BUREAU OF GEOLOGY AND MINERAL RESOURCES

New Mexico Tech

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

Protecting New Mexico's Groundwater….With Data!

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Aquifer Mapping Program Manager

New Mexico Bureau of Geology and Mineral Resources
geoinfo.nmt.edu

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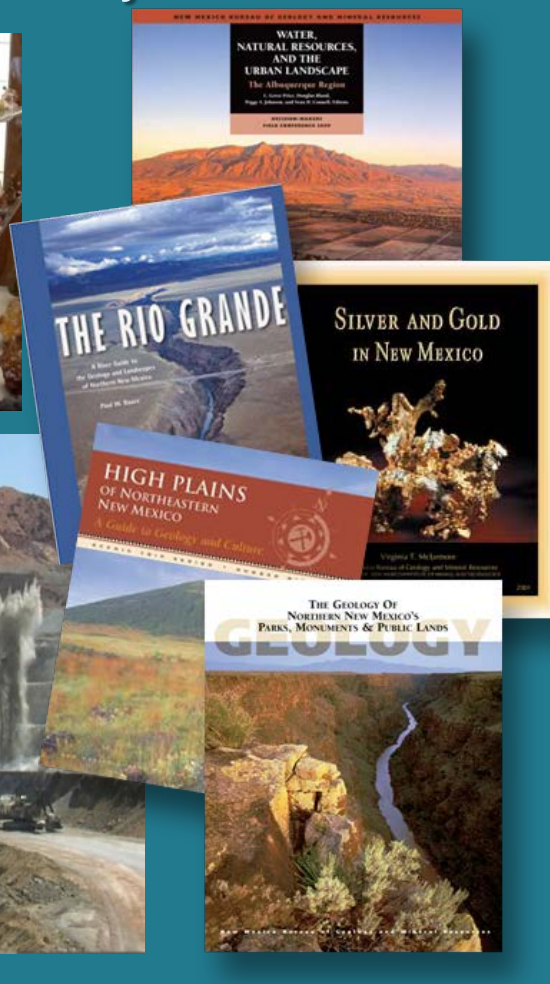
New Mexico Bureau of Geology and Mineral Resources

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

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)



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Aquifer Mapping Program

Frequently asked questions in New Mexico (besides “red or green?”)

- 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 2018

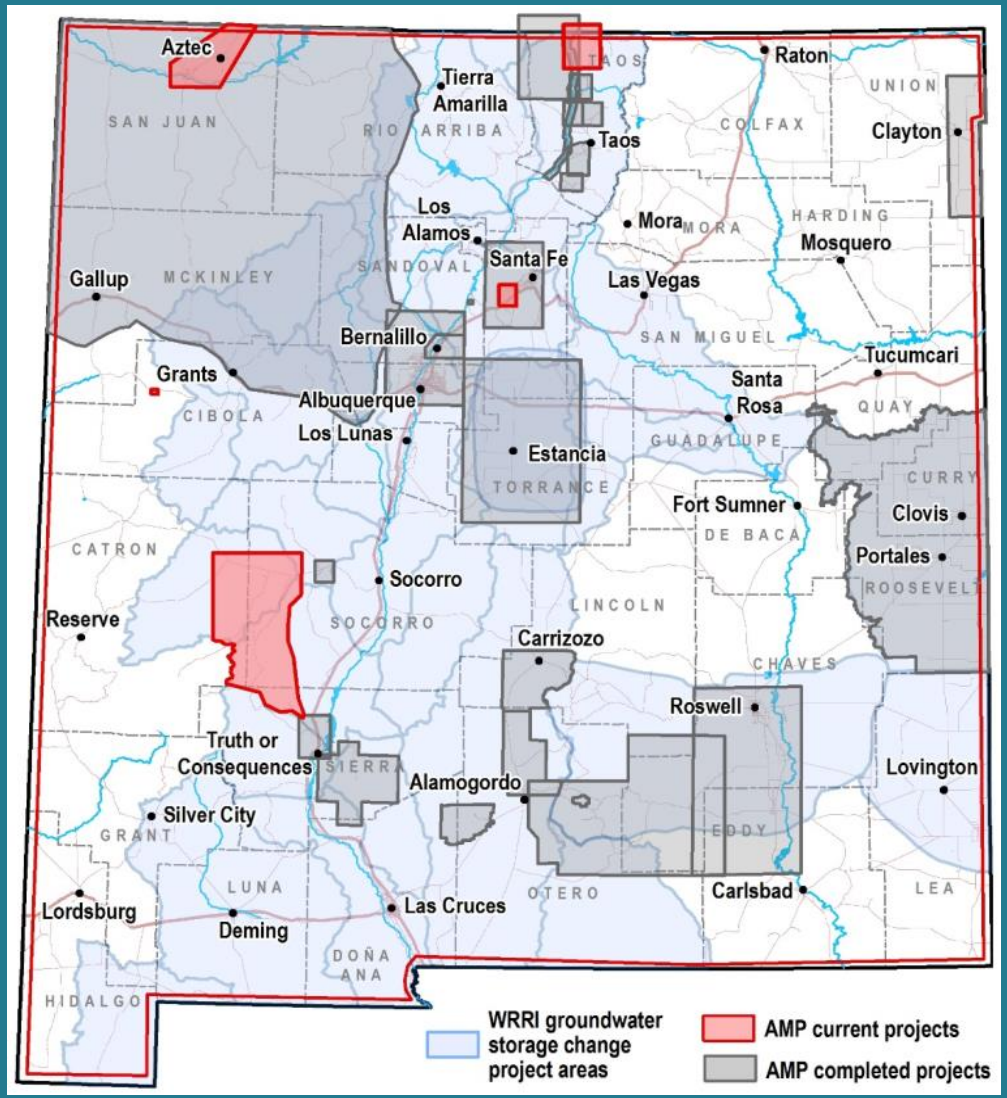
Current projects

- Animas River aquifer long term monitoring (NMED-EPA funding)
- San Agustin Plains (NMBG)
- Groundwater level monitoring in La Cienega (Las Golondrinas – community)
- Aquifer map 3D visualizations (Healy Foundation)
- Collaborative groundwater level monitoring (Healy Foundation)

Recent projects

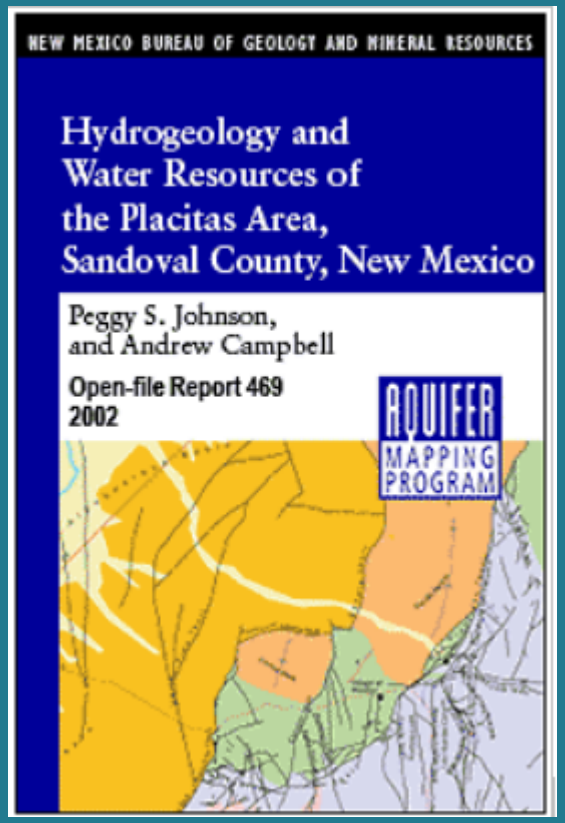
- Groundwater level and storage changes (WRRI)
- Statewide groundwater recharge model (WRRI)
- Clovis Region Aquifer Lifetime Mapping (Clovis, Curry Cty, ENMWUA)

(Primary funding sources in parentheses)



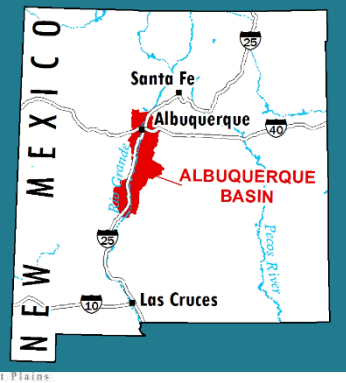
Previous work in Placitas – NMBGMR Open File Report 469 (2002) Peggy Johnson and Andrew Campbell

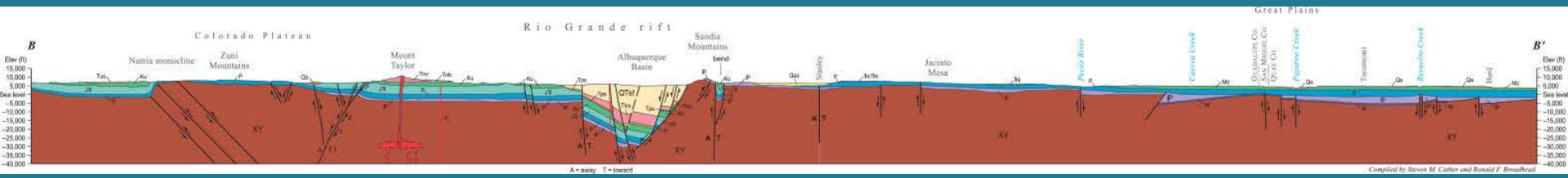
- Detailed description of availability and quality of groundwater and surface water in Placitas area
- Detailed review of complex geology and relationship to water
- Repeated water level measurements in 24 wells
- Water quality sampling in ~60 wells or springs
- Compilation of other existing data

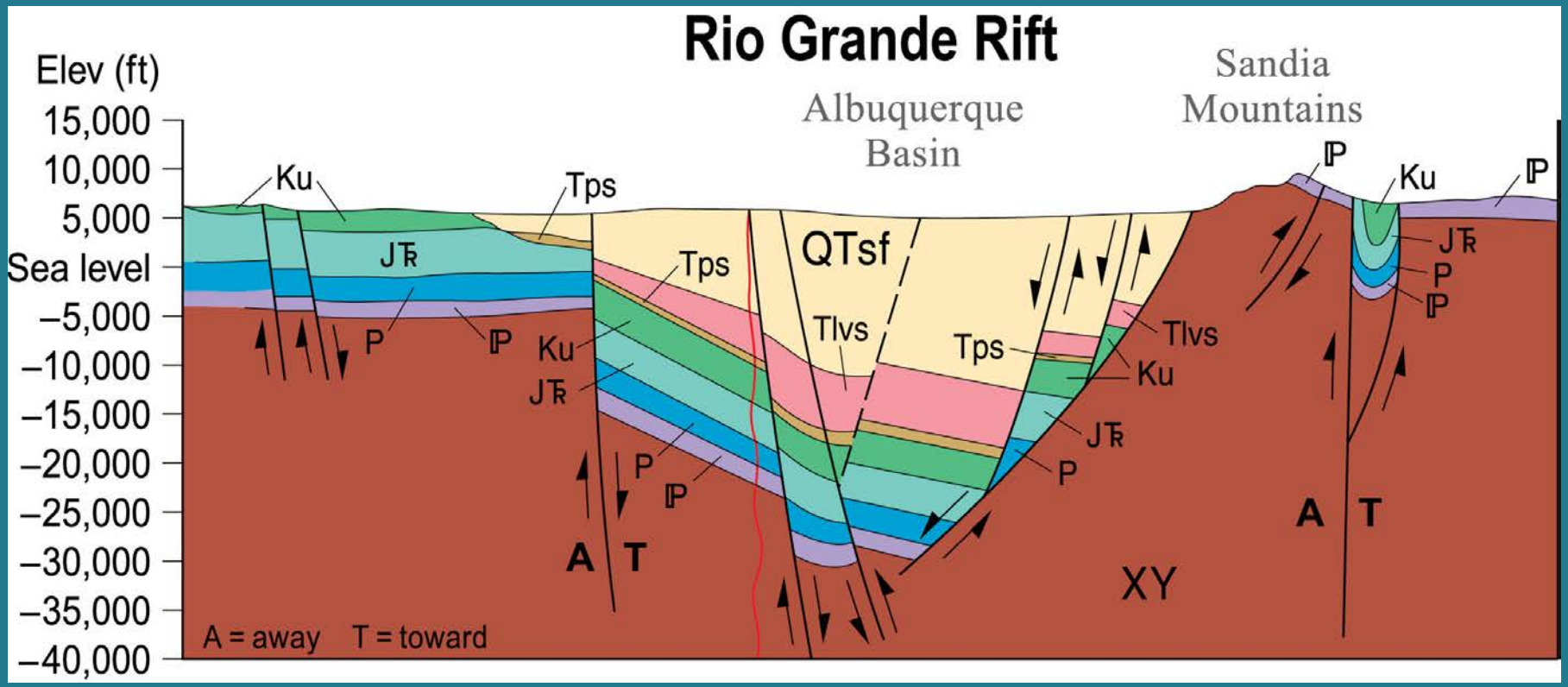


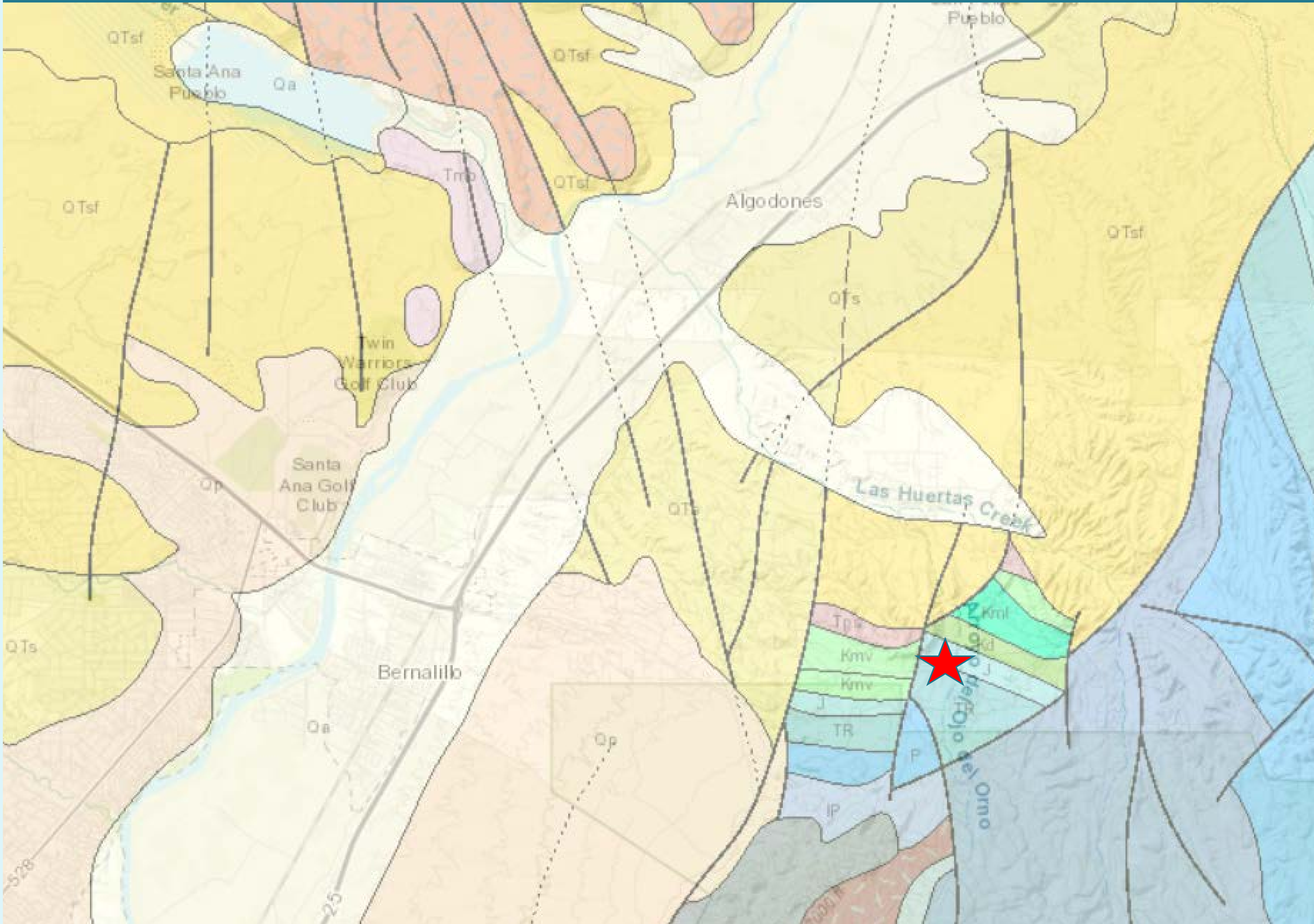

Santa Fe
Albuquerque
Las Cruces
N
0 10 20
Miles

Albuquerque Basin








QTsf
Santa Ana
Pueblo
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Algodones
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QTs
Twin
Warriors
Golf Club
Santa
Ana Golf
Club
Qp
QTs
Las Huertas Creek
Tp
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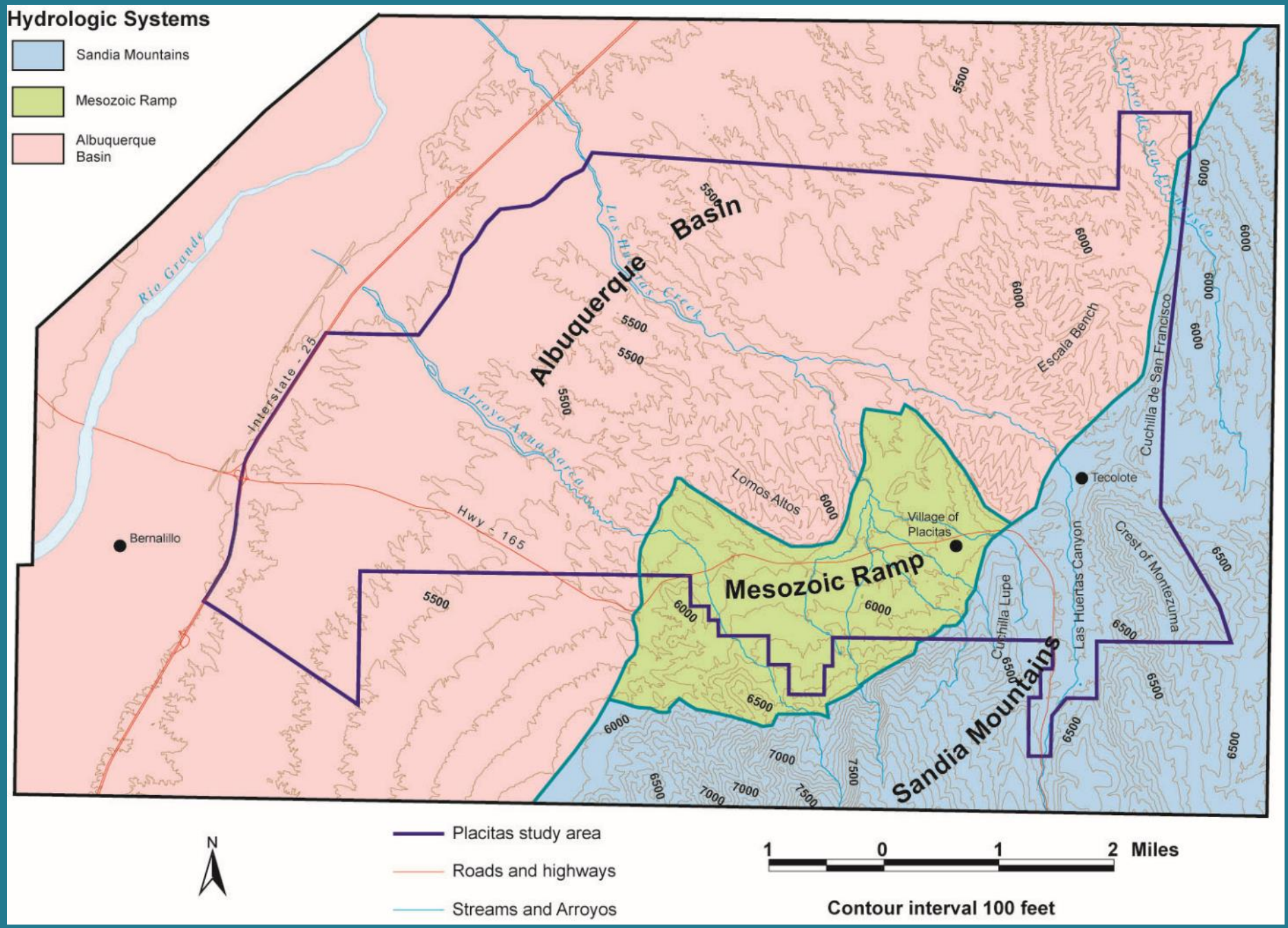
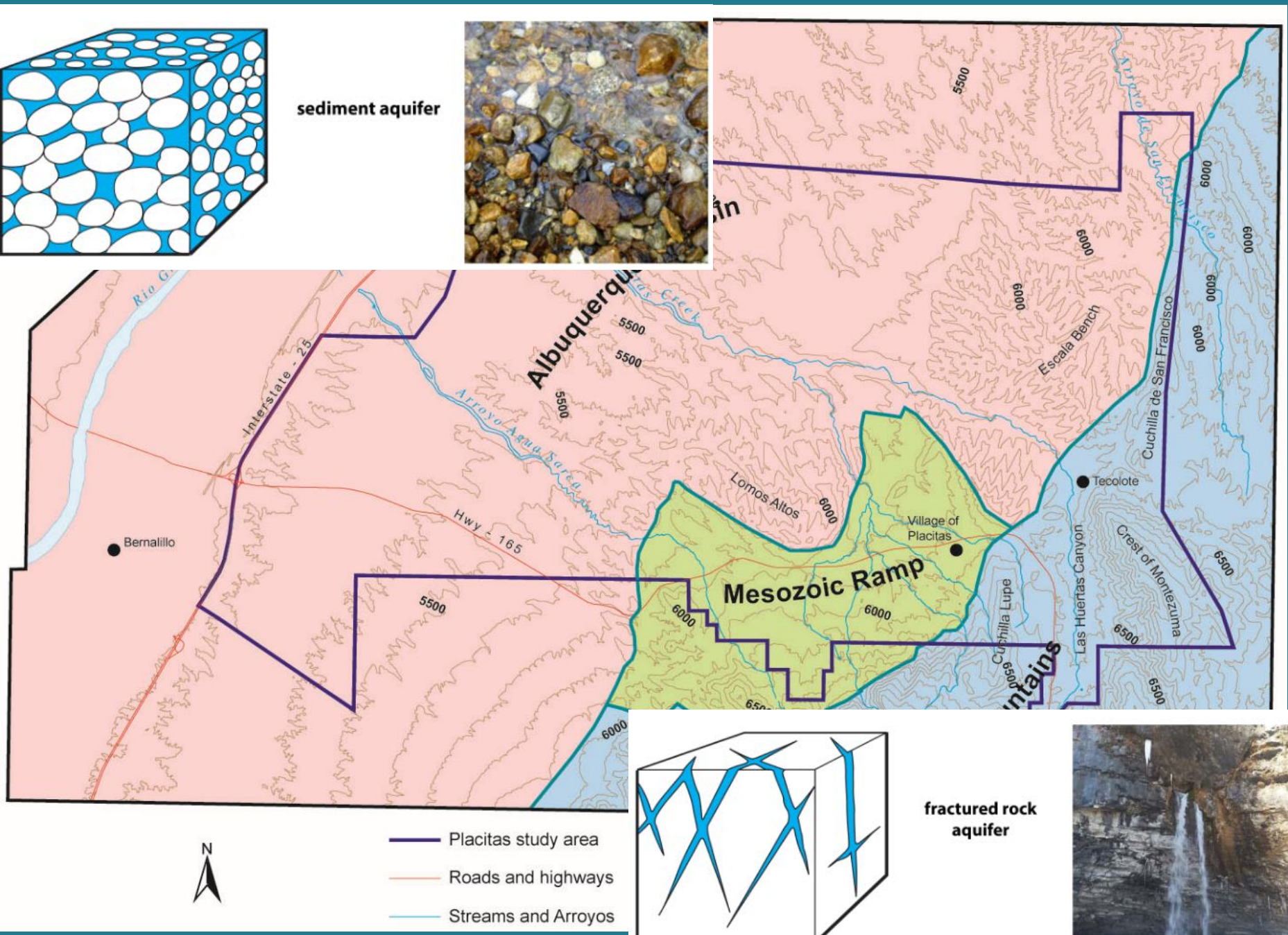
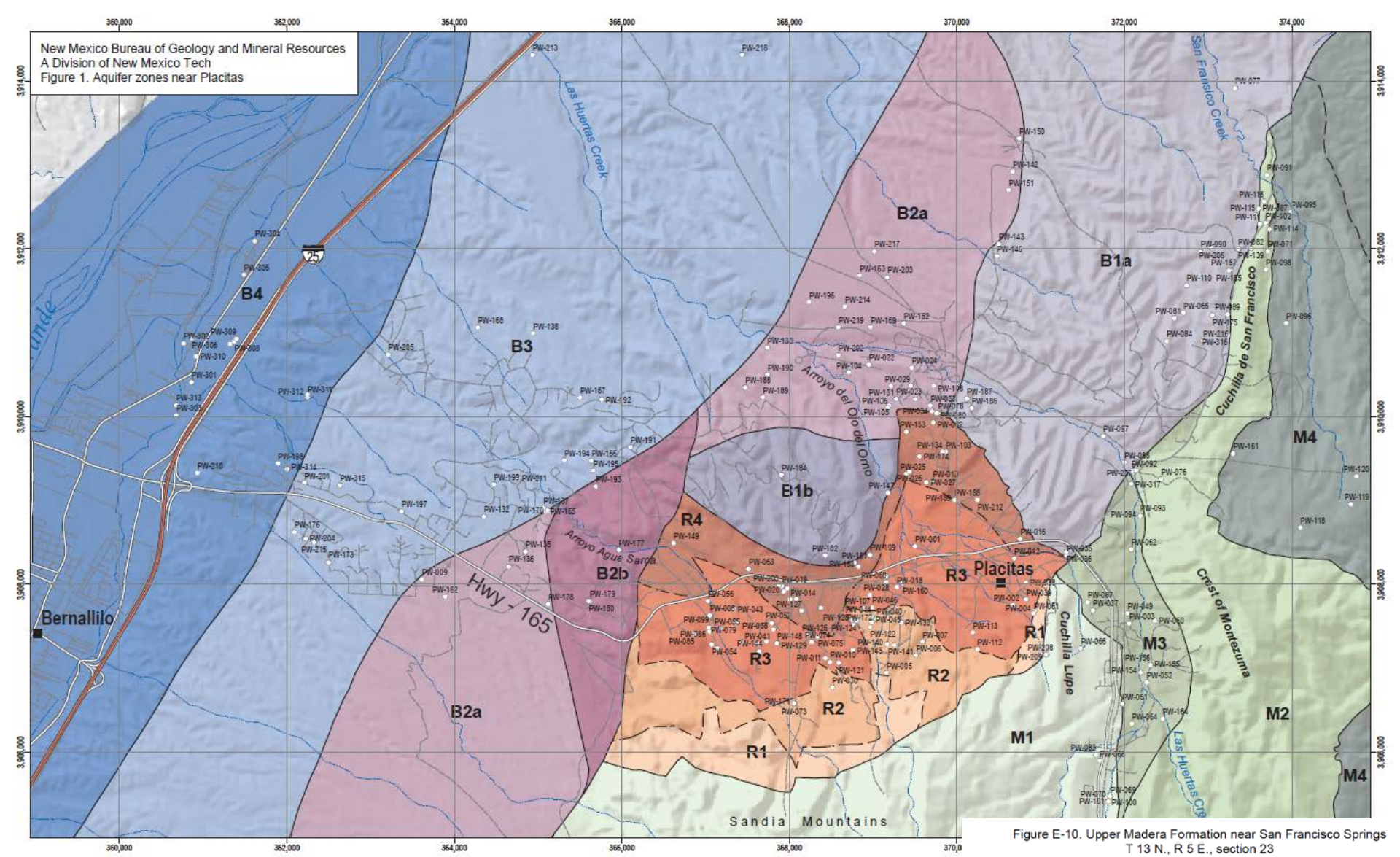
QTs
Bernalillo
Qa
Qp
528
25
Ojo del Orno


Hydrologic Systems
Sandia Mountains
Mesozoic Ramp
Albuquerque Basin
Albuquerque Basin
Mesozoic Ramp
Sandia Mountains
Rio Grande
Las Huertas Creek
Arroyo Agua Fria
Arroyo de San Francisco
Interstate - 25
Hwy - 165
Escala Bench
Cuchilla de San Francisco
Lomos Altos
Cuchilla Lupe
Las Huertas Canyon
Crest of Montezuma
Bernalillo
Village of Placitas
Tecolote
5500
6000
6500
7000
7500
N
Placitas study area
Roads and highways
Streams and Arroyos
1 0 1 2 Miles
Contour interval 100 feet

sediment aquifer



fractured rock aquifer

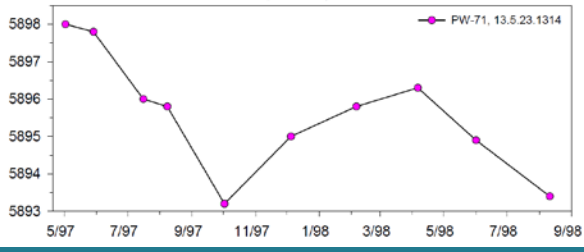


Mountain (M) and Ramp (R) regions moderate to poor aquifer potential

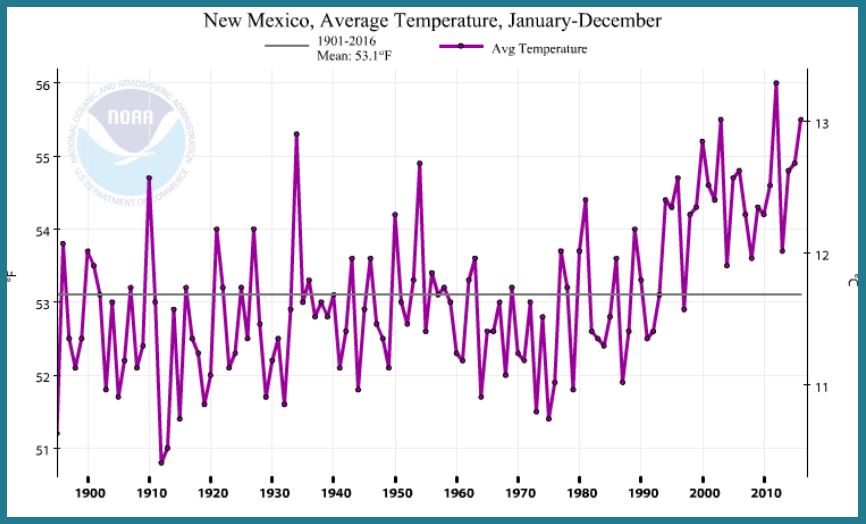
Basin (B) regions moderate to excellent aquifer potential

Would be good to re-visit wells for repeat water level measurements!

Figure E-10. Upper Madera Formation near San Francisco Springs
T 13 N., R 5 E., section 23



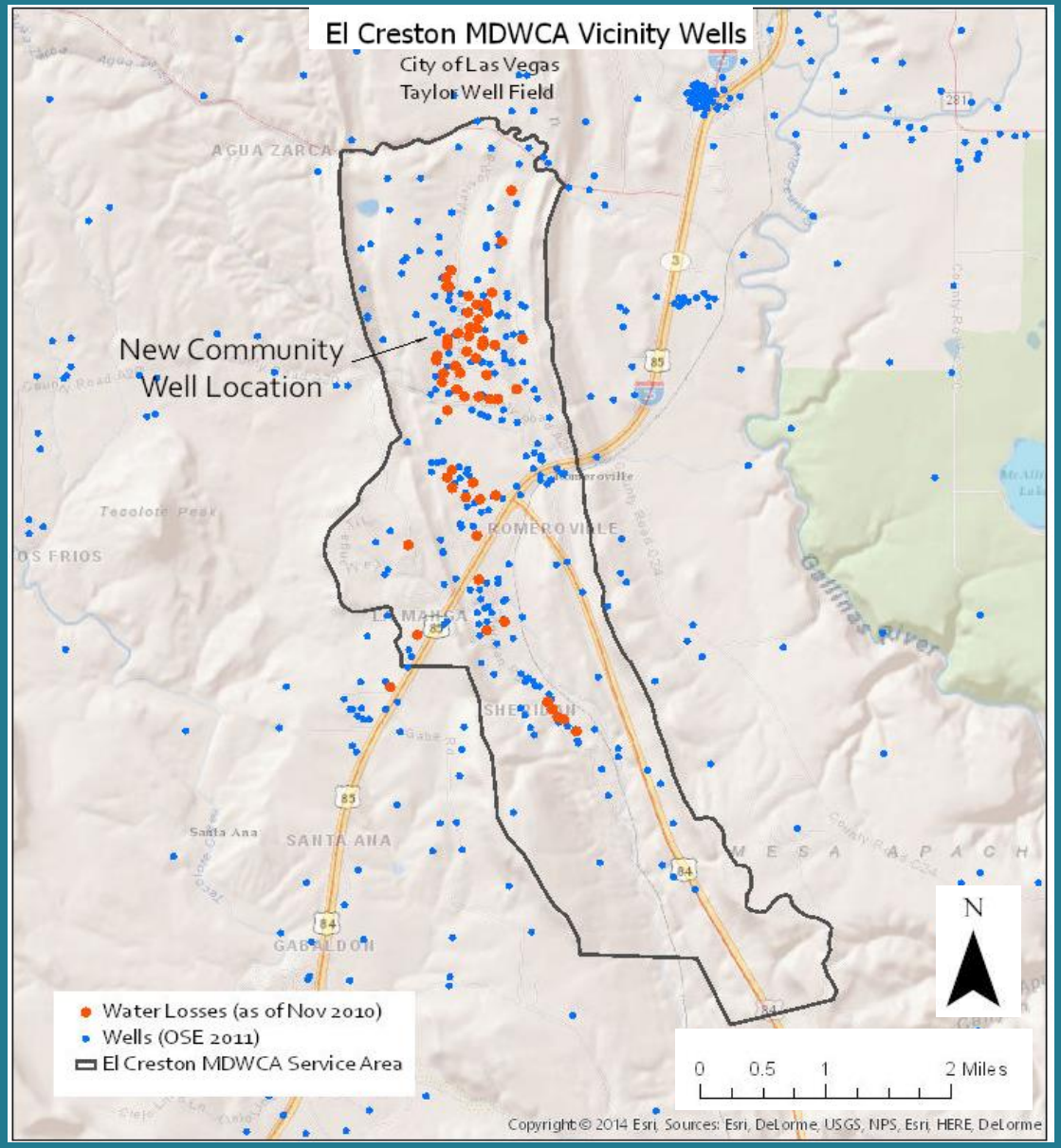
Future of water in New Mexico



Warmer temperatures = less water

- Warmer temperatures (5-7°C)
- Increased sublimation, evaporation and transpiration rates
- Significant reduction in surface water flow and recharge to groundwater
- Longer growing season
- Increase demand on groundwater!

Water issues in New Mexico – an example



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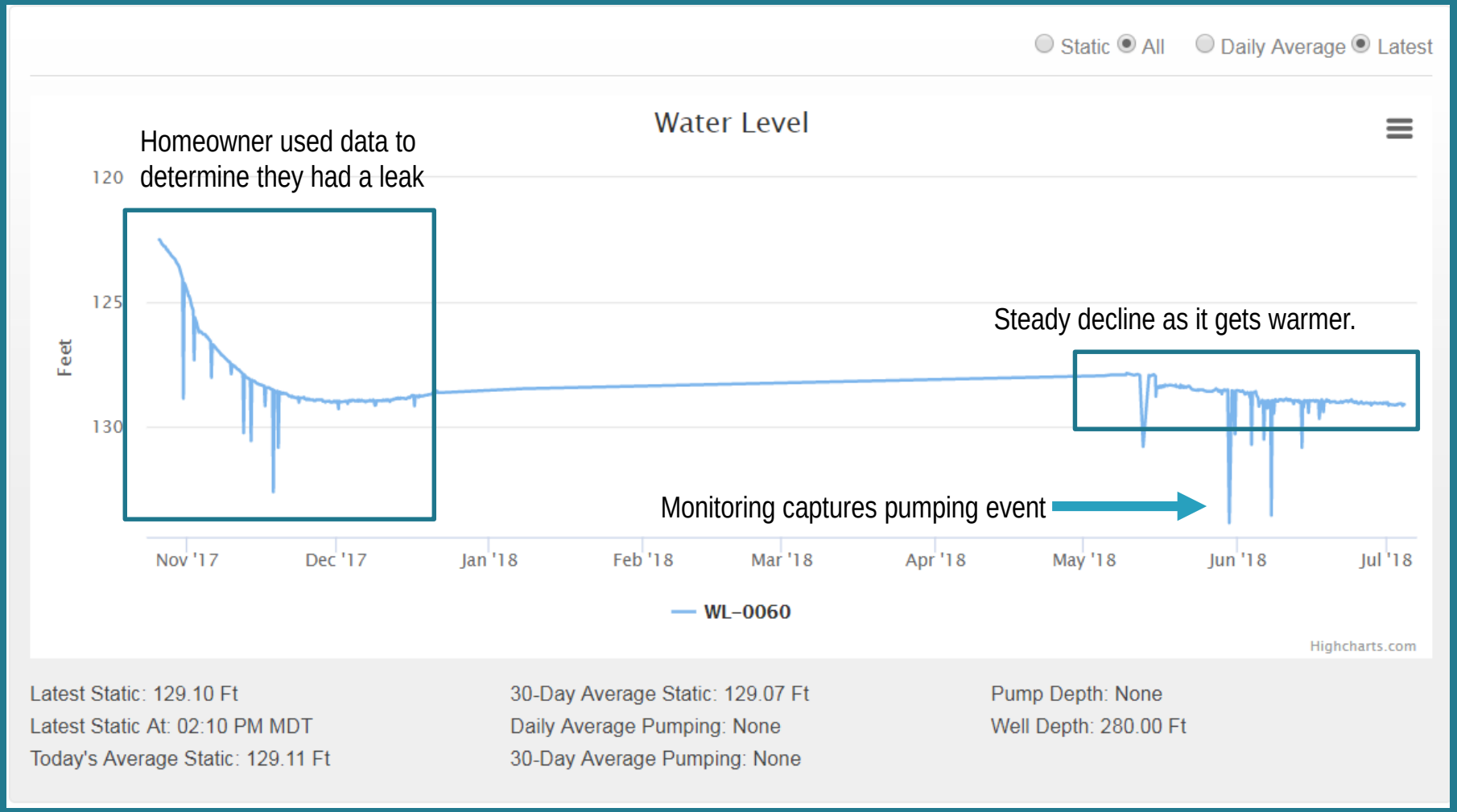


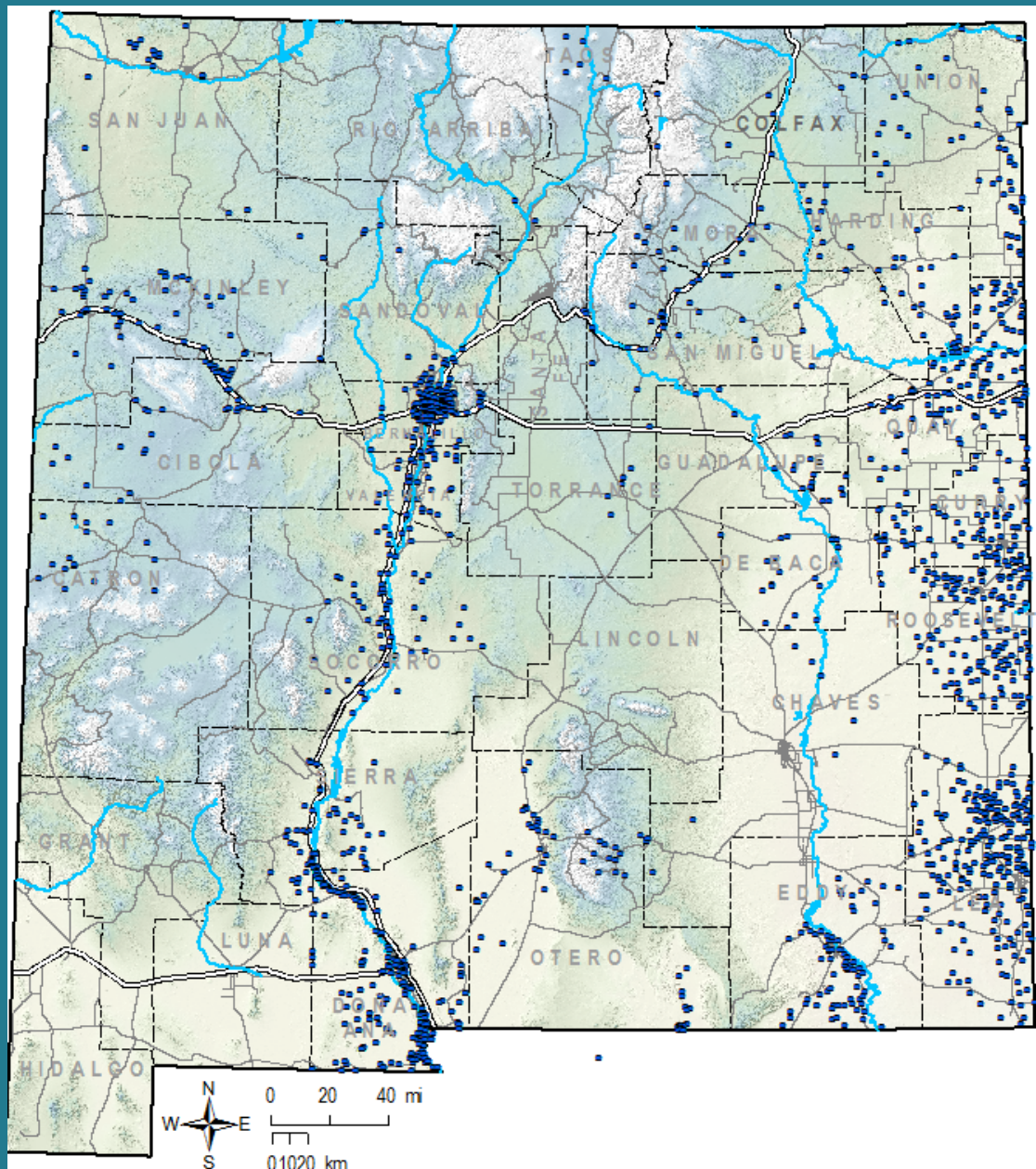
Latest Static: 129.10 Ft
Latest Static At: 02:10 PM MDT
Today's Average Static: 129.11 Ft

30-Day Average Static: 129.07 Ft
Daily Average Pumping: None
30-Day Average Pumping: None

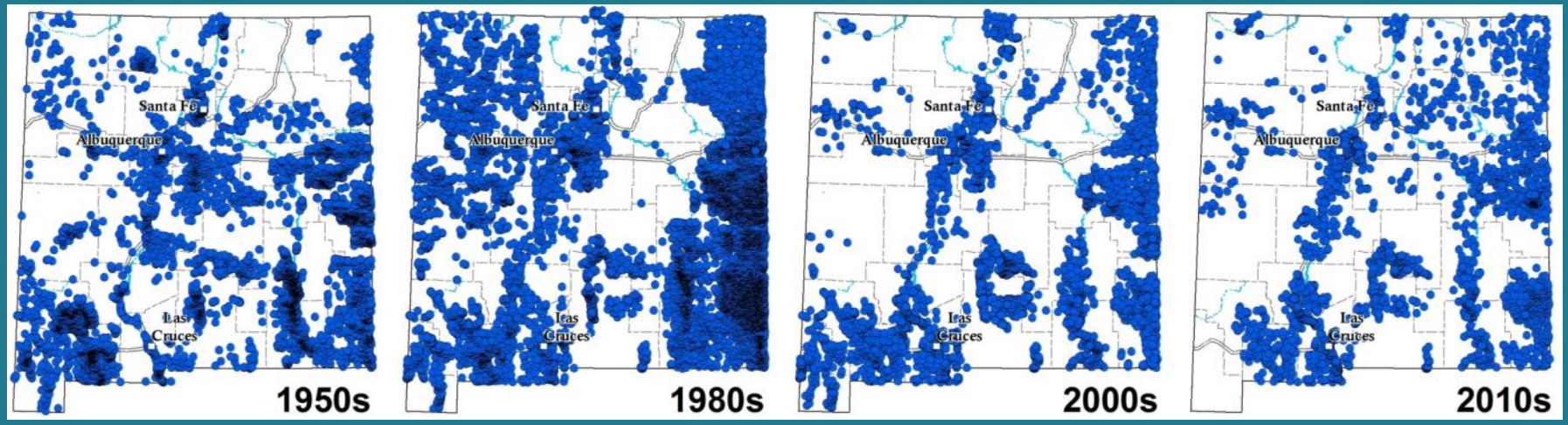
Pump Depth: None
Well Depth: 280.00 Ft

OSE/USGS Groundwater Monitoring Network

- Network is largely once every 5-year monitoring (red points)
- Monitoring done by USGS,OSE and contractors to OSE
- Work in progress by USGS and OSE to modify this current network over next few years

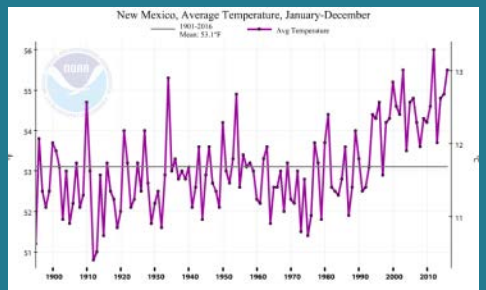


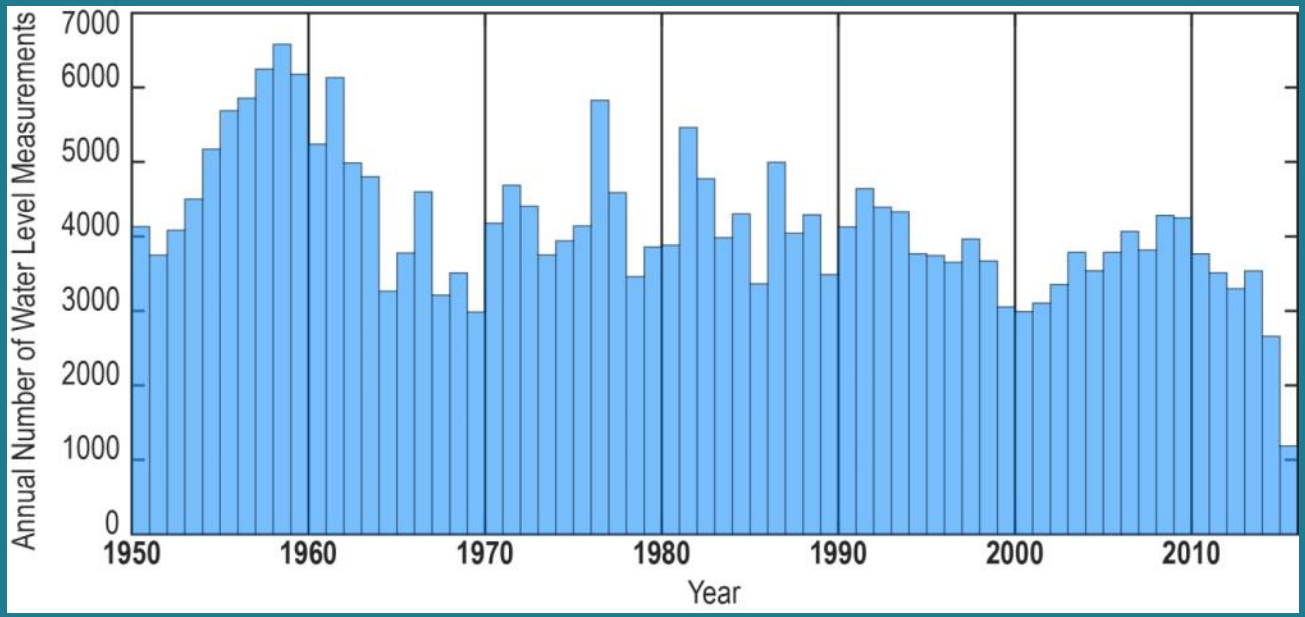
Fewer groundwater level measurements



Coverage of water level measurement has gotten smaller

Fewer measurements have been collected in recent decades





Groundwater level measurements from USGS and NMBGMR

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Collaborative Groundwater Monitoring Network

Collaboration: “the process of two or more people or organizations working together to complete a task or goal”

OUR GOAL

Broaden coverage and frequency of groundwater level monitoring across New Mexico through community collaboration.

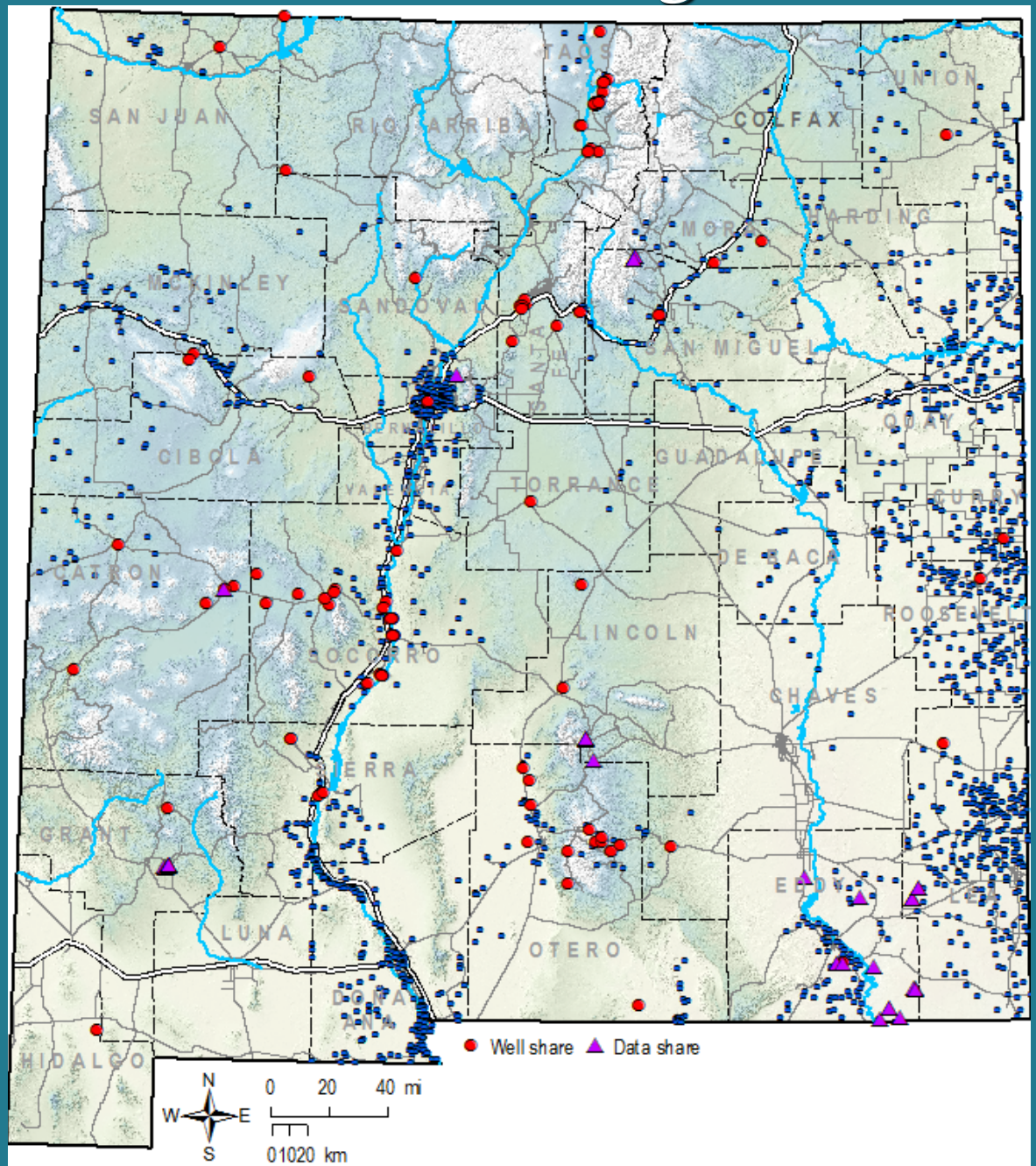
THREE MAIN PARTS

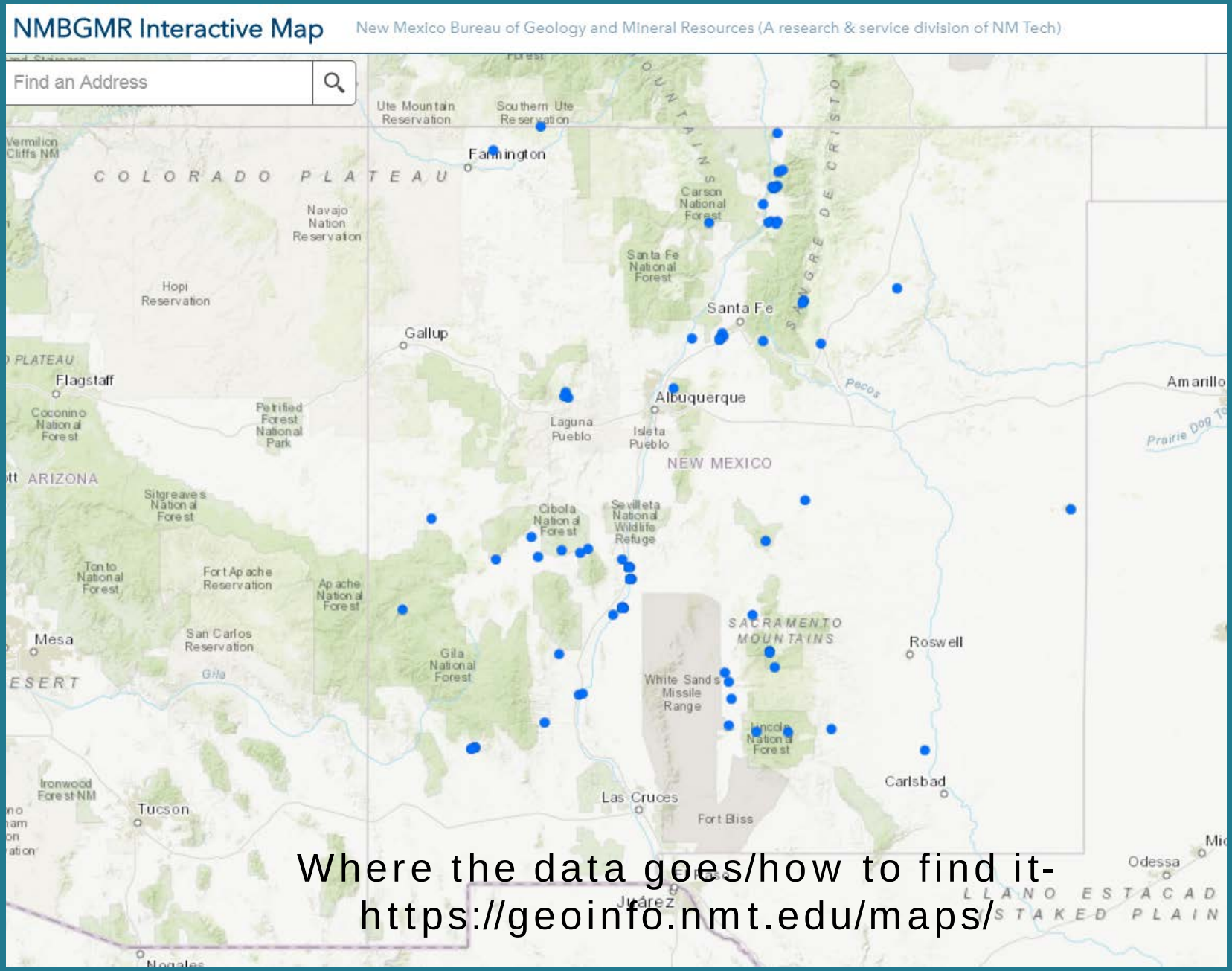
- Groundwater level data collection
  - Our early warning system!
  - Compile and link data
- Training and education
  - NM Rural Water Association annual meetings
  - Invited presentations
  - How and why we measure groundwater levels
- Data archiving and access
  - Interactive webmap (geoinfo.nmt.edu/maps)
  - MS SQL Aquifer Mapping database

Funding from Healy Foundation

Collaborative Groundwater Monitoring Network

- Filling the spatial and temporal gaps
  - Over 90 continuous monitored wells
  - 400+ sites contribute data
- Priority is rural communities and single source
- Collaborating with NMRWA, SWCDs, COGs, NMED, OSE, USGS, consultants, and others to prevent data duplication and promote outreach





Where the data goes/how to find it-
https://geoinfo.nmt.edu/maps/

Equipment

We are utilizing

- WellIntel - continuous monitoring
- Pressure transducers- continuous monitoring
- E-line- manual measurements
- Steel tape- manual measurements
- Sonic – manual measurements

Data Sharing

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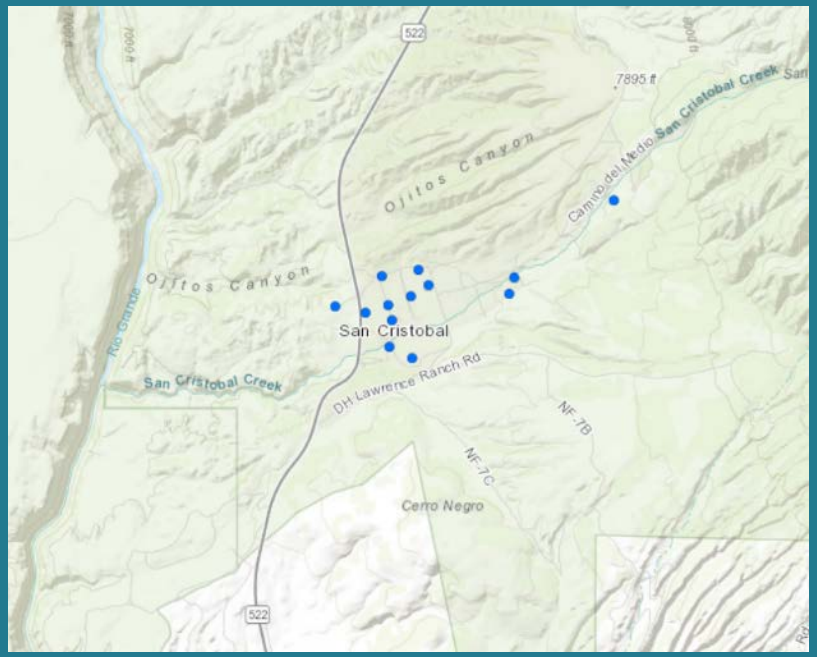
Community or individual collects data

1. Community-built data share
   - Neighborhoods or small communities
   - Training provided, data review
   - Some equipment share possible
2. Water system data share
   - Training provided by NMBGMR
   - Water operators collect measurements and submit data
3. Individual well owner data share
   - Homeowner buys equipment (i.e. WellIntel)
   - NMBGMR help install (free!)
   - Share to NMBGMR database

Well Sharing



NMBGMR collects data

1. Community-organized network (manual measurements)
2. RURAL public or private well continuous monitoring

For your region - ideas

Options to consider:

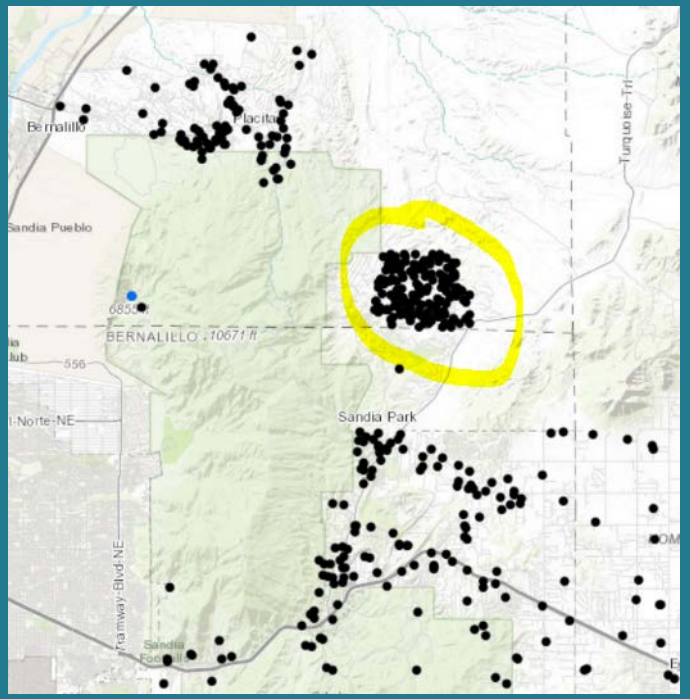
A. Well share: Community-organized network– NMBGMR manually measures ~10-12 wells within 1 day (FREE!)

B. Data share: Community-built
   - San Pedro Creek Estates
   - Benton County, Oregon

C. Data share: Individual well
   - Homeowner buys equipment (i.e. Wellntel)
   - NMBGMR help install (free!)
   - Share to NMBGMR database

San Pedro Creek Estates – Community member supported

- HOA purchased equipment
- Community members collect and maintain data
- Share to NMBGMR database for public access



Benton County, OR – WellIntel Option

"Concerns about groundwater availability and development pressure in rural South Benton County [Oregon] spurred local residents to form a community groundwater monitoring network."

WellIntel

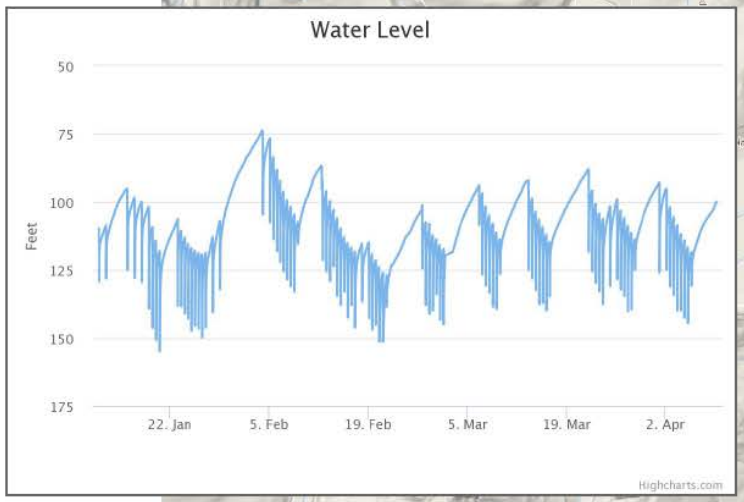
How the South Benton County Oregon Groundwater Network came about

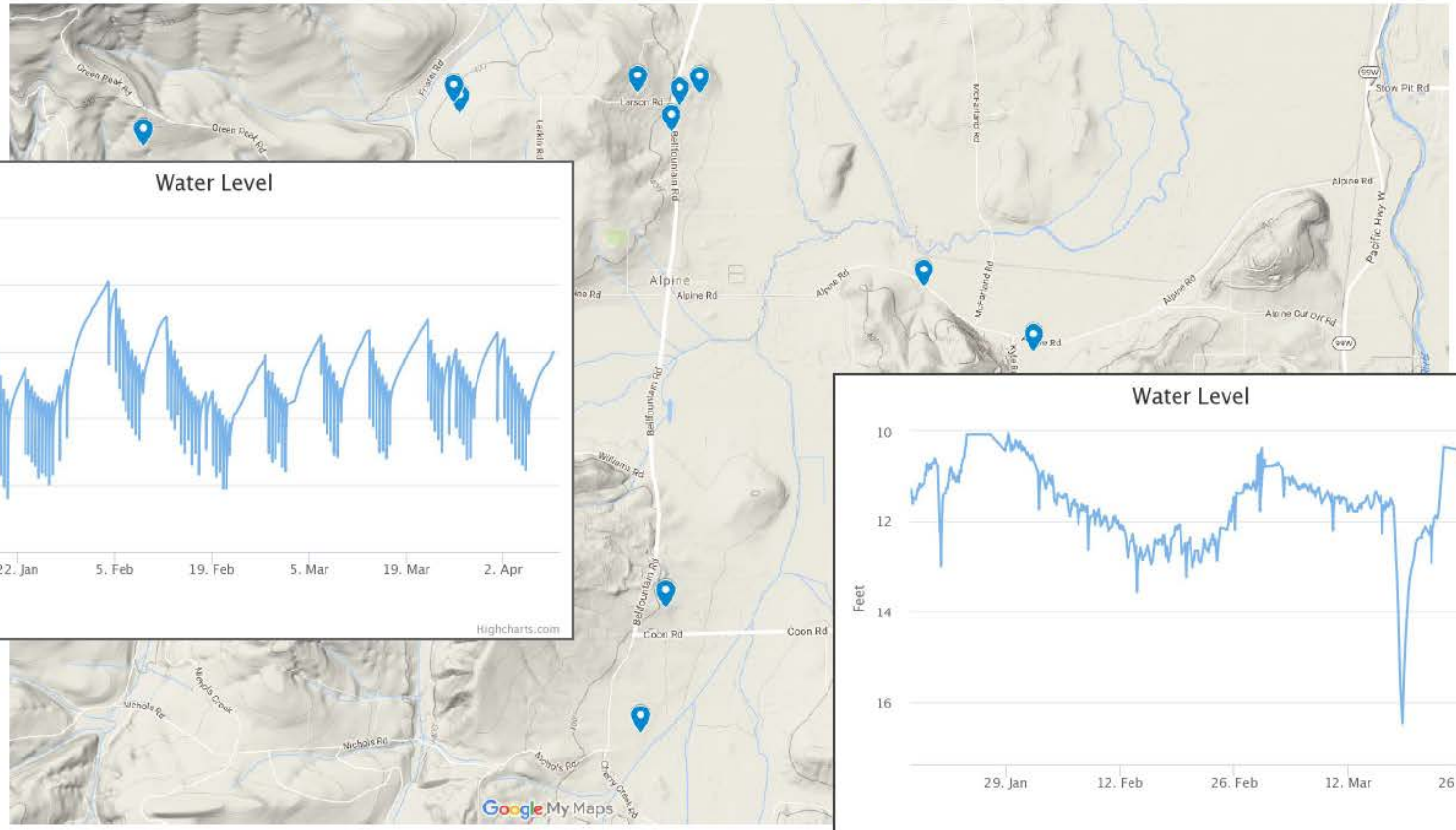
- Public Community Meetings
- Active but informal involvement from OWRD (Oregon Water Resource Department.)
- 14 members contributed financially and as data providers
- Local information sharing agreements

Stated Goal:

*Work together to **measure and understand groundwater**, build community support for **smart local management,** and **protect property value**.*

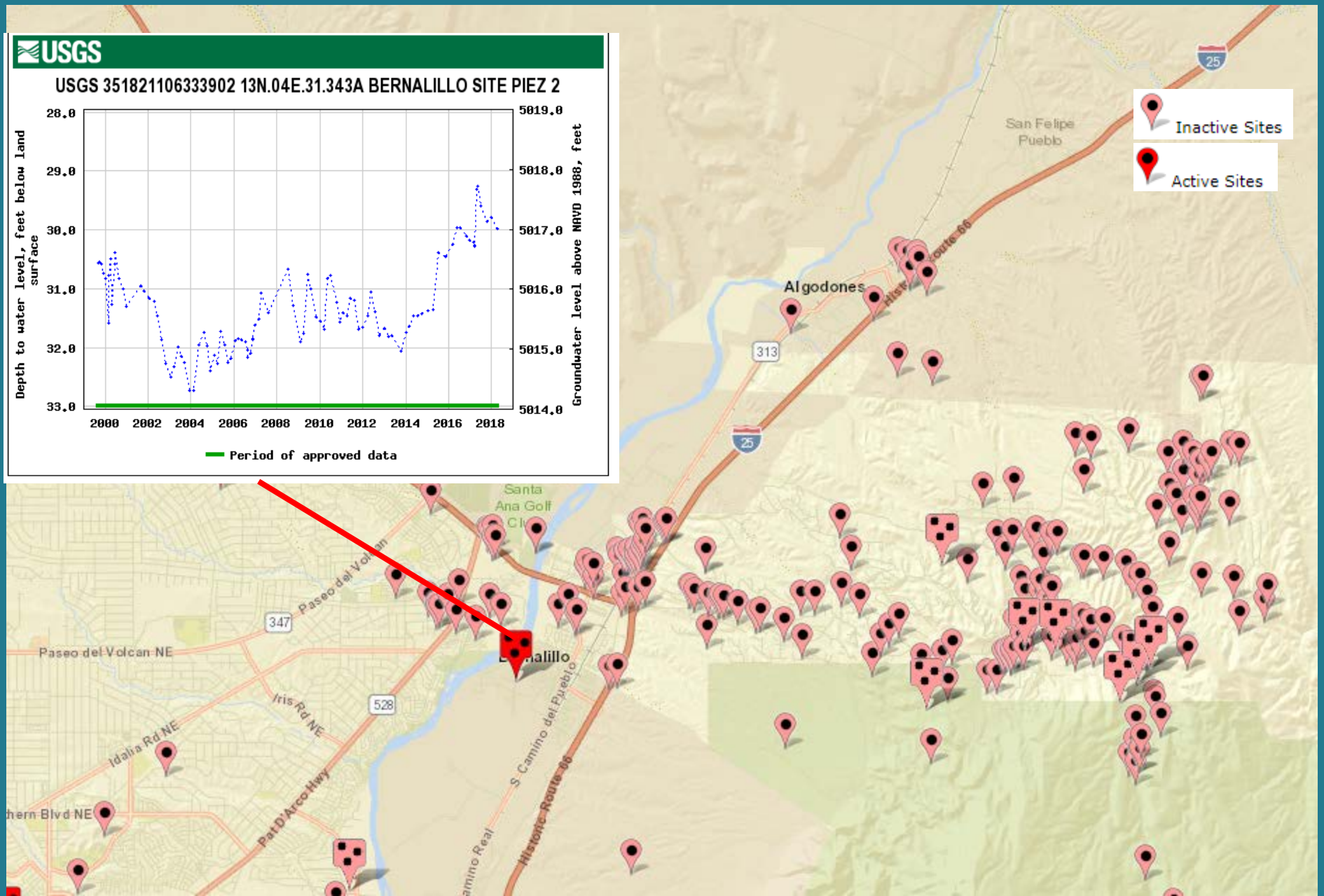
Importantly, diverse geology/hydrogeology and local influences are better understood - informing smarter plans and practices



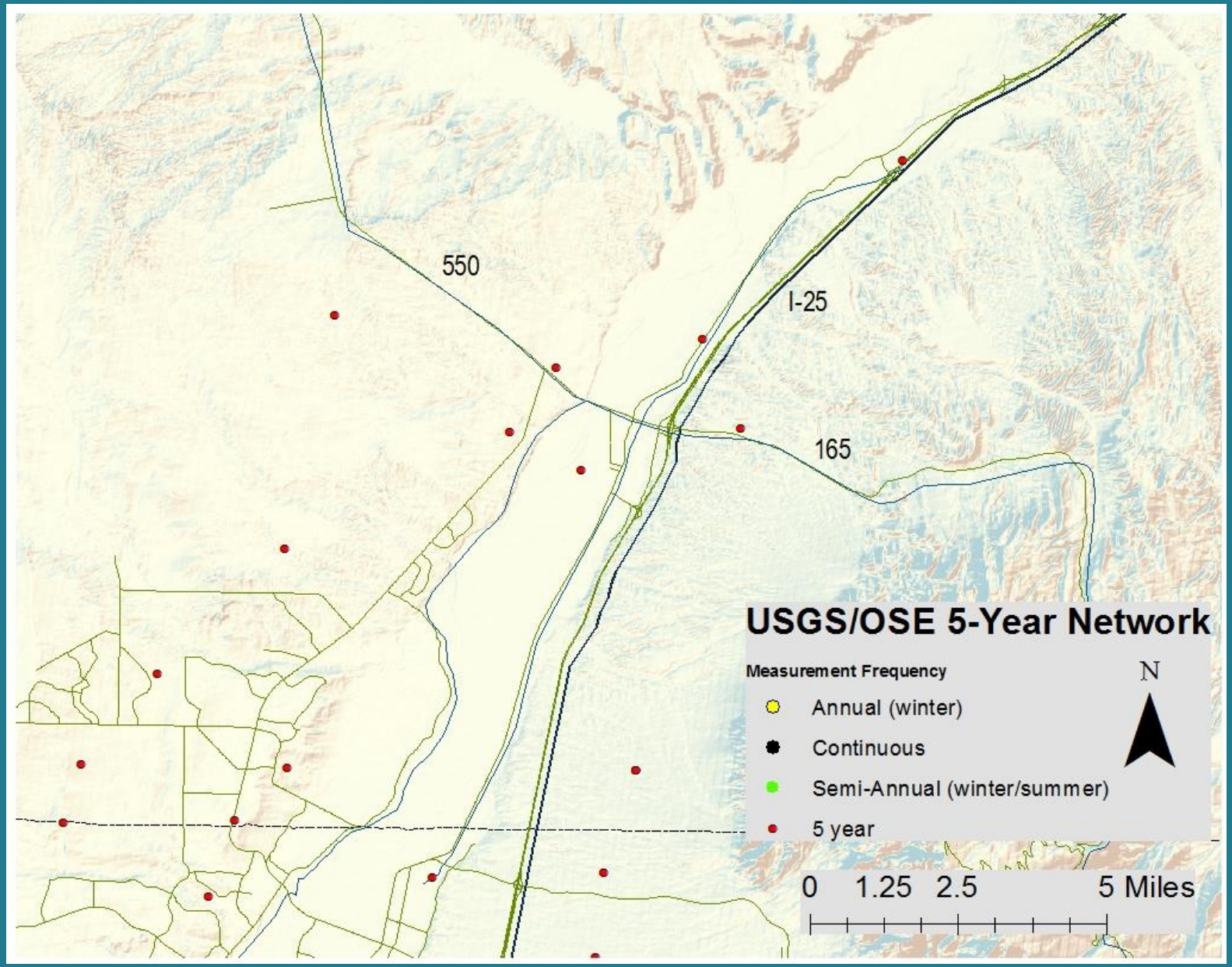


Wellntel

Local data: from USGS National Water Information System



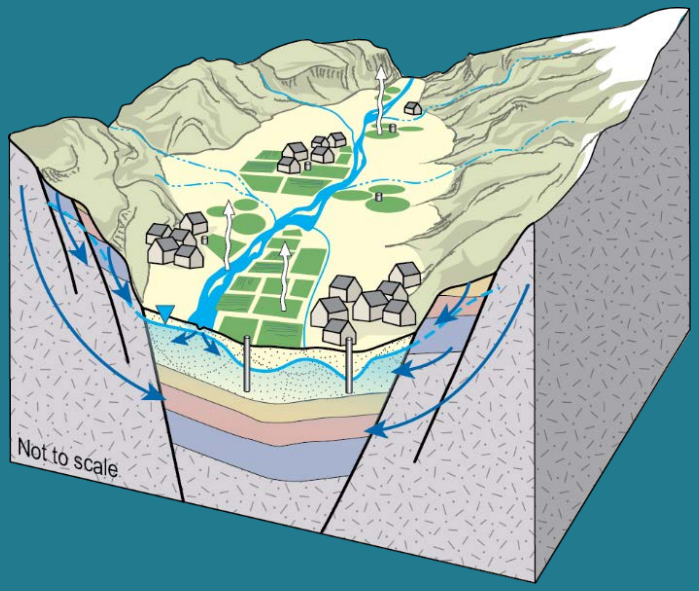
Other monitoring in your region



Why measure groundwater levels?

In many regions of New Mexico, we are mining the aquifers

- Water level monitoring is our check on the “account balance”
- Data can inform our decision making – following trends
- Our aquifers ignore our fence lines and political boundaries
- One way to protect the resource is to have data to show what you have!



For More Information

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