

Legislative Subcommittee on Water Policy

October 3, 2023

Minnesota Well Owners Organization (MNWOO)

Emergency Petition to USEPA to protect drinking water in the Karst

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“Whether it's your well, it's your treatment system, it's your plumbing or your aquifer, you must test your water to know what types of actions are important,”

MNWOO's co-founder, Jeffrey Broberg.

MNWOO/MGWA and Local Partners Water Screening Clinics - 2023

- St. Charles – February
 - Starbuck – June
 - Kimball – August
 - North Branch – September
 - Cottage Grove – September
 - Hackensack – September
 - Elko-New Market - September
- Free on-site screening for nitrates and chlorides with results within 30 minutes
 - Free Arsenic testing in Starbuck, Kimball and Elko-New Market.
 - Free consultation with water professionals about test results, wells and water treatment.
 - Over 1000 wells tested and 2500 attendees focused on the water at their kitchen sink.
 - Over 100 new partners ranging from SWCDS, Non-profits, Public Health and schools

Our partnerships focus in on ensuring safe drinking water at the kitchen tap of every private well user

MNWOO/MGWA Clinics

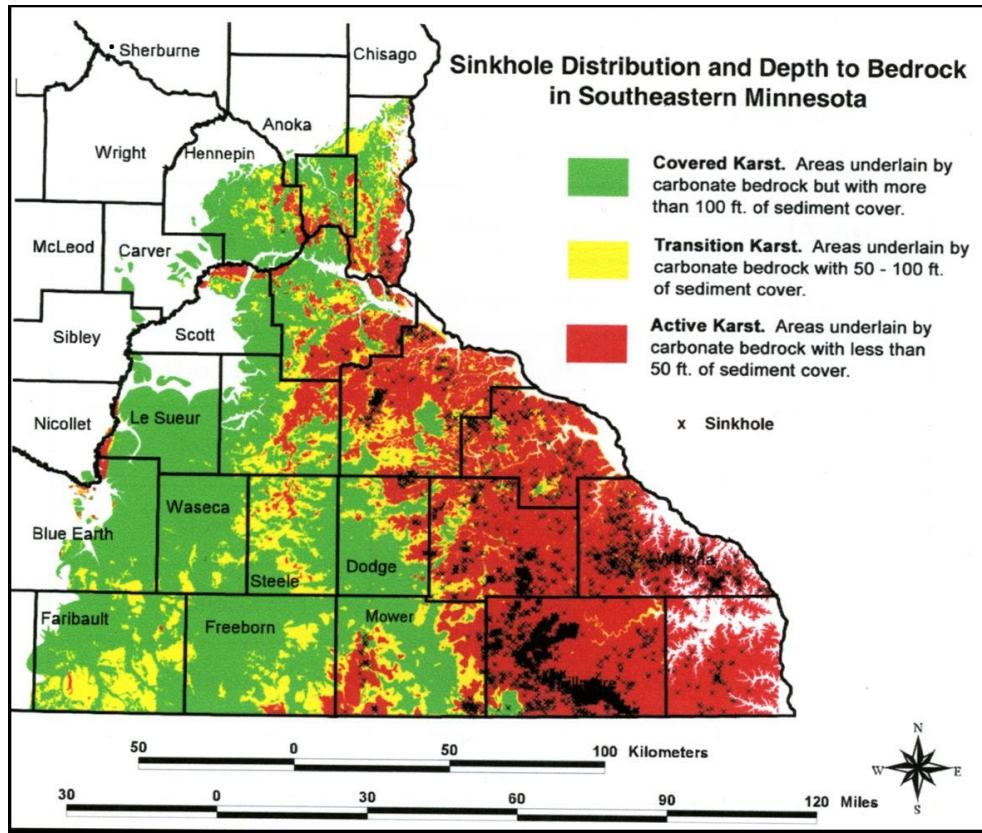


**UofM RSDP Happenings: Pure and simple:
first of its kind support for MN private well
owners. Sept 25, 2023**

Lessons Learned:

- Most PWUS do not test their water
- Most PWUS do not understand aquifers, wells, water treatment, or water testing.
- Most PWUS are worried about their water, the health effects and the costs of wells, treatment or alternative water supplies.
- Many are fearful that the government will condemn their wells
- Most are concerned at the potential costs
- Nitrate and pesticides is a problem locally in the karst and Central Sands
- Arsenic is locally a significant problems
- PWUS want to know what to do to ensure safe water

SE Minnesota's Karst is some of the most studied hydrogeology on earth



- **2021 MNDNR Updated County Geologic Atlas'** [mndnr. part b groundwater atlas.winona_report\(3\).pdf](https://www.mndnr.gov/~/media/Files/2021-County-Geologic-Atlas-Part-B-Groundwater-Atlas-Winona-Report-3.pdf)
- **2020-2023 Minn Dept of Ag. Root River Field to Stream Partnership** <https://www.mda.state.mn.us/root-river-field-stream-partnership>
- **2014-2018 Minnesota Geological Survey Open File Reports on geologic control on groundwater and surface water flow in SE MN and its impact on nitrate concentrations in streams and groundwater (MGS OFR 14-02, 14-03, 14-04, and other peer reviewed publications)**
- **New Pollution Sensitivity Maps for Winona and Houston Counties**
- **Detailed karst mapping and groundwater flow mapping**
- **Pollution sensitivity models for five aquifers,**
- **Age dating of groundwater, Dye trace studies**
- **Isotopic studies of groundwater and nitrates prove most groundwater nitrates are from commercial fertilizers and animal manure**
- **Water quality trends**
- **Current references to applicable research with findings and recommendations**

24 years ago the MPCA determined that the percentage of land in corn and beans showed a linear relation with NO₃ in SE MN Streams. When corn and beans are more than 60% of the land cover our baseflow in our streams is 10ppm nitrogen or higher. These trends occur in rural areas dominated by row crops

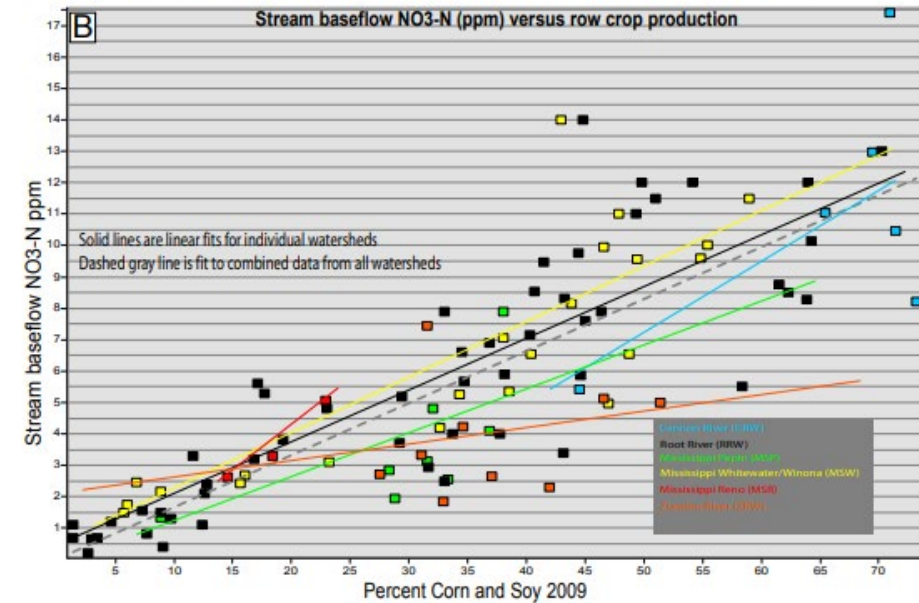
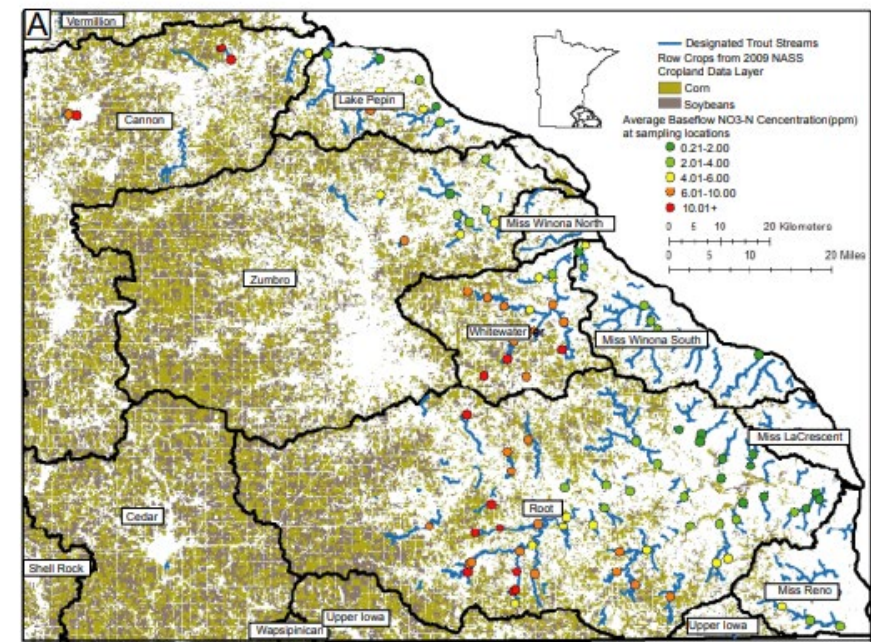
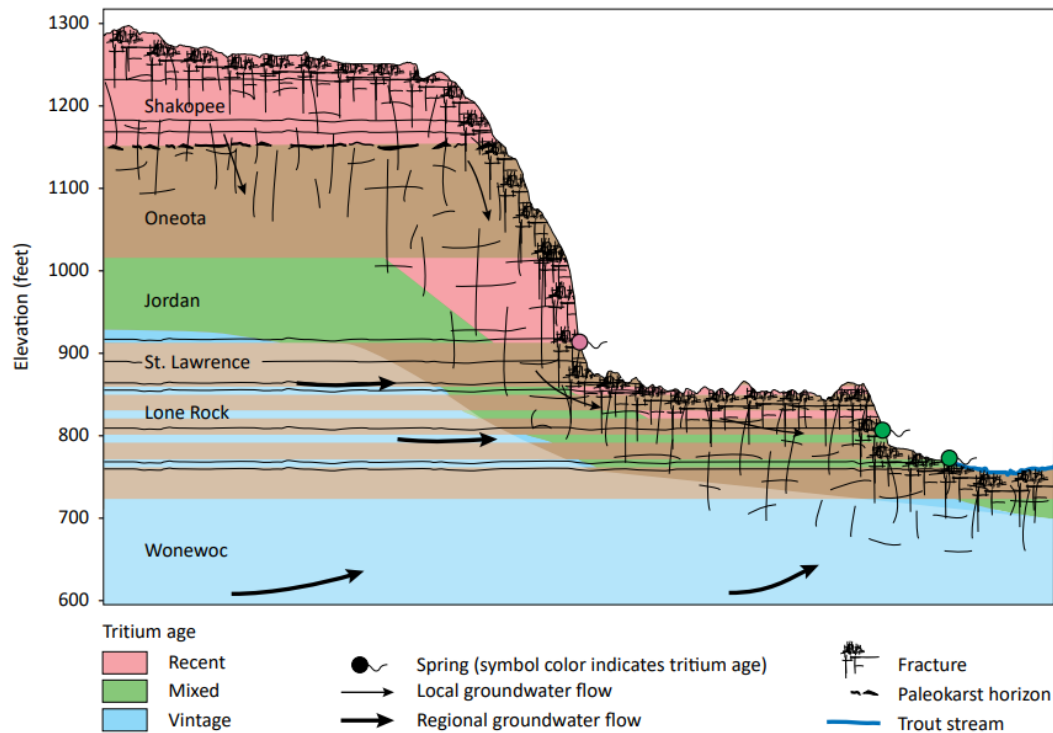
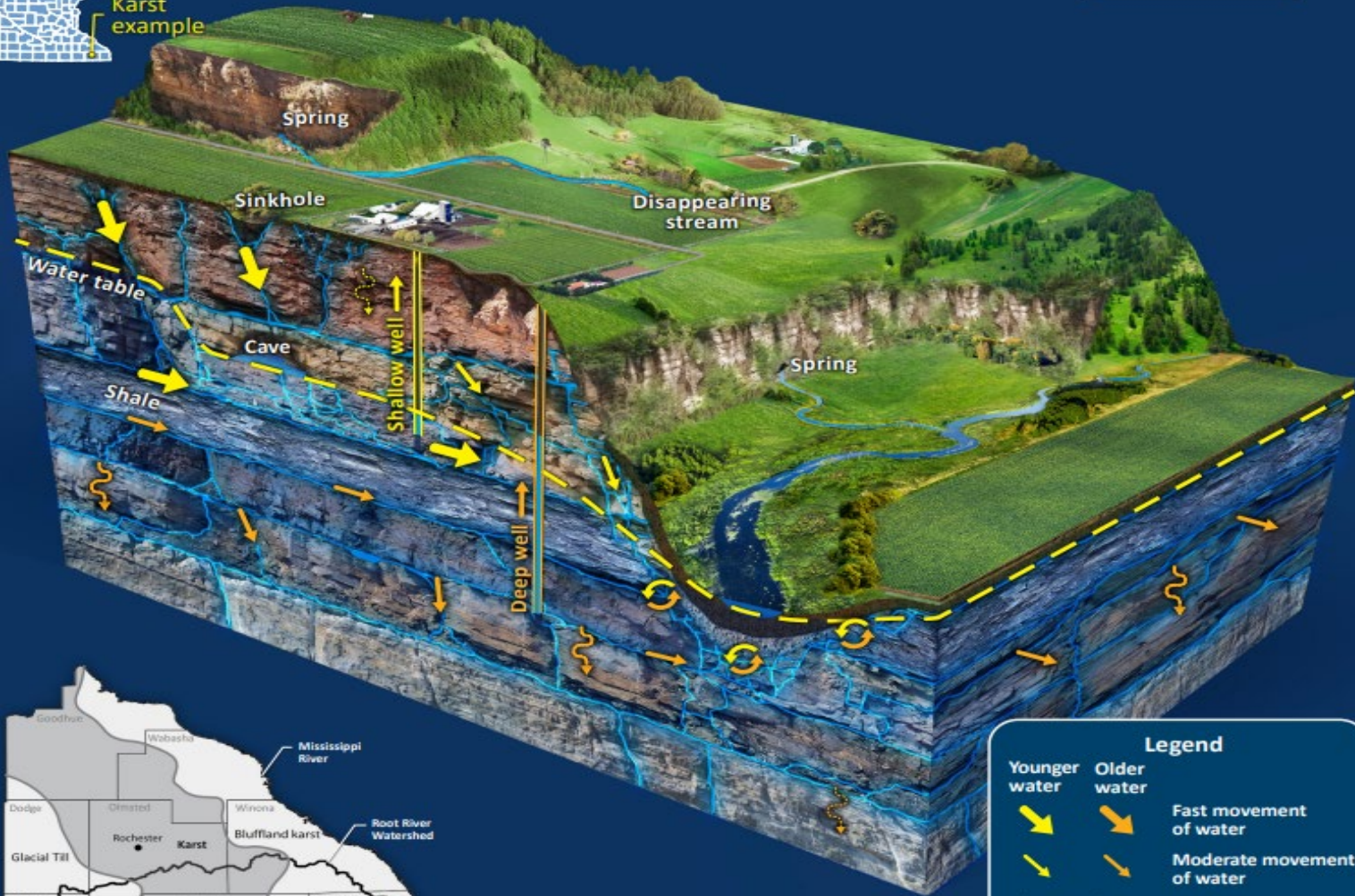


Figure 37. (A) Stream baseflow nitrate concentration sampling point locations on 2009 map of row crop land use for southeastern Minnesota. (B) Stream baseflow nitrate concentration plotted against 2009 row crop land use from Watkins et al. (2011). Stream samples are meant to be representative of baseflow or "non-event" conditions. Individual values are based on multiple samples, most collected between 2005-2010. Complete database available from the MPCA.

How groundwater moves in southeast Minnesota: Karst landscape



Legend

Younger water	Older water	
		Fast movement of water
		Moderate movement of water
		Slow movement of water
		Mixing of younger and older water

<https://rootriverfieldtostream.org/results/>

This block diagram is a 2022 artist rendering of how groundwater moves through the karst. Produced by the Root River Field to Stream Partnership.

A pair of You-Tube videos found at <https://www.youtube.com/watch?v=t3ua4bmYxG8&t=323s>

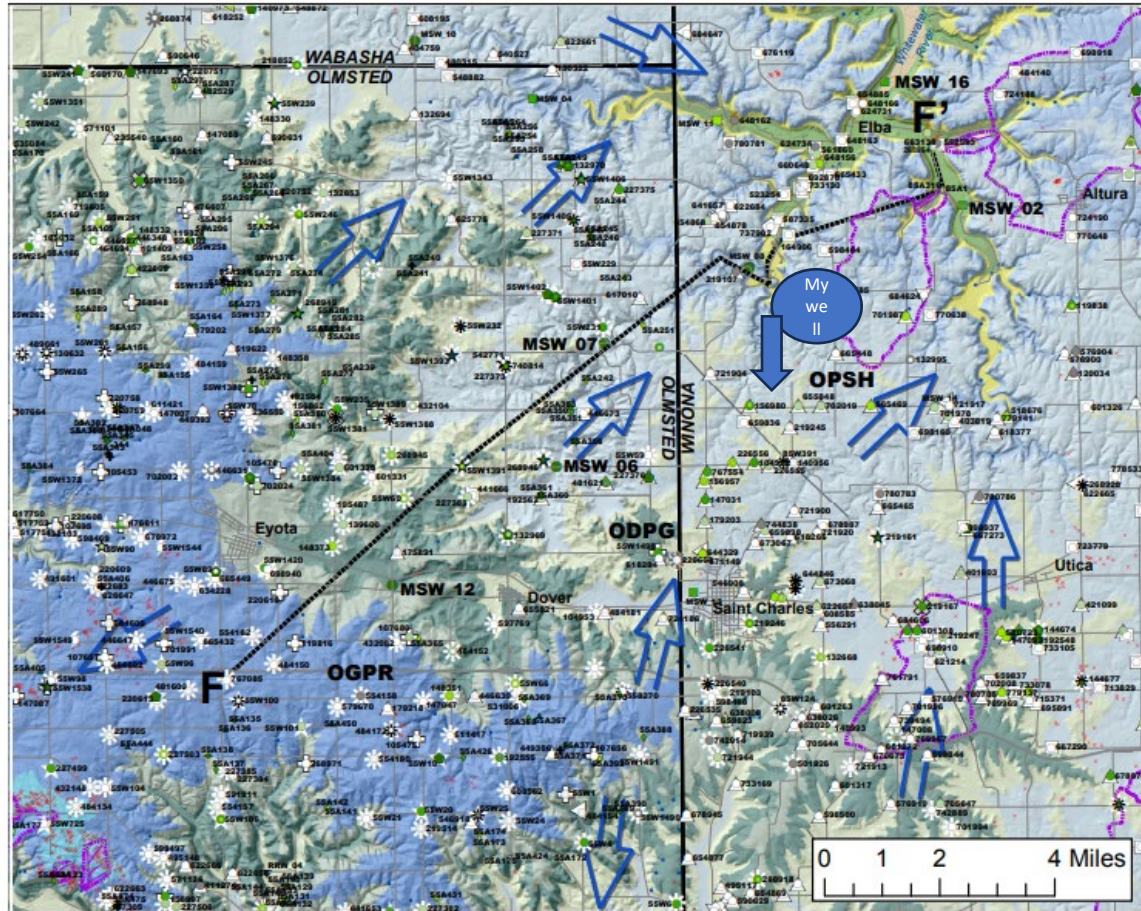


Figure 44 (B) Map showing cross section line, nitrate data, and other relevant information used to construct the cross section in Fig 44A. Arrows depict bulk dominant flow directions for combined St Peter, Prairie du Chien and Jordan aquifers. Distribution of unconsolidated sediment greater than 50 ft not shown on map, but occurs in isolated patches and in deeper stream valleys. It is depicted on cross section, on regional maps (e.g. Figure 4) and available in delivered GIS coverage. Full legend and explanation for map in Appendix A.

The 2014 work on SE MN Karst Nitrate-nitrogen produced detailed, data filled maps on the hydrogeology of the region

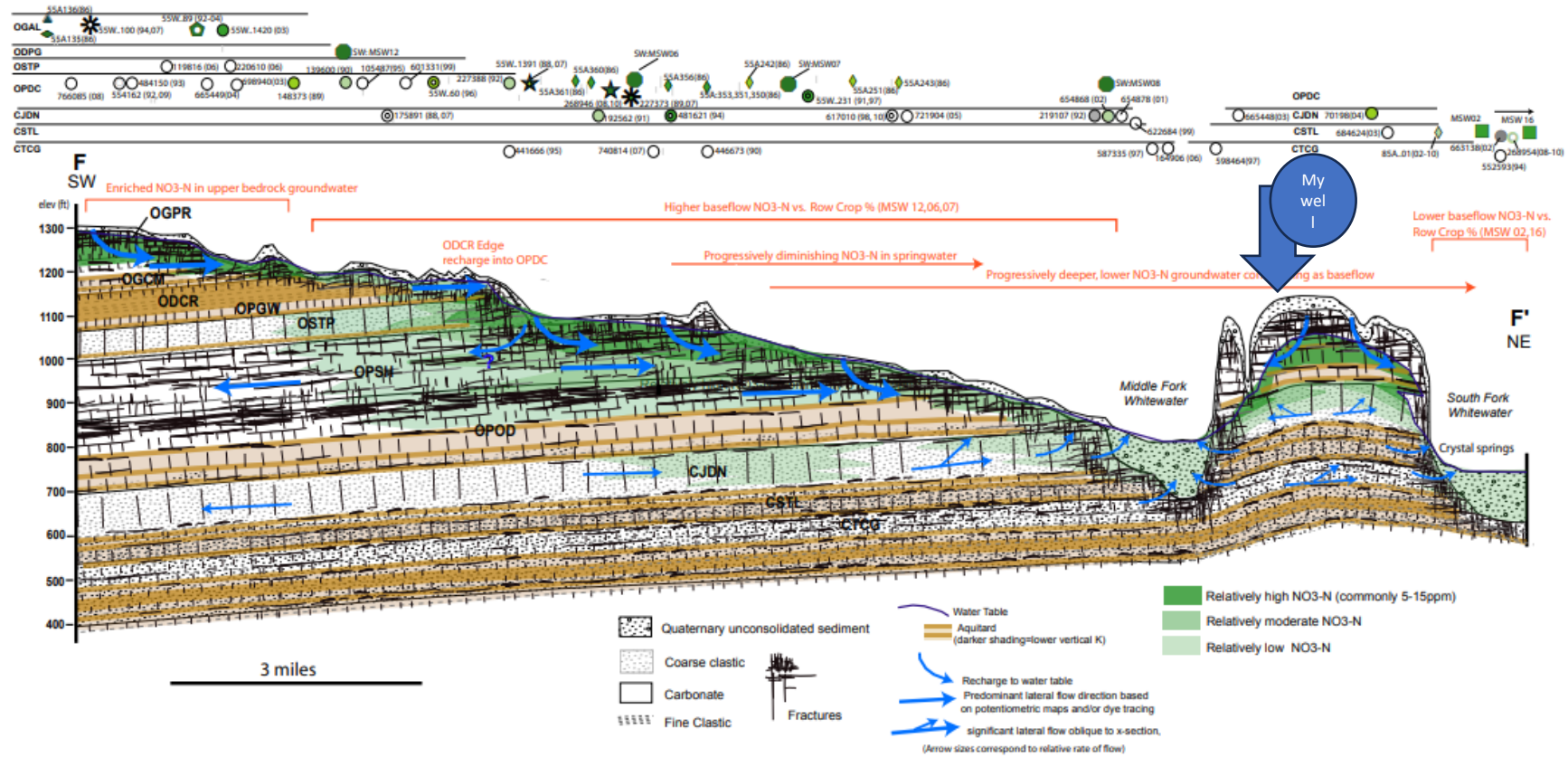
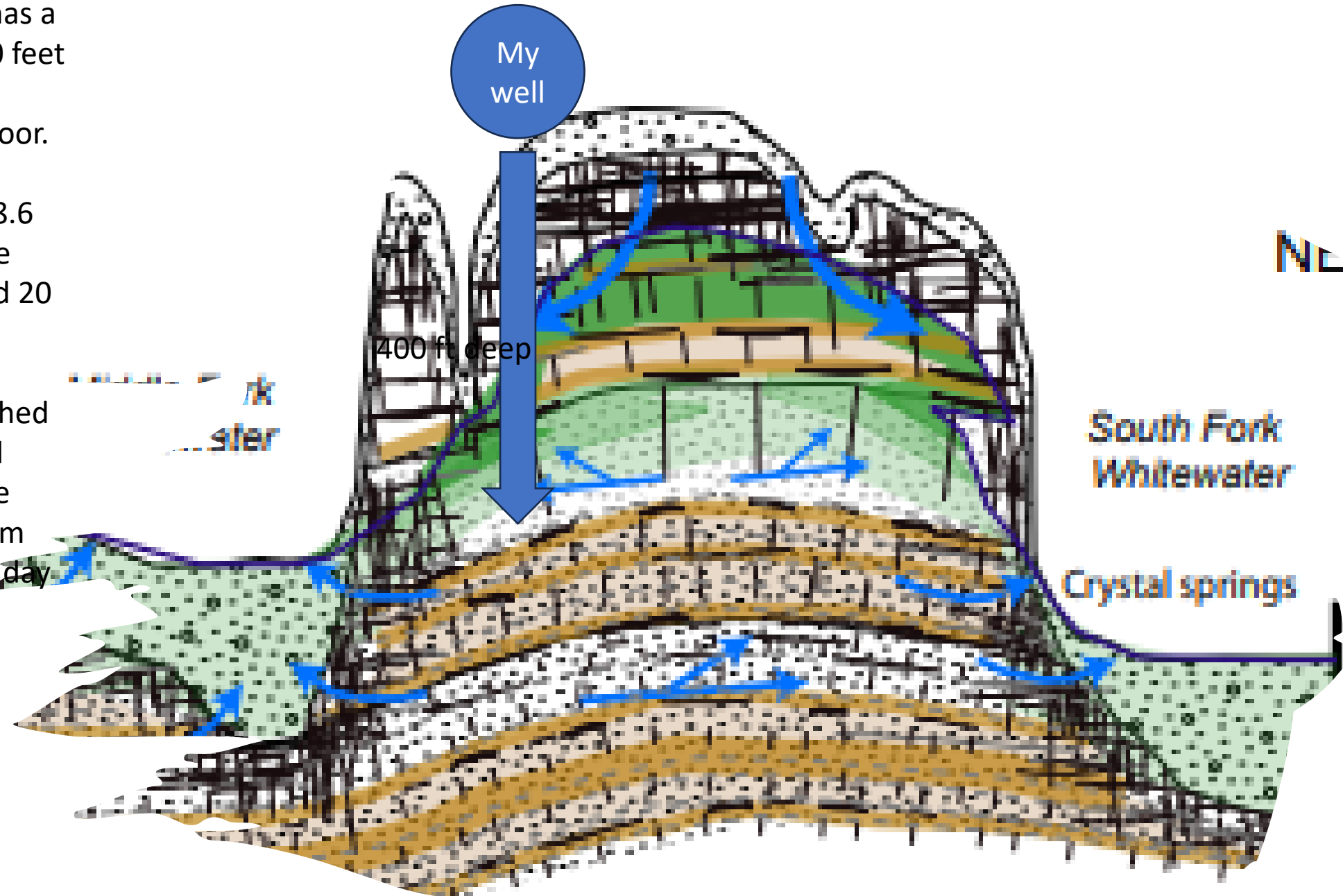


Figure 44. (A) Cross section showing ground and surface water nitrate concentrations in hydrogeologic context from outer edge of Upper Carbonate Plateau (southwest), across escarpment, to the Prairie du Chien Plateau (northeast). Eastern Olmsted and western Winona Counties. Figure 27 provides additional information on flow conditions and sources of information. Full legend and explanation for cross section in Appendix A.

My Well sec 32 Elba, Twn

My 400 foot deep well has a water level of about 180 feet and bottoms out at the elevation of the valley floor.

In 1986 the well tested 8.6 ppm nitrates. The nitrate level rose every year and 20 years ago exceeded the Health Risk Limit for Nitrates. In 2014 it reached 22ppm nitrates. I retired crop land and the nitrate level slowly fell to 17 ppm where it remains to this day I use Reverse Osmosis



The science tells us we have an imminent health risk

We have recognized the risk for over 50 years and measured the predictable trend of more contamination with time.

No data suggests that nitrate levels are receding in the Karst despite BMPS, local government initiatives or state incentives.

As another example, the city of Utica has two city wells, but as shown in the graph below, one well has been exceeding the 10 mg/L MCL since 2003 and is now for emergency use only. The other well, drilled in the late 1970s, began with a nitrate concentration of 3.9 mg/L, but that concentration has been steadily increasing and was as high as 8.6 mg/l in 2019.

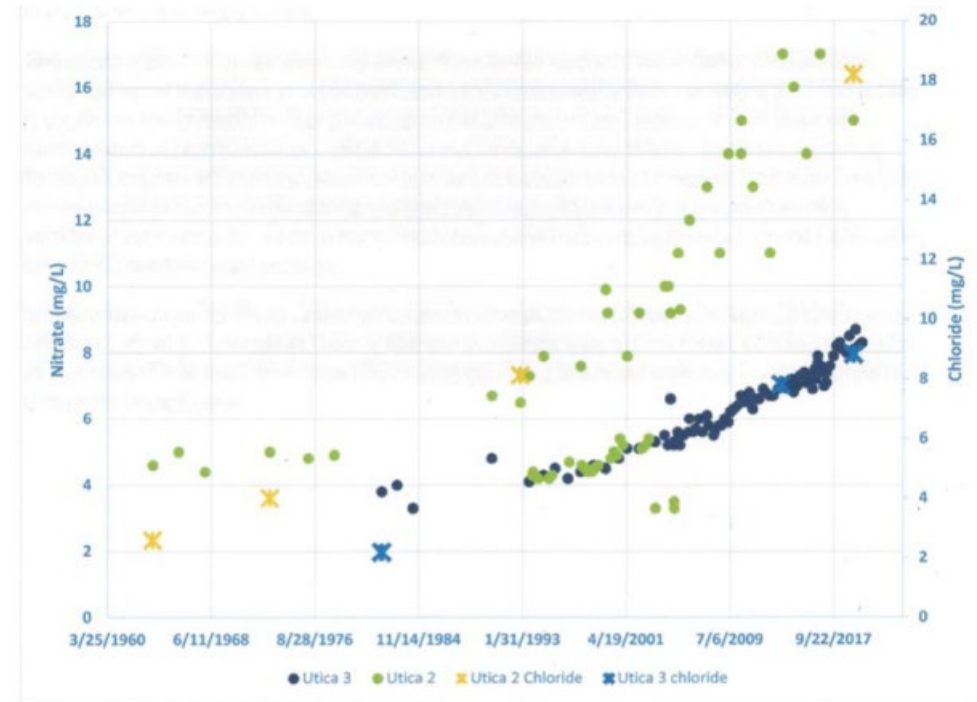


Figure 7: Utica City Well Contamination
Data from Minnesota Geological Survey

The barriers to improvement are mostly social

- Lack of accurate risk management information
- Misinformation
- Mixed Messages and Misdirection
- Paralysis by analysis
- Silos of water management
- Lack of planning and coordination
- Polarization and promotion of an us vs them conflict

Private well owners are left to their own

Lack of information

- PWUS don't understand their wells, their aquifers, the health risks or the options to economically treat their water.
- PWUS don't understand the risk of old pre-well code wells.

Misinformation

- Protecting groundwater will not devastate agriculture
- Asking for help from the USEPA is not a scheme, end-around or maneuver to ignore LGUs or discard the progress that has been made
- In the karst region the LGUS do not have the capacity, or funding to help people who have unsafe water at their kitchen sink.

The Barriers to safe water are not effectively addressed by LGUS or State Government

Mixed Messages & Misdirection

- SWCDS and LGUS are working in the right direction but have not yet been proven to be effective in protecting drinking water aquifers in the karst.
- SWCDS, DNR, MPCA are not health experts or well experts
- Conservation experts are not good spokesmen for Public Health

Paralysis by analysis

- Minnesota's silos of delegated authority create turf battles between Agencies that threaten the health of private well owners.
- Local One watershed-one plan efforts all cite drinking water protection as a priority, but never scale-up the implementation measures to meet the challenge

A plea for help is not a scheme to attack farmers.

Lack of Planning and Implementation

- The trends and science have been settled for decades but we still don't have a comprehensive plan or funding to address the imminent threat.
- Hope is not a strategy. BMPS require proof of effectiveness

Polarization

- Protecting Public Health is not a finger-pointing game.
- This is not a rural versus urban divide. Every household and resident in the karst uses groundwater for drinking water.

What can USEPA do for us?

Communication and Planning

- Call a spade a spade:
 - We have unsafe aquifers where water requires treatment to be safe.
 - PWUS are on their own for their wells and water systems but are largely helpless when faced with contaminated aquifers.
 - Conservation measures will take decades or generation to effectively address nitrate contamination.

Assistance and implementation

- Assign priorities to protecting both public and private well head protection areas.
 - Free water testing
 - Provide priority technical assistance and cost share around every private well.
 - Technical support and funding for household water treatment
 - Rural water districts where nitrate contamination is intractable.



mnwoo

educate • advocate • preserve

Why do we think this will help?

Because everyone cares about
their drinking water.
Jeff Broberg, MNWOO
