

Groundwater Science, Management, and Dispute Resolution in the Lower Rio Grande



April 22, 2026

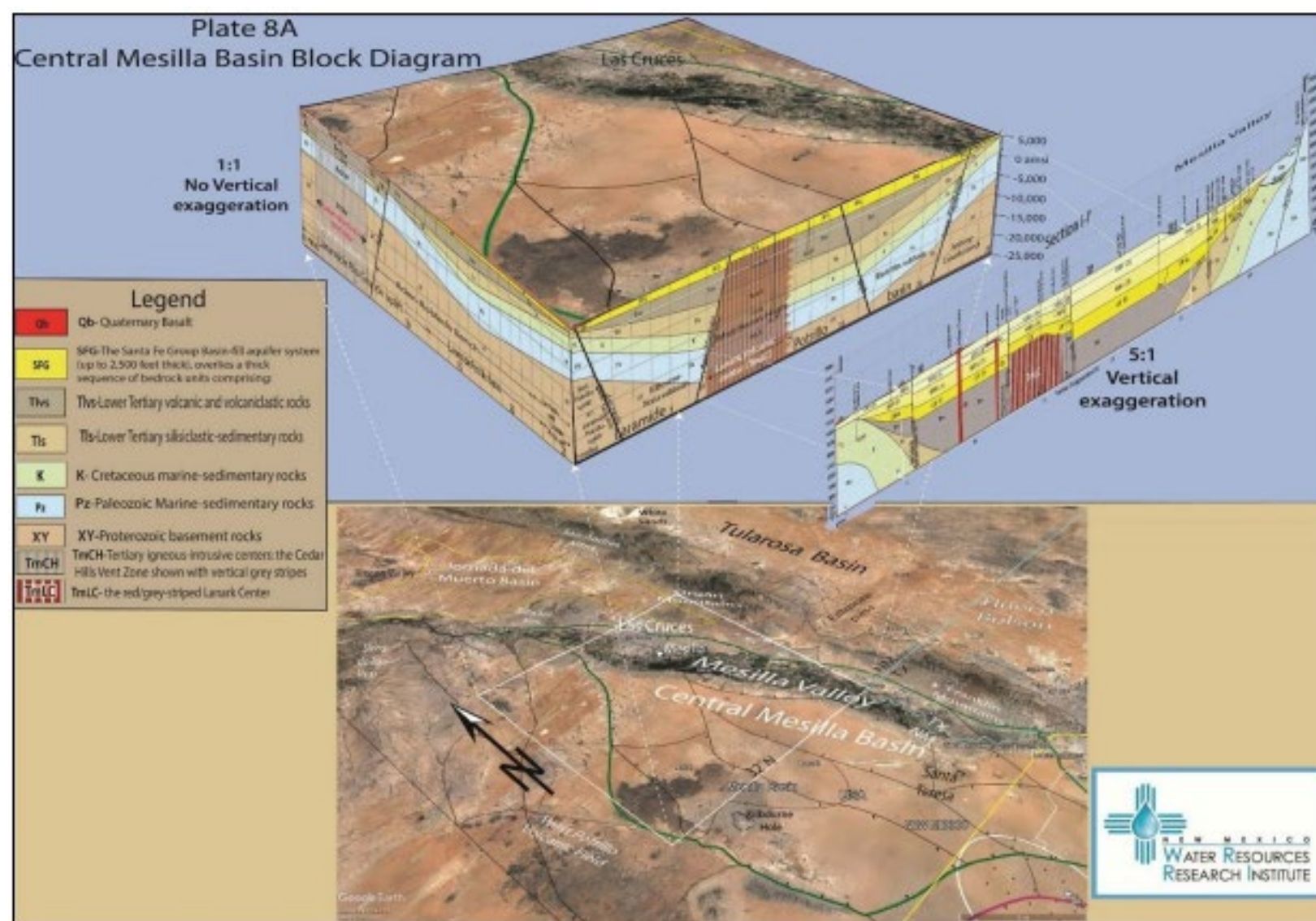
Joshua L. Smith

Treasurer/Manager

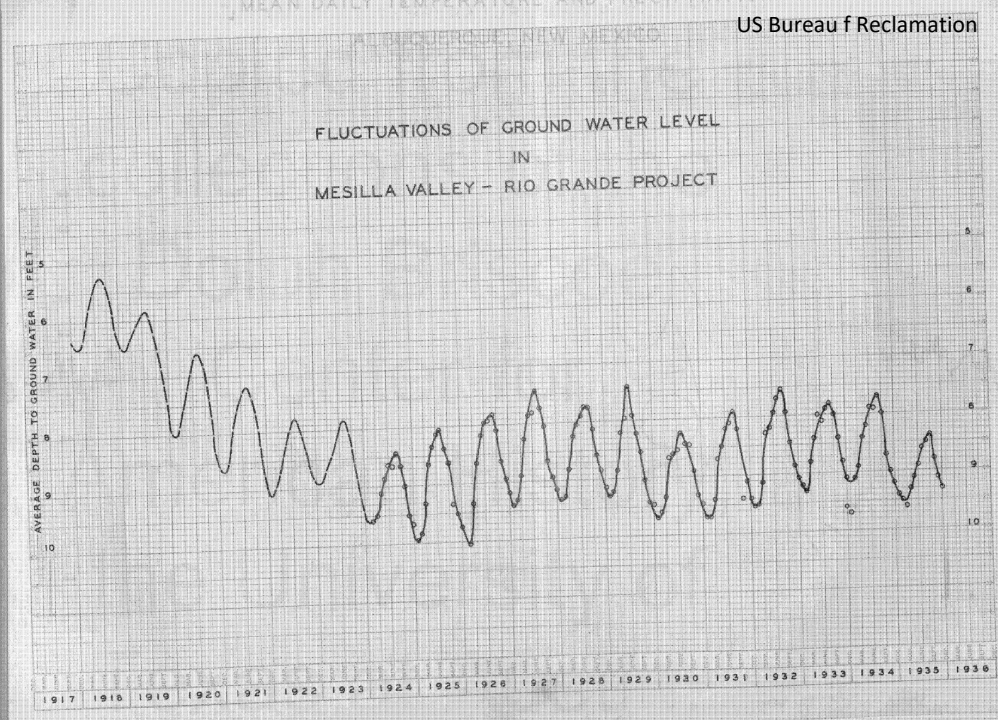
Elephant Butte Irrigation District



Aquifer Mapping and Characterization



- Long history of hydrogeologic studies in LRG (Slichter 1905, Lee 1907)
- Studies by NMBGMR, USGS, NMWRRRI, et al.
- Synthesized by [Hawley et al., 2025](#)
- Current Airborne Electromagnetic Survey work by NMBGMR, NMISC
- Ranging from Hydrogeological to Geohydrological



Aquifer Monitoring

- Pre-Project observations of shallow focusing on drainage
- Systematic monitoring by Reclamation, NM A&M in early years of Project
- Rapid expansion of shallow, valley floor monitoring by Reclamation in late 1940s
- USGS monitoring network ca. 1987
- NMISC replacement of Reclamation wells in 2009

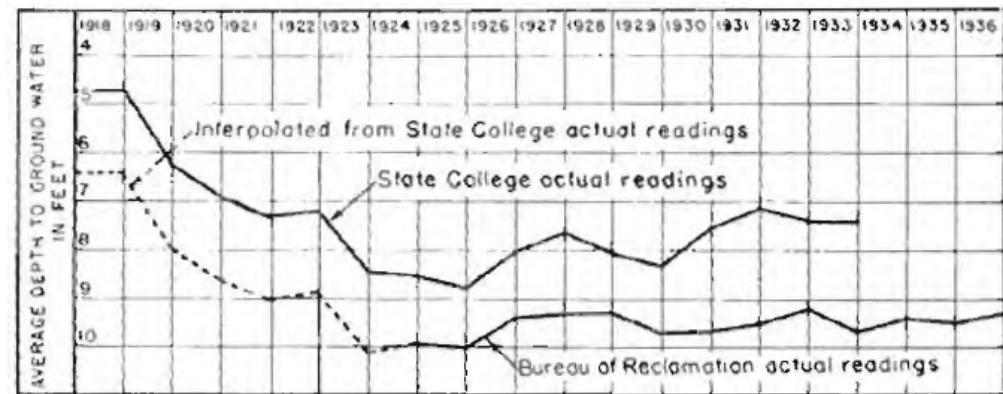
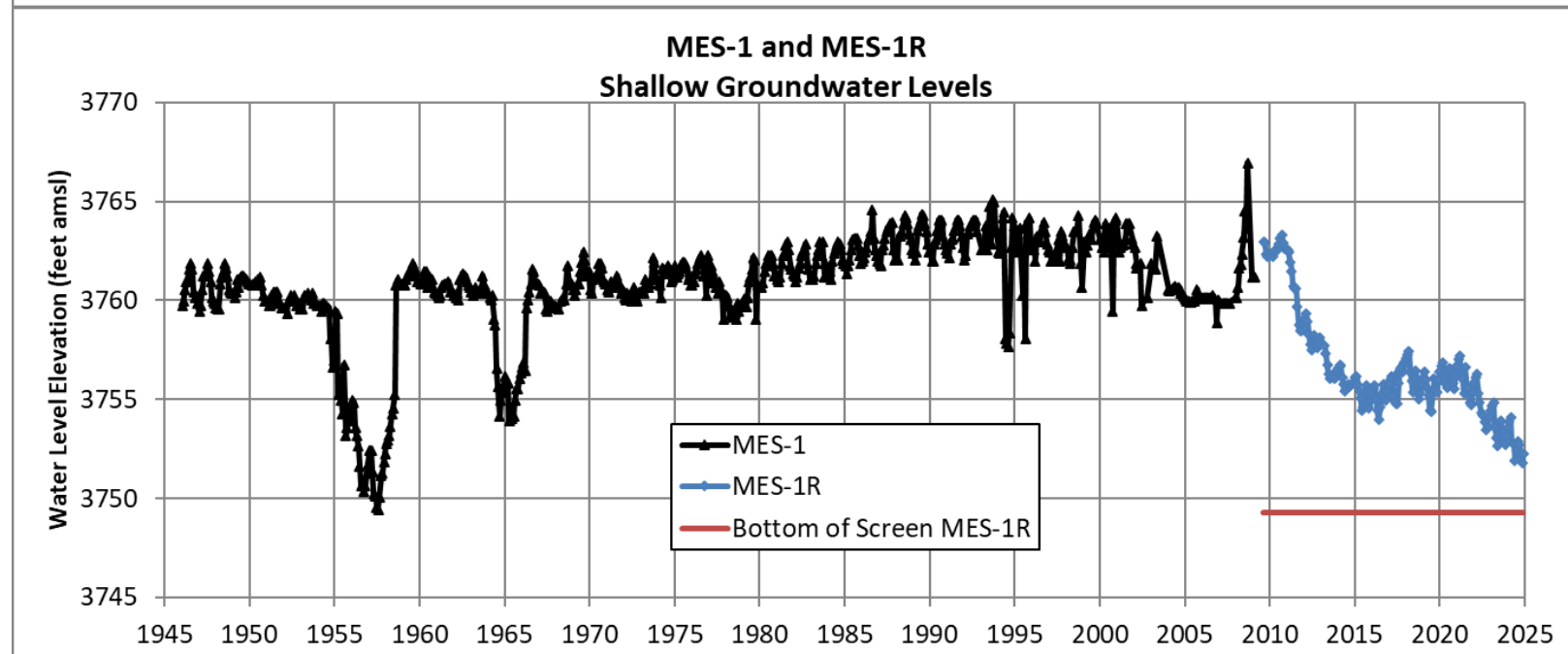
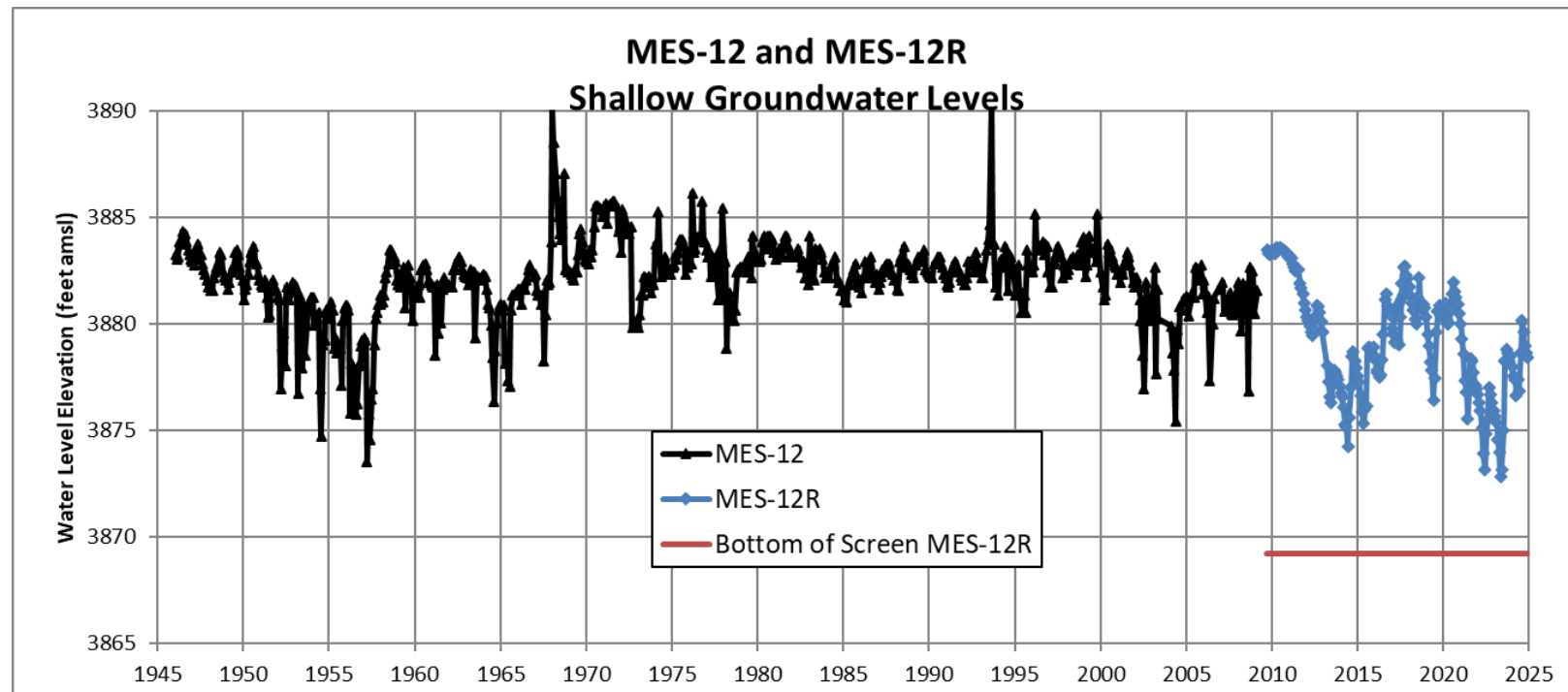


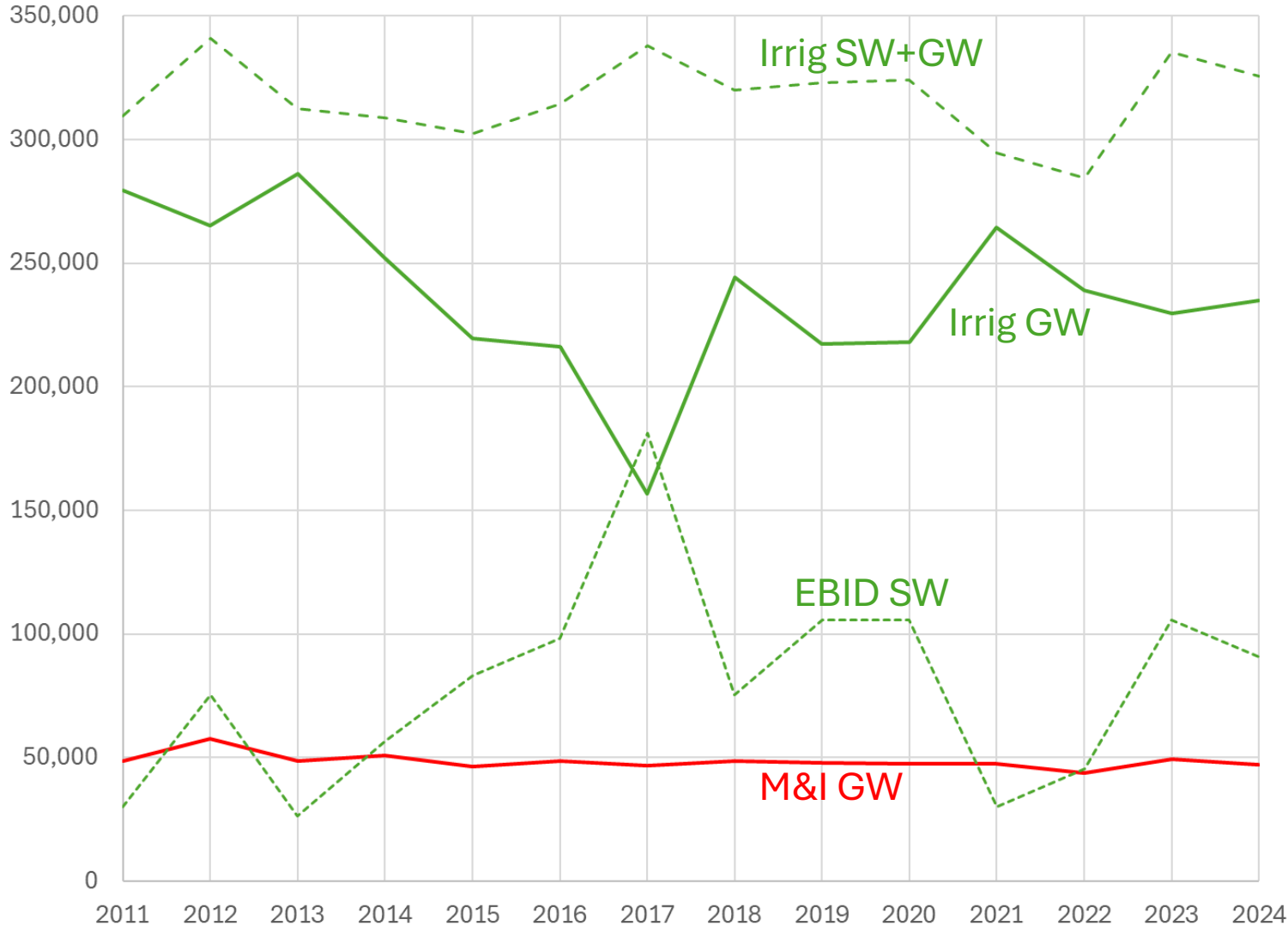
FIGURE 90.—Average depths to ground water in Mesilla Valley during January of each year, 1918 to 1936, based on measurements by the Bureau of Agricultural Engineering, the New Mexico Agricultural Experiment Station, and the Bureau of Reclamation.

¹ Cooperative records by Bureau of Agricultural Engineering and New Mexico Agricultural Experiment Station from 1918 to 1931.

EBID Monitoring



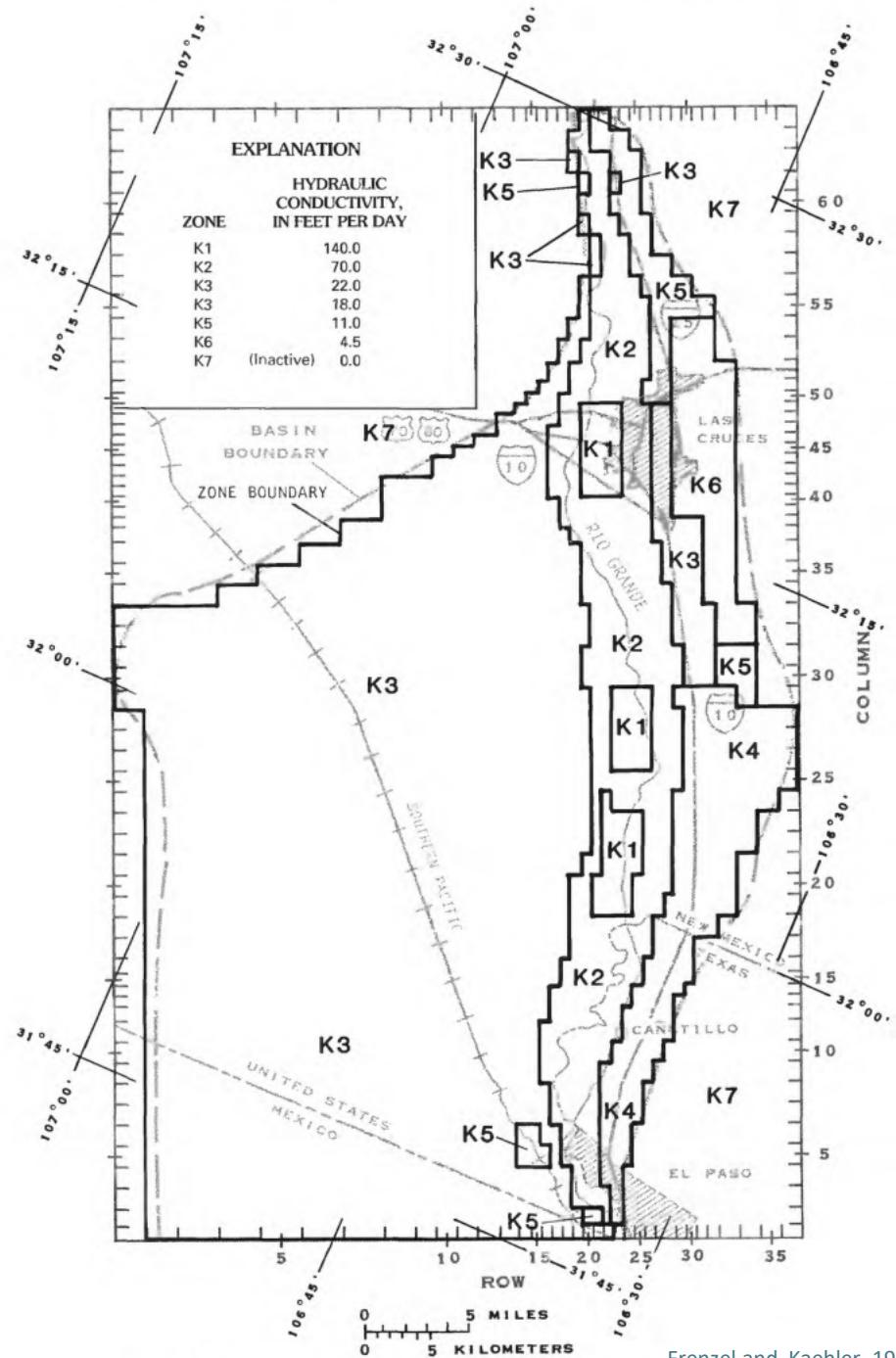
Groundwater usage metering



- Municipal and industrial groundwater metered for decades
- Metering order for irrigation issued by NMOSE in late 2000s
- Provides foundation for management, administration

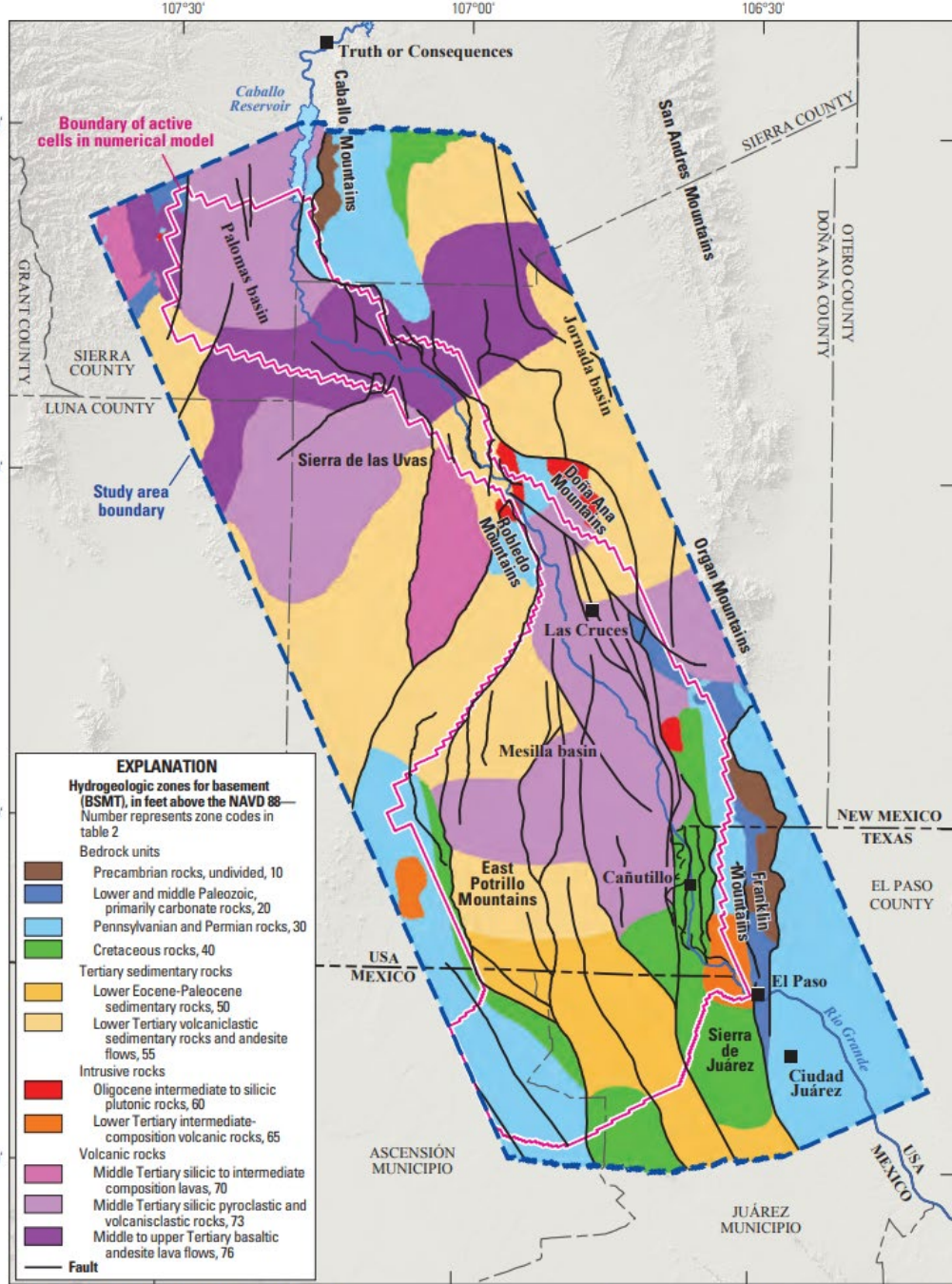
Groundwater Modeling

- Conceptual model by Conover (1950, 1954)
- Lumped Parameter model by Updegraff and Gelhar (1977)
- Numerical models took off as interstate disputes developed in early 1980s
- LRG, West Texas, and northern Chihuahua very heavily modeled by various agencies



Frenzel and Kaehler, 1992

FIGURE 20.—Hydraulic conductivity assigned to model layer 1, the top layer.



Hillshade from USGS 10-meter National Elevation Dataset
 Base from USGS 1:24,000-scale digital data, 2016
 Transverse Mercator Projection, UTM Zone 13N
 North American Datum 1983 (NAD 83)
 Sweetkind, USGS 2017

Current Model Applications

- Bring together aquifer extents and characteristics, monitoring, metered withdrawals, surface water system
- Groundwater administration (NMOSE)
- Water management planning (LRG water users, NMISC, Reclamation, etc.)
- Dispute resolution (e.g., TX v. NM, protests, etc.)

Settlement Documents Interaction

