

Conjunctive Use of Forecast Informed Reservoir Operations and Aquifer Storage and Recovery

Bridget Scanlon, John Malito, Sarah Fakhreddine, Bob Reedy, and
Yu Zhang*

Bureau of Economic Geology, Jackson School of Geosciences, Univ.
of Texas at Austin

*Civil Engineering, Univ. of Texas at Arlington

Sept. 22, 2023

Background

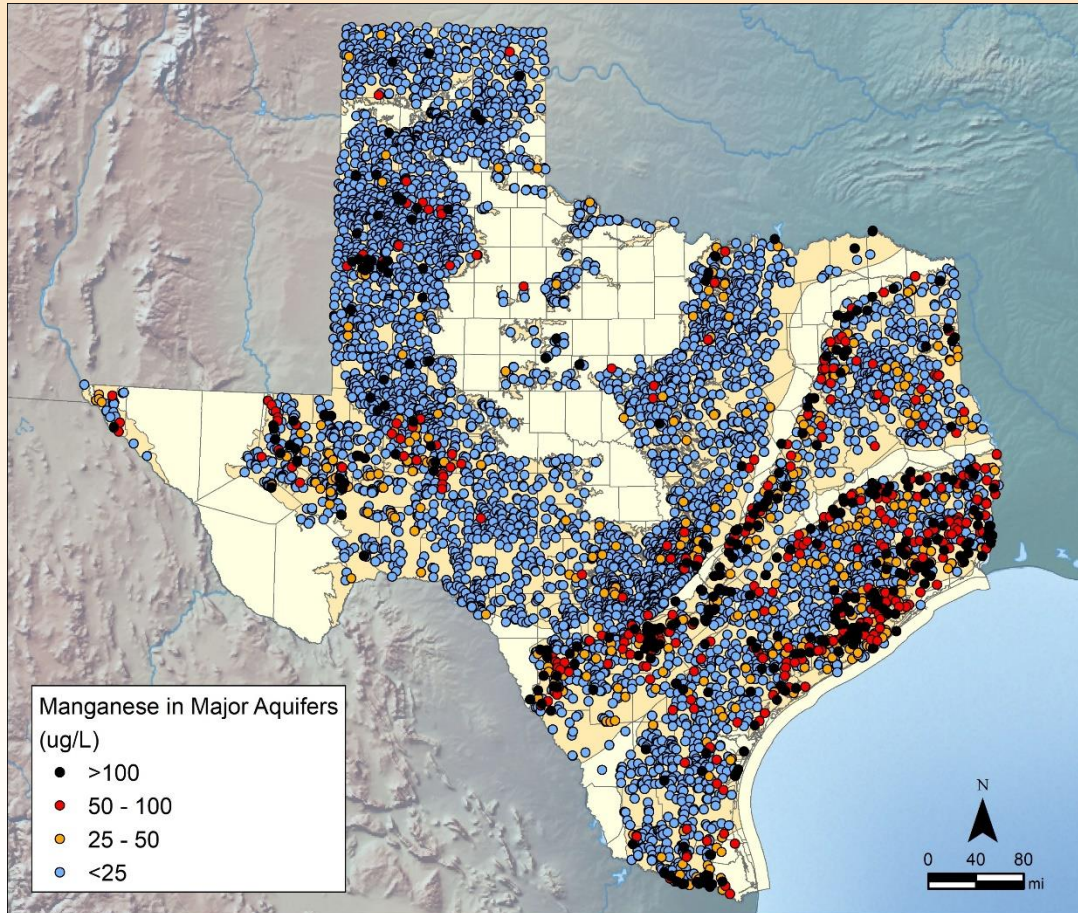
- UT BEG did Feasibility Analysis of Water Supply for Small Public Water Systems (2005 – 2012) for 91 Public Water Supply systems, [link](#)
- Analyses considered sources of contaminants, regional geology context, detailed assessment, and alternative groundwater sources
- Variety of contaminants considered: arsenic, fluoride, nitrate, radionuclides, selenium
- **Short courses:** Aquifer recharge (2003), Aquifer vulnerability to contamination (2004), Engineered Covers (2004), Groundwater/Surface Water Quality Issues (2005); Non-point source contamination (2005), Arsenic (2006 – 2009), GW hydrology (2008); geochemistry (2008)

Feasibility Study for Public Water Systems with Secondaries Exceedances (Manganese)

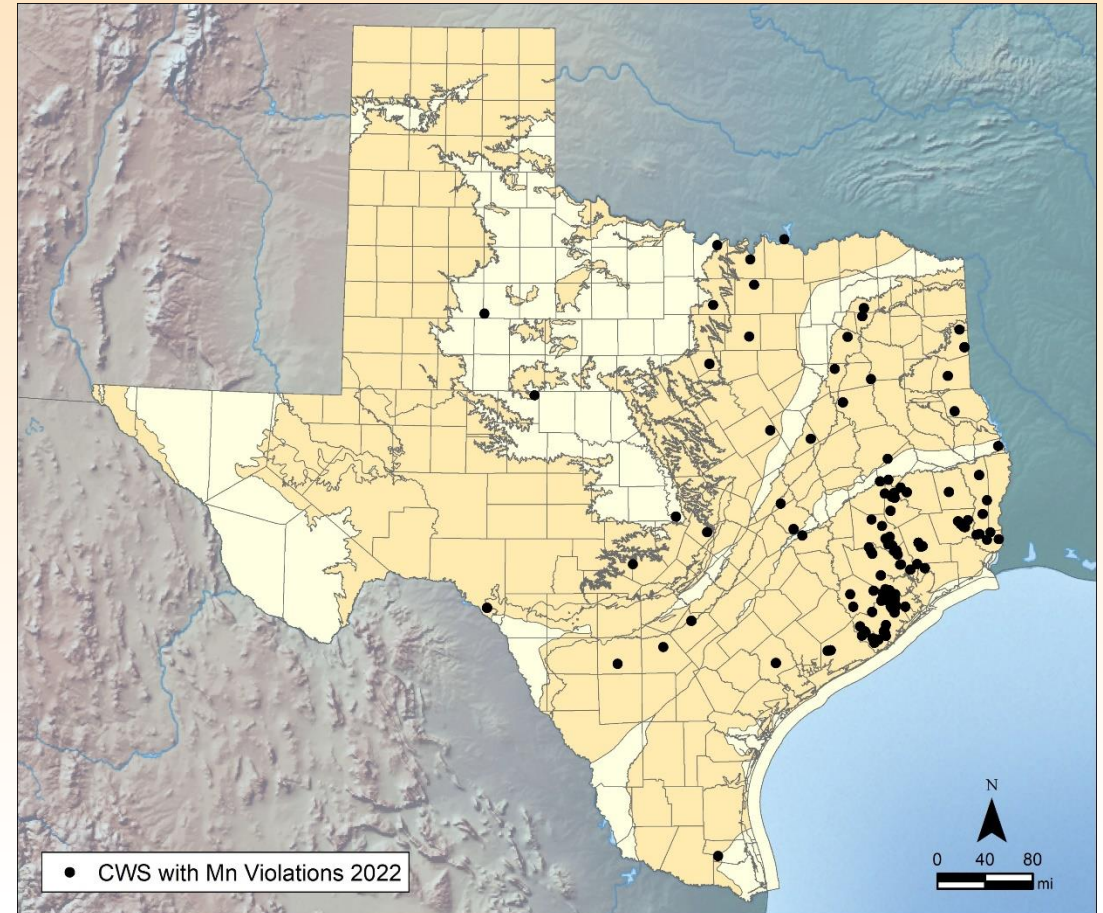
- EPA Secondary MCL for Mn, 0.05 mg/L
- EPA Health Advisory Level for Mn (0.30 mg/L)
- USGS Health Based Screening Level (0.30 mg/L)
- Distribution of Mn and Fe in TX waters (TWDB database)
- Understanding the geologic controls on Mn distribution
- Contamination problems in PWSs, accumulation in distribution lines
- Treatment options
- Co-contaminants (Fe, Mn, As etc)

Manganese Levels

Manganese Levels in Major Aquifers (TWDB)

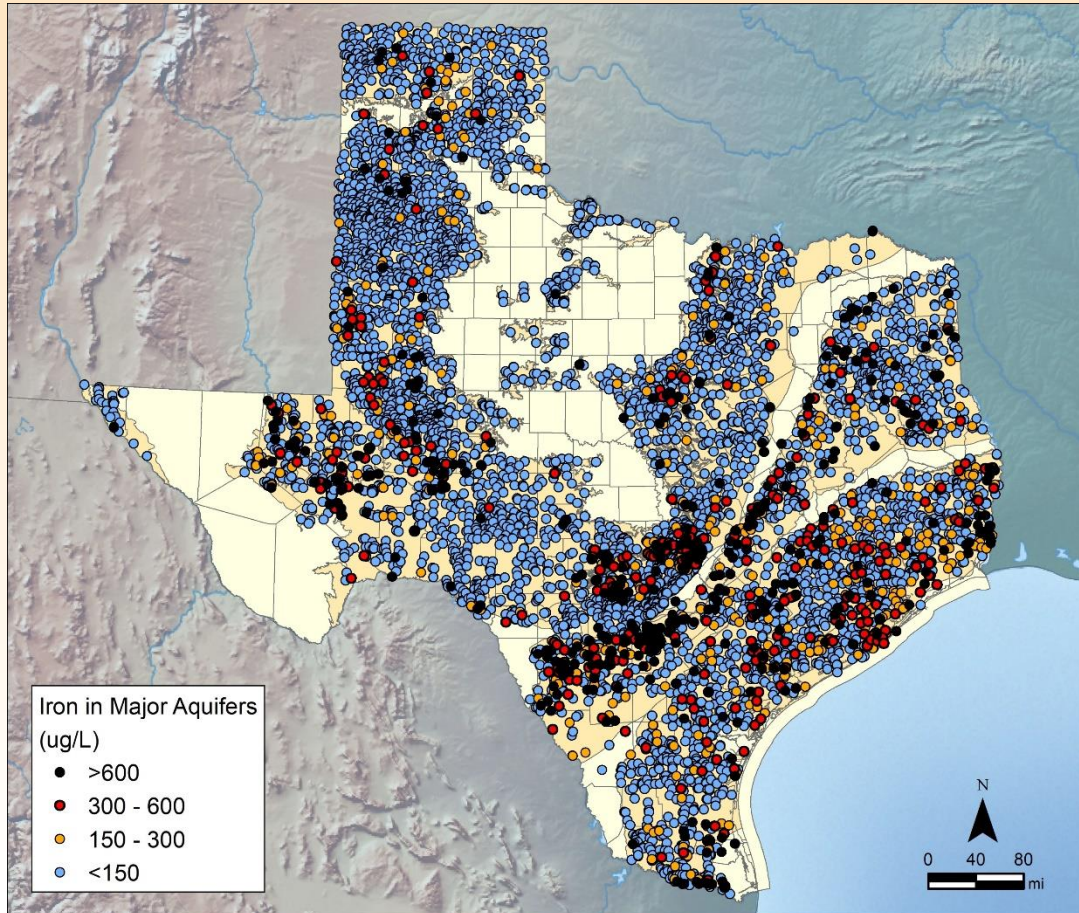


Manganese Violations (> 50 ug/L; 2022)

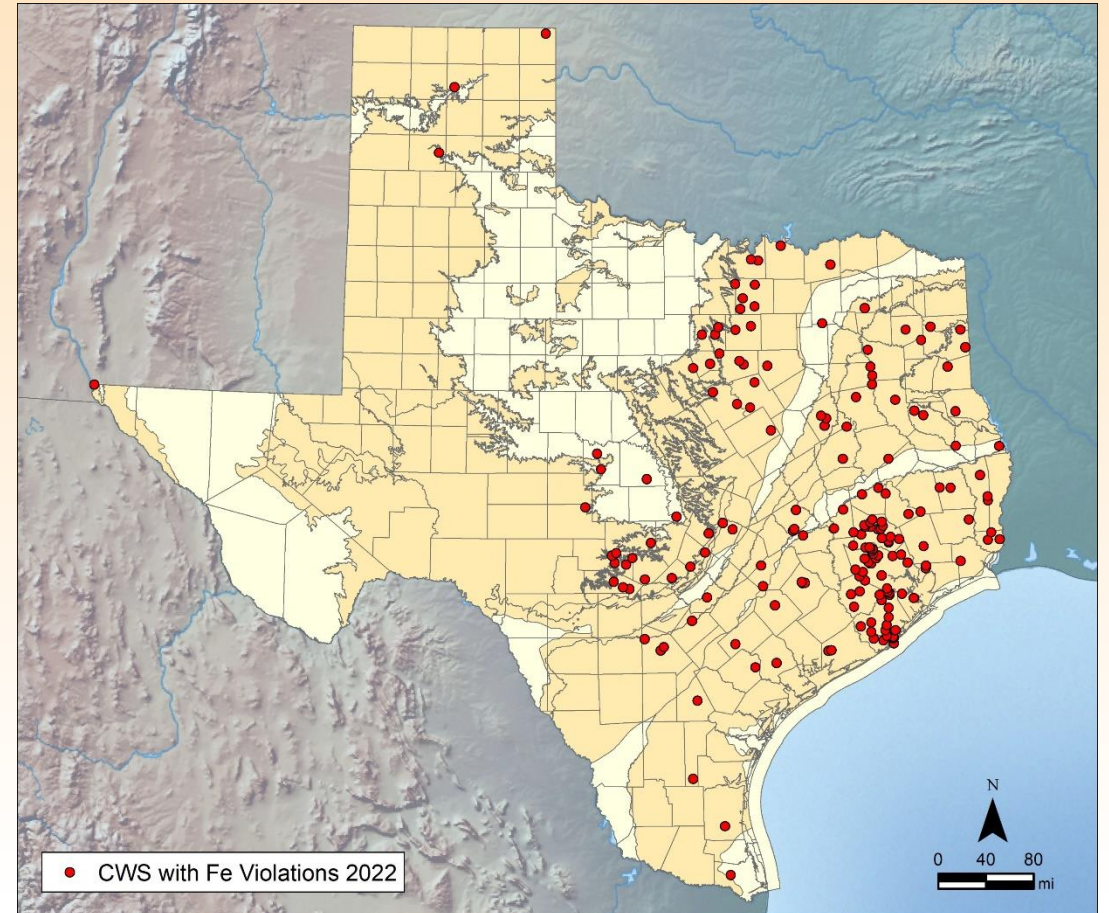


Iron Levels

Iron Levels in Major Aquifers (TWDB)



Iron Violations (> 300 ug/L; 2022)



True Cost of Compliance to Texas Small Systems

- Naturally occurring contaminants
- Arsenic, fluoride, radionuclides, and nitrates
- Connect with PWSs to assess market costs for determination, design, installation, operations and maintenance of treatment and customer impacts of these costs
- Alternative source identification and implementation in near and long-term to support resiliency and regionalization planning

Training/Webinars (Nicot and Scanlon)

Topics

- Geology of the South Texas Uranium Province, January 2010
- CO2 plume modeling, March 2009.
- Geologic Sequestration, June 2009
- Elements of ground water geochemistry, June 2008.
- Ground Water Hydrology, May 2008.
- Fate and transport, April 2008.
- Groundwater arsenic contamination in Texas, March 2008.
- Groundwater arsenic contamination in Texas, May 2007.
- Groundwater arsenic contamination in Texas: April 2006.
- Fate and transport: April, 2007, April, 2006; April, 2005; May 3-4, 2004; March, 2004; June, 2003; May, 2003.
- Vadose Zone Hydrology, March 2003

- **CE Credits**