mexico's hydrogeology can be divided into 5 main groups

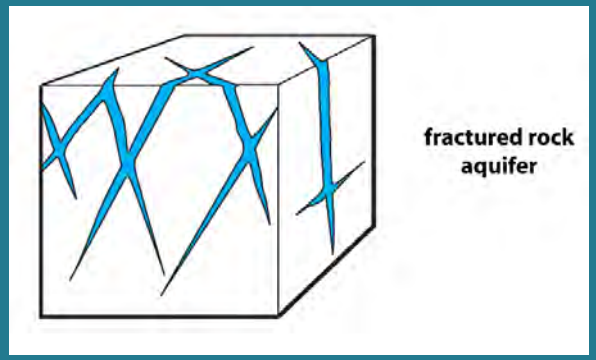
1. Crystalline rocks
2. Paleozoic cemented sedimentary rocks
3. Mesozoic sedimentary rocks
4. Cenozoic volcanic rocks
5. Cenozoic sediments and rocks

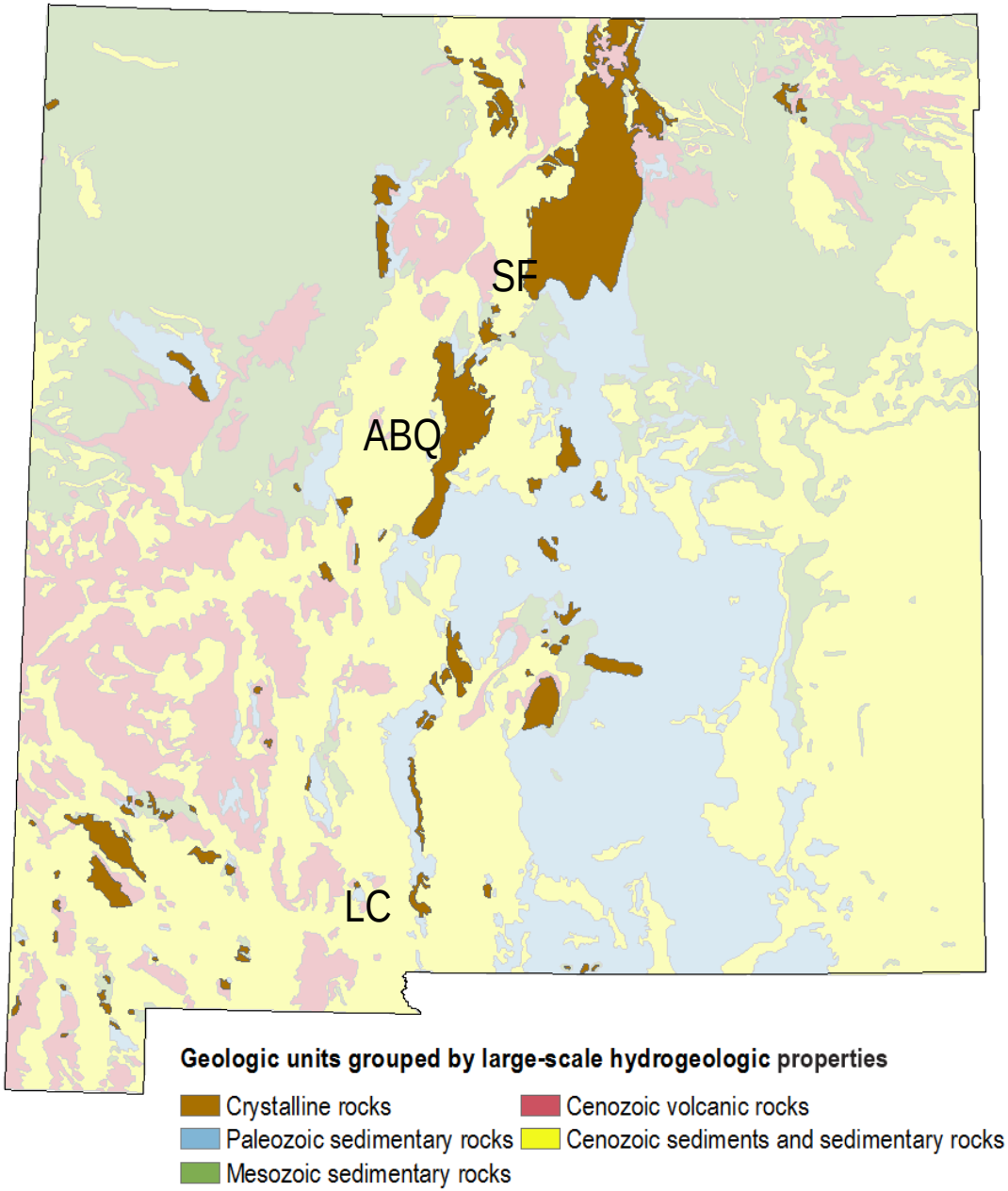


Crystalline rocks

Strong and resist fractures

Poor aquifers, except where fractured or near fault zones.



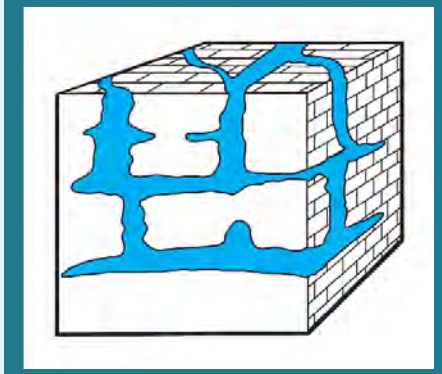


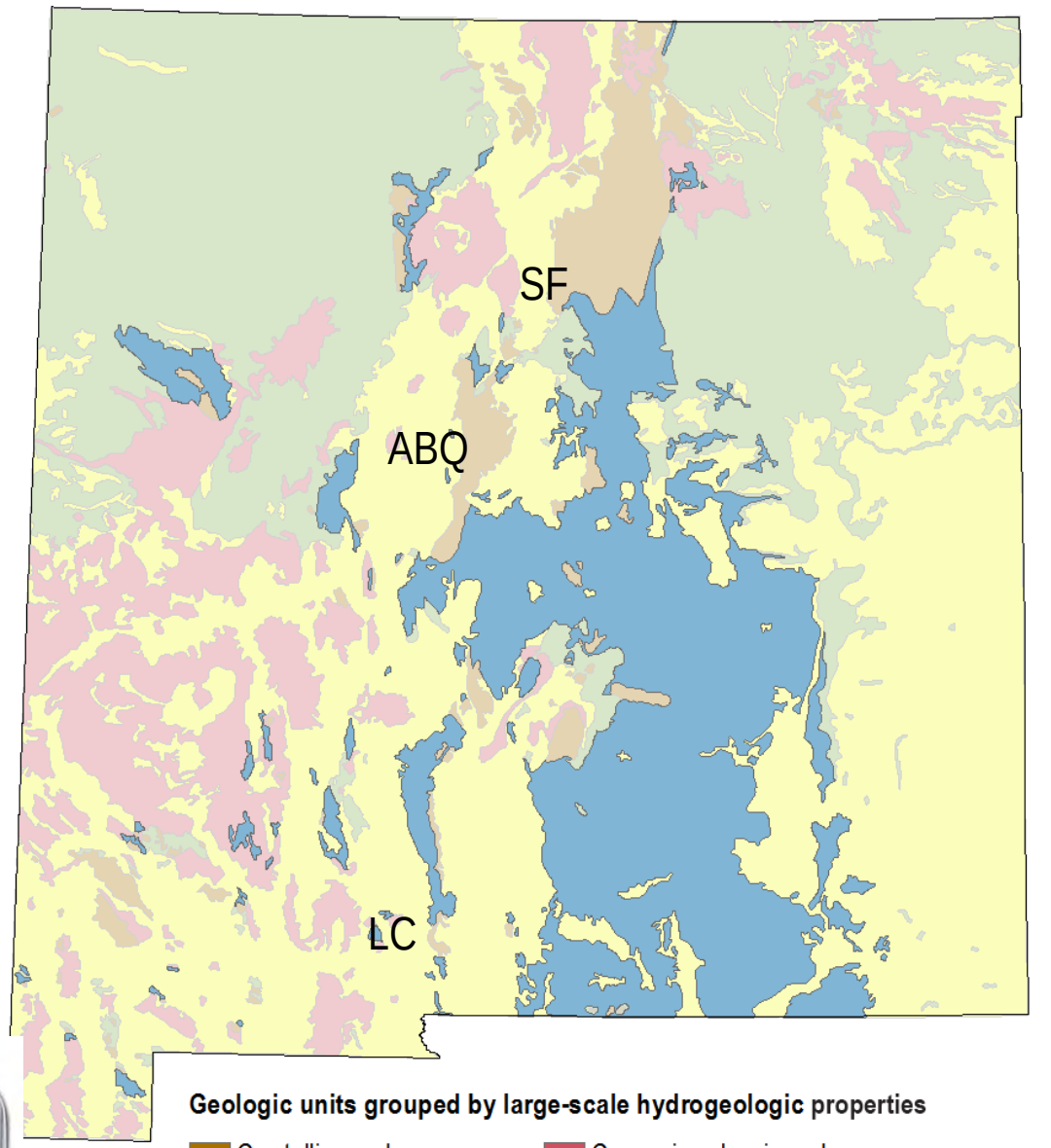
Paleozoic sedimentary rocks (540-250 million years old)

Limestone - fractured and dissolved (sometimes with caves)

Fractured sandstones; some shale, mud, silt

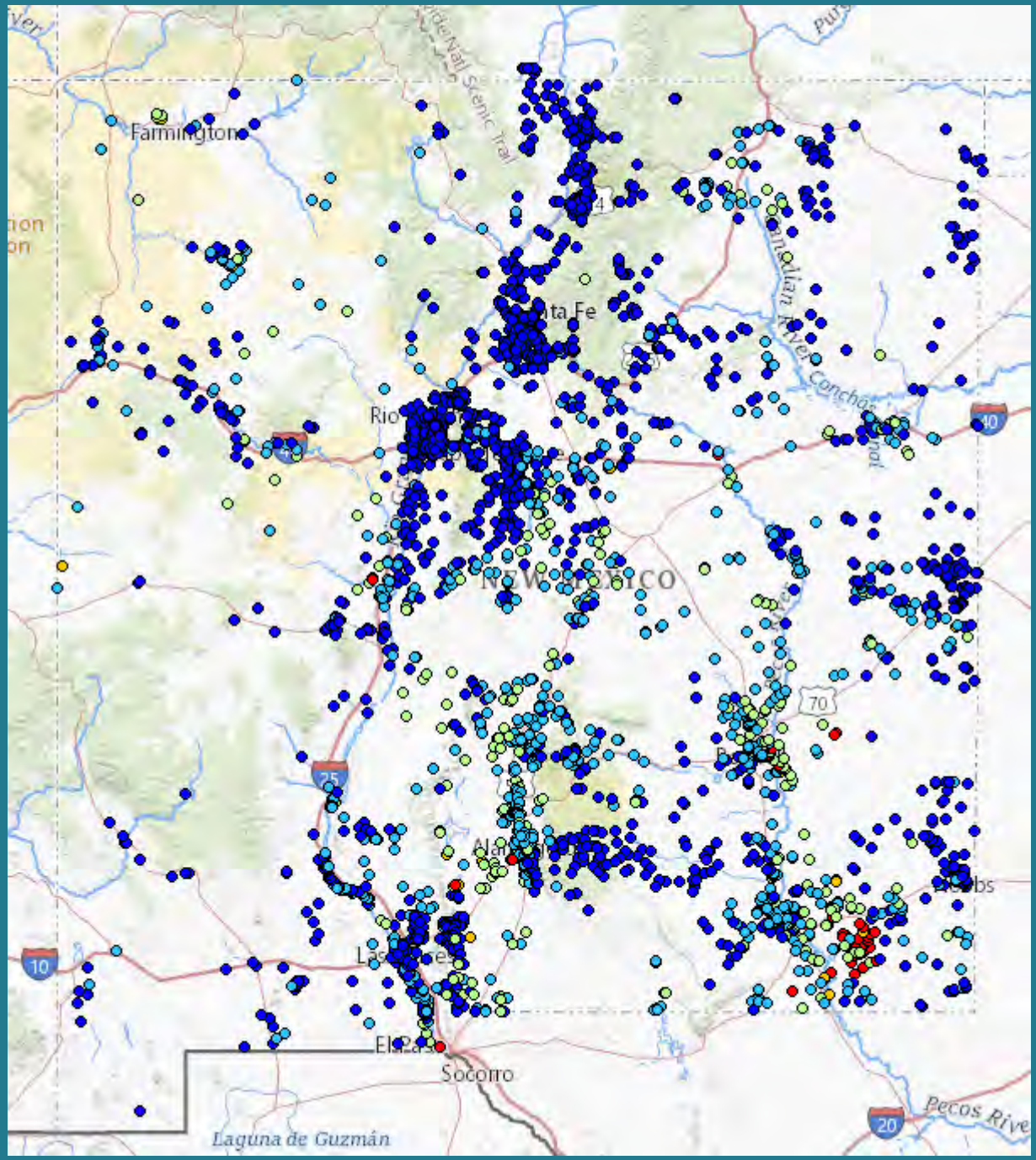
Compartmentalized aquifers





New Mexico's geology affects water quality

High TDS found in areas of limestone aquifers or high salt content rocks (gypsum or halite)

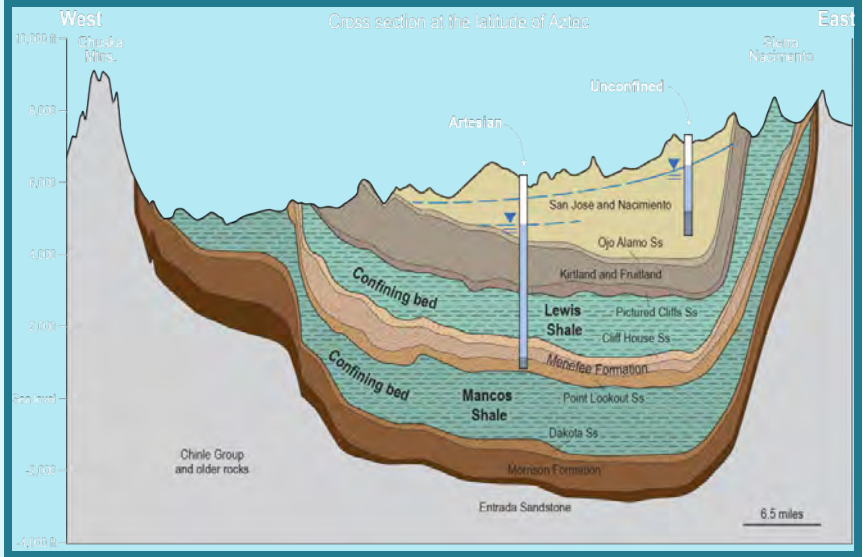


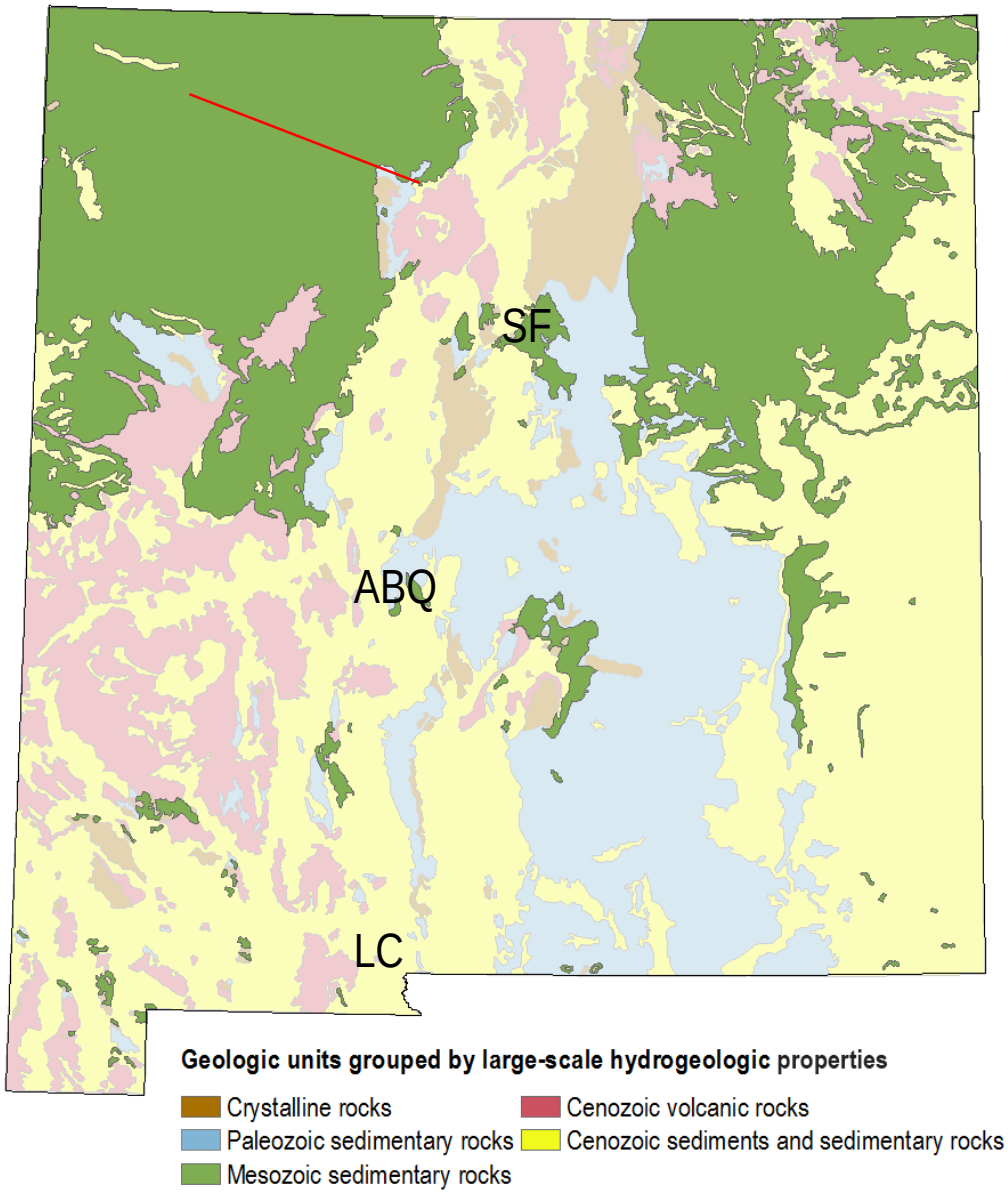
Total Dissolved Solids (mg/L)

- < 1,000
- 1,001 - 3,000
- 3,001 - 10,000
- 10,001 - 20,000
- > 20,000

Mesozoic sedimentary rocks (250-65 million years old)

Aquifers in sandstones; aquitards shale, mud, silt

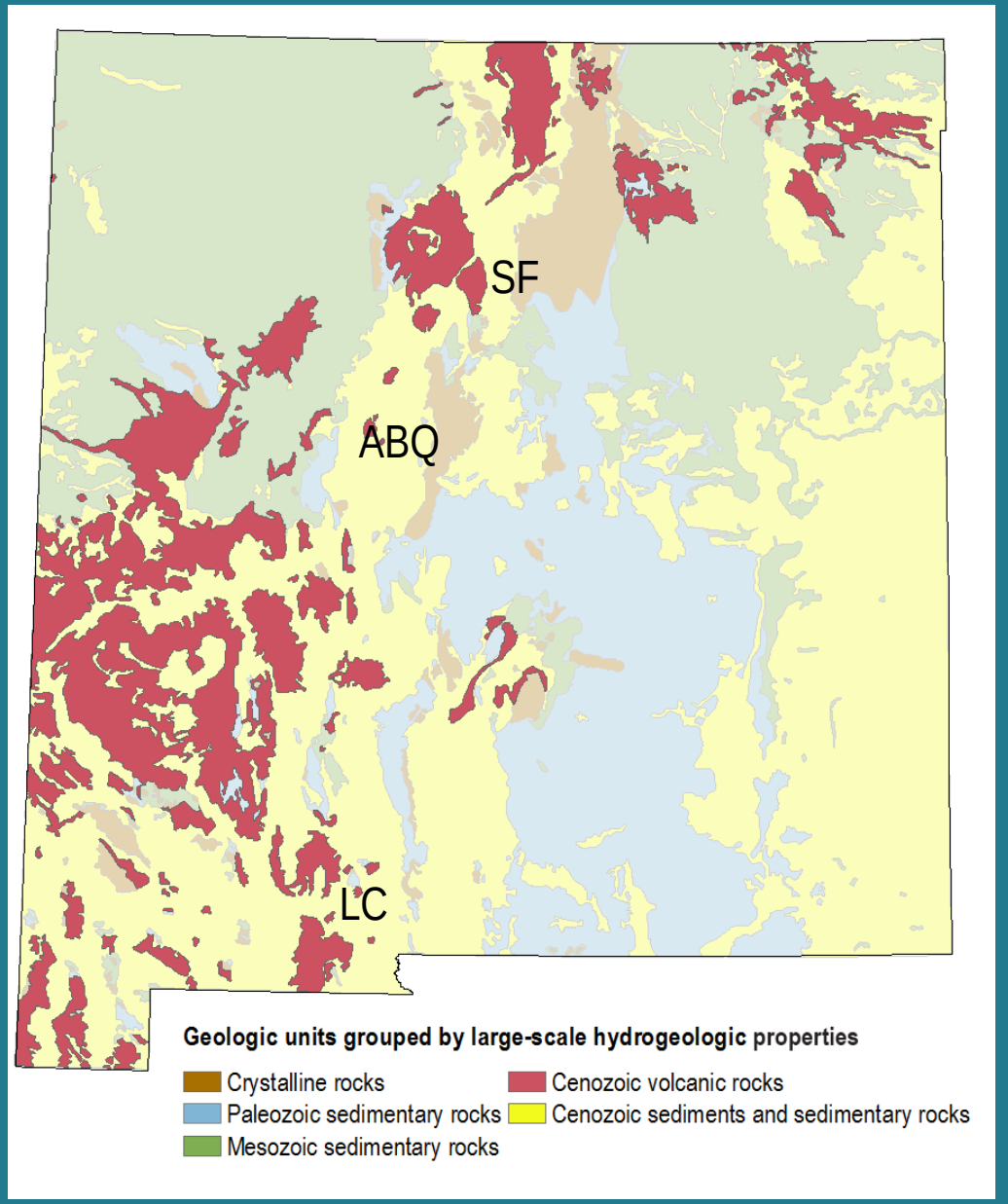




Cenozoic volcanic rocks (65 million years to present)

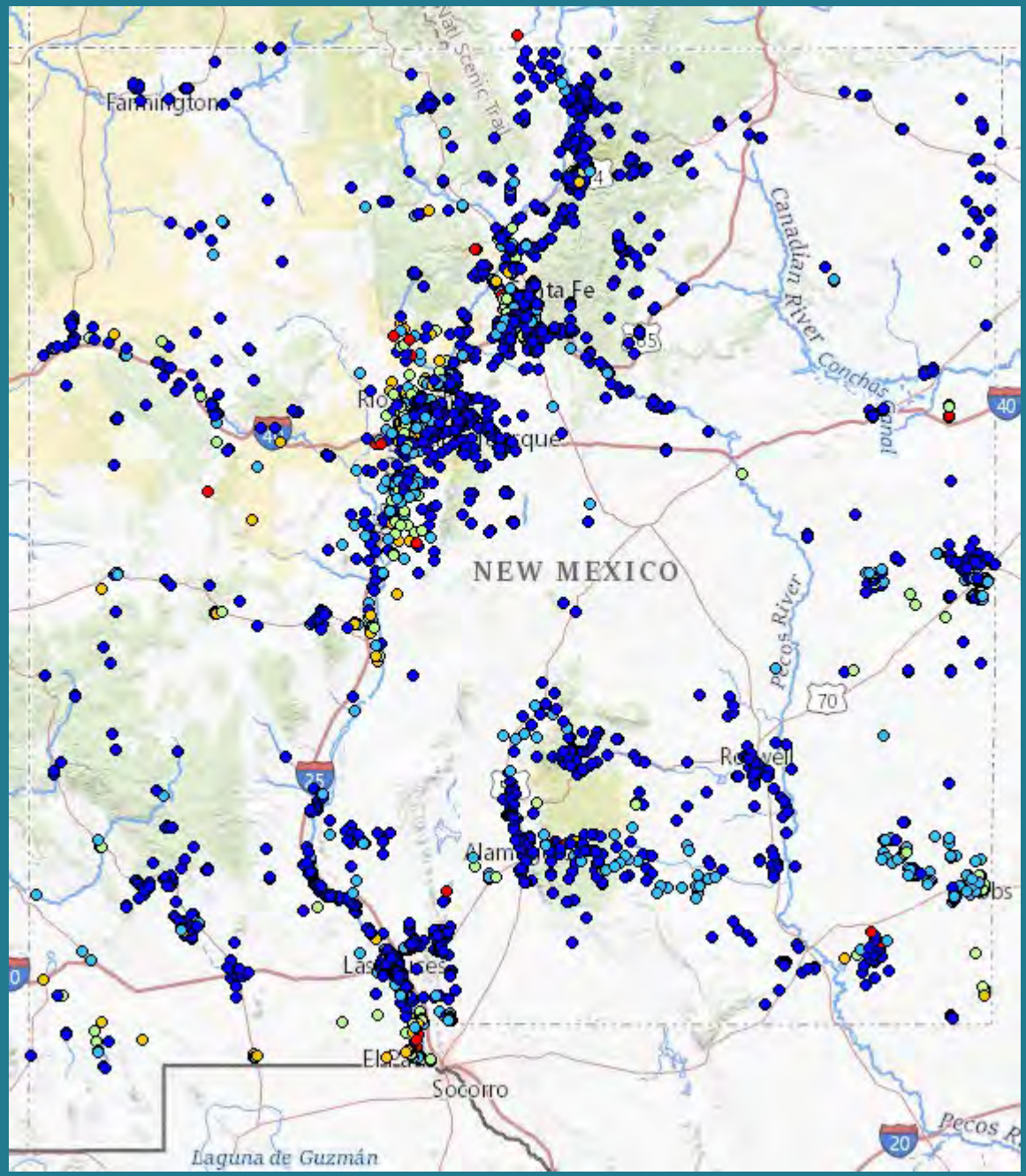
Volcanic rocks and lava flows; variable fractures

Unpredictable aquifers



New Mexico's geology affects water quality

Arsenic found in basin fill aquifers and near volcanic features



Arsenic (mg/L)

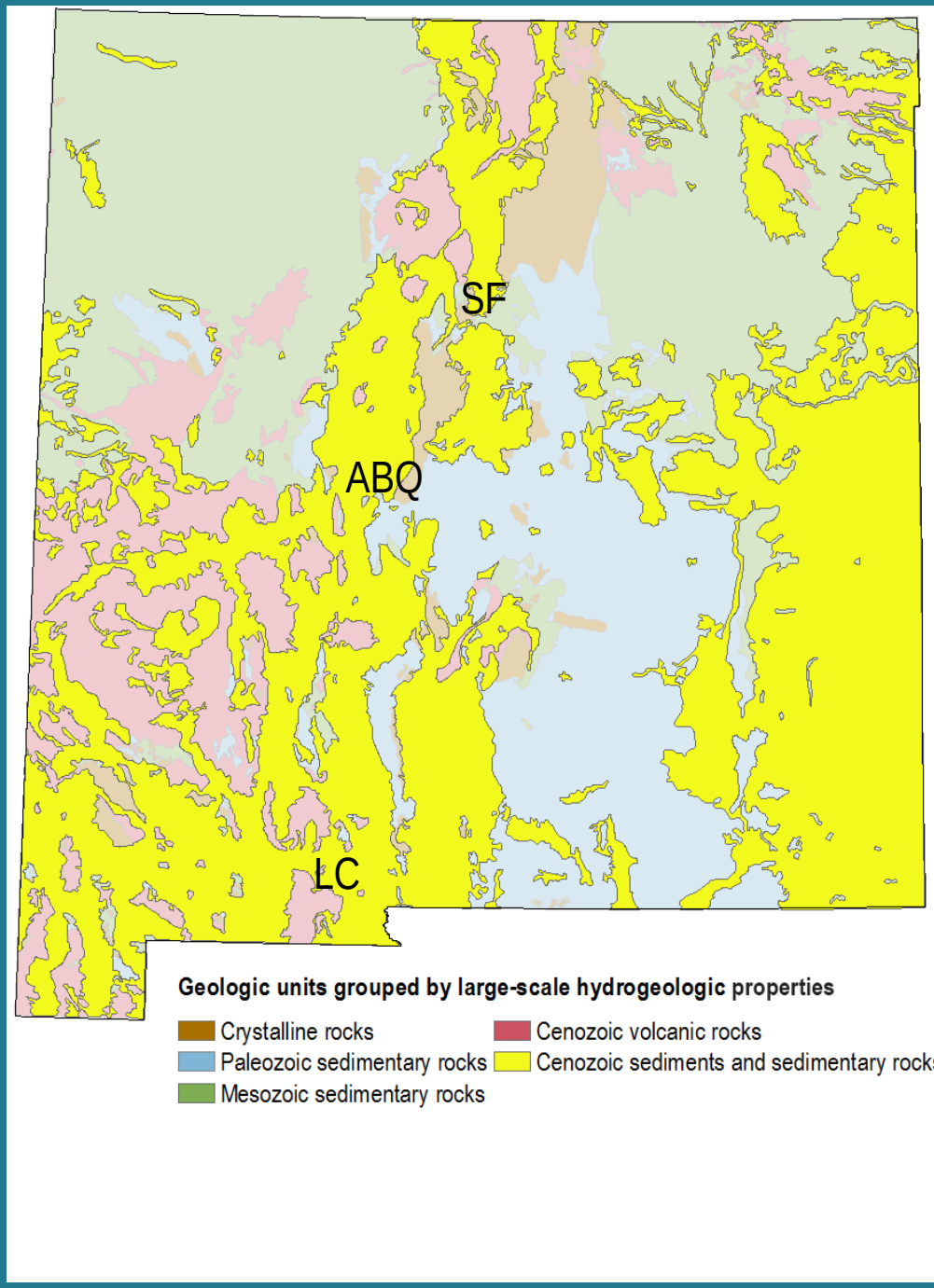
- < 0.005
- 0.0051 - 0.010
- 0.011 - 0.020
- 0.021 - 0.050
- > 0.051

https://maps.nmt.edu/

Cenozoic sediments and rocks (65 Million years to present)

Some of the **best aquifers** in the state

High porosity and permeability



Story map products available

Groundwater in New Mexico (overview):

https://goo.gl/UzidBW

Estancia groundwater basin:

https://goo.gl/ctxxN4

For More Information

geoinfo.nmt.edu

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newmexicowaterdata.org