



Groundwater Level Monitoring

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A Research Division of New Mexico Institute of Mining and Technology

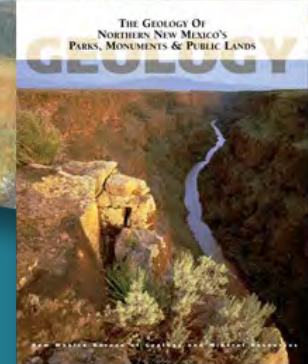
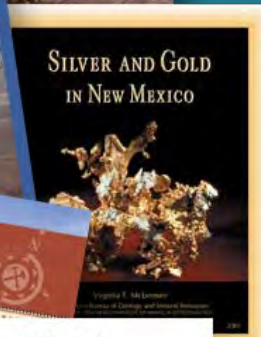
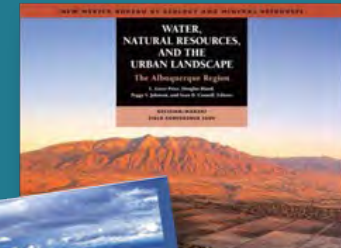


New Mexico Bureau of Geology and Mineral Resources

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)



Aquifer Mapping Program 2021

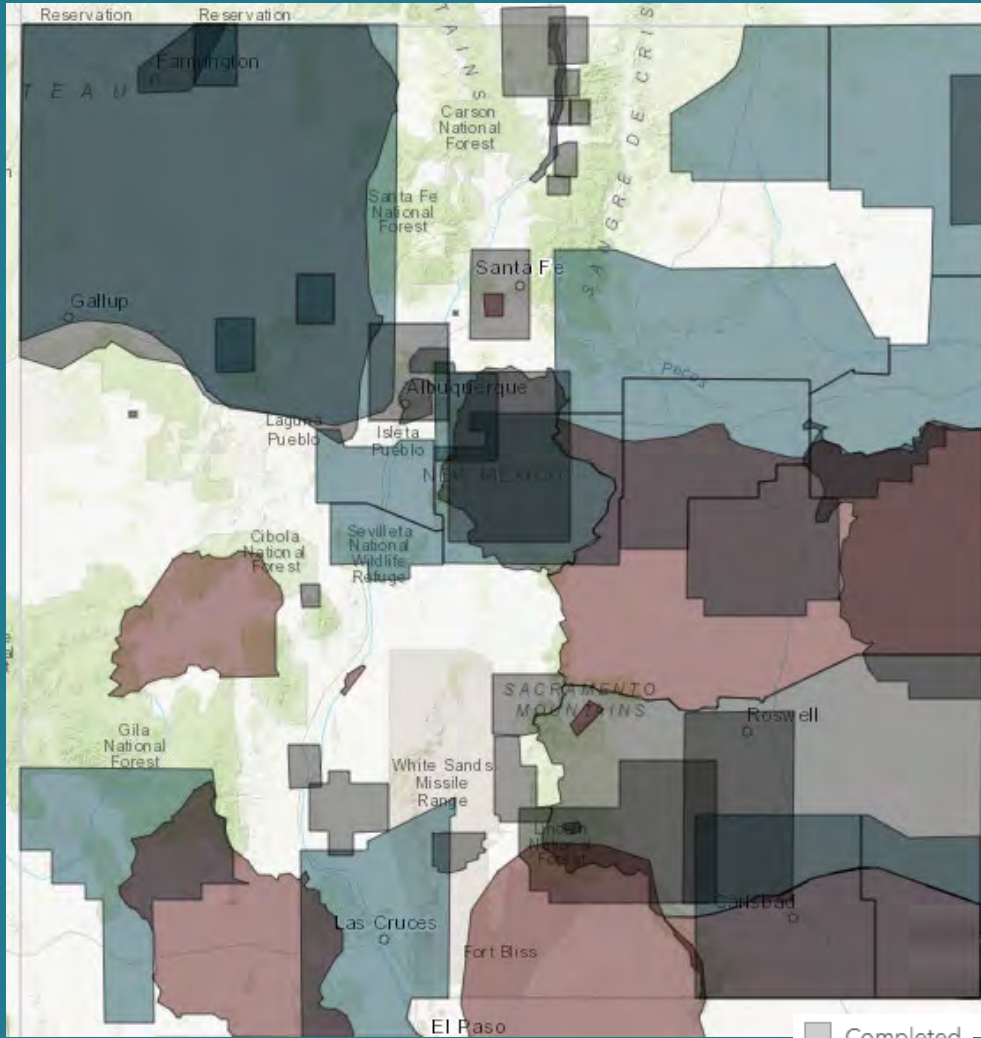
Current projects

- Salt Basin hydrologic Assessment
- Aquifer map 3D visualizations (Healy Foundation)
- Mapping suitability for Managed Aquifer Recharge, Albuquerque Basin (Albuquerque-Bernalillo County Water Utility Authority)
- **Healy Collaborative Groundwater Monitoring Network (Healy Foundation)**

Recent projects

- Animas River aquifer long term monitoring (NMED-EPA funding)
- Mimbres Basin Hydrogeology (NMBG, Healy Foundation)
- Groundwater level monitoring in La Cienega (Las Golondrinas – community)

(Primary funding sources in parentheses)

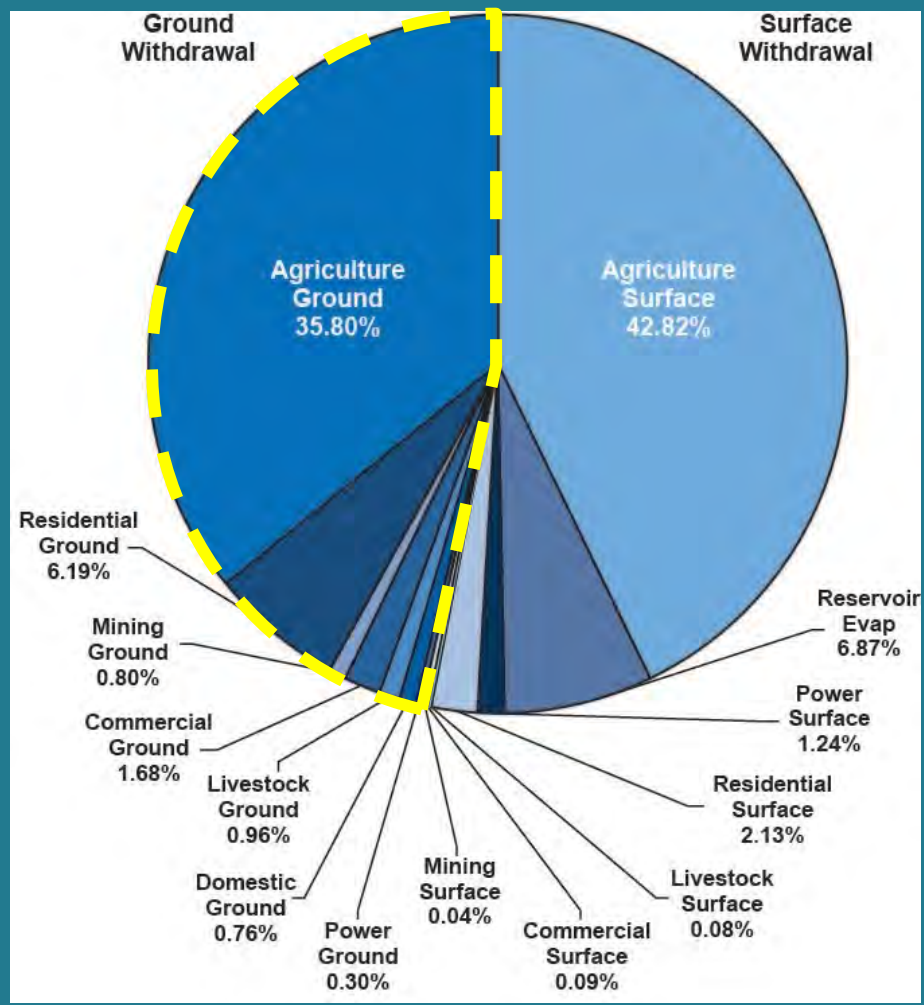
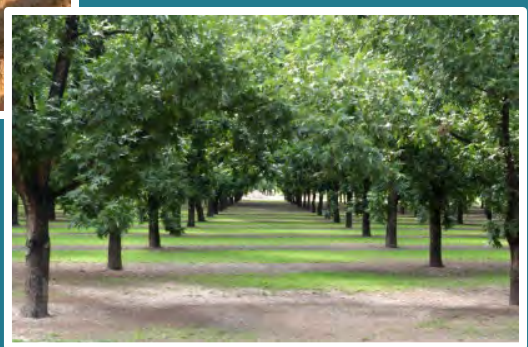


geoinfo.nmt.edu/resources/water/projects

Grey square	Completed
Red square	Ongoing
Blue square	historic

Water use in New Mexico

- Surface water 55%
- Groundwater 45%

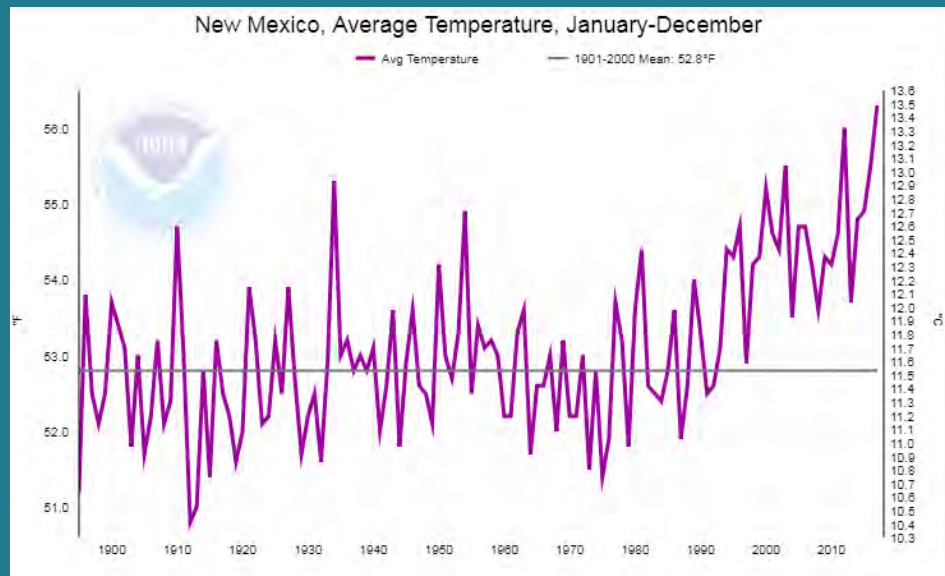


Water use in 2010 from Longworth et al., 2013

Future of water in New Mexico

A MORE ARID Southwest

- Warmer temperatures (5-7°C) in next 100 years
- Increased sublimation, evaporation & transpiration rates
- Significant reduction in surface water
- Reduction of recharge to groundwater
- Longer growing season
- Increase demand on *groundwater!*



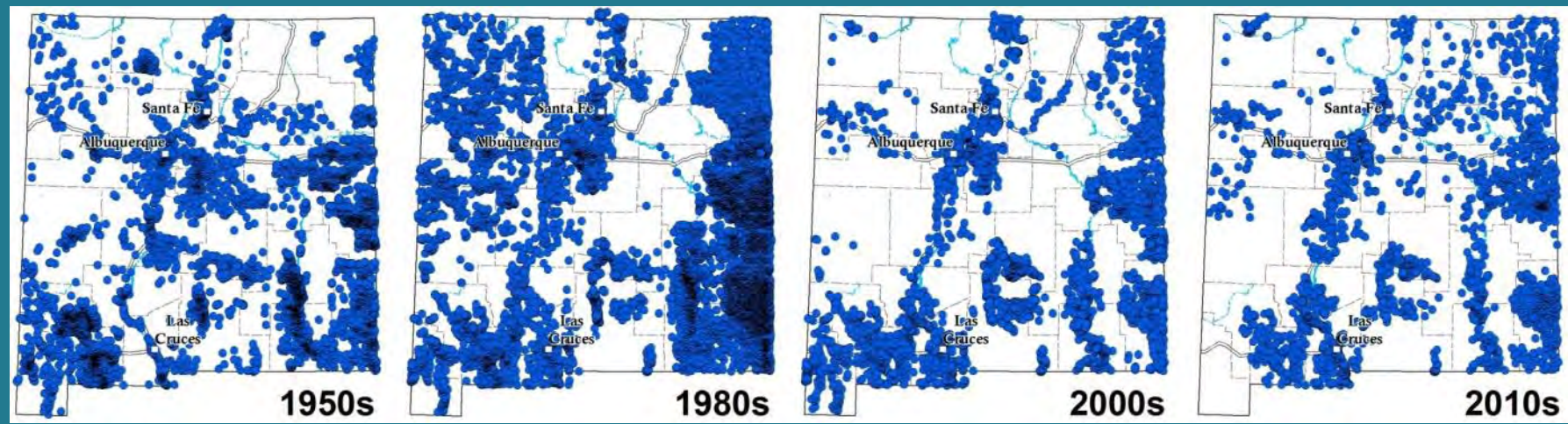
Udall and Overpeck, 2017

The twenty-first century Colorado River hot drought and implications for the future

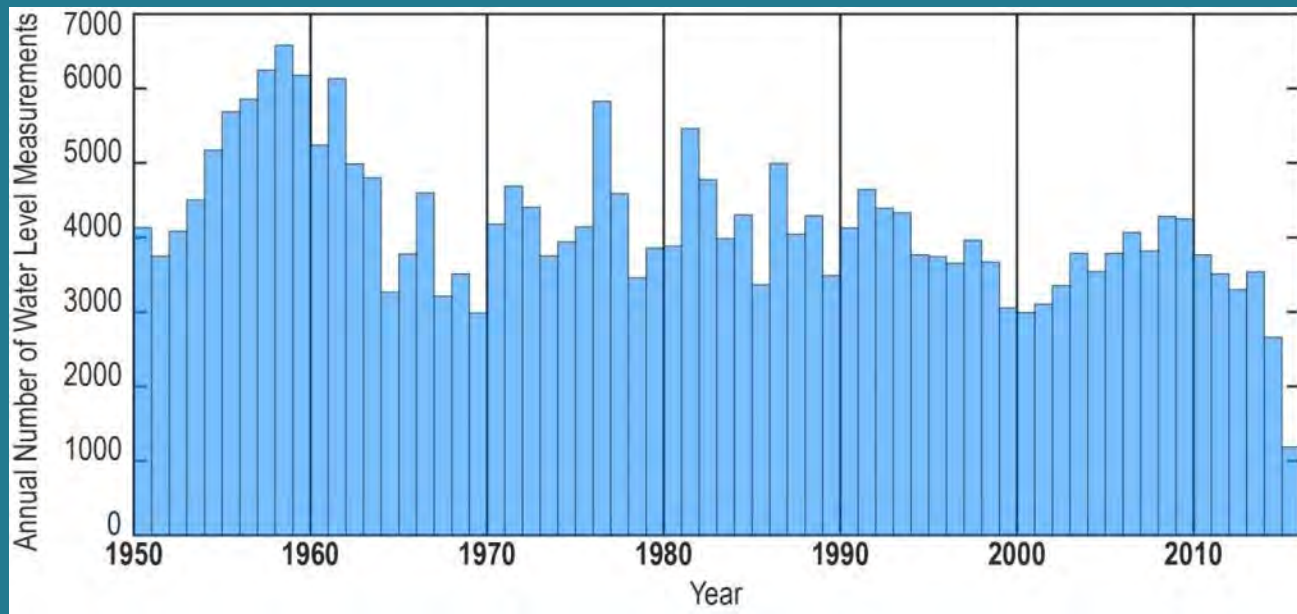
<https://rdcu.be/bbn9d>

<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016WR019638>

Fewer groundwater level measurements



- Coverage of water level measurement has gotten smaller
- Fewer measurements have been collected in recent decades

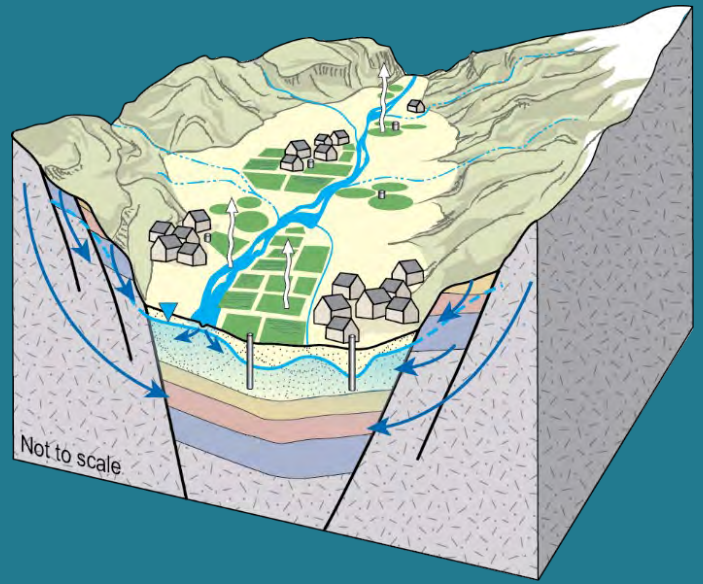


Groundwater level measurements from USGS and NMBGMR

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!



OVERDRAFT

Healy Collaborative Groundwater Monitoring Network

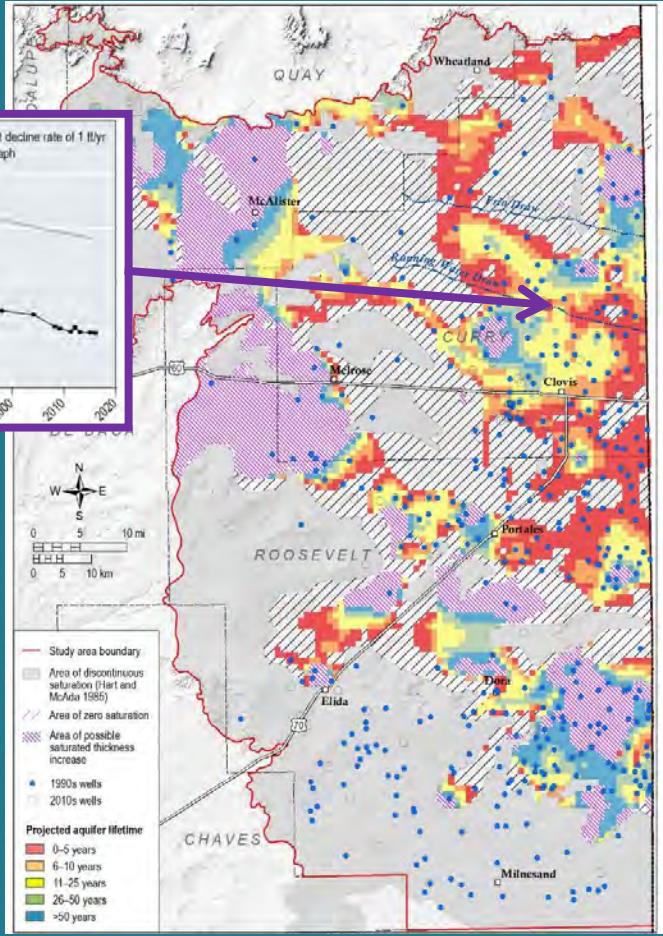
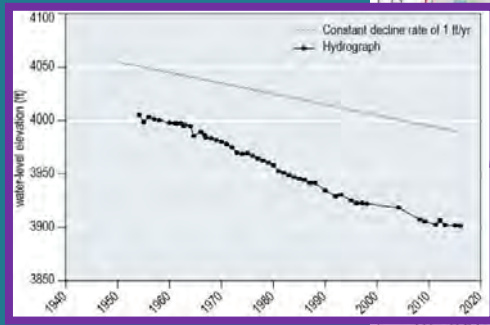
Using data to face our water-limited reality

- Groundwater levels track multiple different influences
 - Pumping
 - Land use
 - Changes to recharge

- We can follow the **TRENDS** - keeping an eye on the "account balance"

- Long term trends can be used to face the future climate (i.e. Lifetime mapping)

- With geologically complex state, we need even more data



Red = 0-5 years remain!

Healy 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

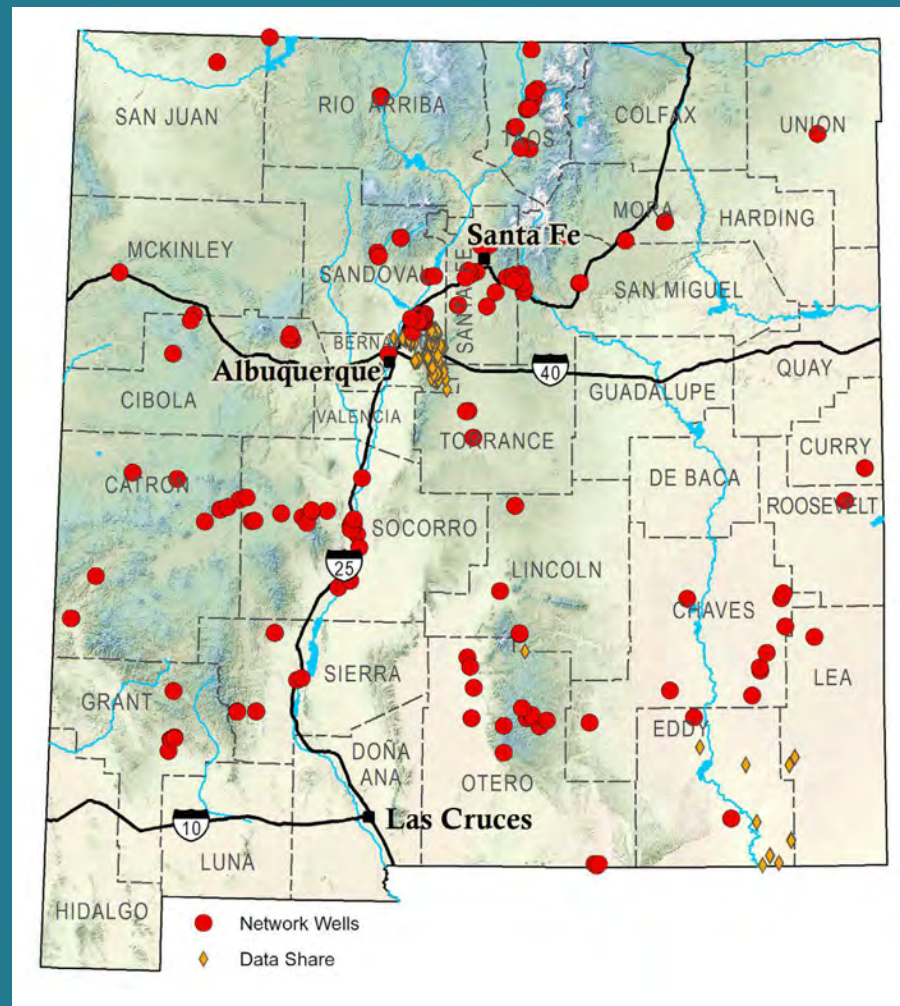
- Groundwater level data collection
 - Our early warning system!
 - Compile and link data
- Training and education
 - NM Rural Water Association annual meetings
 - Invited presentations
 - How and why we measure groundwater levels
- Data archiving and access
 - Interactive webmap (maps.nmt.edu)
 - MS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



Healy Collaborative Groundwater Monitoring Network

CURRENT STATUS

- Filling the spatial and temporal gaps
 - 90 continuous monitored wells
 - 86 wells monitored manually
 - 538 wells share data
 - **713 total wells**
- Collaborating with many other agencies / groups to prevent data duplication and promote outreach
- Some of these sites are shared to USGS National Groundwater Monitoring Network
- Water level data shared and integrated with other state agency water data under the Water Data Act



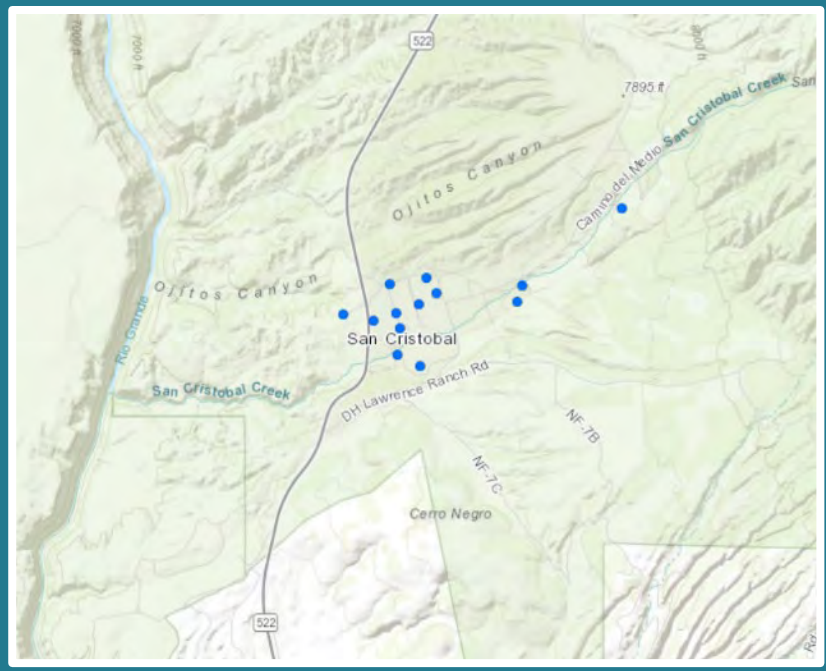
Data Sharing

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

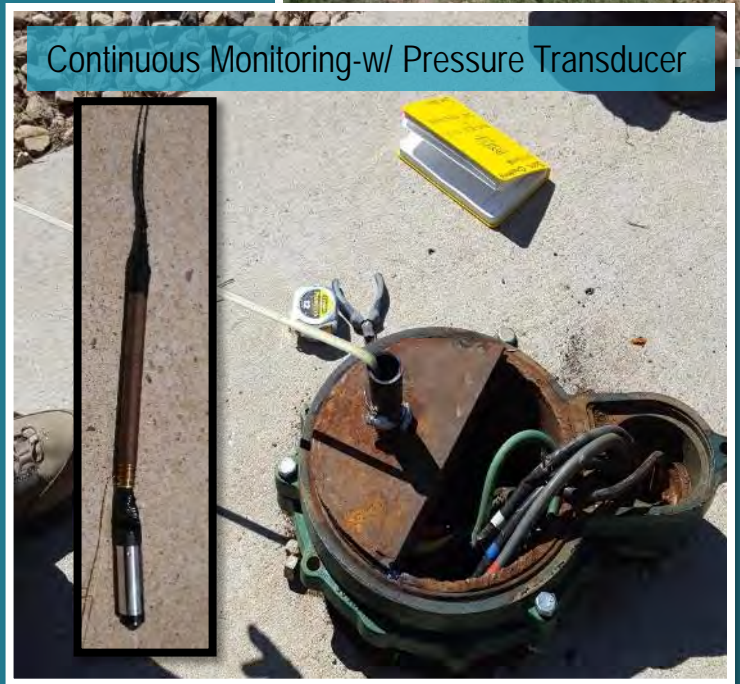


Well Sharing

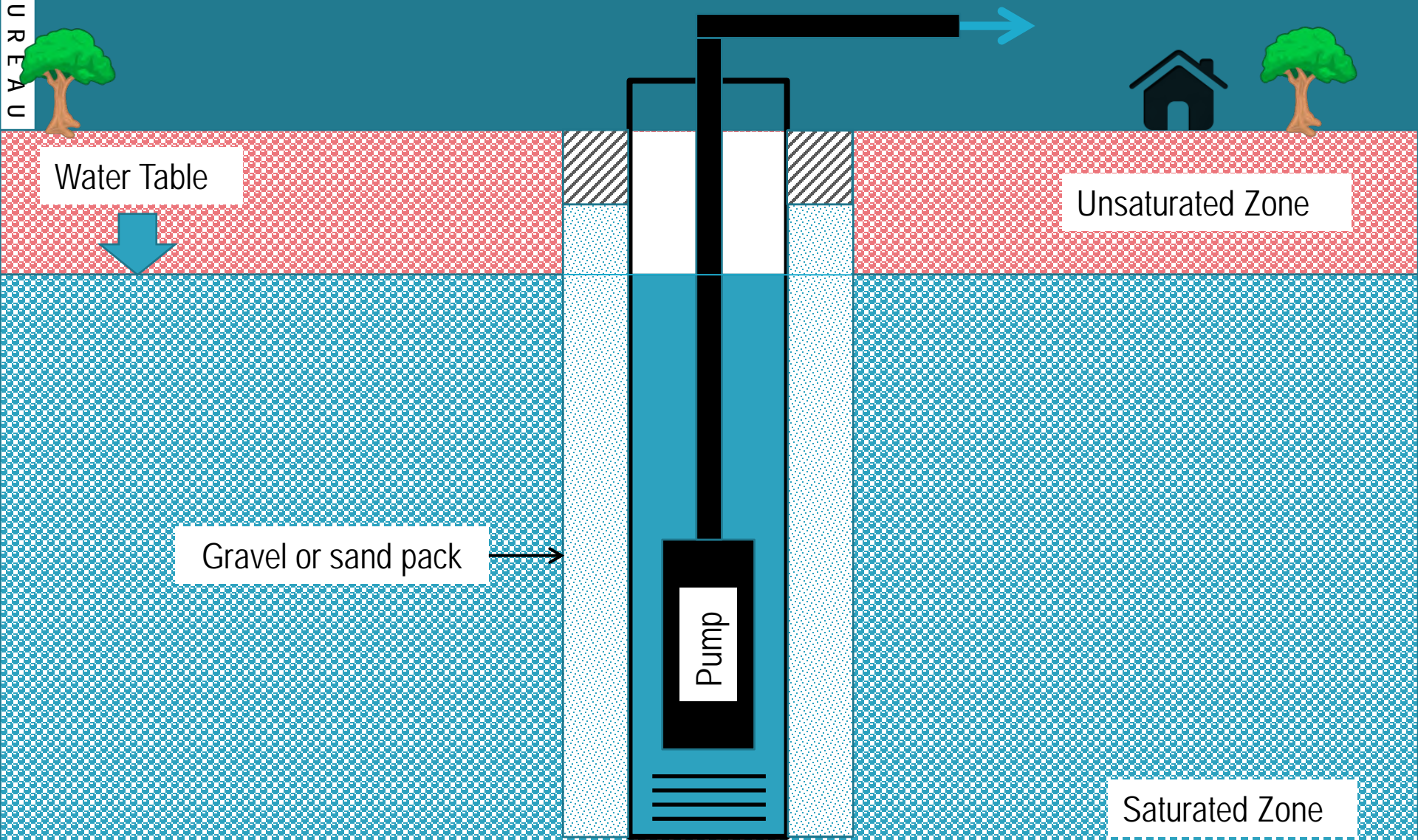


NMBGMR collects data: **FOR FREE!!!**

1. Community-organized network
2. RURAL public or private well continuous monitoring, targeting gaps in monitoring.
3. OR we collect manual measurements, if continuous monitoring is not an option.



Unconfined Aquifer



Water Table

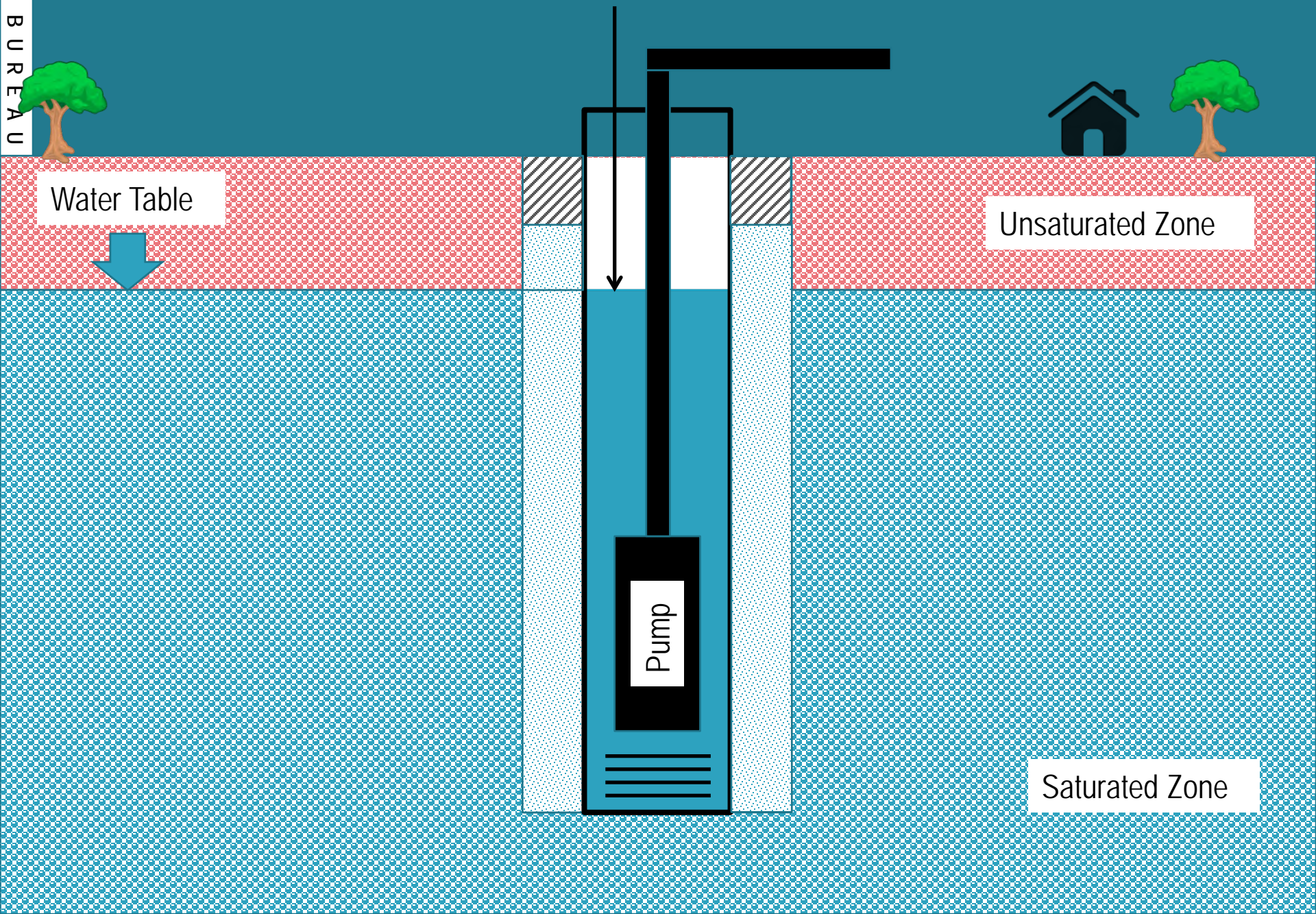
Unsaturated Zone

Gravel or sand pack

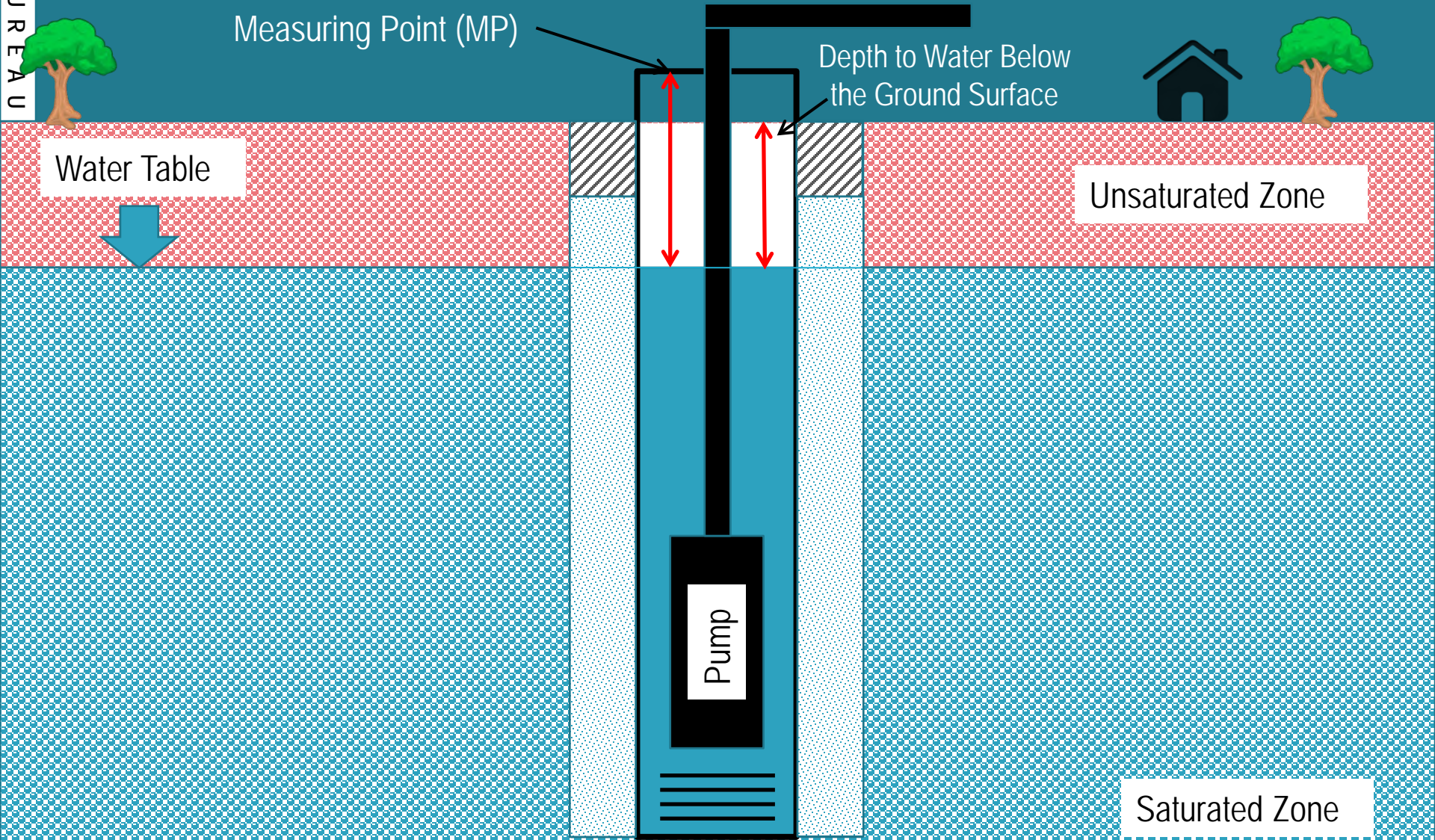
Pump

Saturated Zone

Static water level



Static water level Measurement



Measuring Point (MP)

Depth to Water Below
the Ground Surface

Water Table

Unsaturated Zone

Saturated Zone

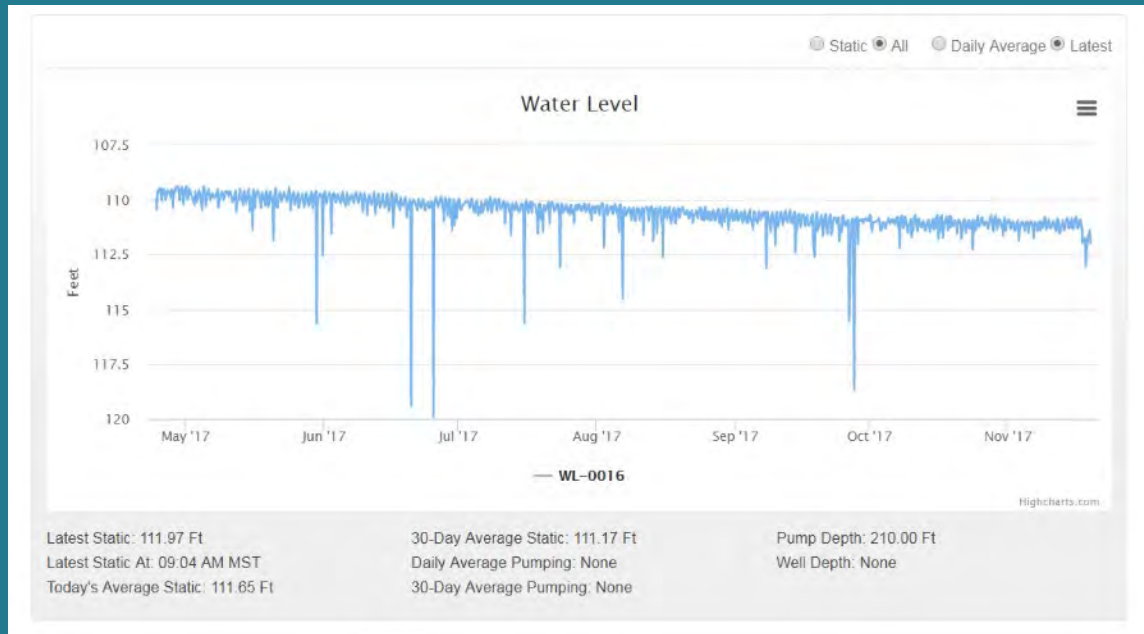
Pump



Equipment

We are utilizing

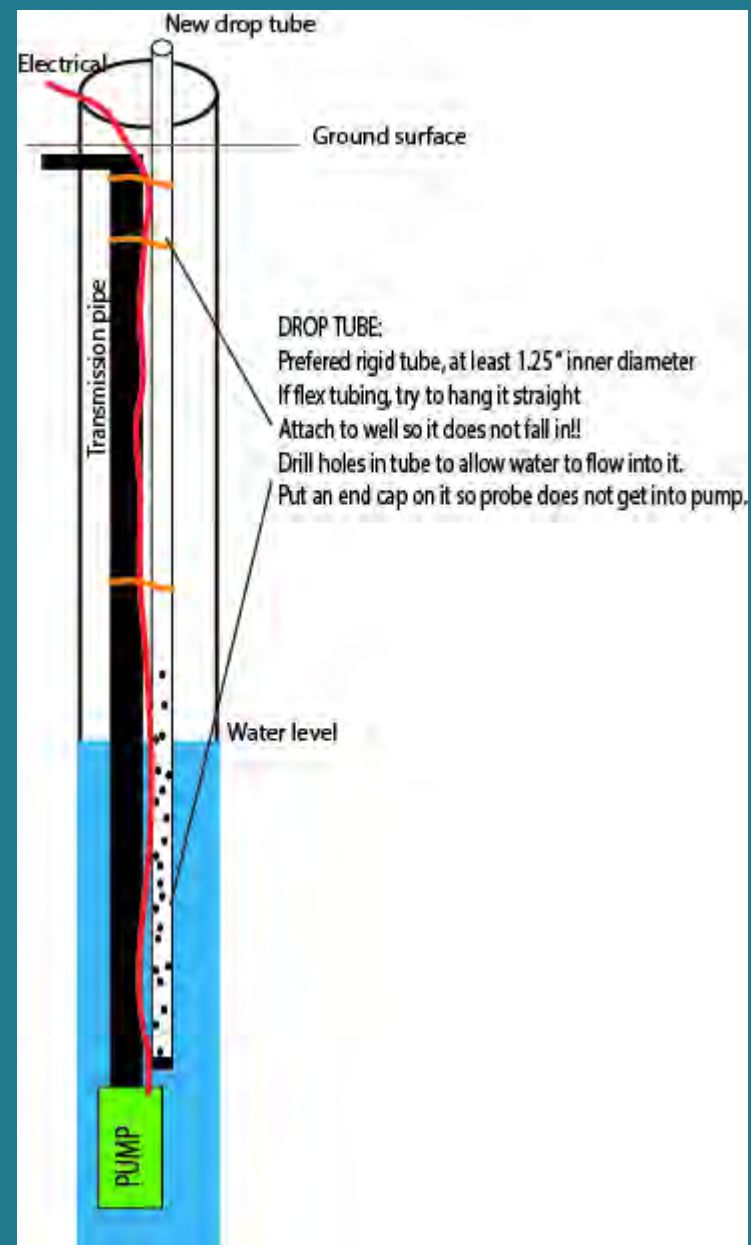
- WellIntel - continuous monitoring
- Pressure transducers- continuous monitoring
- E-probe- manual measurements
- Steel tape- manual measurements
- Sonic – manual measurements

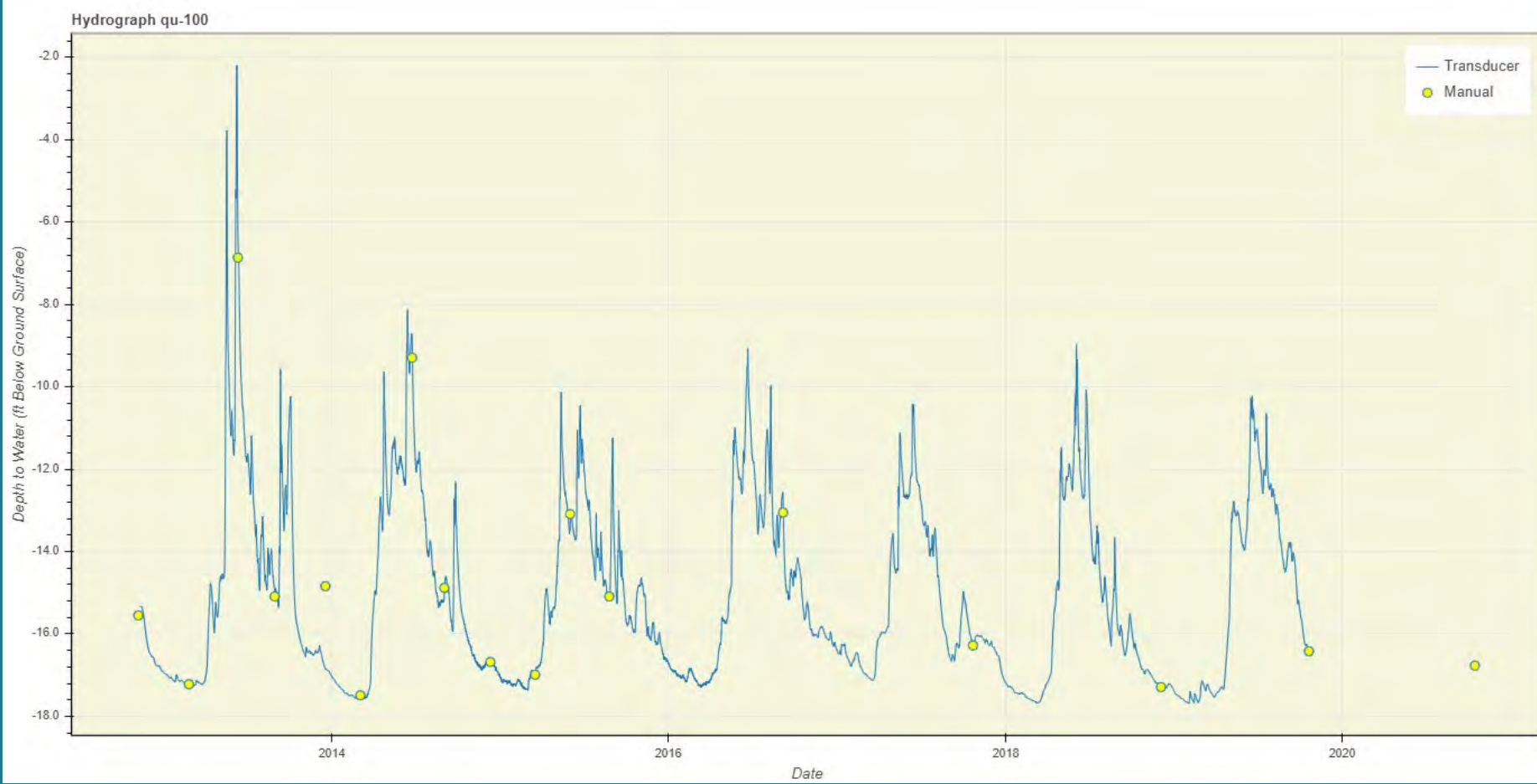


Possible modifications

Getting a new pump or well??

- Have a driller install a drop tube, especially for deeper wells
- Use a rigid tube attached to transmission pipe down to pump
- Requires driller to pull pump and reset it with new drop tube attached
- Can use E-probe with this, or dedicated data logger

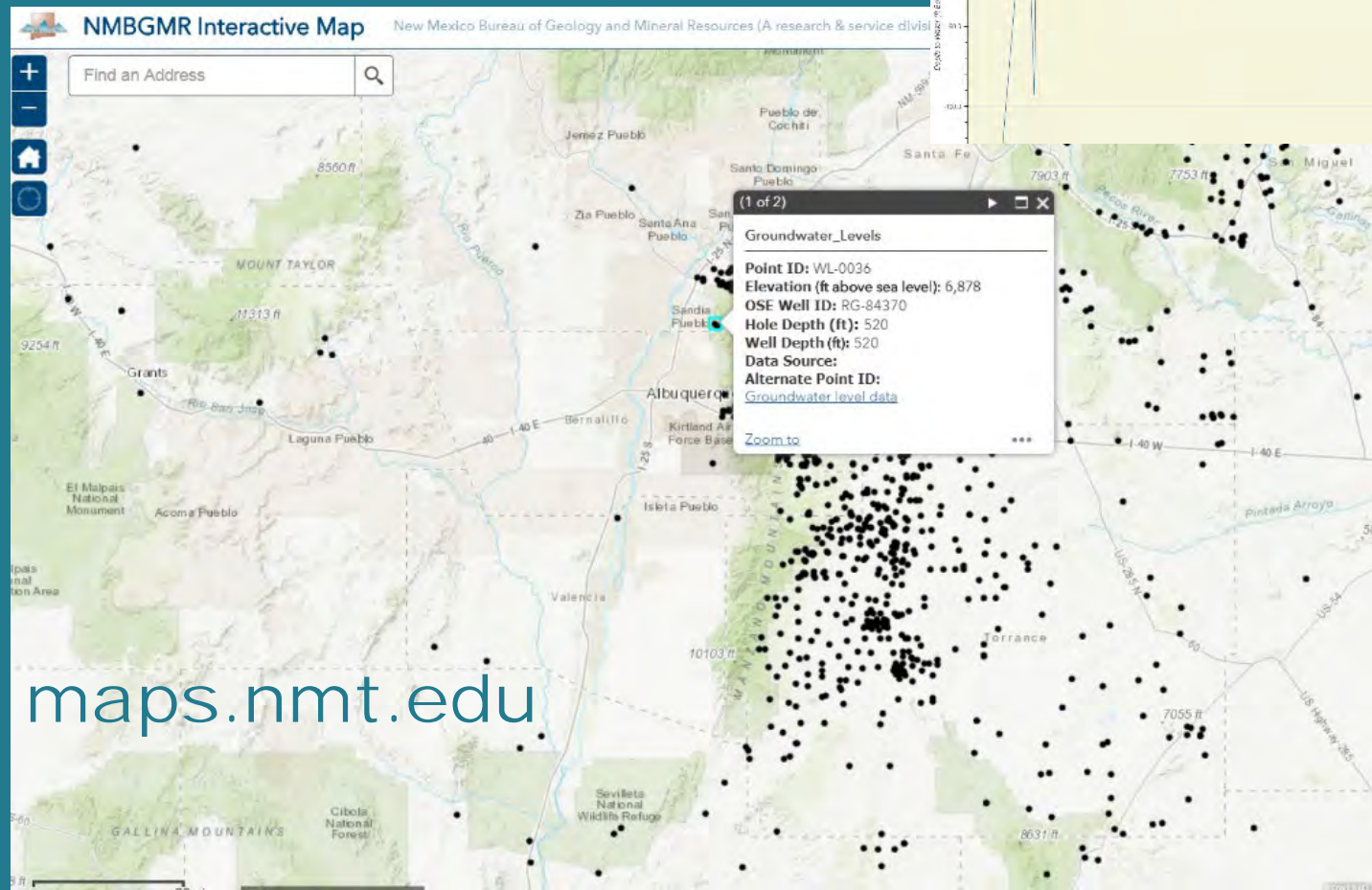
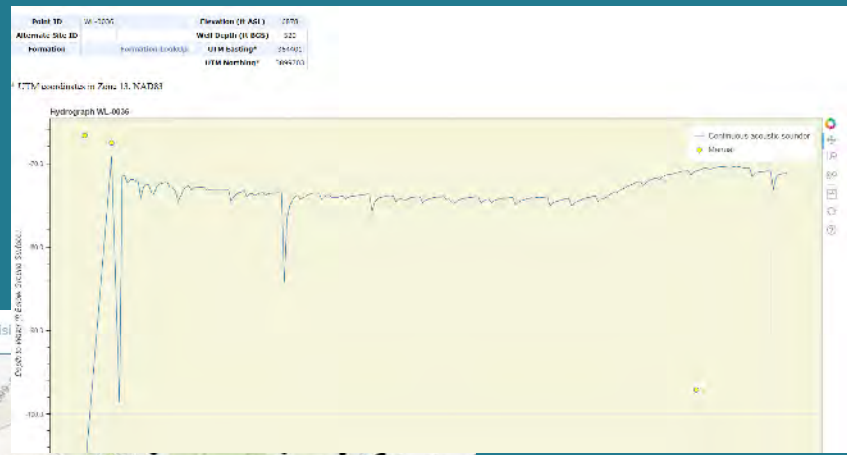




Source: Healy Collaborative Groundwater Monitoring Network
New Mexico Bureau of Geology and Mineral Resources

Where are we going with this?

- Public groundwater data for greater visibility
- Webmap – making data accessible
- Improve groundwater awareness and public education



Healy Collaborative Groundwater Level Monitoring Network

We are seeking well cooperators to:

1. Measure and submit accurate water level measurements to NMBGMR database
2. Allow NMBGMR staff to perform site visit, and if well is appropriate, instrument with measurement device for periodic download or manually measure annually.
3. Spread the word!!!

For more Information

Visit:

www.geoinfo.nmt.edu/resources/water/cgmn/

Or send an email to:

nmbg-waterlevels@nmt.edu

kristin.pearthree@nmt.edu

Office: (575) 835-5320

