



NM Bureau of Geology Update on NGWMMN NGWA December 2017

New Mexico Bureau of Geology and Mineral Resources

geoinfo.nmt.edu

PROJECT TEAM

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Socorro, NM

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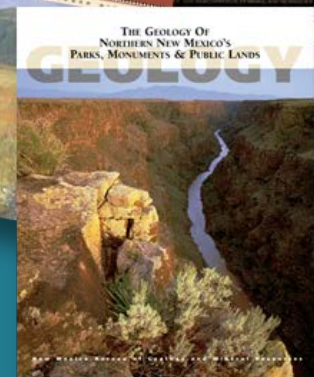
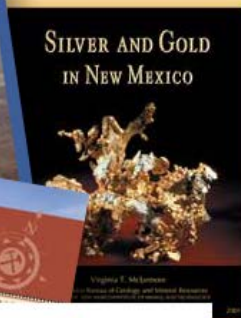
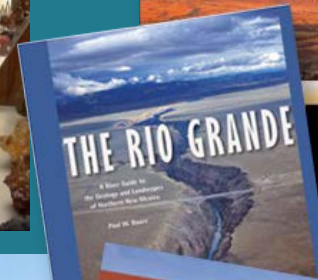
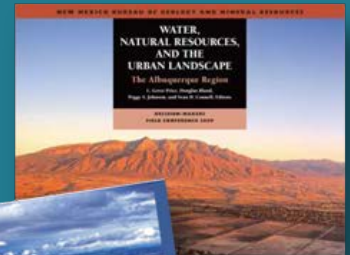


New Mexico Bureau of Geology and Mineral Resources

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

Divisions of our agency:

- Energy
 - Oil/Gas
 - Geothermal
- Mineral/Economic
- Laboratories
- Outreach and education
 - Publications
 - Archives and collections
- Geologic mapping & hazards
- Hydrogeology (Aquifer Mapping Program)



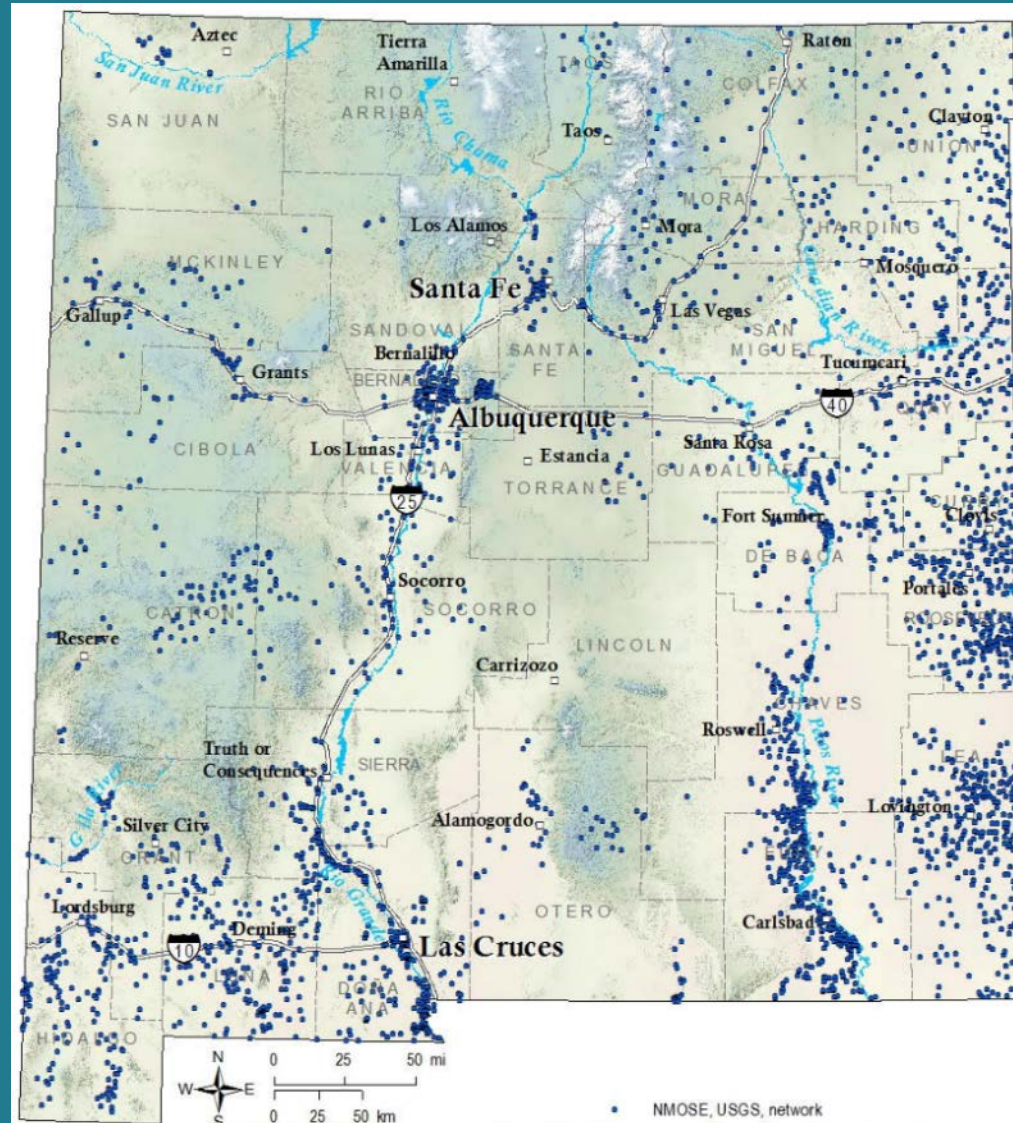
New Mexico's Groundwater Data

USGS with NM Office of State Engineer maintain the primary groundwater monitoring network

Blue points are part of the once per year or per 5 year monitoring network currently operated by OSE/USGS

ISSUES

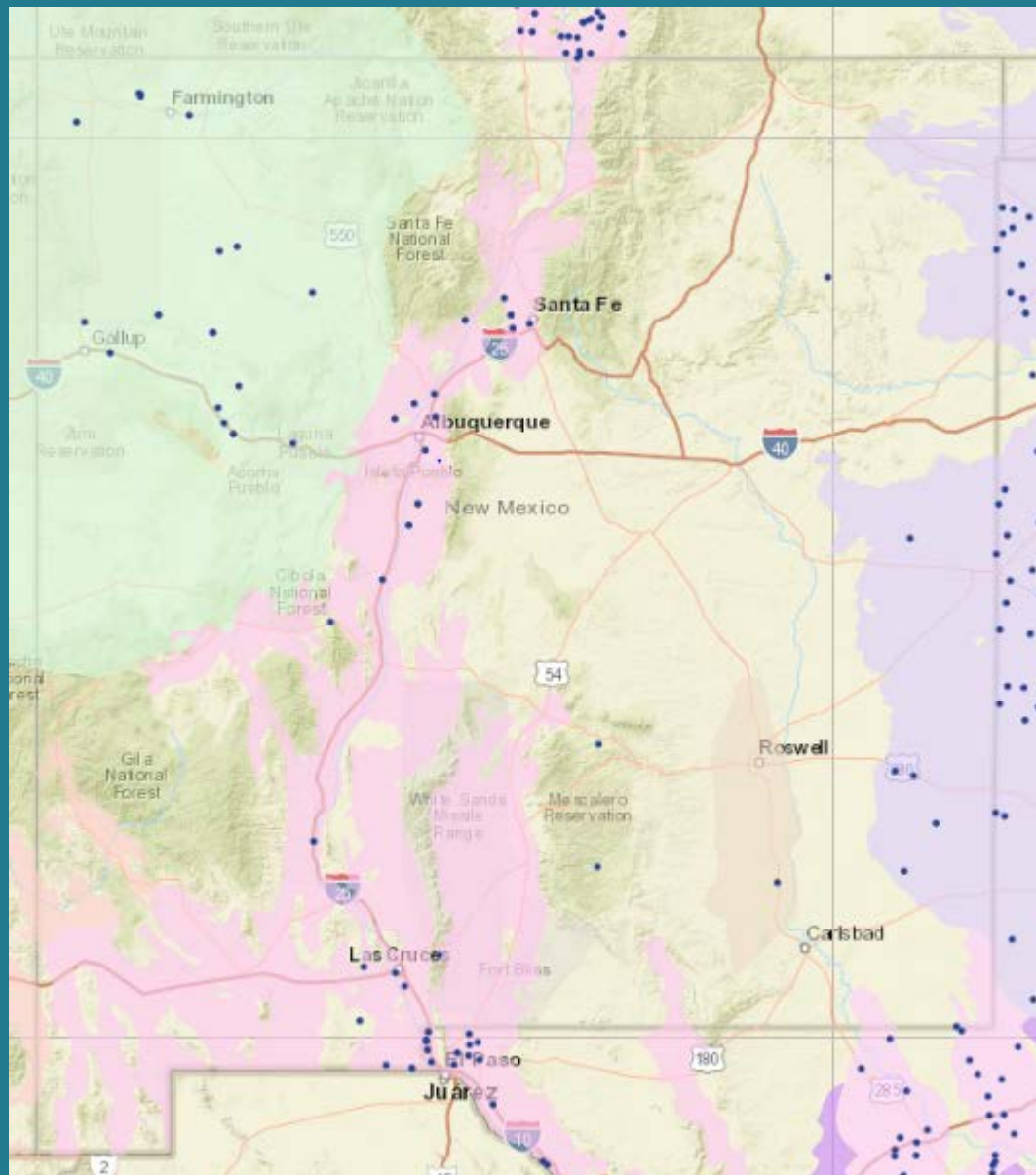
- Dense clusters in urban areas or critical management areas / administrative concern regions
- Many regions of NM not getting monitored
- Tenuous state funding
- Sites only visited once every 5 years = higher attrition rates



USGS NM Water Science Center NGWMN

USGS with NM Office of State Engineer maintain the primary groundwater monitoring network

- Working in coordination with NM USGS Water Science, they are also populating NGWMN independently
- Map points – from NGWMN online – USGS sites only
- Principal aquifers
 - Colorado Plateau
 - Rio Grande rift
 - Basin and Range rift
 - Roswell artesian basin
 - High Plains aquifer (Ogallala)



NMBGMR Groundwater Monitoring Network

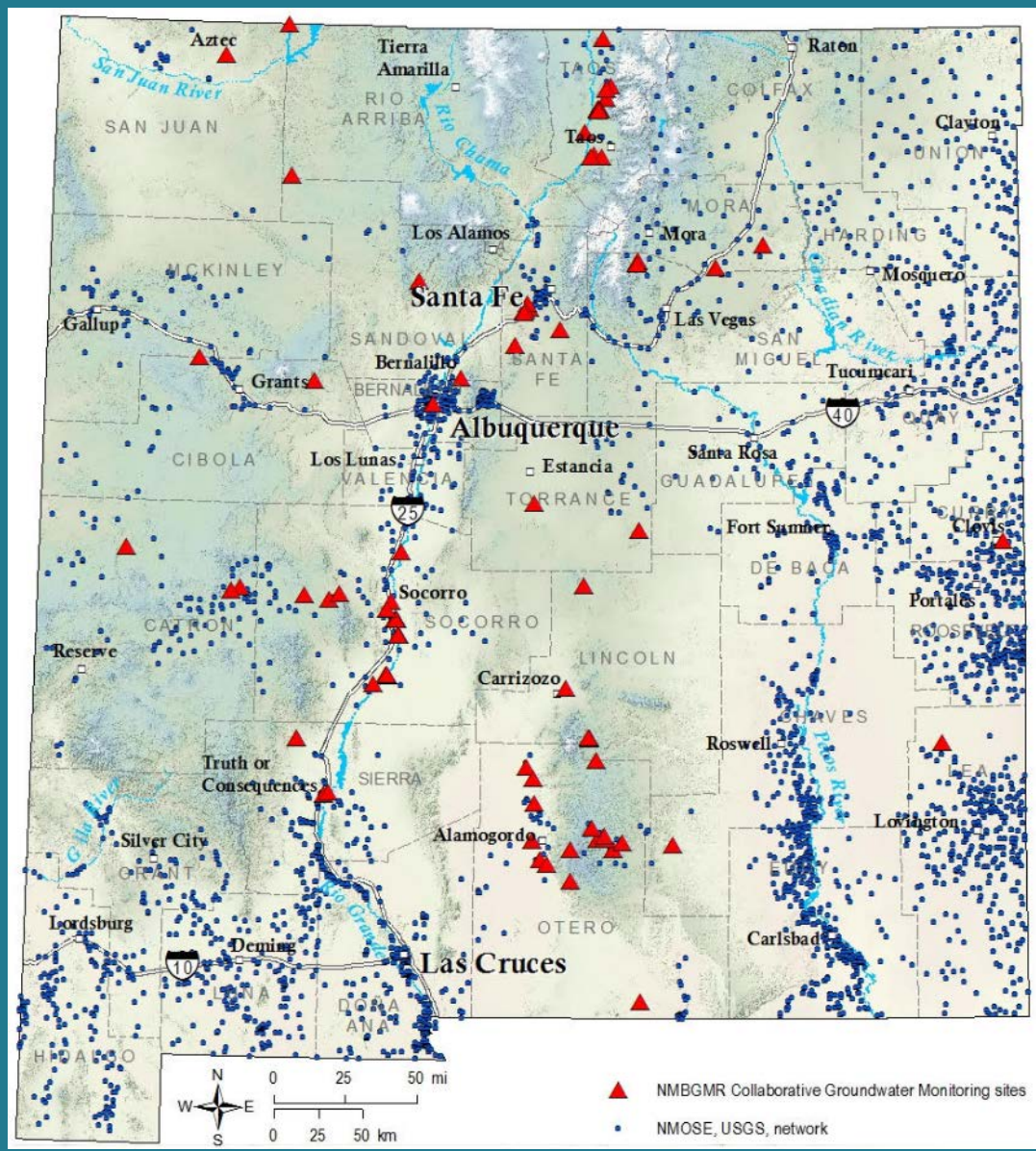
OUR GOALS

1. Fill in data gaps
 - Temporal; frequency of measurement
 - Spatial; covering more regions of New Mexico
2. Maintain/ create LONG TERM DATA - *essential* in tracking the trends in groundwater level and storage changes
 - Continue data maintenance after regional projects have ended



NMBGMR Groundwater Monitoring Network

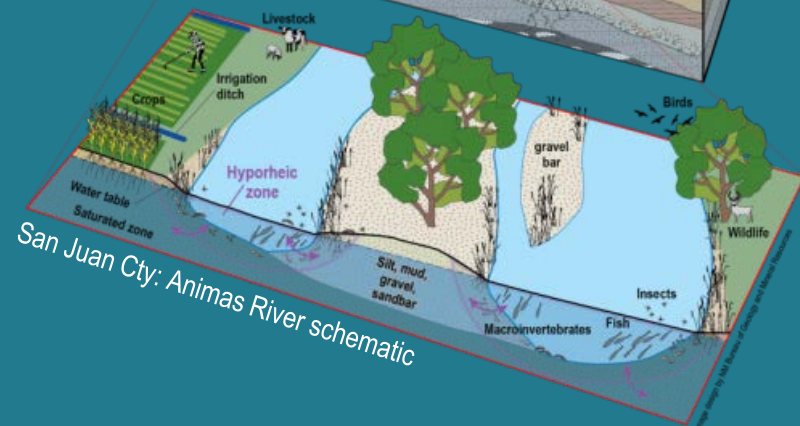
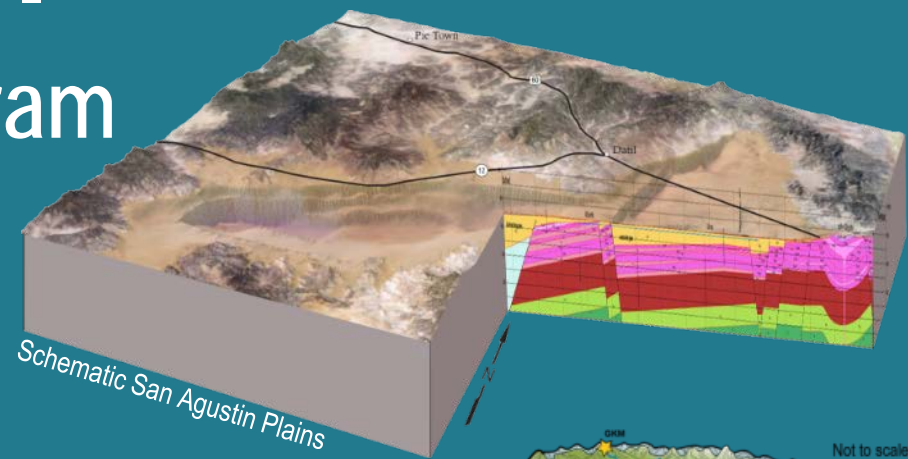
- Network maintained by NMBGMR is small, but actively growing
- Red triangles are sites in our statewide network, some with less than 5 years of data
- Blue points are USGS/OSE statewide network



How we use the data - Aquifer Mapping Program

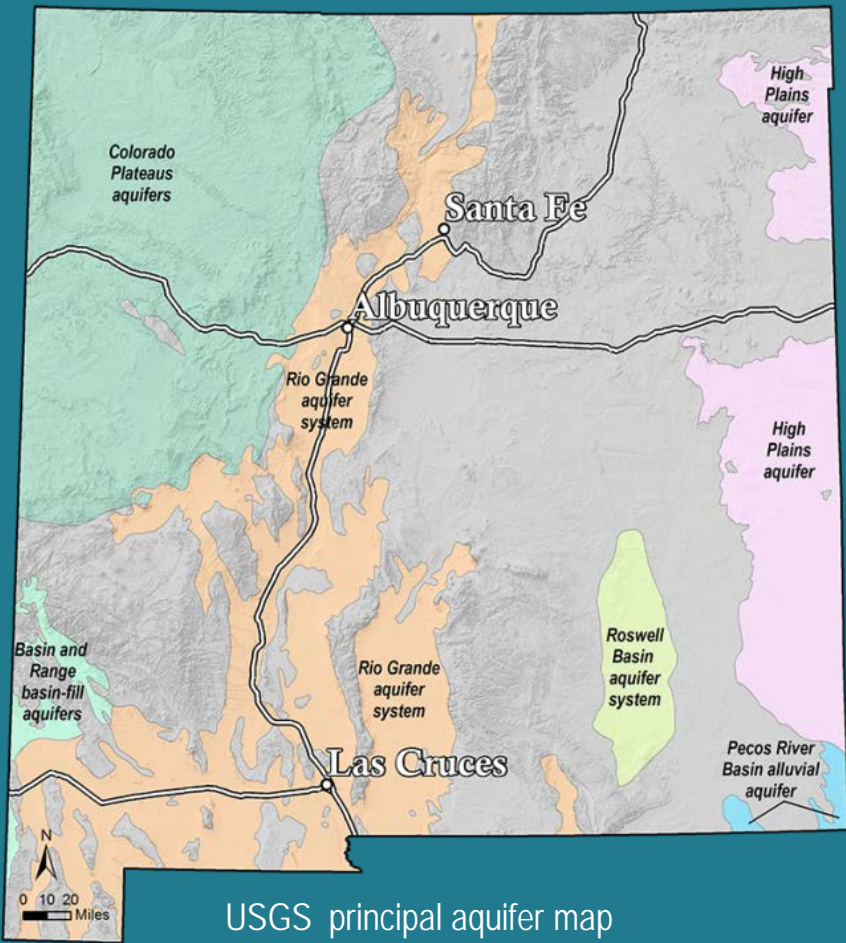
Using our geologic resources to better understand our water-limited reality

- Building better maps and information on groundwater resources, availability, and recharge - **Mapping**
- Expanding basic groundwater monitoring – keeping an eye on the groundwater “account balance” – **Data archiving**
- Improving New Mexico’s understanding of our water resources – **Education and outreach**



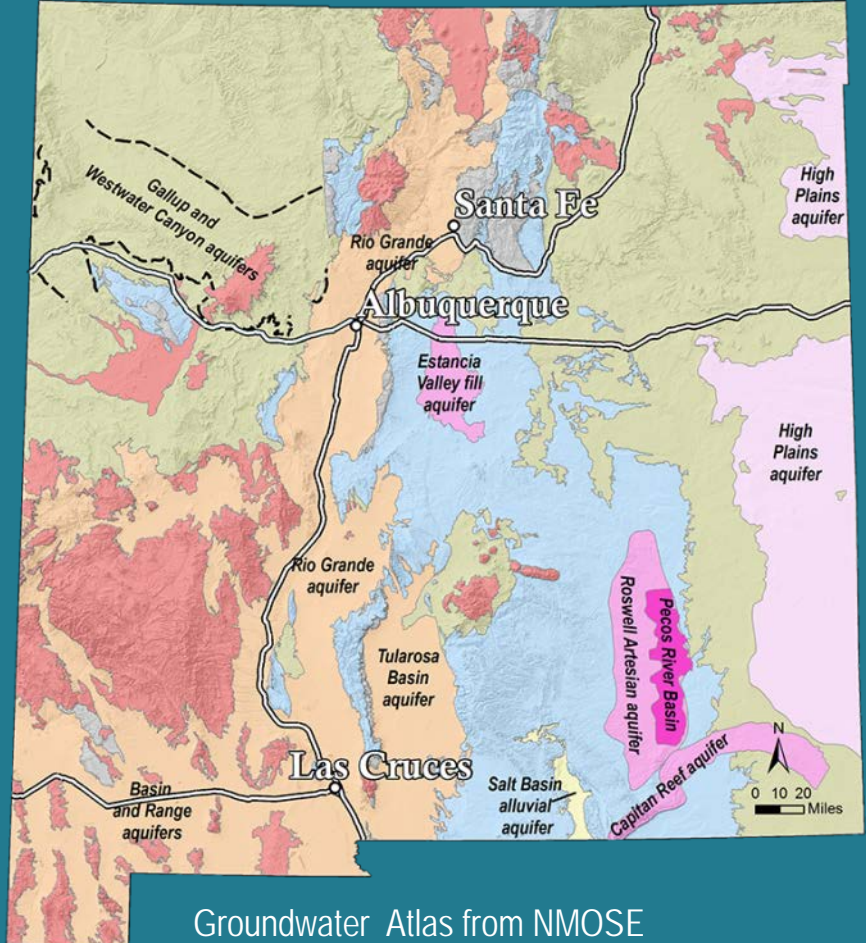
How we use data – Improve our aquifer maps of New Mexico

Maps for many of our aquifers lack certain necessary details
(i.e. depth, boundaries, sub-basin connections)



USGS principal aquifer map

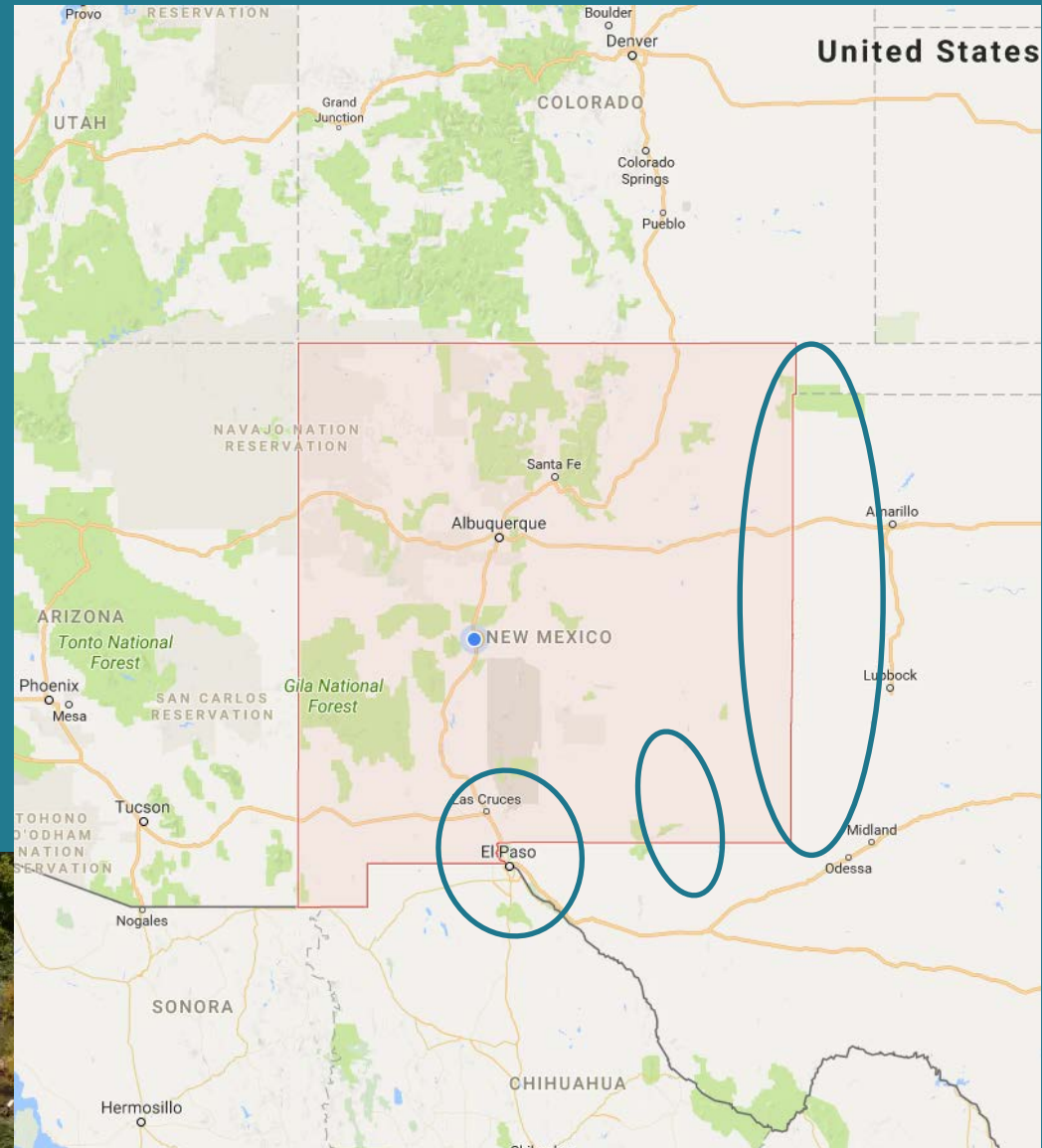
Grey regions = no major aquifers or it's unknown



Groundwater Atlas from NMOSE

Transboundary issues

- Biggest issues on eastern and southern margins
- TX vs. NM – multi year legal battle
 - Groundwater – surface water connection along Rio Grande
 - Pecos River
- Groundwater pumping along TX- NM - Mexico borders

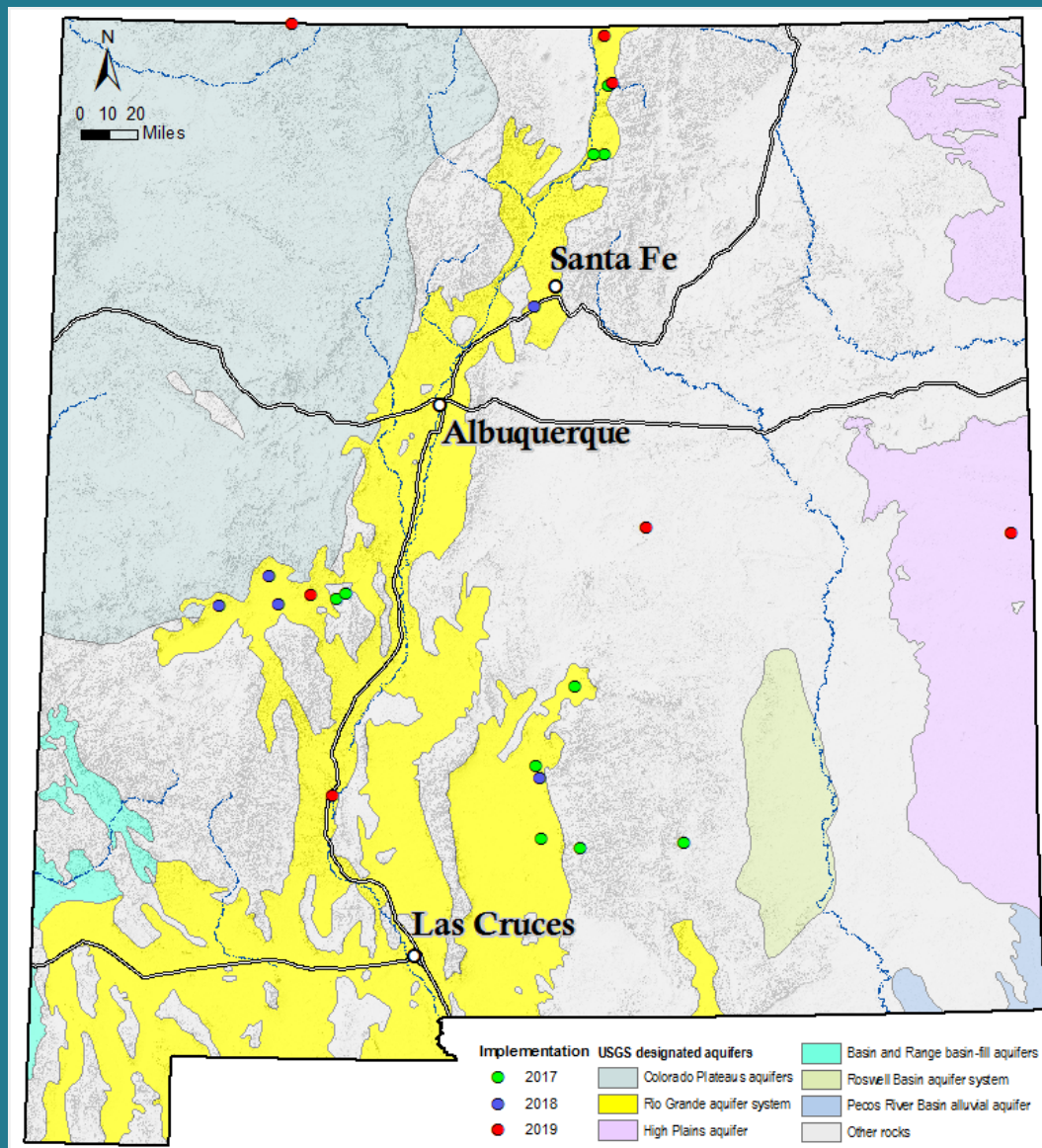
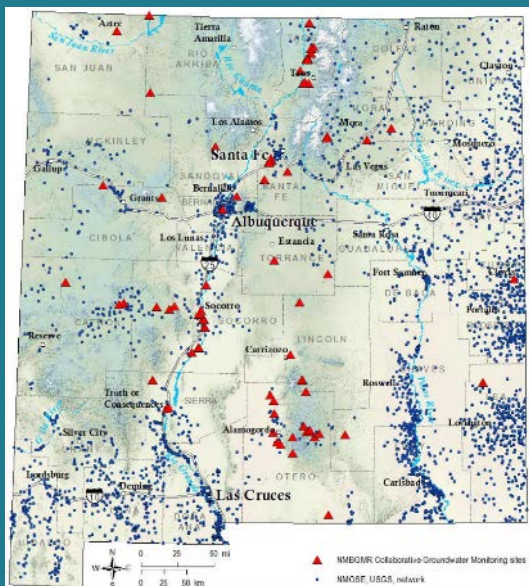


Current project status

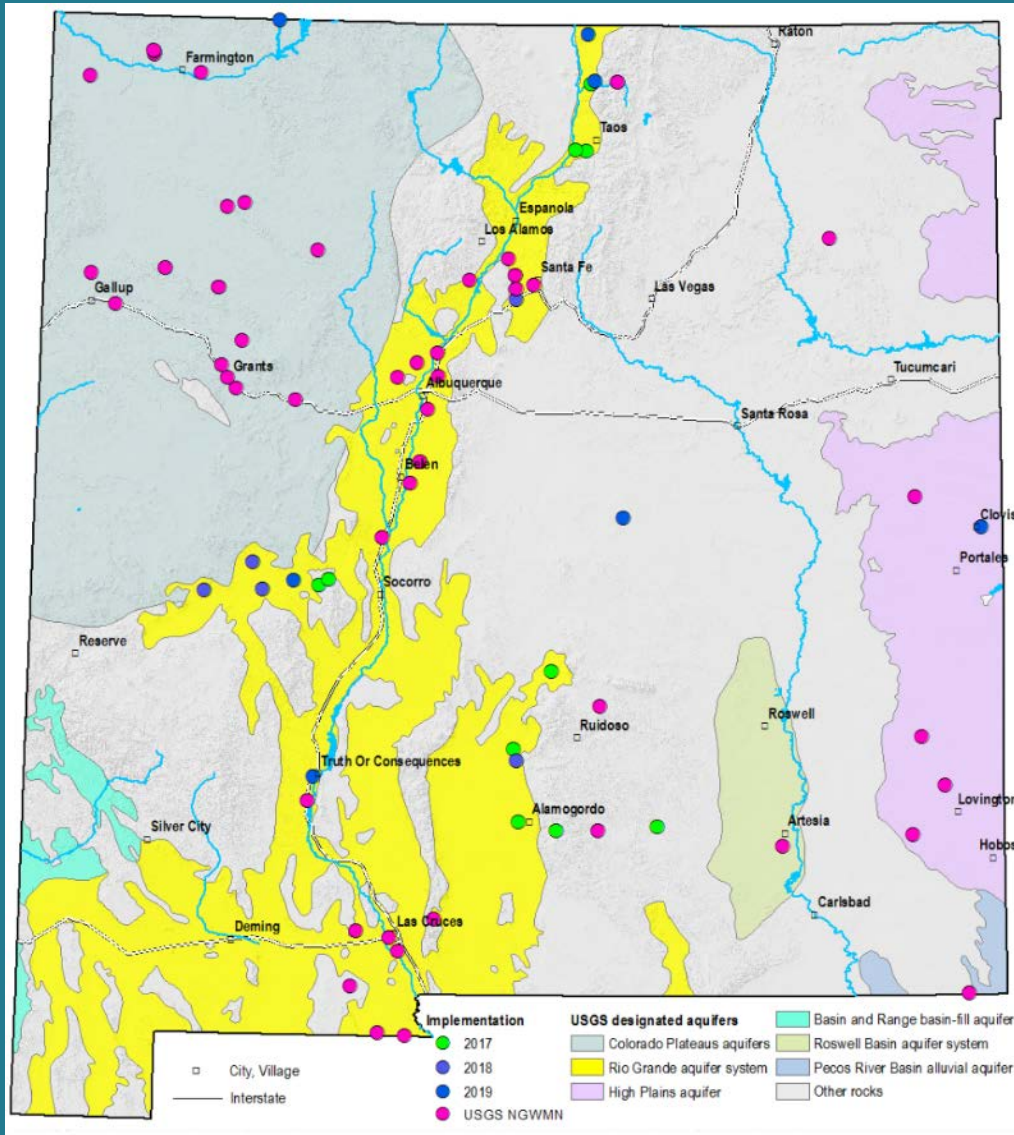
- Well selection criteria
 - Selected based on location within or near Principal Aquifers
 - Multiple years of data (>5 yrs)
 - Most have continuous data recorders – our motivation to continue monitoring (sometimes without funding)
 - Collaborating with USGS to provide good coverage
- Nov. 2017- Feb. 2018: Working on web services connections
 - DATA AVAILABLE by May 2018
 - Report due June 2018

Current project status

- 11 sites selected, so far
- Green points on map
- Future sites – blue and red points on map
- Growing network!



New Mexico's *near future* NGWWMN



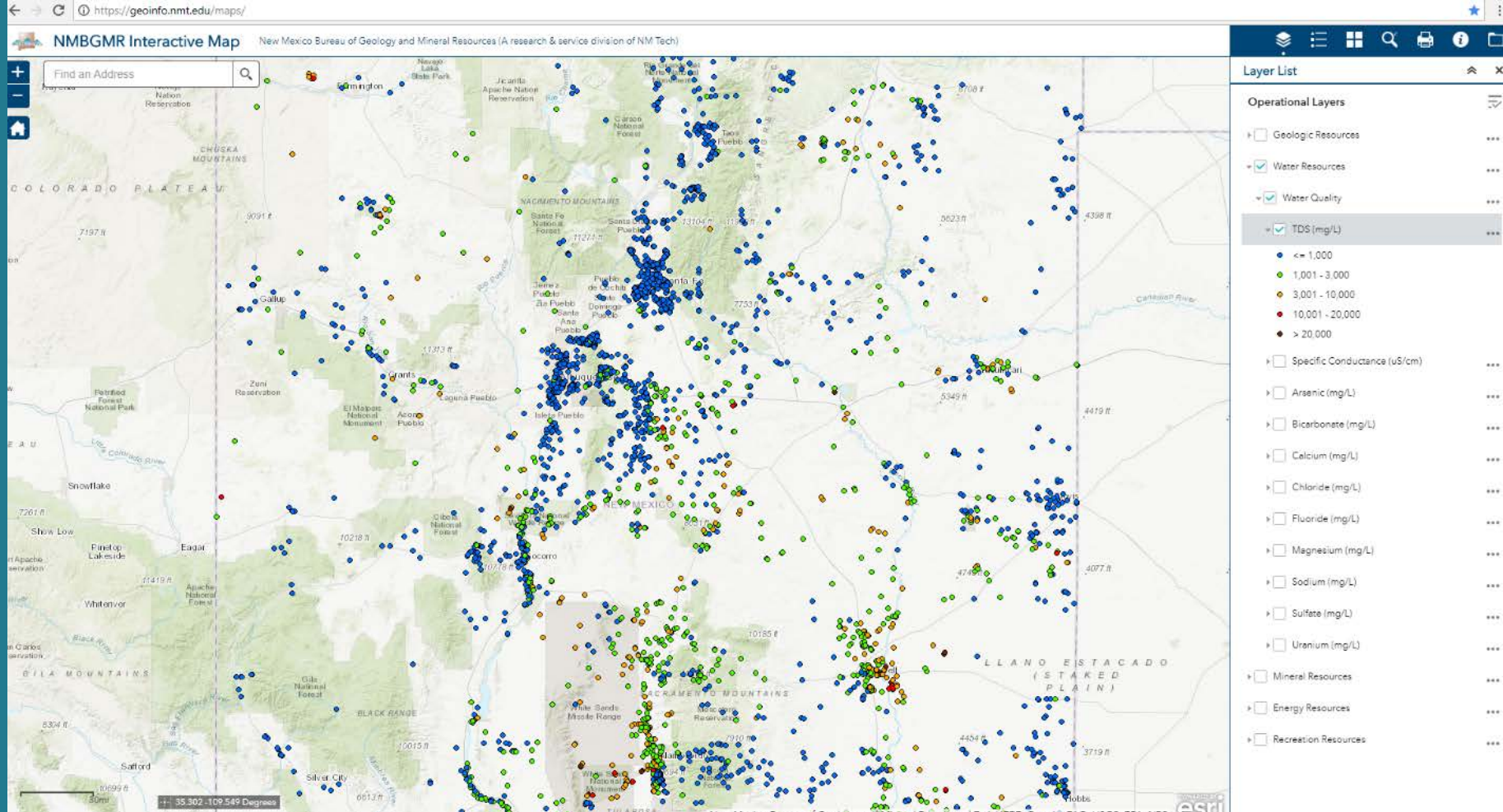
- Pink = USGS submitted sites (or will be soon)
- Green = selected sites for this year NMBG
- Blue = Future sites from NMBG

Data collection methods

- Manual measurements aligned with NGWMN protocols
 - Steel tape, multiple until repeated to within 0.02 ft
 - Electronic probe, repeatable
- Unsure how or IF we'll share continuous data
 - Larger data batches
 - QA/QC protocol for data corrections?
 - i.e. method for correcting between manual measurement



Experience with web application



Interactive Water Quality Map

Serves static data currently

geoinfo.nmt.edu/maps

Planned approach web services

- Proof of concept, work with USGS and finalize by spring 2018
- Network, hardware and database infrastructure is very stable
 - Initially use the current infrastructure
 - Iteratively monitor all components and upscale as needed
 - Have virtual servers, storage arrays and SQL Server
- Staff well experienced GIS, Web Service and Database Development
 - Data Warehouse versus High Transaction Database
 - Currently looking at using stored procedures for beta
 - Test out to see if beta best

Future work

- Year 1 – current – plan to establish database connections and web services
- Future years – as our network grows into new locations and fills gaps, we will have many more sites to add
- Careful coordination with USGS NM WSC
- Possibly incorporating other monitoring network data (i.e. PVACD or City of Santa Fe)