

New Mexico Bureau of Geology and Mineral Resources

A Research Division of New Mexico Institute of Mining and Technology

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Otero Soil and Water Conservation District Annual Meeting

December 4, 2024

Otero County Fairgrounds

The Bureau's Mission

We serve the citizens of New Mexico with these main goals:

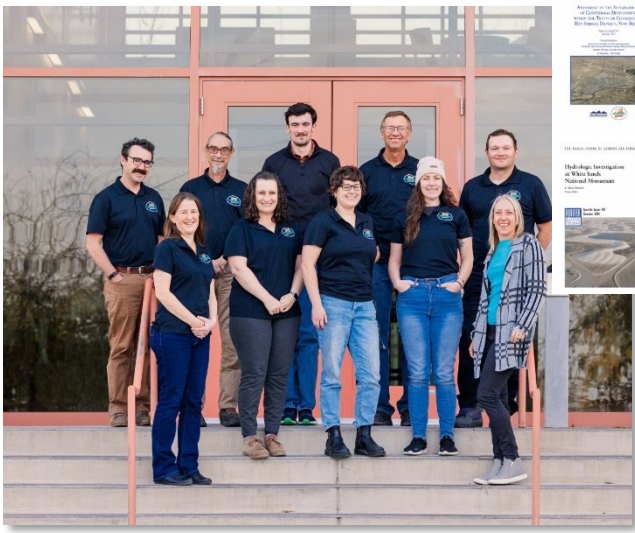
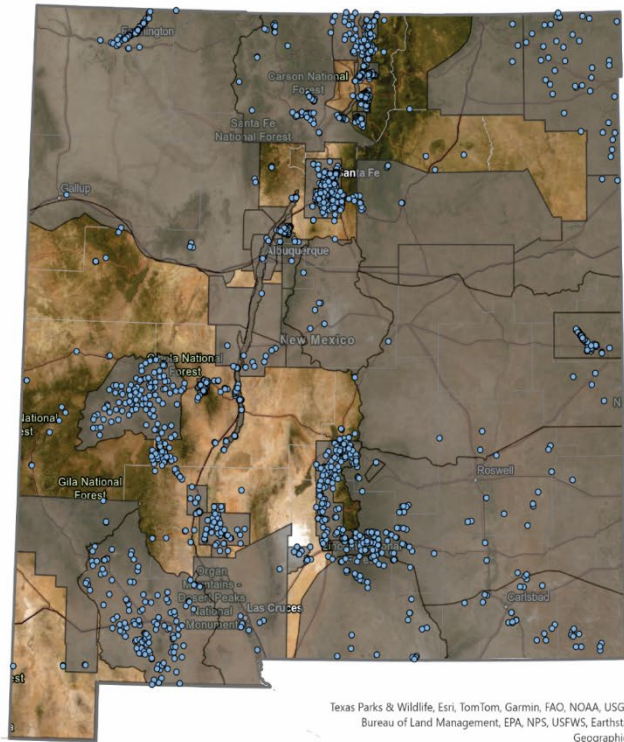
- Conduct **research** and interact with State and Federal agencies and industry to facilitate prudent exploitation of the state's geological resources.
- Distribute **accurate information** to scientists, **decision makers**, and the New Mexico public regarding the state's geologic infrastructure, **mineral and energy resources**, and **geohydrology** (including water quantity and quality).
- Create accurate, up-to-date **maps** of the state's geology and resource potential.
- Provide timely information on potential **geologic hazards**, including earthquakes, volcanic events, soils-and subsidence-related problems, and flooding.
- Act as a **repository** for cores, well cuttings and a wide variety of geological data. Provide convenient physical and internet access for New Mexicans to such resources.
- Provide **public education and outreach** through college teaching and advising, a **Mineral Museum**, and teacher- and student-training programs.
- Our staff serve on a number of **boards and commissions** within the state and the region concerned with various geoscience-related issues.

Hydrogeology Program at NMBG

Aquifer Mapping and Monitoring Program

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

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

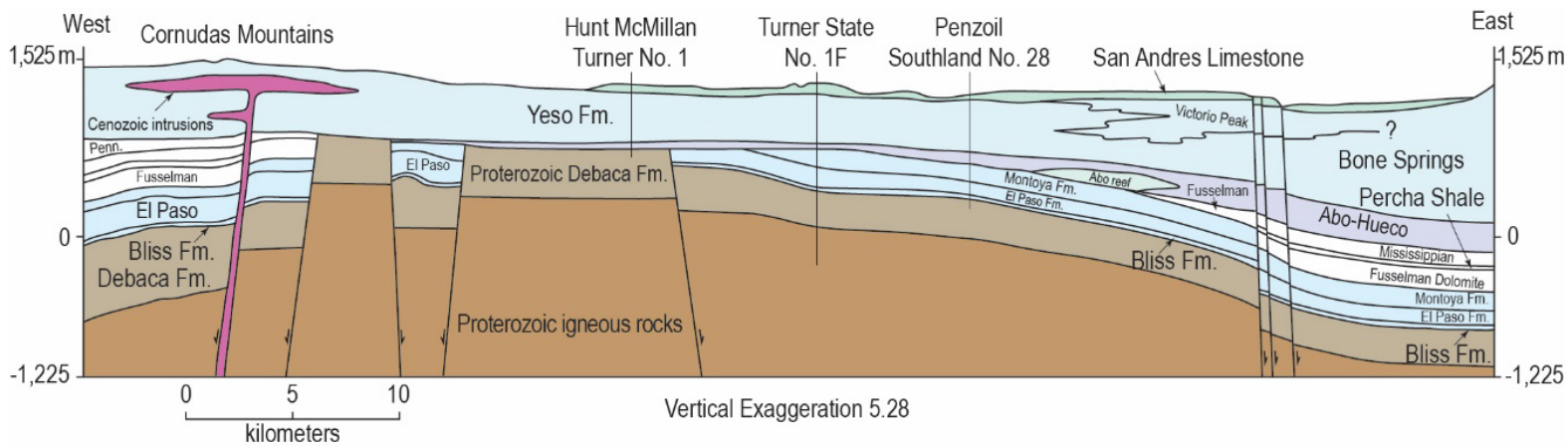
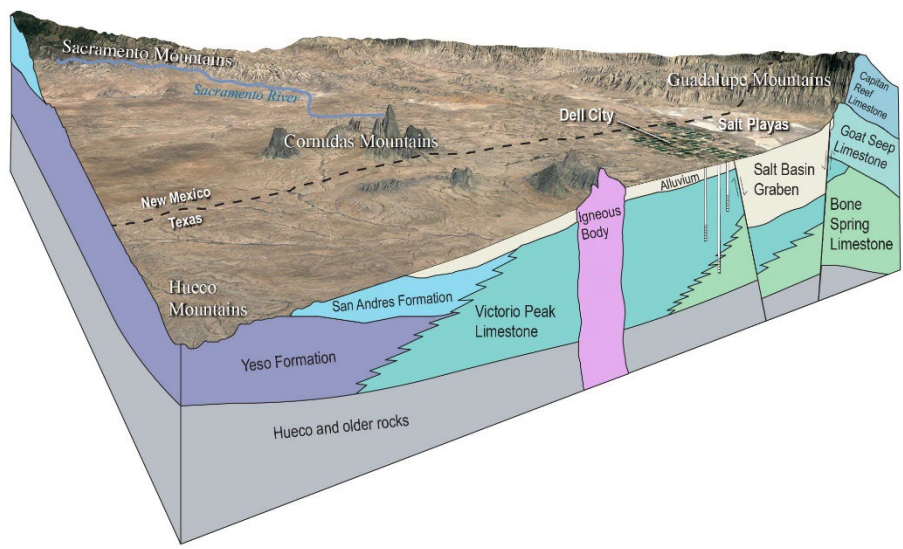


Texas Parks & Wildlife, Esri, TomTom, Garmin, FAO, NOAA, USGS, Bureau of Land Management, EPA, NPS, USFWS, Earthstar Geographics

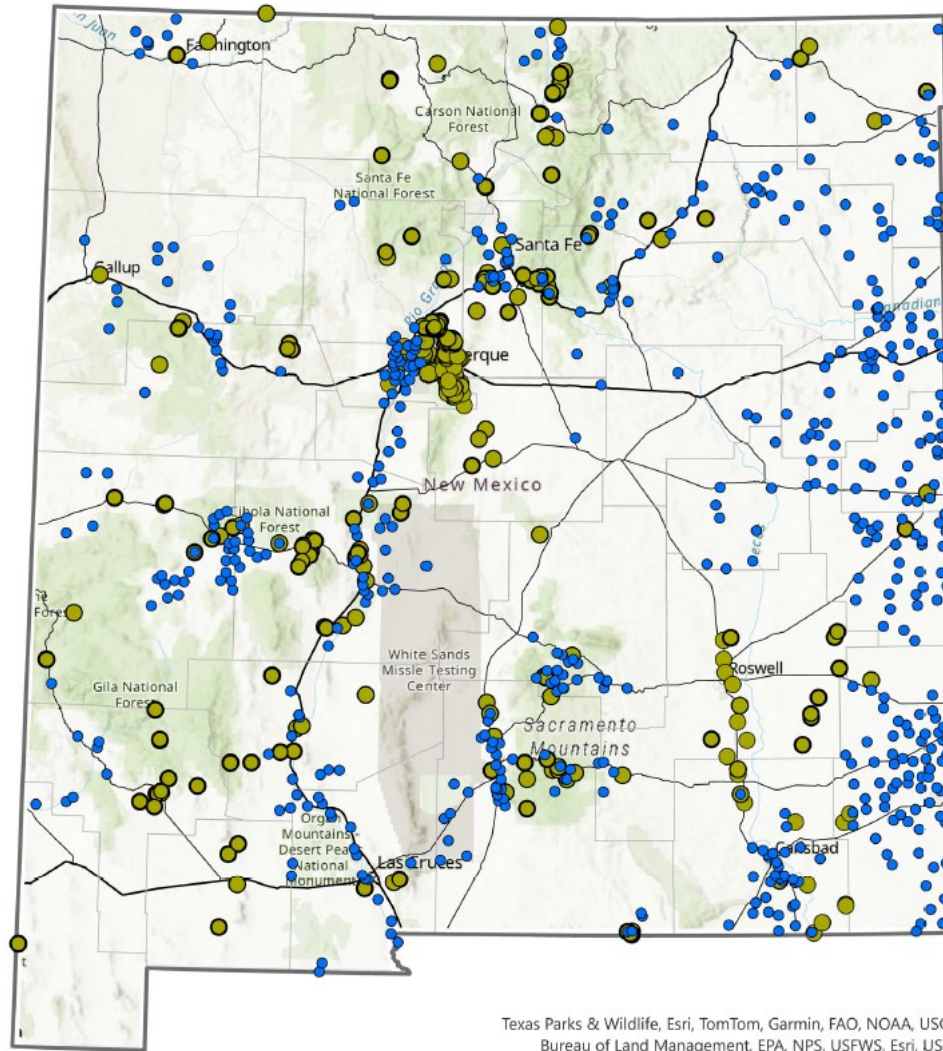
geoinfo.nmt.edu/resources/water/amp/home.html

2024 Research Update

- New Mexico Water Level Monitoring
- Regional water level trends
- Previous work
- Carrizozo Soil Water Conservation District water resource assessment.



Groundwater Monitoring in New Mexico



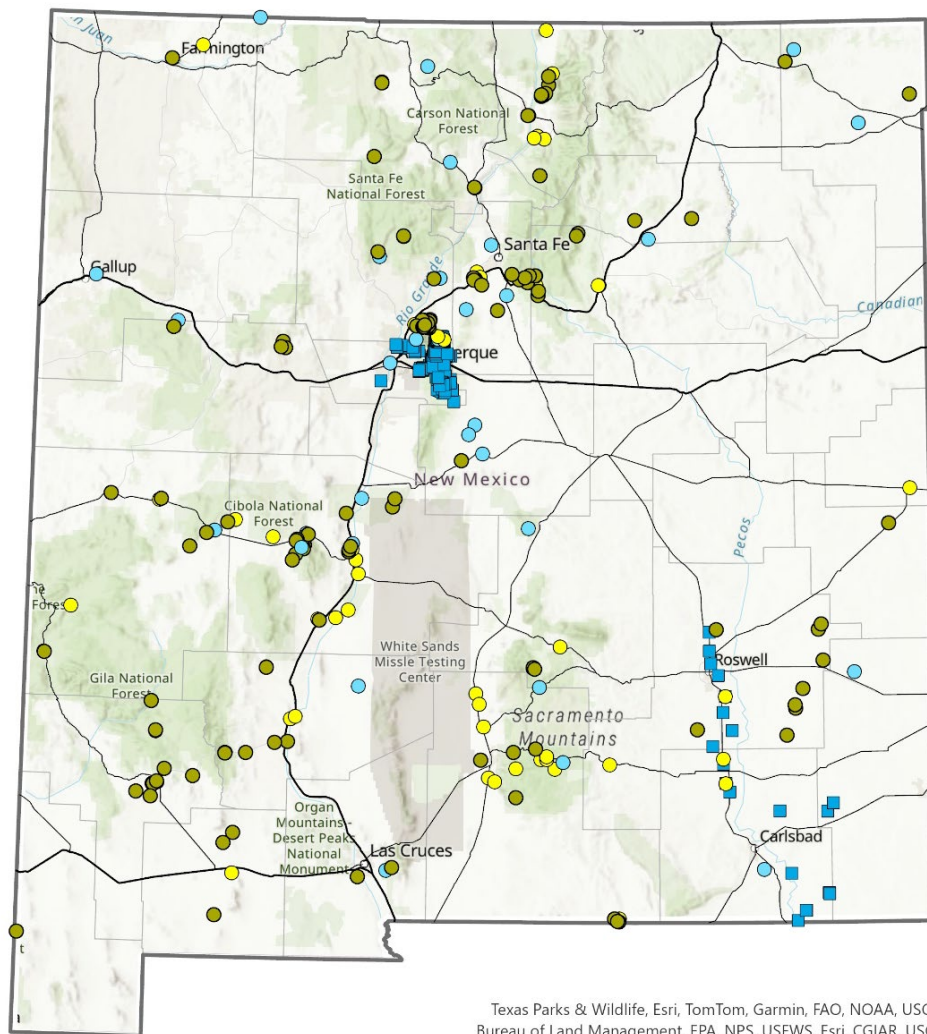
Healy Foundation, the USGS and the Aquifer Mapping Program at the Bureau of Geology fund this important program

1,192 active wells monitored in NM

- USGS monitors: 589
- NMBG Healy network: 603

Texas Parks & Wildlife, Esri, TomTom, Garmin, FAO, NOAA, USGS, Bureau of Land Management, EPA, NPS, USFWS, Esri, USGS

Healy Collaborative Groundwater Monitoring Network (NMBG)

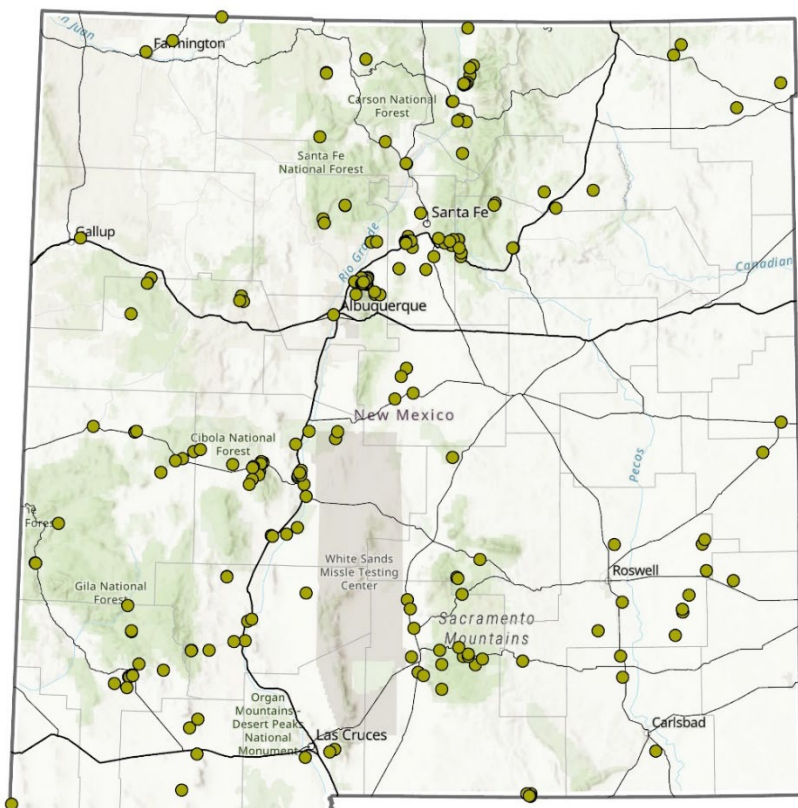


Texas Parks & Wildlife, Esri, TomTom, Garmin, FAO, NOAA, USGS, Bureau of Land Management, EPA, NPS, USFWS, Esri, CGIAR, USGS

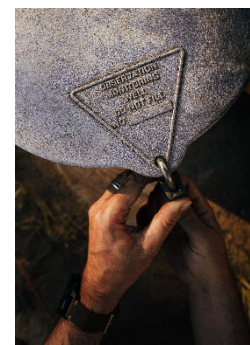
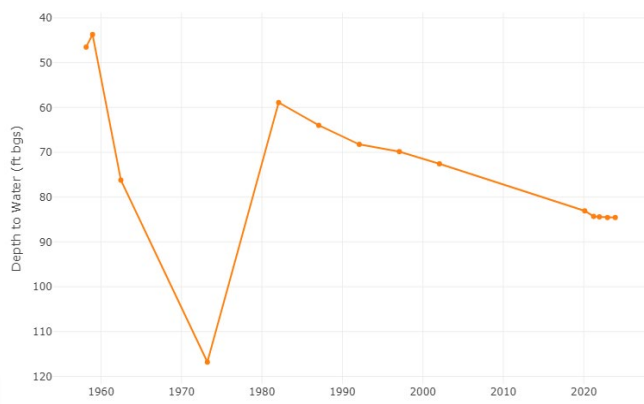
Healy Collaborative Network (NMBG)

- 95 sites equipped with continuous loggers
 - 50 Pressure transducers
 - 45 Acoustic loggers
- 217 wells measured manually
- 386 Data Share locations

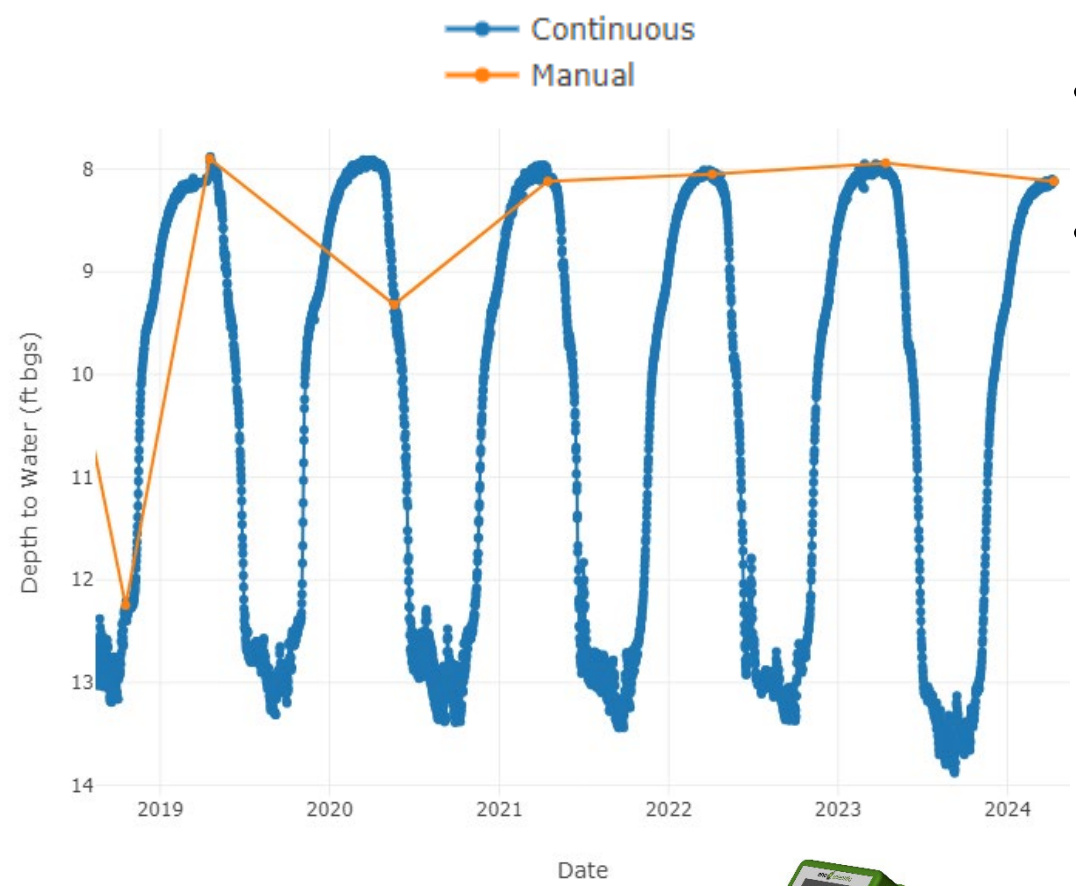
Manual Measurements



- Typically collected with a steel measuring tape
- eProbes are used when there is no pump in the well and a low chance of getting stuck
- These wells are visited annually



Continuous Data Loggers



- Help fill in gaps in hydrographs between manual measurements
- Help identify influences on the aquifer such as
 - Seasonal variation
 - Pumping
 - River stage
 - Recharge influences and timing



Accessing Data

The screenshot displays the 'NM Groundwater Dashboard' interface. At the top, there is a navigation bar with links for Home, Dashboards, Healy Collaborative Network, Tools, and Secure Area. A 'Logout' button is visible in the top right corner. The main content area features a map of New Mexico with numerous green circular markers representing groundwater data points. A large QR code is overlaid on the map, with the text 'NEW MEXICO AQUIFER MAPPING' below it. On the left side, there is a legend titled 'Data Layers' with the following items:

- NMBGMR** (New Mexico Bureau of Geology and Mineral Resources Aquifer Mapping Program (AMP))
 - NMBGMR Trends (How trends are calculated)
- USGS NWIS** (USGS National Water Information System Groundwater - Active Sites)
- PVACD** (Pecos Valley Artesian Conservancy District)
- BernCo** (Bernillo County Groundwater Resources)
- EBID** (Elephant Butte Irrigation District Groundwater Data)

At the bottom of the legend, it states 'More sources coming soon!'. The map includes labels for various locations such as Roswell, Dexter, Hagerman, Lake Arthur, and Artes, as well as major roads like I-40, I-25, and US-82.

- weaver.newmexicowaterdata.org/groundwater

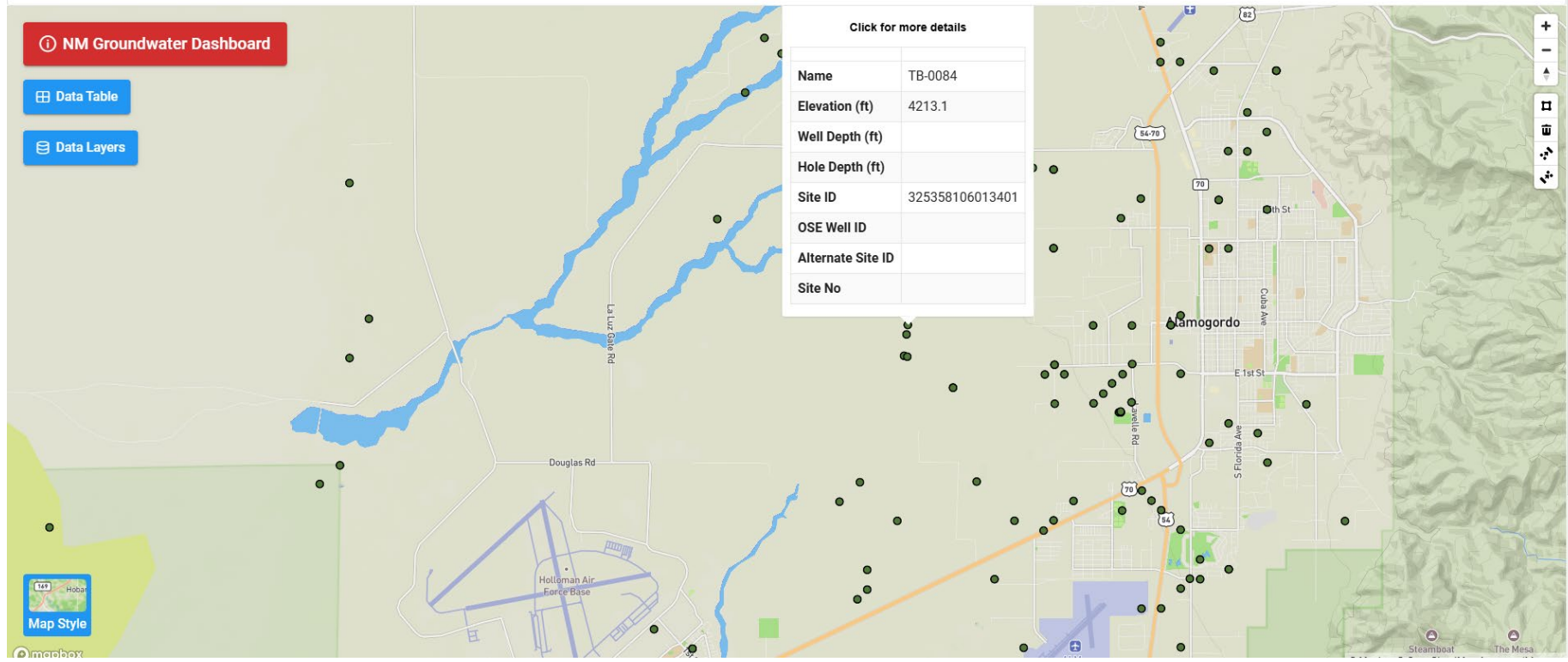
NM Groundwater Dashboard

Data Table


Data Layers

Click for more details

Name	TB-0084
Elevation (ft)	4213.1
Well Depth (ft)	
Hole Depth (ft)	
Site ID	325358106013401
OSE Well ID	
Alternate Site ID	
Site No	



weaver.newmexicowaterdata.org/groundwater


Home | Dashboards | Healy Collaborative Network | Tools | Secure Area | Logout

Search for another PointID:

Location Detail: TB-0084

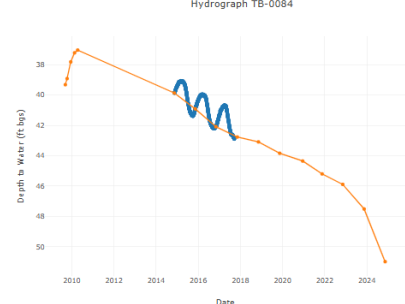
Site Type: Groundwater other than spring (well)

[Share](#) [Directions](#)

Hydrograph

Hydrograph TB-0084

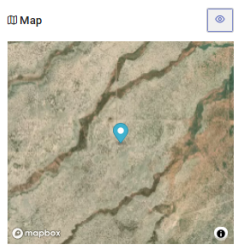
[Show Continous Data](#)



No.	Date	Method	Depth to Water (ft)	Source	Agency
No.	2024-11-12	Steel-tape measurement	50.98	Measured by NMBGMR staff	NMBGMR
No.	2023-11-15	Steel-tape measurement	47.51	Measured by NMBGMR staff	NMBGMR
No.	2023-11-09	Electric tape measurement (E-43.99 probe)	43.99	Measured by NMBGMR staff	NMBGMR
No.	2021-11-16	Electric tape measurement (E-43.2 probe)	43.2	Measured by NMBGMR staff	NMBGMR
No.	2020-12-15	Electric tape measurement (E-44.35 probe)	44.35	Measured by NMBGMR staff	NMBGMR
No.	2019-11-12	Electric tape measurement (E-43.84 probe)	43.84	Measured by NMBGMR staff	NMBGMR
No.	2018-11-09	Electric tape measurement (E-43.09 probe)	43.09	Measured by NMBGMR staff	NMBGMR
No.	2017-11-08	Electric tape measurement (E-42.77 probe)	42.77	Measured by NMBGMR staff	NMBGMR

Disclaimer

Map



Location Info

Name Value

Lat/Lon 32.895965, -106.026500 (WGS84)

Elevation ft 4213.09 (NAVD83)

Elevation Method Interpolated from digital elevation r

UTM 18QUG52 26A5037 (NAD83)

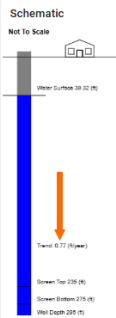
USGS Site No. 325358106013401

Site Names Mesa Verde New well 5

Public Release Yes

Schematic

Not to Scale



Well Info

Name	Value
ose_well_id	T04284 5-4
ose_well_id	310
hole_depth_ftgs	295
casing_diameter_ft	6.7
casing_depth_ftgs	295
casing_description	Steel/PVC 6 inch
construction_notes	Call in advance to let him
measuring_point	TCC
measuring_point_height_ft	1.5
measuring_point_height_ftgs	6
formation	Quaternary-Tertiary basi
static_water_level_ftgs	42
monitoring_status	Annual water level

Notes +

Water Notes +

Status User Notes +

Screens +

Location Editor

Name	Value
agency_cd	USGS
site_no	325358106013401
station_nm	166.096.28.143 TB-0084
site_tp_cd	GW
lat_va	32.8959744
long_va	-106.026500
dec_lat_va	32.89994
dec_long_va	-106.026
coordmeth_cd	0
coord_agcy_cd	0
coord_datum_cd	NAD83
dec_coord_datum_cd	NAD83
district_cd	35
state_cd	35
county_cd	035
country_cd	US

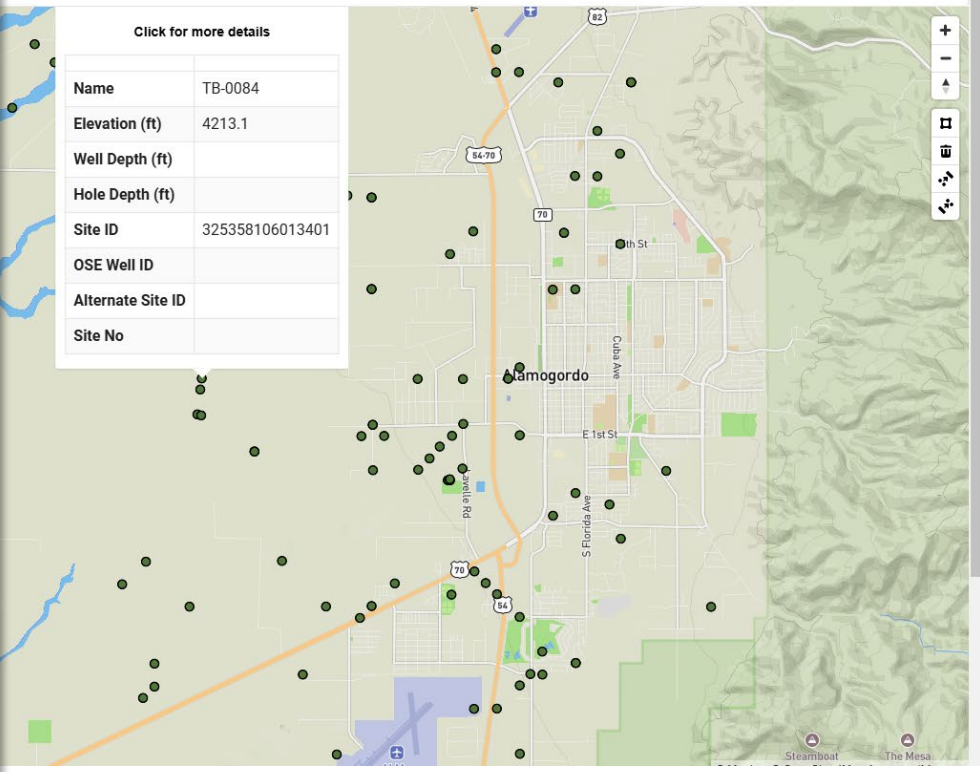
OSE POD (Point Of Diversion)

Name	Value	Description
No results found		

Secure Area
Logout

Click for more details

Name	TB-0084
Elevation (ft)	4213.1
Well Depth (ft)	
Hole Depth (ft)	
Site ID	325358106013401
OSE Well ID	
Alternate Site ID	
Site No	





Future Purpose built monitoring network (~100 wells)

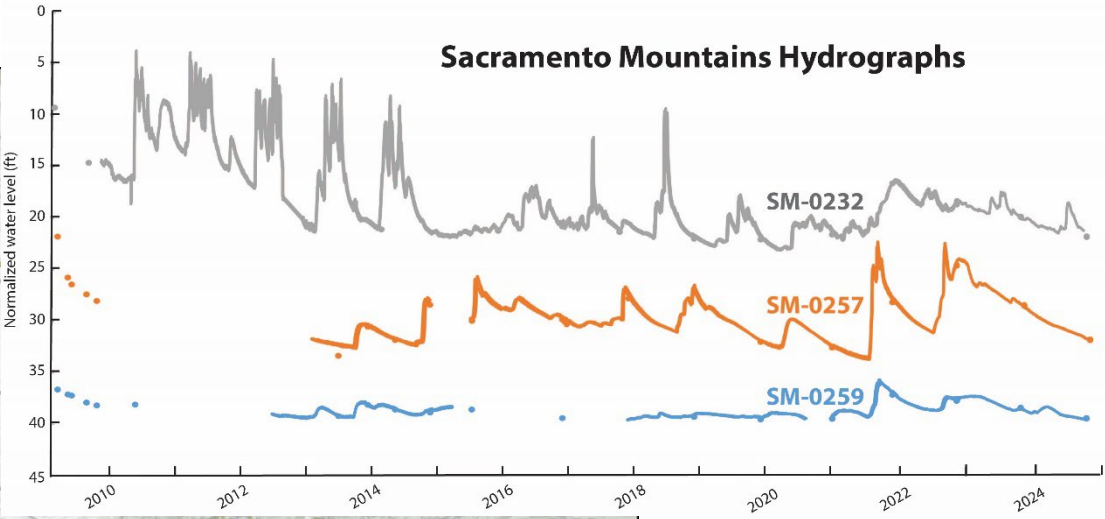
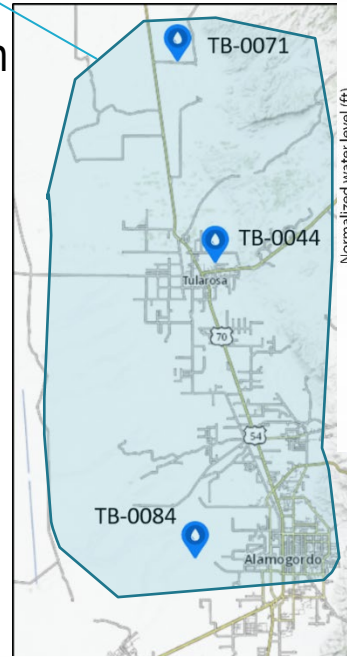
- Located and designed to meet specific monitoring goals
- High resolution well logs to understand lithology and better target key aquifers
- Monitoring High use areas where large drawdown and variability are expected
- Monitor background areas with little impact from production to reflect changes in recharge or natural discharge
- Monitor groundwater-surface water interactions to determine gaining and losing conditions and access future shifts
- Guaranteed long-term access is crucial

Regional Water Levels

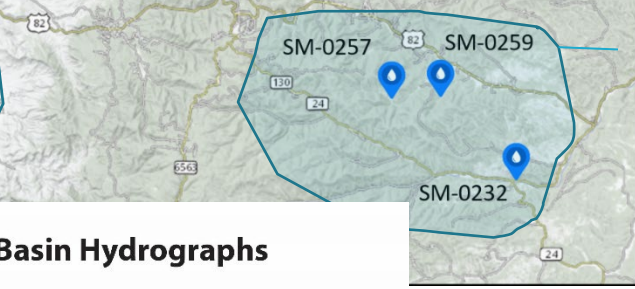
Tularosa Basin

-Steady decline north of Tularosa 2011 to 2019 more than -2 feet per year.

-Since 2023 water level decline near Tularosa and Alamogordo has accelerated.



Sacramento Mountains Hydrographs

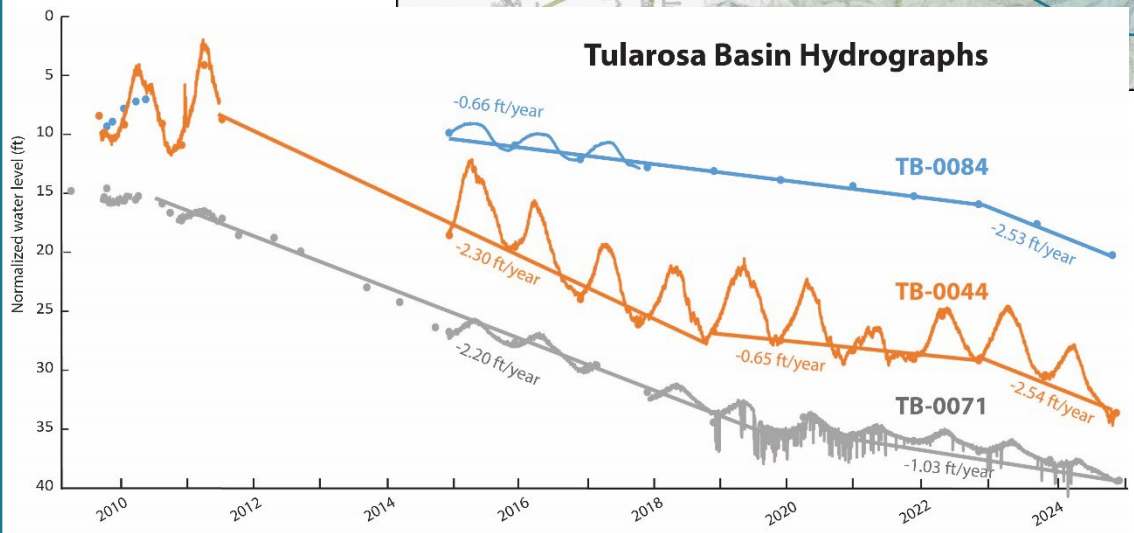


Sacramento Mountains

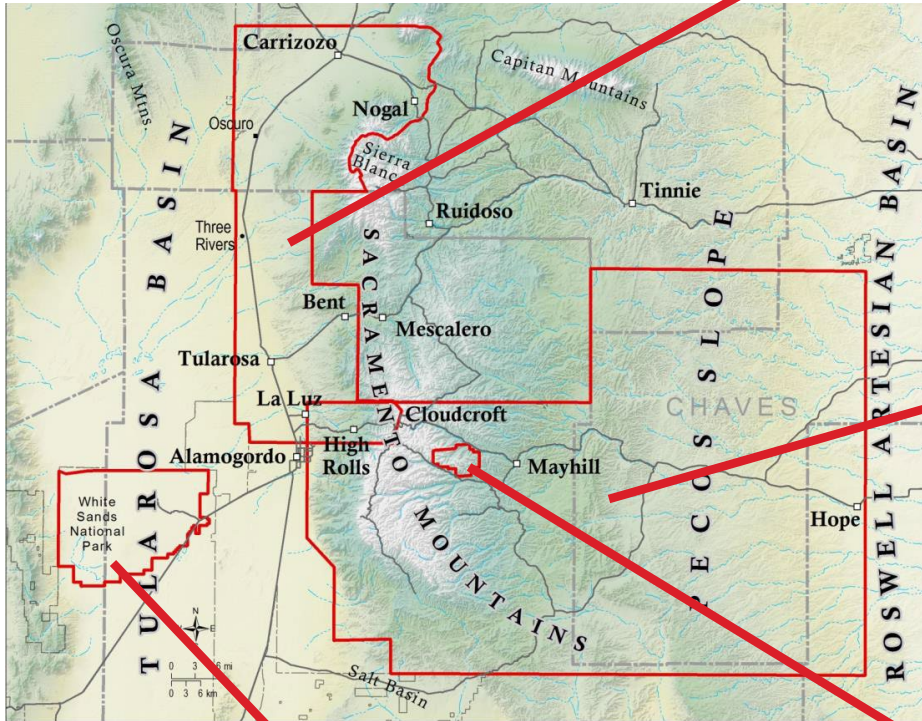
-Water table has remained in roughly same range throughout record.

-Reacts quickly to recharge events such as snow melt or monsoon storms typical of limestone aquifers.
 -Water levels slowly declining from strong monsoons in 2021 and 2022.

Tularosa Basin Hydrographs



Previous Work



Tularosa Basin

- Recharge Estimates ~ 68,000 ac ft/yr divided between Mountain Front (arroyo infiltration along alluvial fans and drainages) and Mountain Block (deep flow through aquifers connecting mountains and basin)
- Up to 9% of precipitation as recharge
- Groundwater is older

Sacramento Mountains

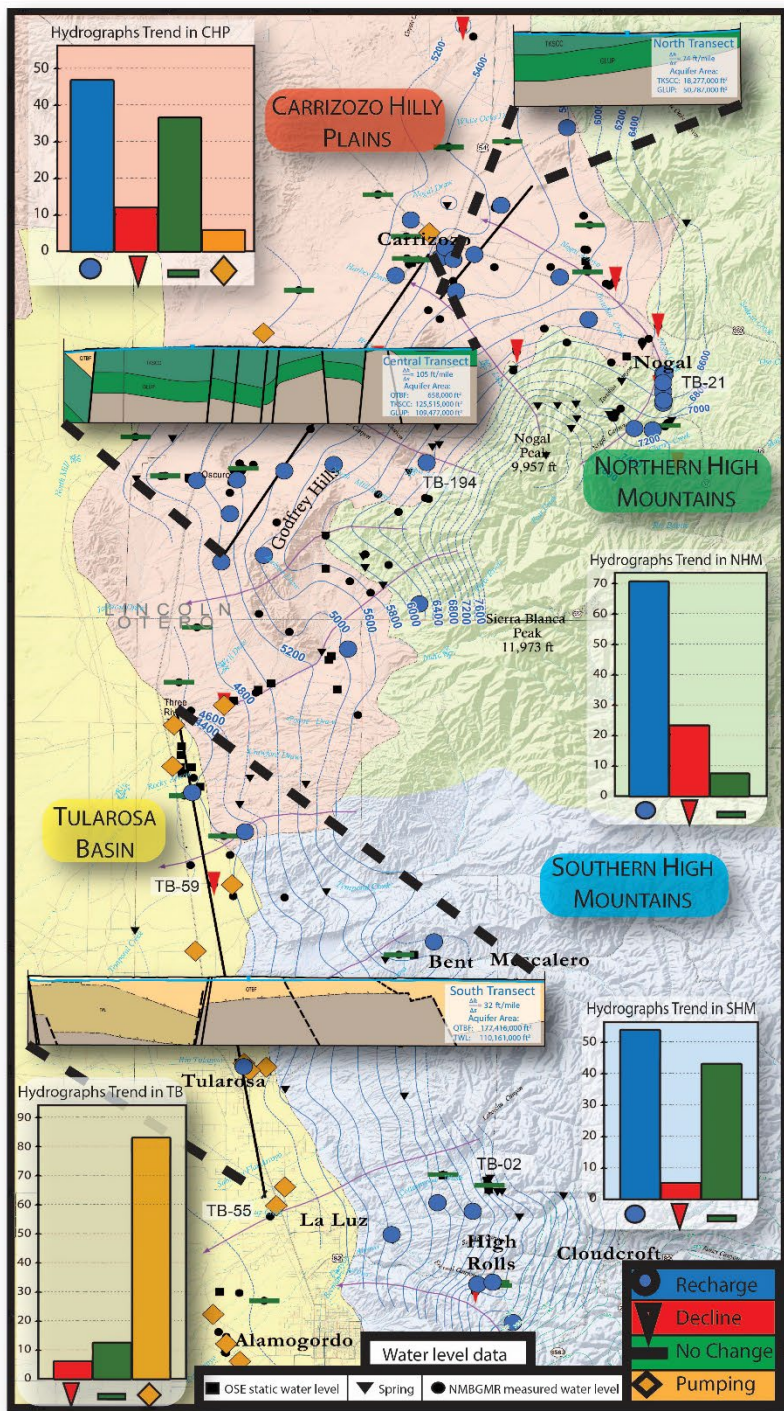
- Recharge estimates ~129,000-178,000 ac ft/yr towards Roswell Artesian Basin
- Up to 22% precipitation as recharge
- Groundwater is younger

White Sands study

- Shallow salty water table helps secure gypsum in dune field
- Pumping at the eastern portion of the Tularosa Basin does not affect water levels in the dune field because of fault zone dividing basin along the center

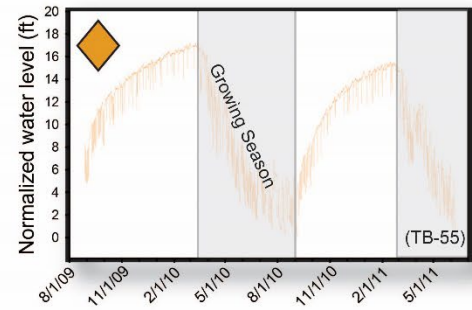
Tree Thinning Study

- Evidence that tree thinning does increase potential groundwater recharge
- Thinning suitable for settings with shallow hydrologic system
- Recommended for many reasons but not for the sole purpose to increase groundwater recharge



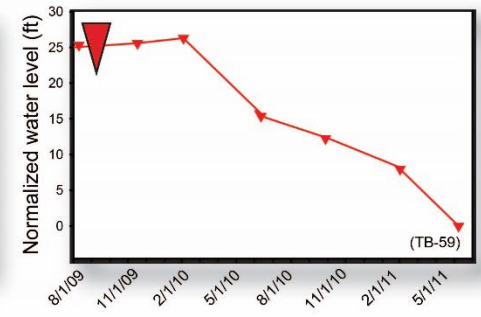
Tularosa Basin Study

Pumping Trend



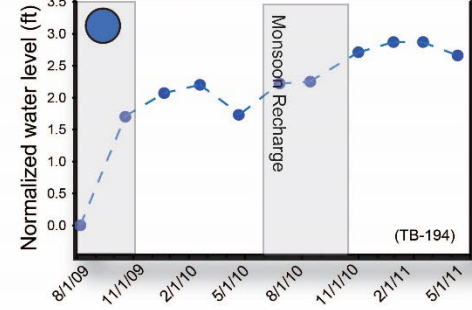
- o Follows agricultural cycle of the area
- o Mostly found in the Tularosa Basin
- o Typically screened in the basin-fill

Decline

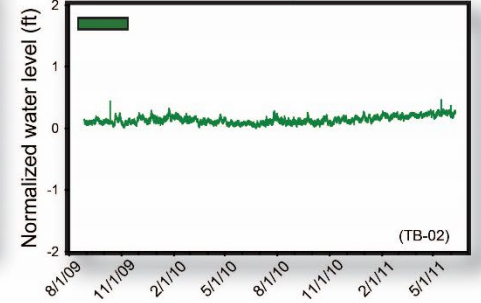


- o More than 1 ft of decline per year.
- o Average water level drop in these wells is 4.3 ft
- o Makes up 11% of hydrographs, most near Nogal

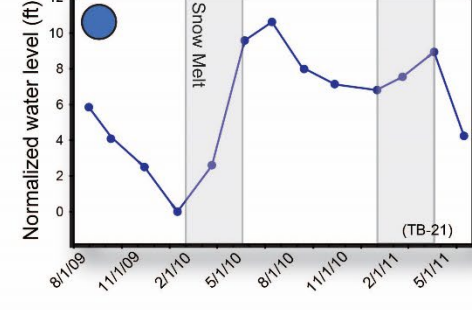
Recharge Trend: Monsoon



No Change

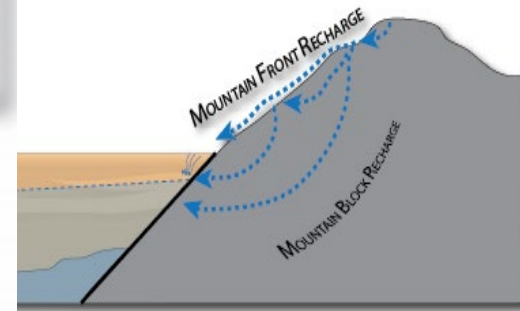


Recharge Trend: Snow Melt



- o Less than 1 ft of change per year.
- o Makes up 30% of hydrographs
- o No-Change trend mostly in CHP and SHM
- o Majority found in Gallup Sandstone

- o Monsoon precipitation shows a rebound in water levels during summer monsoon (CHP, and SHM)
- o Some wells show recharge from snow melt during spring (NHM)
- o Generally found in High Mountains (80% found above 6000 ft)



Carrizozo Regional Hydrogeology Study

- Data Compilation from previous research
- Map series showing well locations and well use over time
- Initiate groundwater monitoring study in the area with continuous monitoring devices
- Identify data gaps and recommendations for improved understand of hydrogeology
- Compile data into a map package to understand water resources in the area

