



New Mexico Bureau of Geology and Mineral Resources

A state agency and research division of New Mexico Tech



Dr. J. Michael Timmons
Interim Director and State Geologist



About the Bureau of Geology and Mineral Resources

- Founded in 1927 through state legislation.
- A non-regulatory governmental agency (the state's geological survey) that conducts scientific investigations leading to responsible economic development of the state's mineral, water, and energy resources.
- Currently has 67 staff members at approximately 60 FTEs consisting of research scientists, professionals and permanent support staff, and emeritus staff. We also mentor and employ graduate students (12 students) and part-time undergrads (29 students).
- Two office locations: Socorro (59 staff), Albuquerque (3 staff) and remote (5 staff)
- Total Budget in FY22: Approximately 60% is hard money funding - 40% is soft money funding



Bureau's Mission

Conduct research and interact with industry and state or federal agencies to facilitate responsible development of the state's geological energy and mineral 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).

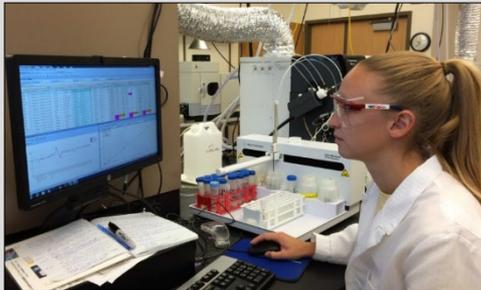
- Create accurate, up-to-date maps**
- New Mexico STATEMAP Program
 - Aquifer Mapping Program



Bureau's Mission

Provide timely information on potential geologic hazards, including earthquakes, volcanic events, soils-and subsidence-related problems, and flooding.

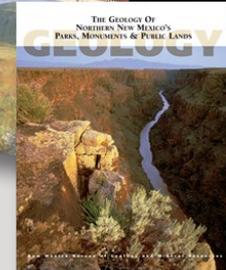
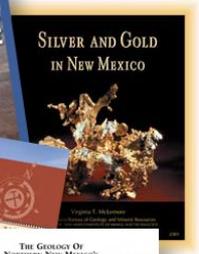
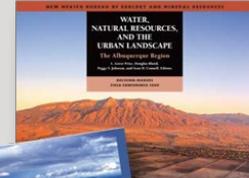
Act as a repository for cores, well cuttings and a wide variety of geological data. Provide convenient physical and internet access for New Mexicans to such resources.



Provide public education and outreach through college teaching and advising, a Mineral Museum, and teacher- and student-training programs.

Programs at the Bureau of Geology

- Geologic mapping & hazards
- Hydrogeology
 - *Aquifer Mapping Program*
 - *3D hydrogeologic models*
 - *Water Data Act implementation*
- Analytical laboratories
- Outreach and education
 - *Publications*
 - *Archives and collections*
- Energy Resources
 - *Oil/Gas*
 - *Geothermal*
 - *Uranium*
- Mineral Resources
 - *Critical and Strategic Minerals*
 - *Metals*
 - *Industrial*





New Mexico Water Data Act: An update



AUGUST 2022
STACY TIMMONS
ASSOCIATE DIRECTOR, HYDROGEOLOGY
NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES

newmexicowaterdata.org



2019 Water Data Act becomes *statute* (NMSA 1978, §72-4B)

State agencies will collaborate with regional and national efforts to SHARE, INTEGRATE, and MANAGE water data.

- **Convener:** Bureau of Geology and Mineral Resources
- Office of State Engineer
- Interstate Stream Commission
- Environment Department
- Energy, Minerals and Natural Resources Department

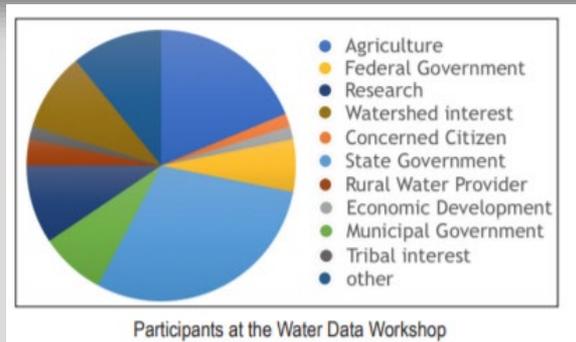


Stakeholder questions and needs drive our work toward open data

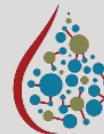


From what we have heard, the needs for data are:

- To find data in one place
- Geospatially-based data searchable using maps or locations
- Metadata to indicate sources of data, quality, and intent of data collected
- A range of users can access
- Easy access to for download and use



So far, two paths for data sharing and access



DATA CATALOG

Data are discoverable by listing data on our catalog

Open source and community driven



FEDERATED DATA MODEL

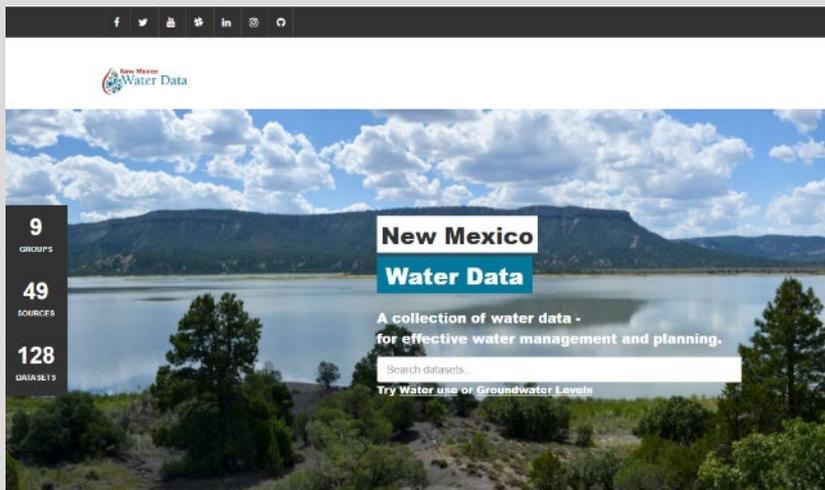
Data are shared by API, following specific data standard (OGC's SensorThings)

Applications developed using these robust and dynamic APIs



Explore the data catalog

- Initial data inventory
 - Illuminate the different data sources
 - Evaluate data readiness
- Promotes engagement
 - Feedback on data (do we have it all?)
 - Build interaction with data
- Launching point for future refinements



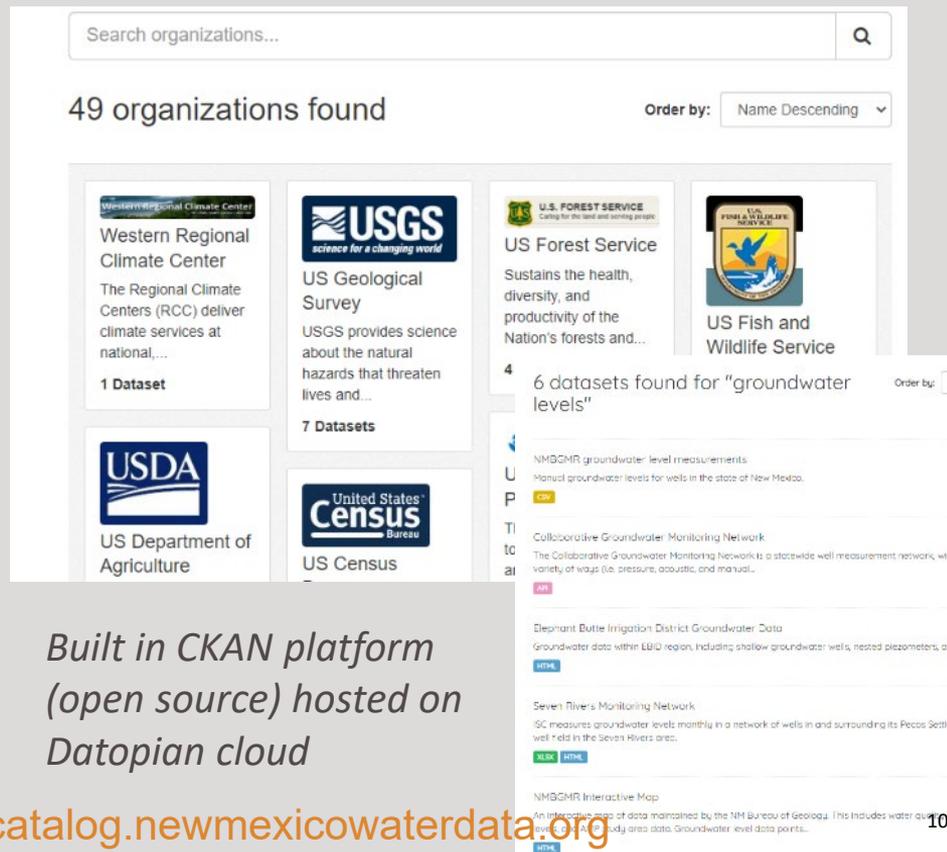
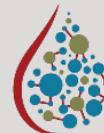
9 GROUPS
49 SOURCES
128 DATASETS

New Mexico Water Data

A collection of water data - for effective water management and planning.

Search datasets...

[Try Water use or Groundwater Levels](#)



Search organizations...

49 organizations found

Order by: Name Descending

Western Regional Climate Center
The Regional Climate Centers (RCC) deliver climate services at national,...

1 Dataset

USGS
science for a changing world
US Geological Survey
USGS provides science about the natural hazards that threaten lives and...

7 Datasets

U.S. FOREST SERVICE
Caring for the land and working people
US Forest Service
Sustains the health, diversity, and productivity of the Nation's forests and...

US Fish and Wildlife Service

USDA
US Department of Agriculture

United States Census Bureau
US Census

6 datasets found for "groundwater levels"

NMQMNR groundwater level measurements
Manual groundwater levels for wells in the state of New Mexico.

Collaborative Groundwater Monitoring Network
The Collaborative Groundwater Monitoring Network is a statewide well measurement network, with a variety of ways (i.e. pressure, acoustic, and manual).

Elephant Butte Irrigation District Groundwater Data
Groundwater data within EBD region, including shallow groundwater wells, nested piezometers, and...

Seven Rivers Monitoring Network
ISC measures groundwater levels monthly in a network of wells in and surrounding its Pecos Settlement well field in the Seven Rivers area.

NMQMNR Interactive Map
An interactive map of data maintained by the NM Bureau of Geology. This includes water quality and groundwater level data points.

catalog.newmexicowaterdata.org

*Built in CKAN platform
(open source) hosted on
Datopian cloud*

catalog.newmexicowaterdata.org 10

Example: Water quantity data



Groups / Water Quantity

Datasets Activity Stream About

Search datasets...

35 datasets found Order by: R

Water Quantity
Data describing how much water is available, such as measurements of groundwater levels, reservoir levels, aquifer properties, or stream flow. [read more](#)

Followers **2** Datasets **35**

[Follow](#)

Organizations

Show More New Mexico Office o... **0**

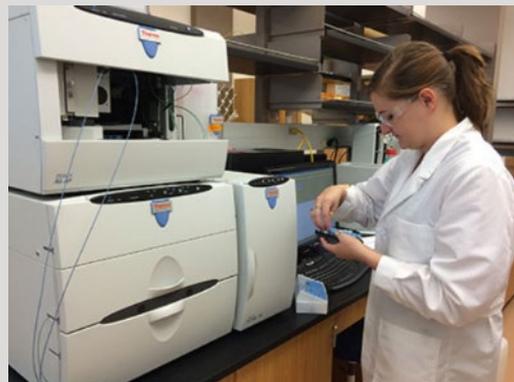
New Mexico Bureau o... **7**

Pecos Valley Artesian Conservancy District Water Data
The Pecos Valley Artesian Conservancy District (PVACD) website for water level reports, graphs and more. [HTML](#)

City of Albuquerque Groundwater level data API
Groundwater level data for monitoring wells in Albuquerque, collected by City of Albuquerque. [API](#)

Public Water Supply areas
The Public Water Suppliers (PWS) geospatial shapefiles are a dataset of non-transient PWS locations, th areas, and the locations of their supply sources... [GeoJSON](#) [TXT](#) [ZIP](#) [cskg](#)

Example: Water quality data



Home / Groups / Water Quality



[Datasets](#) [Activity Stream](#) [About](#)

Search datasets...

40 datasets found Order t

Water Quality
Data related to the chemical or biological condition of the water, such as chemistry measurements, field parameters or ecological data. [read more](#)

Followers: **1** Datasets: **40**
[Follow](#)

Organizations

- Show More** New Mexico Environ... **11**
- New Mexico Bureau o... **6**
- US Environmental Pr... **4**

NM Water System Sample Results Non-TCR 2019
These are non-TCR (Total Coliform Rule) samples for water systems around the state of New Me
[XLSX](#) [XML](#)

NMED GWQB Agriculture Discharge Permits
Permits are issued for five year terms and must be renewed to provide continuous coverage. Thi
as more permits are issued. Currently the section...
[HTML](#)

NMED GWQB Voluntary Remediation Sites
The Remediation Oversight Section encourages and oversees voluntary efforts to clean up conte
administers the Ground and Surface Water Protection Regulations...
[HTML](#)

NMED Public Water Systems Search
Application allowing the search of public water systems for water supply in NM.

Water data challenges are big, but not impossible!



Funding

Staffing at state agencies:

- Short and long term staffing needs
- Build data literacy
- Grow internal technical skills

Infrastructure:

- Upgrades to data systems for modernizing data management

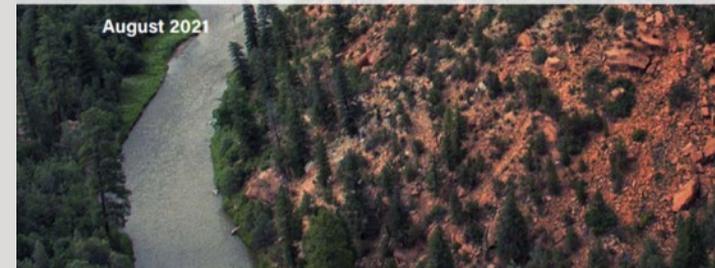
Data gaps

- A. Groundwater data
- B. Water use data
- C. Inaccessible paper records



New Mexico
Water Data

**A Summary of
Stakeholder Perspectives
on New Mexico's
Water Resources and
Data Needs 2021**

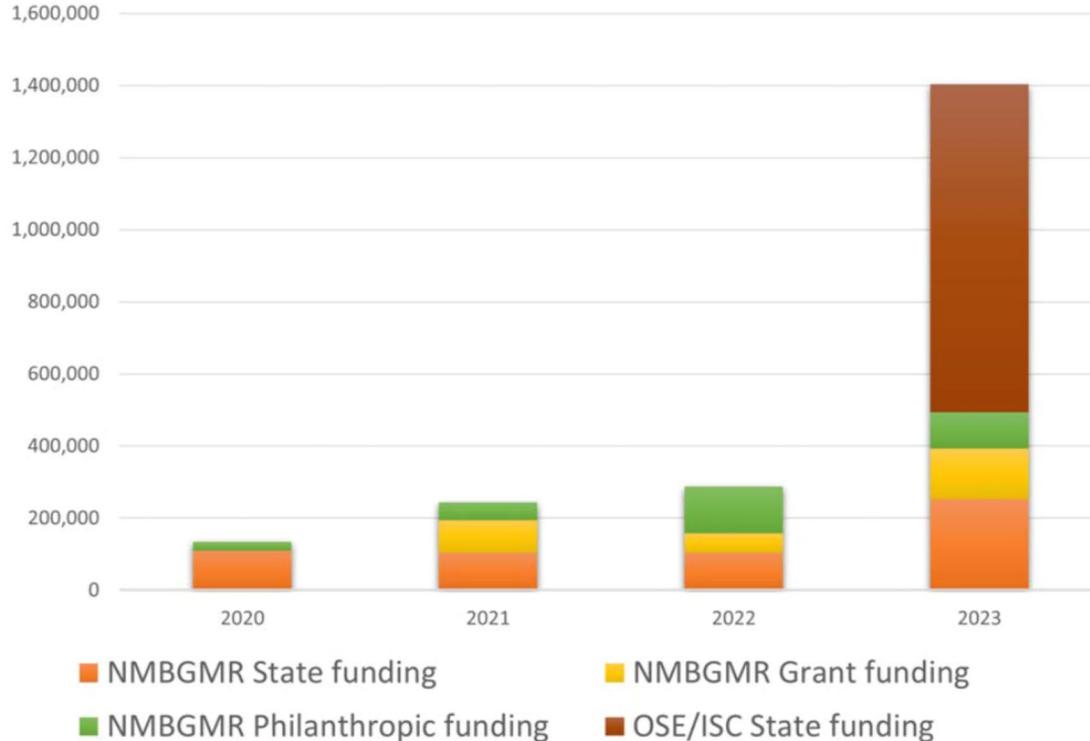


August 2021

Funding has grown this year thanks to NM legislature



Funding for Water Data Act

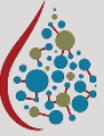


New state funding in FY2023 to NMBGMR and OSE/ISC

- NMBGMR: \$250,000 annually recurring
- OSE/ISC: \$410,000 annually recurring; \$500,000 non-recurring

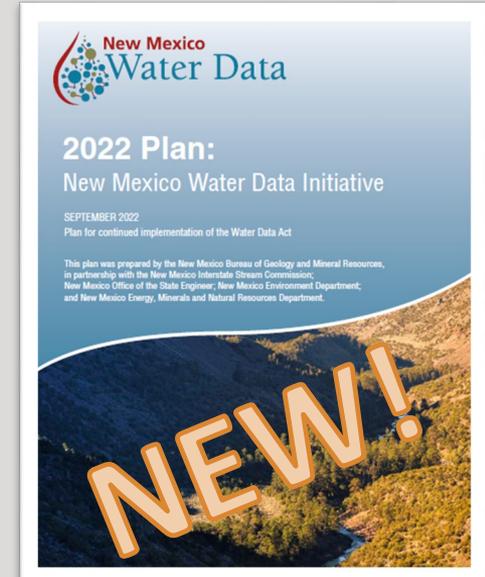
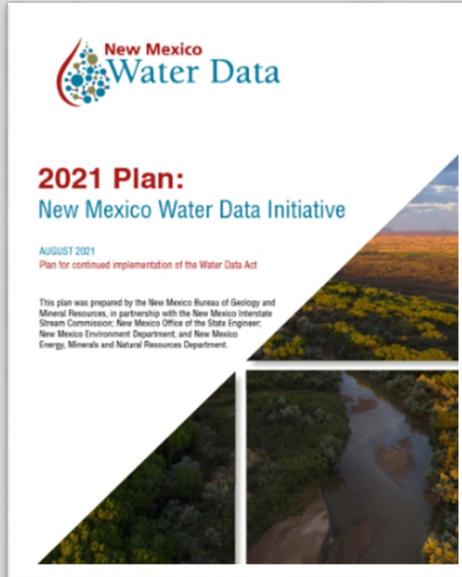
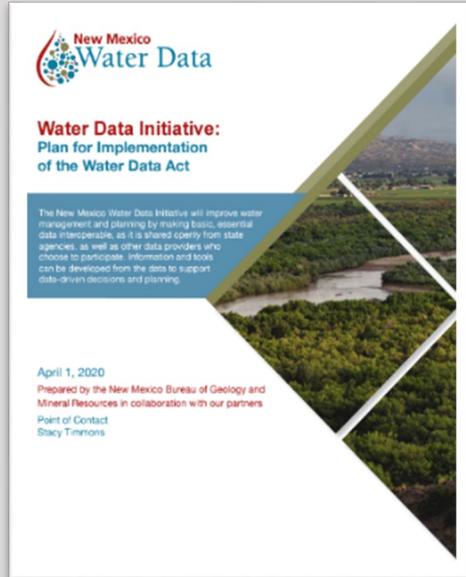
Opportunities for state funding to be leveraged additional federal funding, such as:

- U.S. Bureau of Reclamation WaterSMART Program
- U.S. EPA Environmental Information Exchange Network



Looking ahead for NM Water Data Initiative

- See Handout - Water Data Plan for 2022, as required by statute annually
- Shared to the Governor's office and interim legislative committees



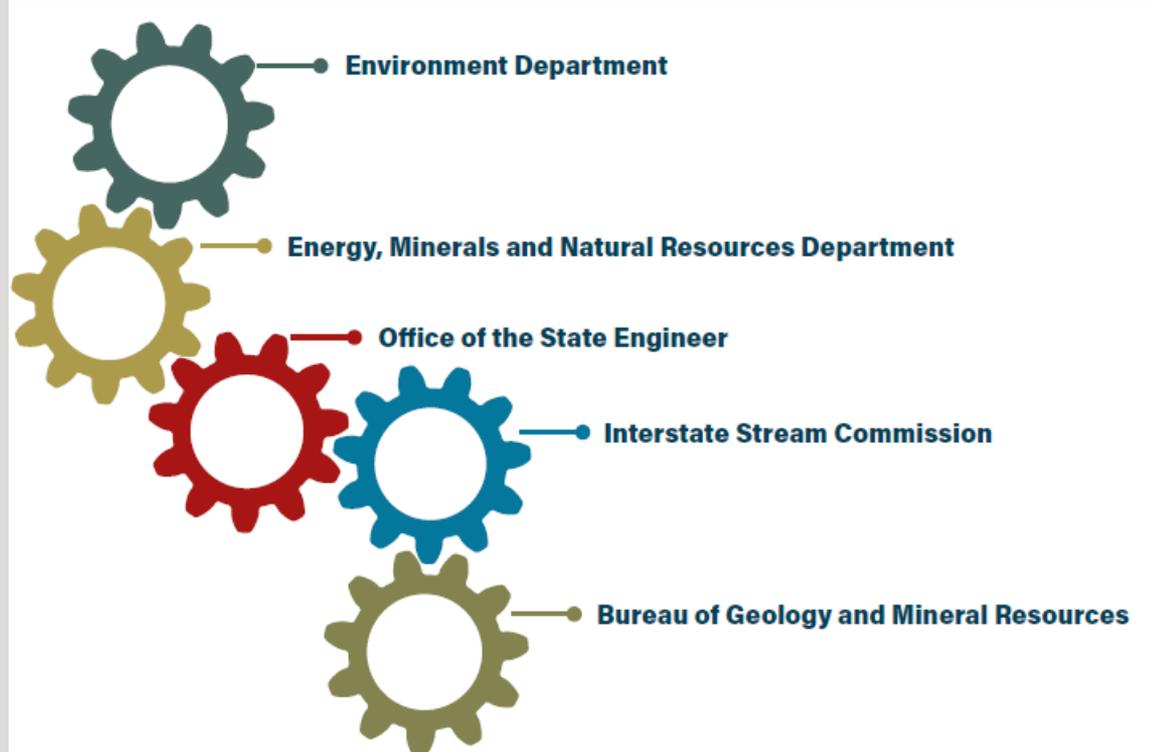
Budget needs identified in 2022 Water Data Plan

For the five agencies in the Water Data Act

Total Annual Recurring Funding
Goal
\$2 .65M

Total Non-Recurring Funding
Goal \$6.5M

See handout pages 7-8





Environment Department

The Environment Department plans to develop, implement, and support technology infrastructure to improve the agency's water data collection, data management, data documentation, and data access through application programming interfaces. This work will be supported by five divisions within the NMED that collect or maintain water data.

Staffing Need

- 5 FTEs (2 in IT section, 2 in Water Protection Division, 1 in Resource Protection Division)

Funding Requirements

- Annual recurring estimate: \$725K
- Non-recurring estimate: \$1M

Energy, Minerals and Natural Resources Department



The Energy, Minerals and Natural Resources Department plans to make improvements to automate data compilation/collection; build structured, standardized databases; and develop/maintain data access points using application programming interfaces. This work will be supported by three divisions of EMNRD that collect water data.

Staffing Need

- 2 FTEs (IT section), plus other contract or temporary staff

Funding Requirements

- Annual recurring estimate: \$250K
- 5-year non-recurring estimate: \$1.9M

Office of the State Engineer and Interstate Stream Commission



In order to fully engage in the Water Data Act, the OSE/ISC, with a shared IT department, needs to develop, implement, and support improvements in water data collection, data management upgrades, and data sharing capabilities. New funding is essential to expand staff capacity, get paper data in an electronic and accessible format, and support essential technology infrastructure to improve inter- and intra-agency water work within numerous bureaus and district offices.

Staffing Need

- 10 FTEs (in IT services and OSE/ISC management positions)

Funding Requirements

- **Recurring funding received for FY23: \$410K**
- **Non-recurring funding received for FY23: \$500K**
- Additional annual recurring estimate: \$1.175M
- Additional 5-year non-recurring estimate: \$3.3M

Bureau of Geology and Mineral Resources

(under Higher Ed at NMT)



The Bureau of Geology and Mineral Resources serves as the convening agency of the Water Data Act, coordinating all the water data agencies, working with regional and national water data efforts, reporting and planning, and hosting numerous data services. Additionally, the NMBGMR collects and maintains water data about streams, springs, and aquifers as part of the Aquifer Mapping Program. This funding estimate includes both roles: convening the Water Data Act and as a data provider.

Staffing Need

- 6 FTEs (in IT services, support, and management positions)

Funding Requirements

- **Recurring funding received for FY23: \$250K**
- Additional annual recurring estimate: \$500K
- 2-year non-recurring estimate: \$300K

Looking ahead for NM Water Data Initiative



Data access and analytical tools in development now using APIs

Query Builder
SensorThings Servers
<https://st2.newmexicowaterdata.org/FROST-Server/v1.1/#1>

Spatial Query
Polygon

Observed Property
Depth to Water Below Ground Surface

SUBMIT

Locations

<input type="checkbox"/>	Name	Description
+ <input type="checkbox"/>	EB-025	Location of well where measurements are made
+ <input type="checkbox"/>	EB-026	Location of well where measurements are made
+ <input type="checkbox"/>	EB-027	Location of well where measurements are made
+ <input type="checkbox"/>	EB-028	Location of well where measurements are made
+ <input type="checkbox"/>	EB-029	Location of well where measurements are made
+ <input type="checkbox"/>	EB-030	Location of well where measurements are made

SUBMIT

Tools

EXPORT LOCATIONS

EXPORT DATASTREAMS

Things

Datastreams

Map
Map showing well locations (blue circles) overlaid on a geographic area. The map includes labels for 'Wine Valley Park', 'Lincoln National Forest', and 'OpenStreetMap contributors'.

Thanks to our collaborators and supporters

- Staff contribution and management support at OSE, ISC, NMED, EMNRD, NMBGMR and NMT
- Funding from State of New Mexico, Healy Foundation, U.S. Bureau of Reclamation (WaterSMART), Thornburg Foundation
- Collaboration from Internet of Water Coalition, Sandia National Laboratories, Earth Data Analysis Center at UNM, Datacequia, Sol Web Solutions, WellIntel, and Moxiecran Media
- Tremendous legislative support for water data funding
- We appreciate our regional collaborators, data providers and advocates for water data!



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