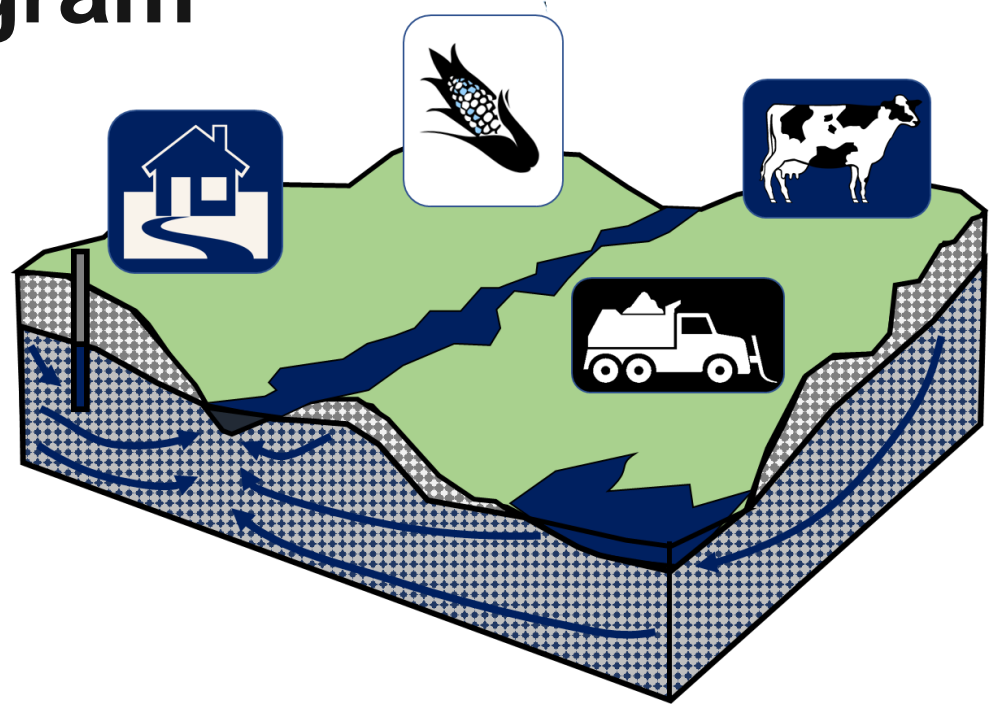


Green County Well Water Monitoring Program 2020

Year 1 of 5



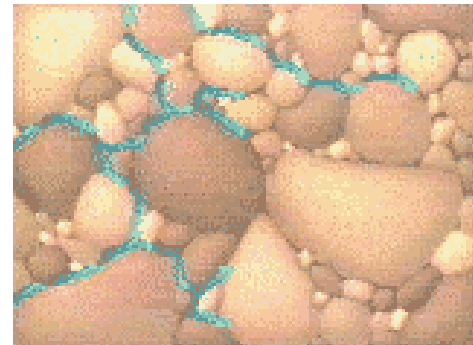
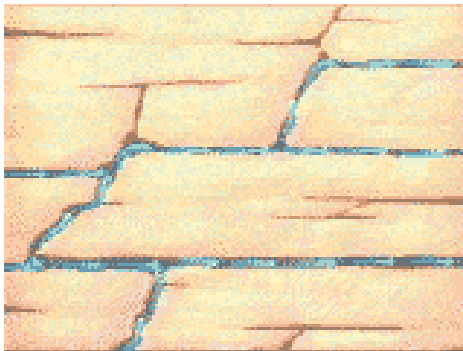
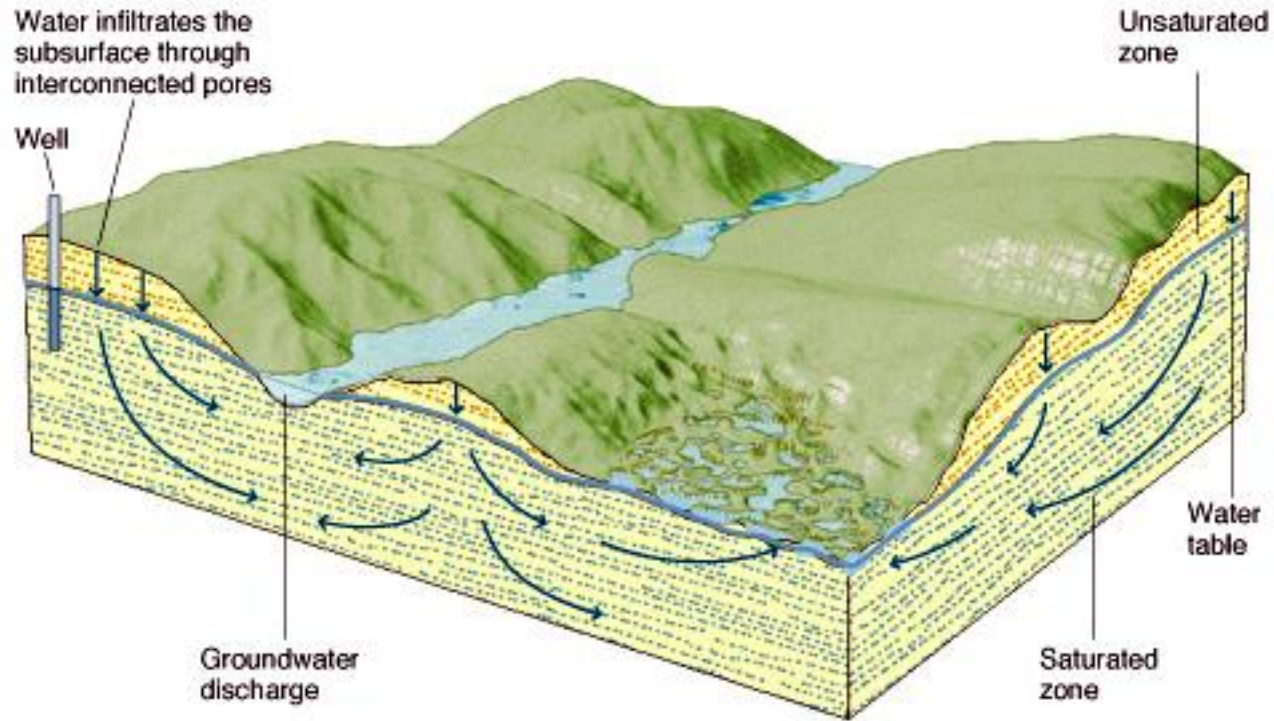
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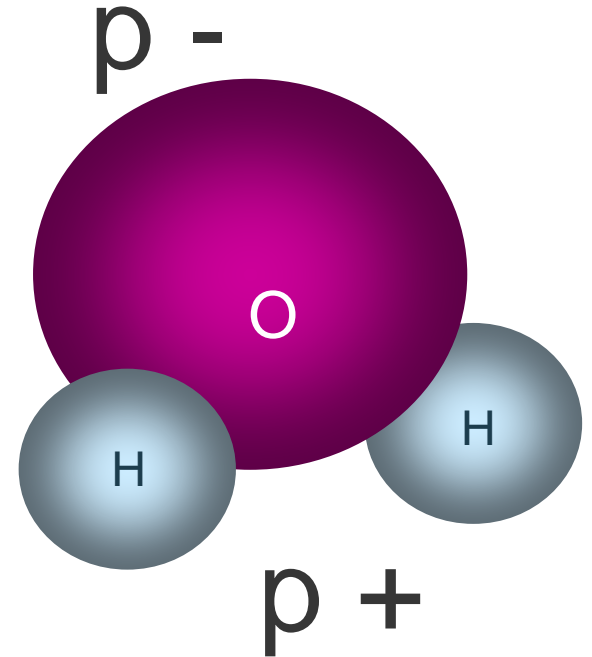
Through Extension, all Wisconsin people can access University resources and engage in lifelong learning, wherever they live and work. The Center is a partnership between the University of Wisconsin-Stevens Point and University of Wisconsin-Madison Division of Extension.

Groundwater Movement

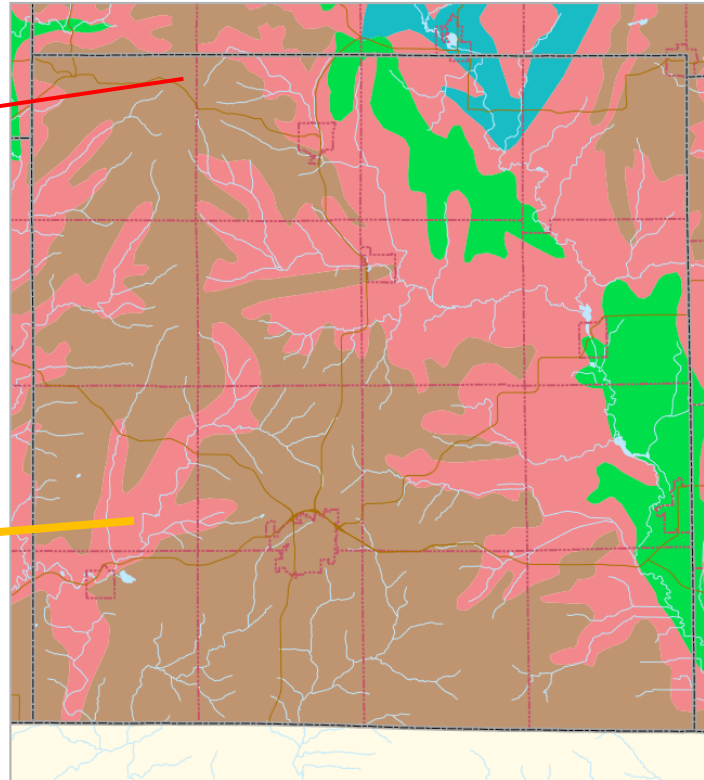
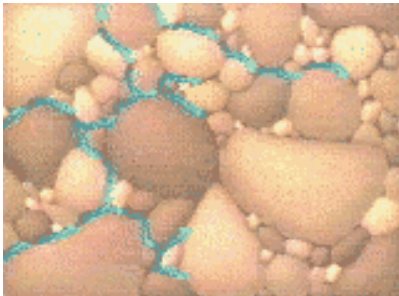
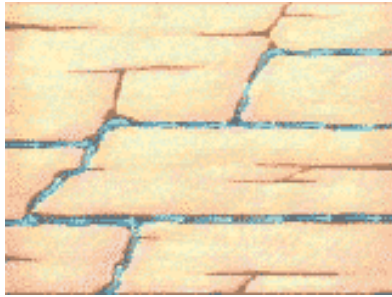


water basics

- “Universal Solvent”
- Naturally has “stuff” dissolved in it.
 - Impurities depend on rocks, minerals, land-use, plumbing, packaging, and other materials that water comes in contact with.



Green County Geology

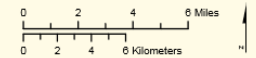


Green County

1994 - 2015 Summary

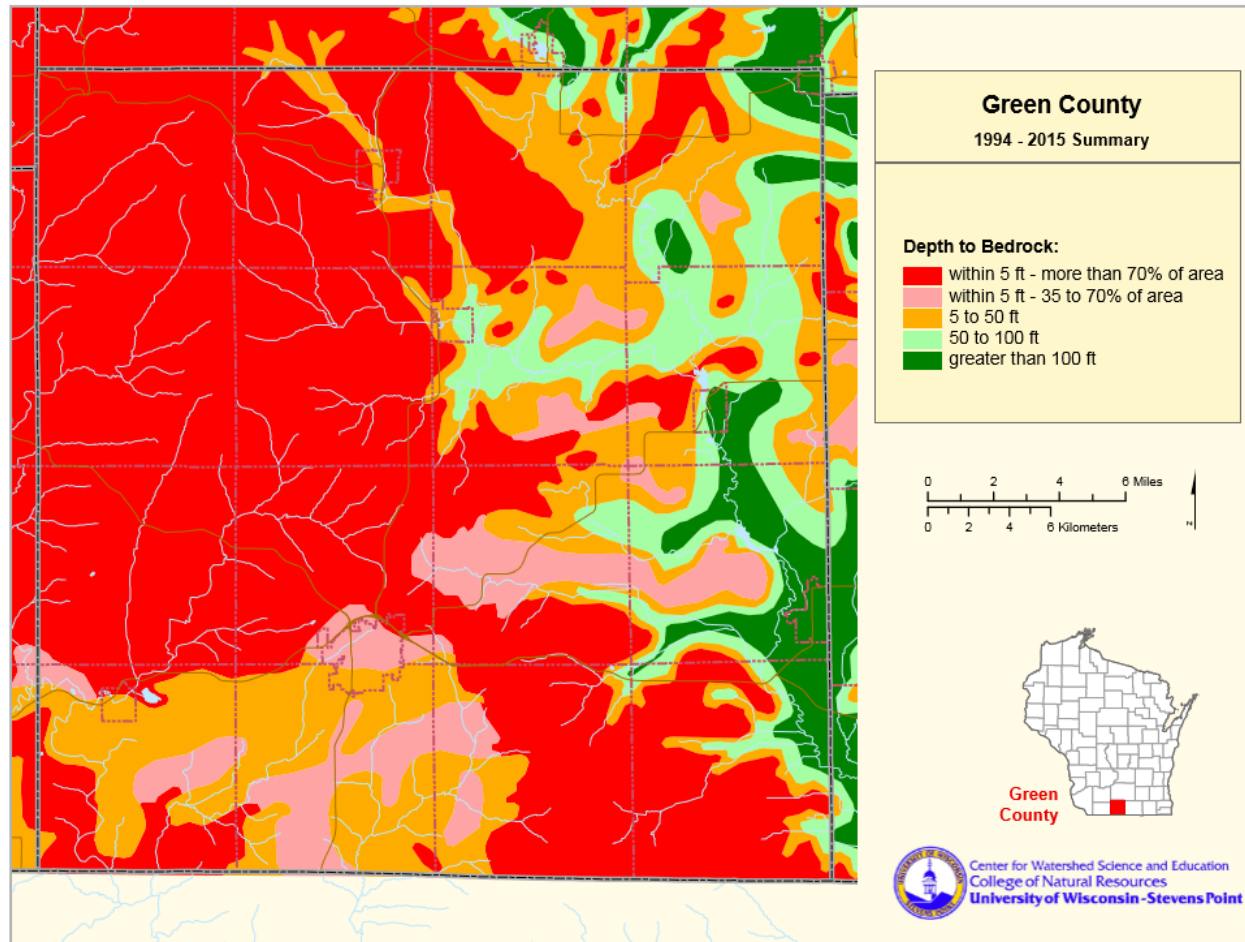
Bedrock Units:

- Cambrian Sandstone
- Galena-Platteville Dolomite
- Prairie du Chien Dolomite
- St. Peter Sandstone



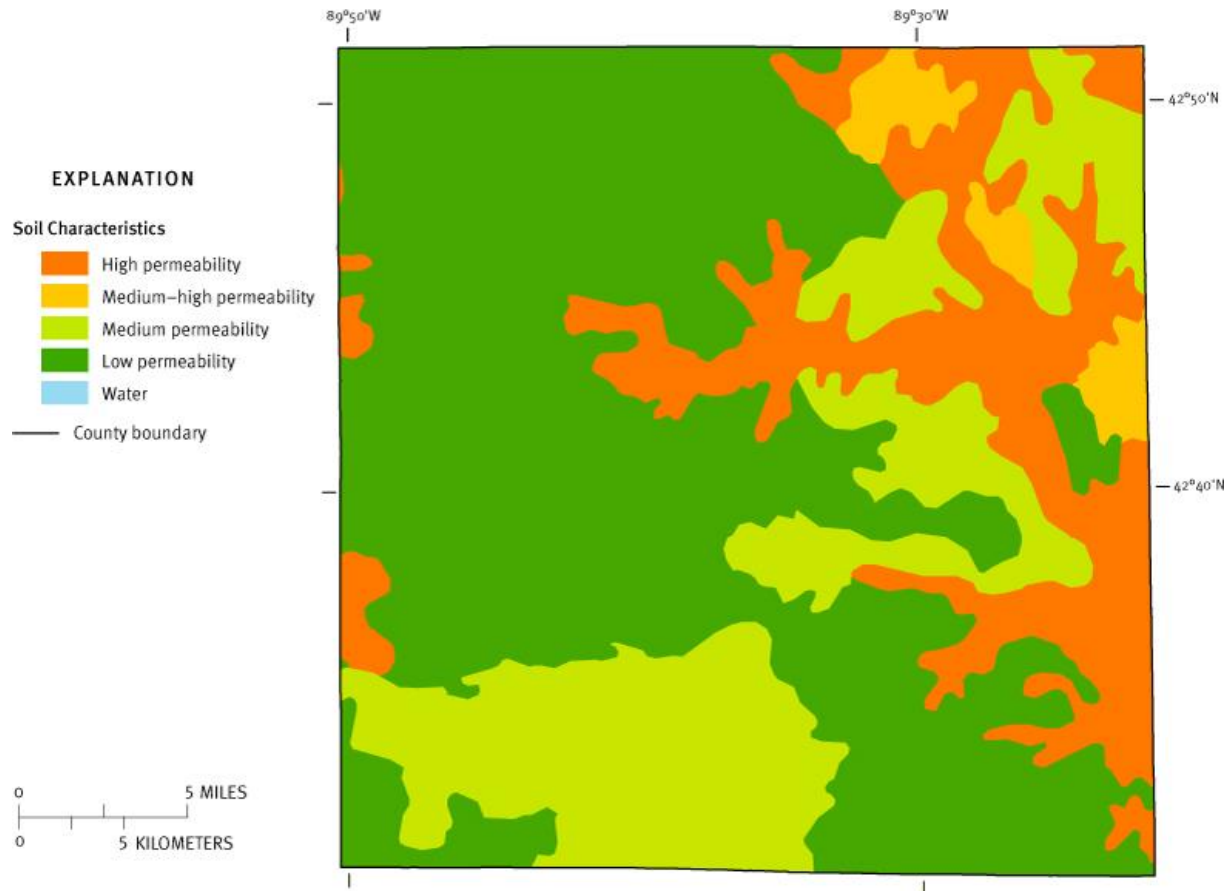
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Depth to Bedrock in Green County



Soil Permeability in Green County

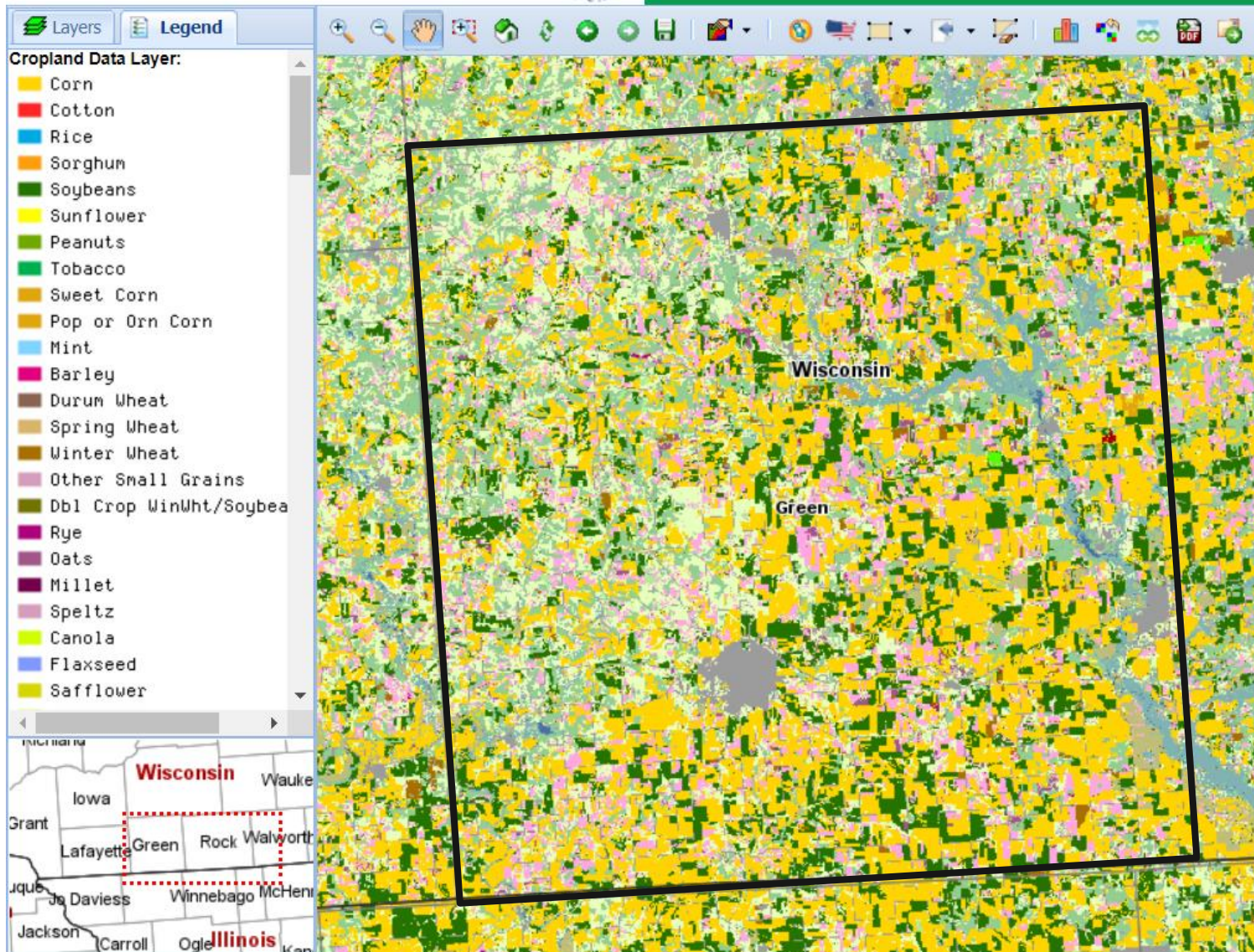
Green County – Soil Characteristics



This resource characteristic map was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, <http://wi.water.usgs.gov/gwcomp/>



WHY certain wells were selected

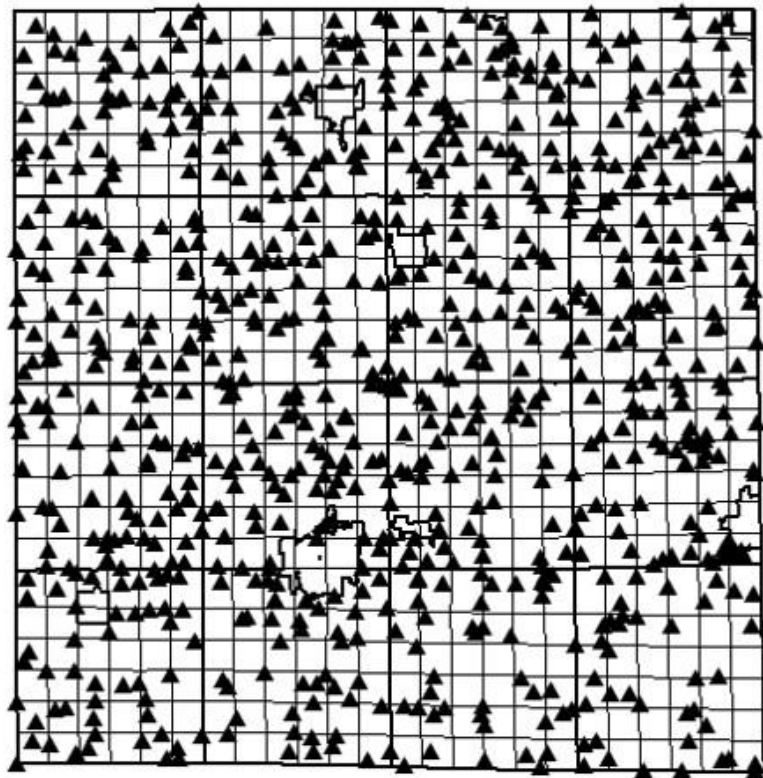
Our Recruitment Strategy

- ❑ Mostly wells drilled after 1988
 - ❑ Wisconsin Unique Well Numbers that links to a Well Construction Report (ex. SP123)
 - ❑ Information on well depth, casing depth, depth to water, and geology.
- ❑ Attempted to find one well per section that met the criteria above and could be matched to an individual parcel with a high degree of confidence
 - ❑ Spatially distributed
 - ❑ Account for wide variety of soils, geology, and land use
- ❑ All things being equal, preference was given to those landowners that participated in previous Extension well testing efforts.

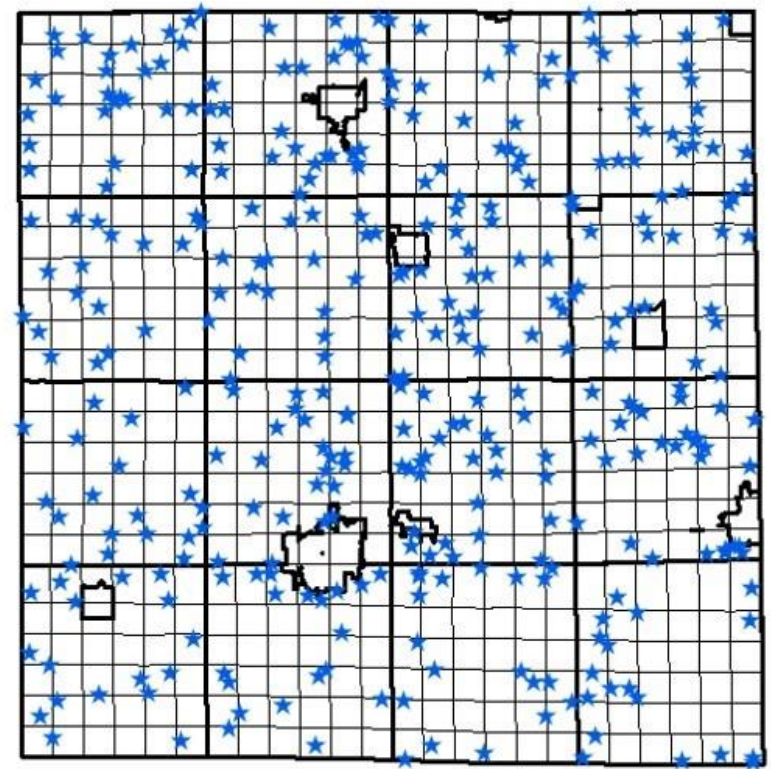


WHERE and HOW many wells?

Total of 778 landowners were sent recruitment materials asking whether or not they wanted to participate



Total of 388 landowners indicated their interest and were mailed sample materials, with 342 actual samples submitted



GOAL: To learn how well water quality changes over time



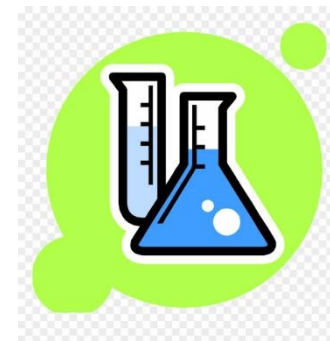
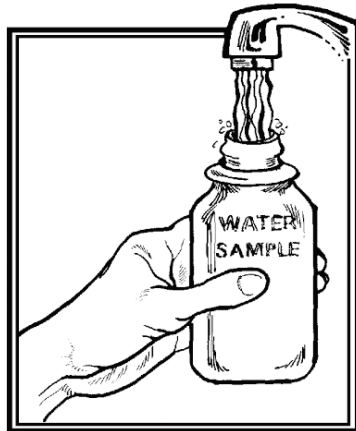
Is well water quality getting better, worse, or staying the same.

If changing, what can we learn about where and why

This project works best when:

- Wells are representative of diverse geology and land use
- The same wells are sampled every year

Year 1 - Overview



January
Mailed sample kits



February-March
Participants collected samples and mailed back to lab



March-April
Lab analyzed samples

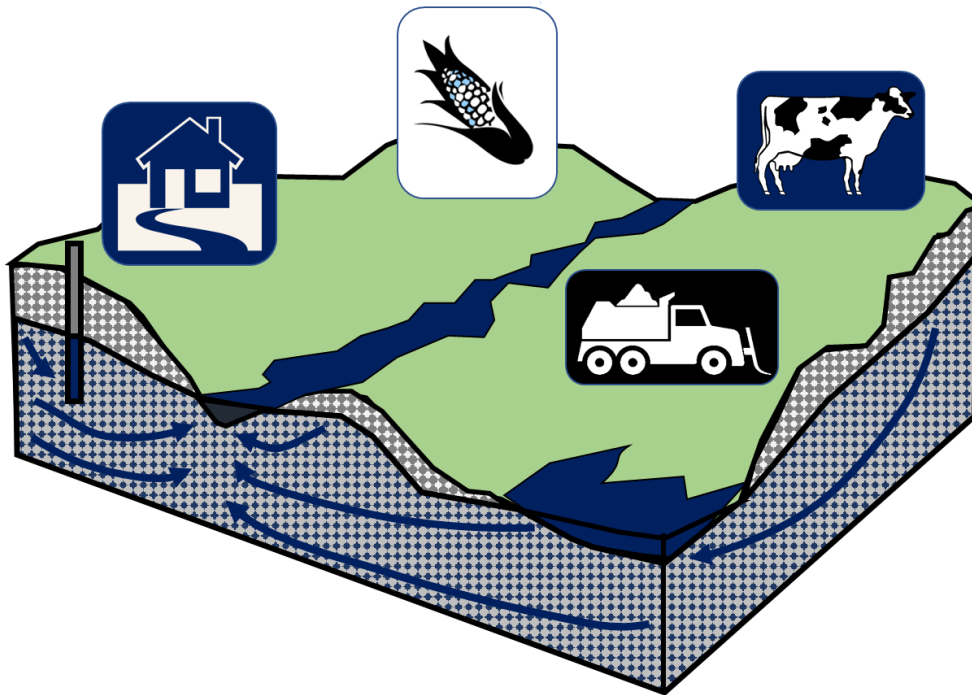


May
Mailed out results

WHAT tests were performed?

Nitrate / Chloride

- Useful for understanding land-use impacts on groundwater



Conductivity

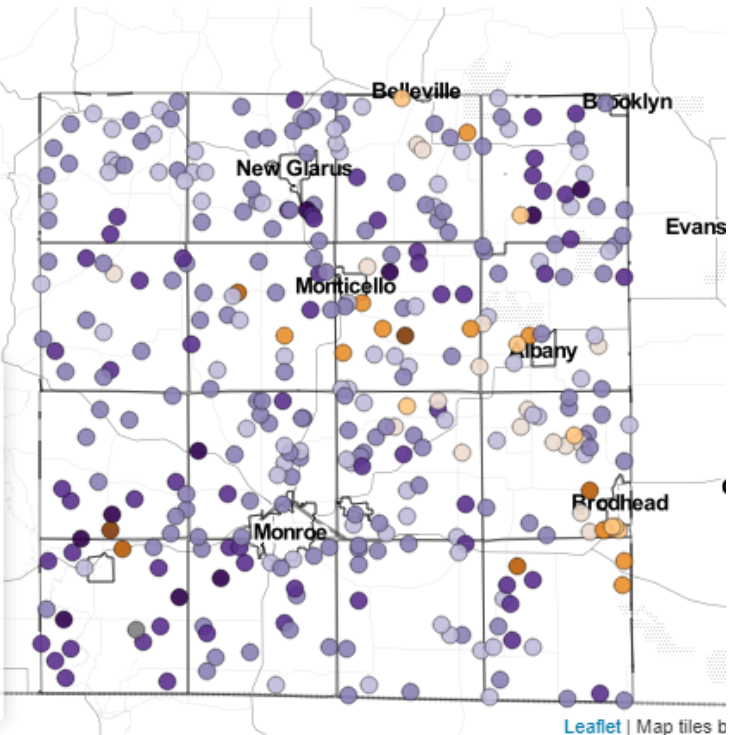
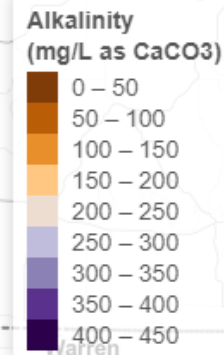
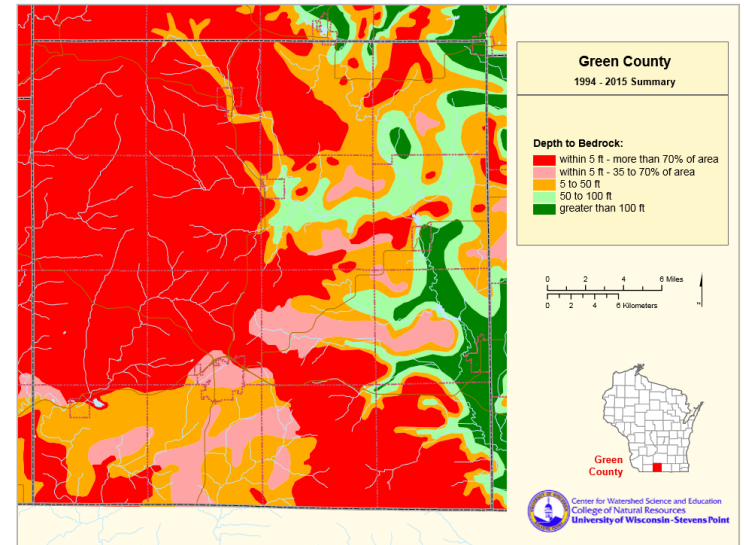
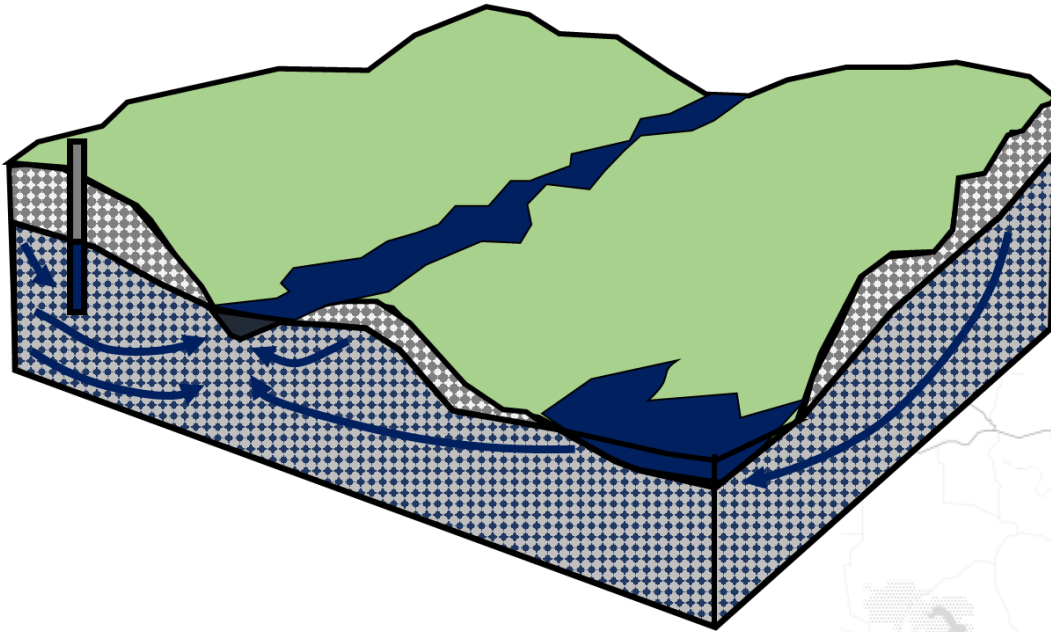
- Overall water quality, combination of both land-use, rocks, and soils

Total Hardness / Alkalinity / pH

- Help us understand how rocks and soils impact groundwater

Total Hardness / Alkalinity / pH

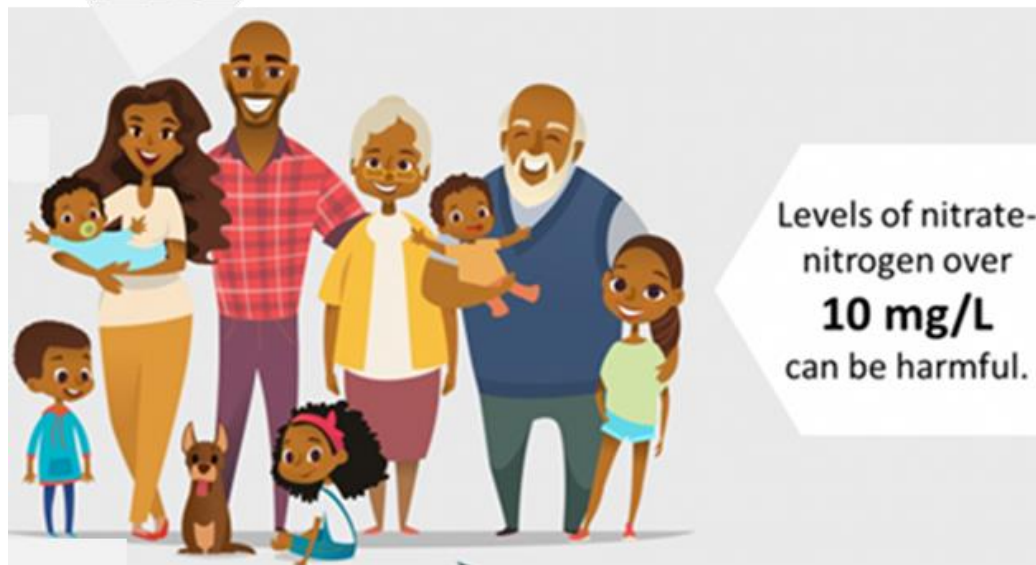
- Help us understand how rocks and soils impact groundwater



Nitrate-Nitrogen

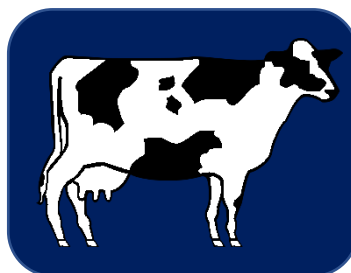
Health Effects:

- **Infants Less than 6 months:**
 - Methemoglobinemia (blue baby disease)
- **Women who are or may become pregnant:**
 - Possible links to birth defects and miscarriages (humans and livestock)
- **Everyone:**
 - Thyroid disease
 - Increase risk of certain types of cancers

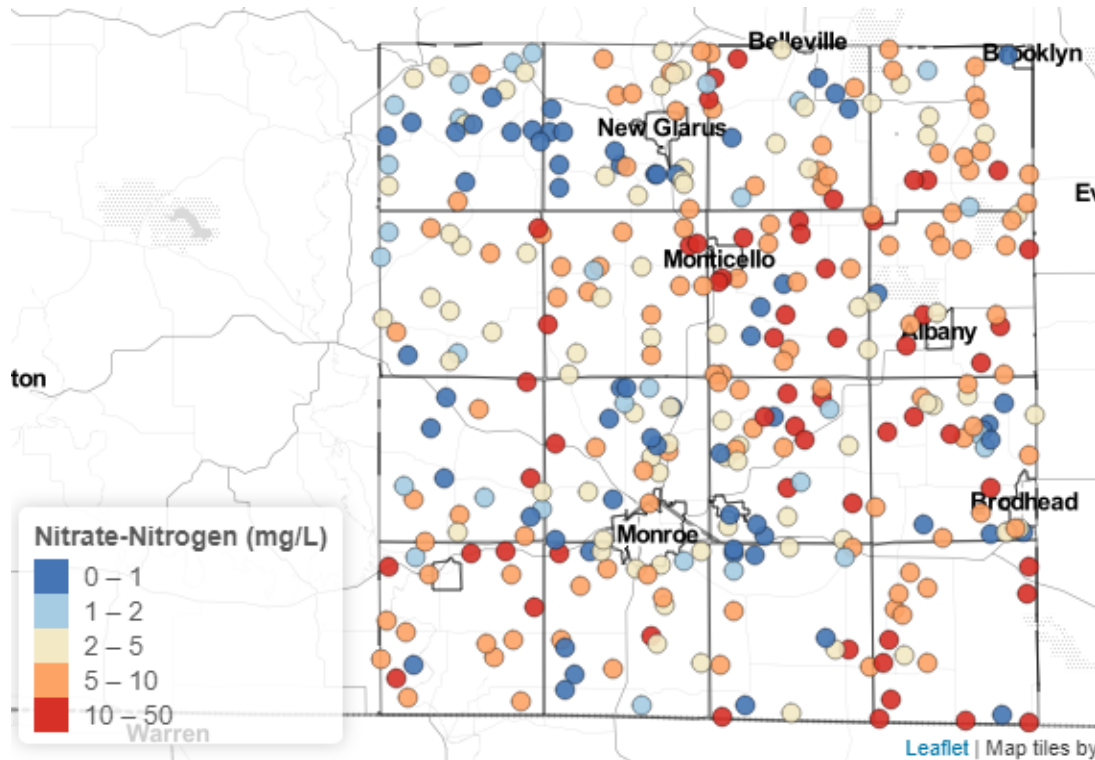


Sources:

Agricultural fertilizer / Animal Waste or other bio-solids / Septic Systems / Lawn fertilizer



2020 Green County Nitrate Results



Nitrate-Nitrogen Summary

- 15% of wells tested greater than 10 mg/L
- 28% of wells tested less than 2 mg/L
- **Average:** 5.3 mg/L
- **Median:** 4.95 mg/L
- **Maximum:** 26.8 mg/L
- **Minimum:** < 0.1 mg/L

What's next for the project?

- Test kits for Year 2 will be sent sometime in November
- **Coming in Year 2:**
 - Will work to investigate relationships between land-use, soils, geology, well depth, etc. on water quality results
 - Develop statistical models to better predict water quality risk for wells that are not part of the project
 - Integrate temporal component to data analysis for understanding changes over time
 - Trends
 - Better understand which wells fluctuate and why
 - How does weather impact well quality from year to year
 - Working on website to communicate project results

Questions?

Kevin Masarik

800 Reserve St.

Stevens Point, WI 54481

715-346-4276

kmasarik@uwsp.edu

www.uwsp.edu/cnr/watersheds

Thanks to you and the following for helping sponsor this program:

- Green County
- University of Wisconsin-Madison, Division of Extension – Green County
- Green County Health Department
- Green County Land Use and Zoning Department
- Green County Land and Water Conservation



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