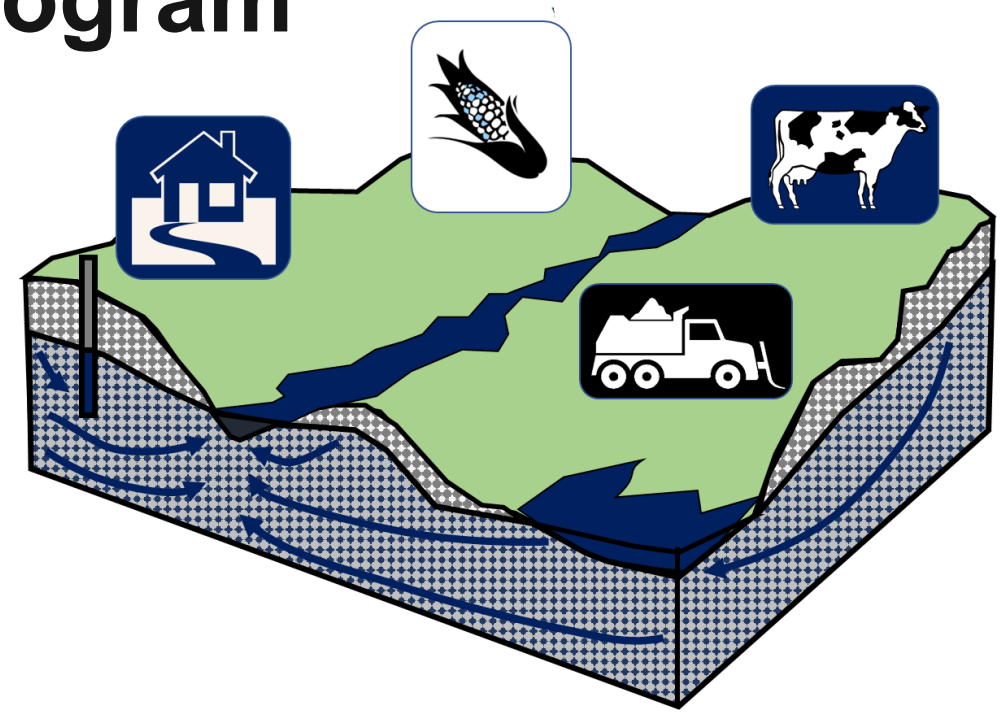
Green County Well Water Monitoring Program

Year 6



GREEN COUNTY WISCONSIN
there's an art to it.

Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin-Stevens Point

Extension
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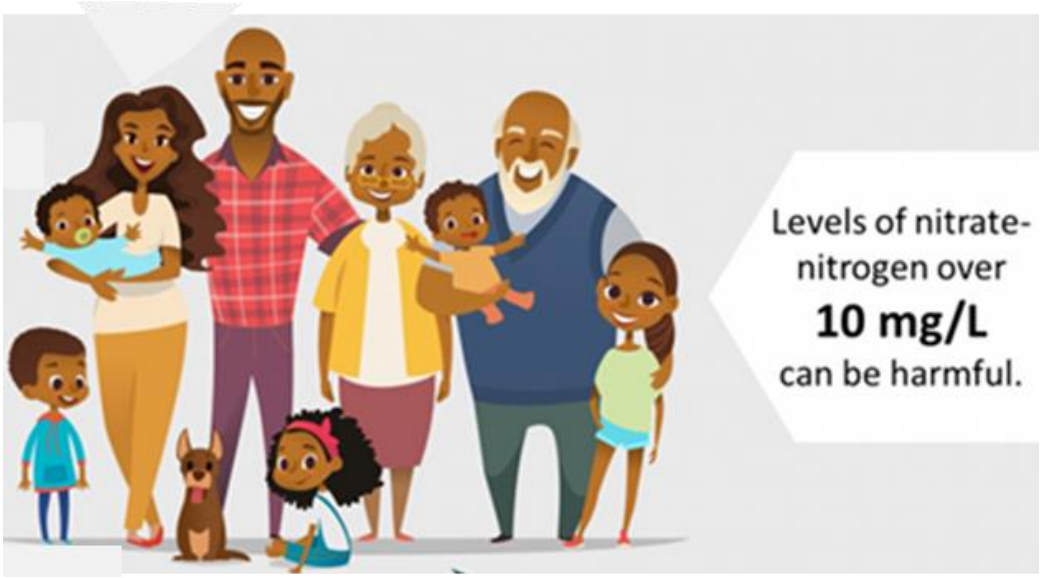
Nitrate-Nitrogen

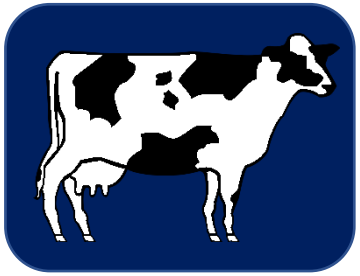
Health Effects:

- **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

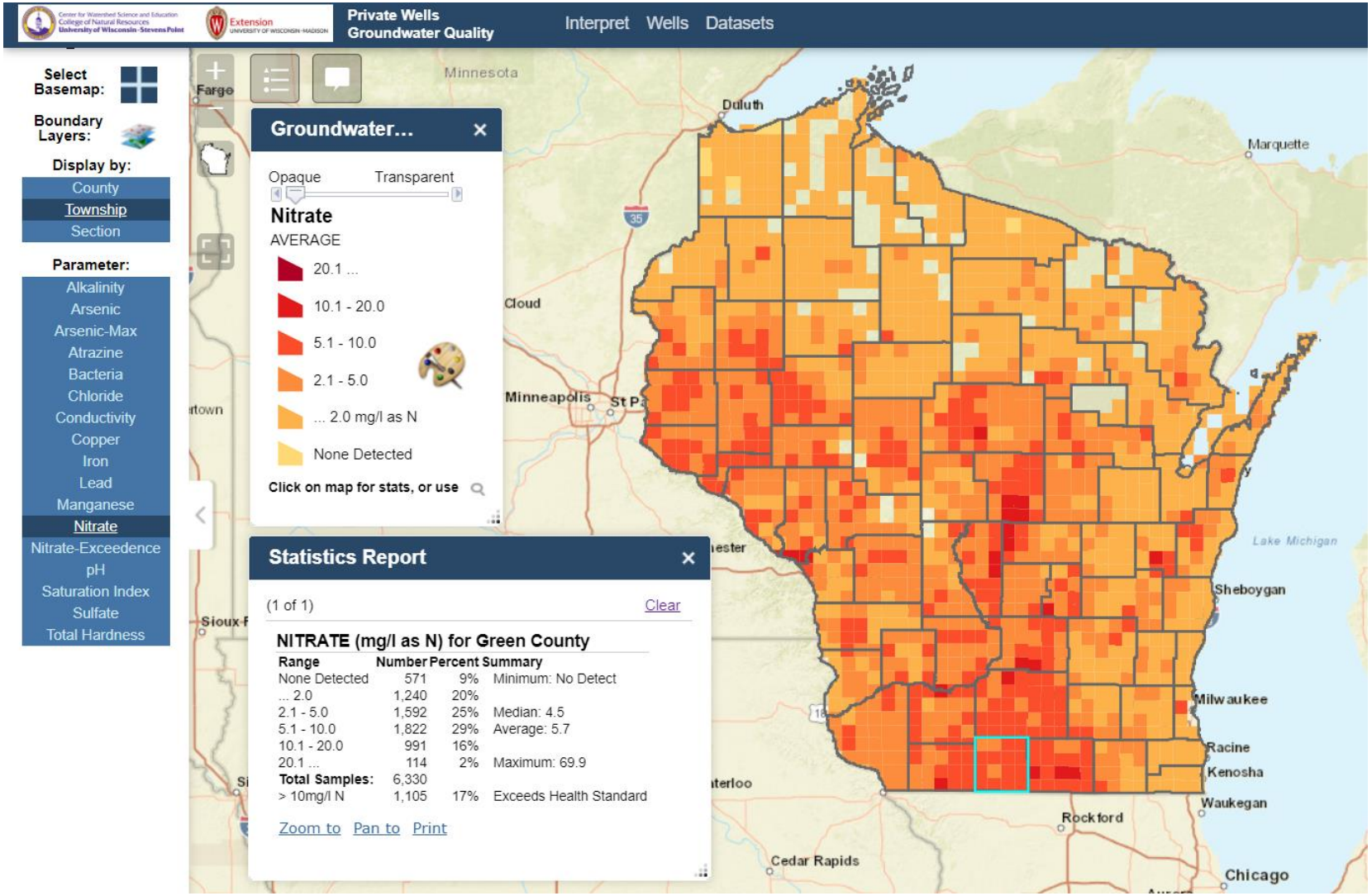


Sources:

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

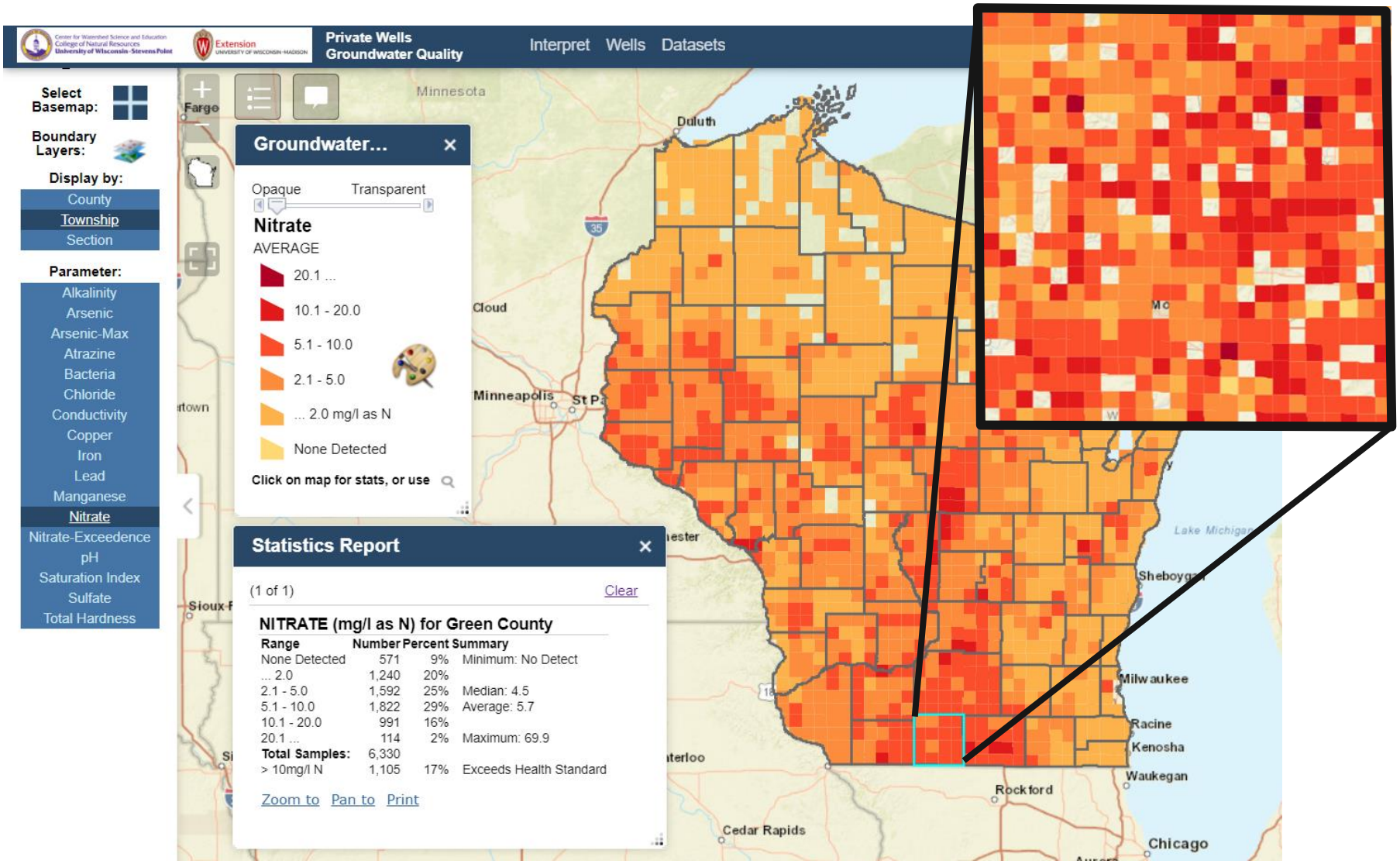


What do we know about Nitrate in Green County?



Source: WI Well Water Quality Viewer
https://gissrv3.uwsp.edu/webapps/gwc/pri_wells/

What do we know about Nitrate in Green County?



Source: WI Well Water Quality Viewer
https://gissrv3.uwsp.edu/webapps/gwc/pri_wells/

GOAL of Green County Trend Monitoring:

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

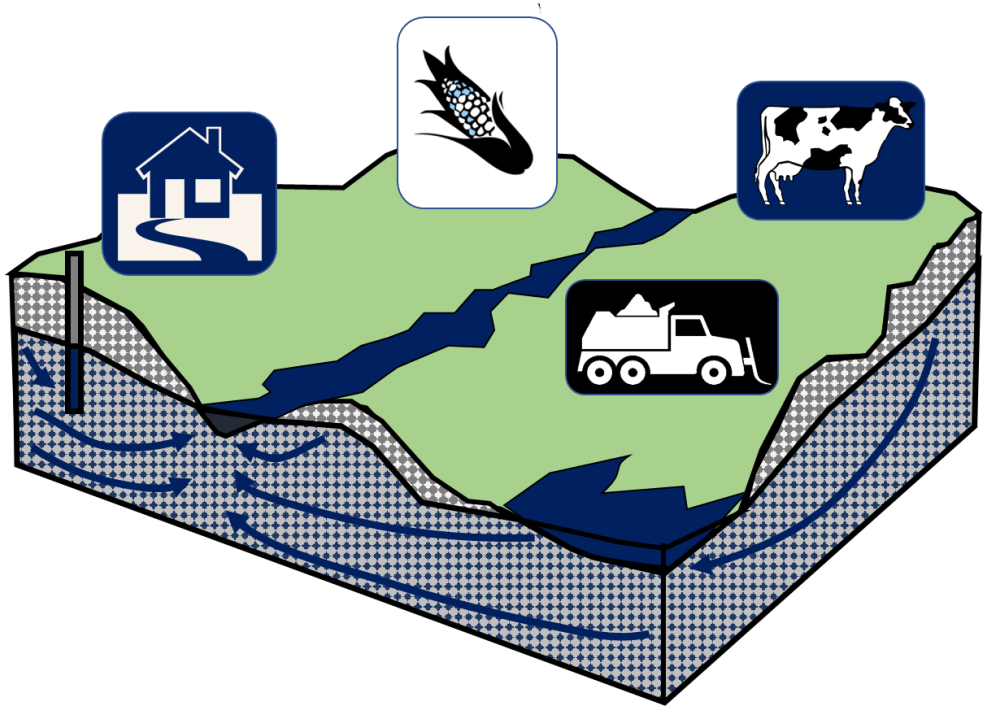
This project works best when:

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

WHAT tests were performed?

Nitrate / Chloride

- Useful for understanding land-use impacts on groundwater



Conductivity

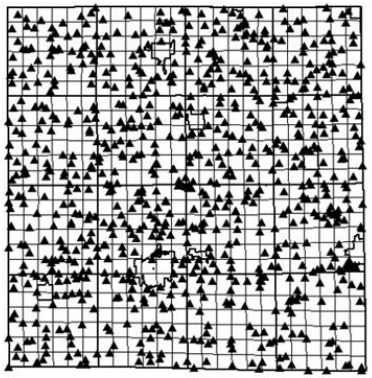
- Overall water quality, combination of both land-use, rocks, and soils

Total Hardness / Alkalinity / pH

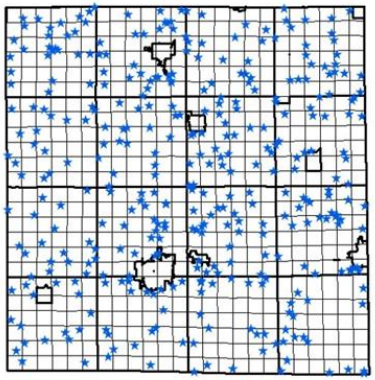
- Help us understand how rocks and soils impact groundwater

WHERE and **HOW** many wells?

Initial Recruitment
770 Participants

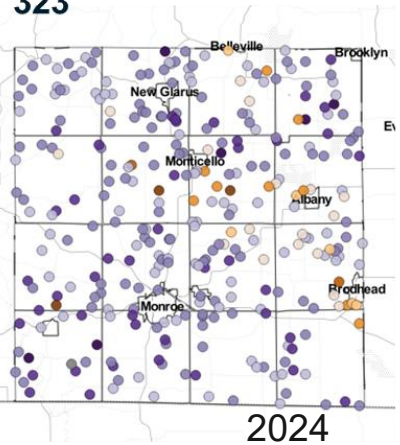


Yes Respondents
388

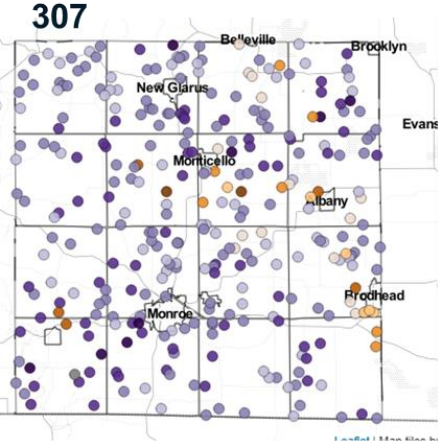


2019
Samples Received
348

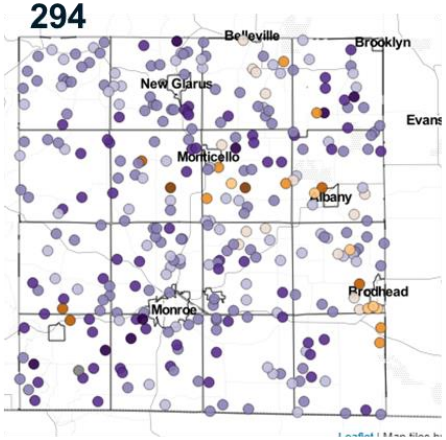
2020
Samples Received
323



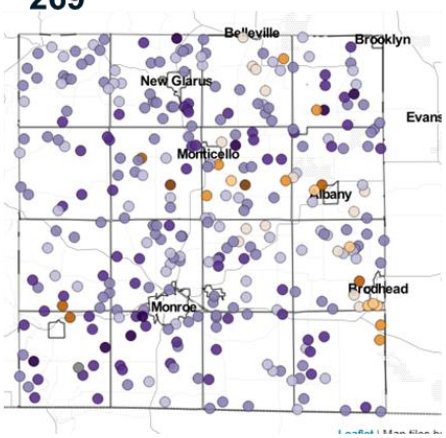
2021
Samples Received
307



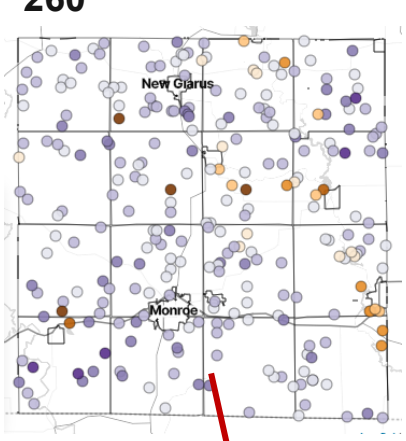
2022
Samples Received
294



2023
Samples Received
269



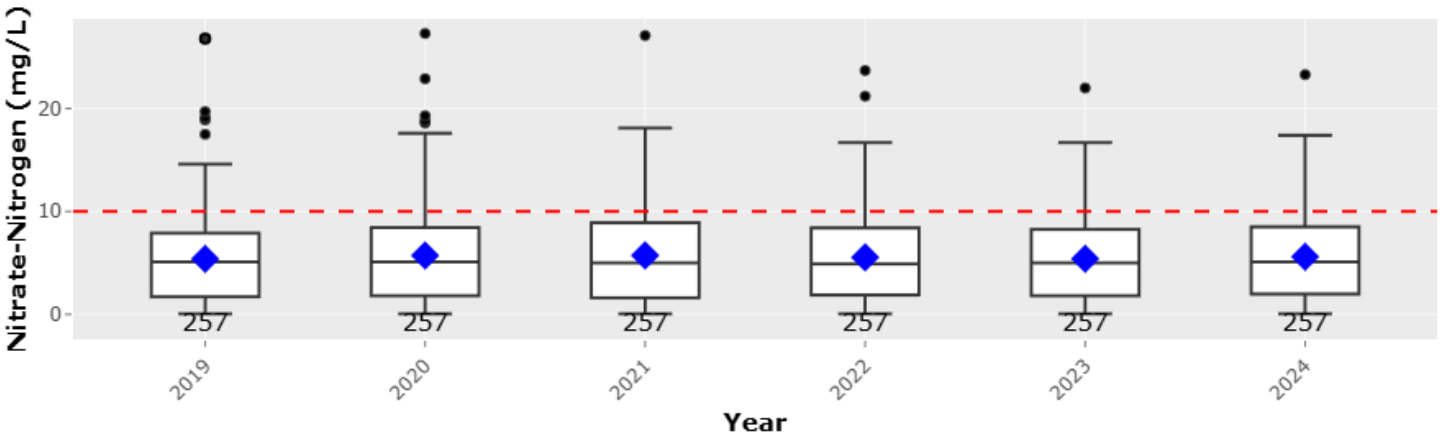
2024
Samples Received
260



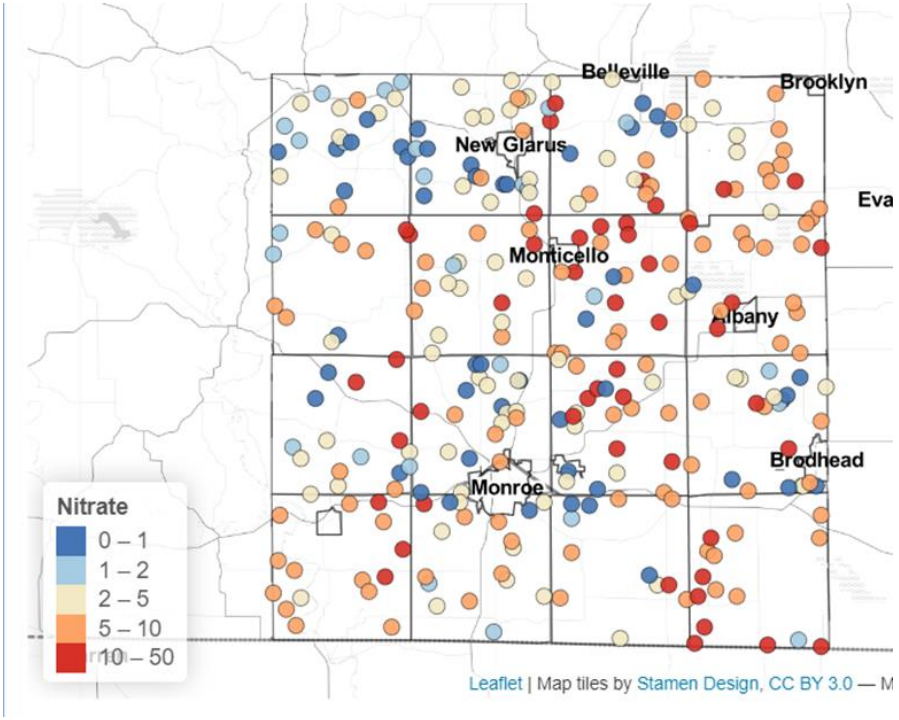
2025
Last Year of County Funded

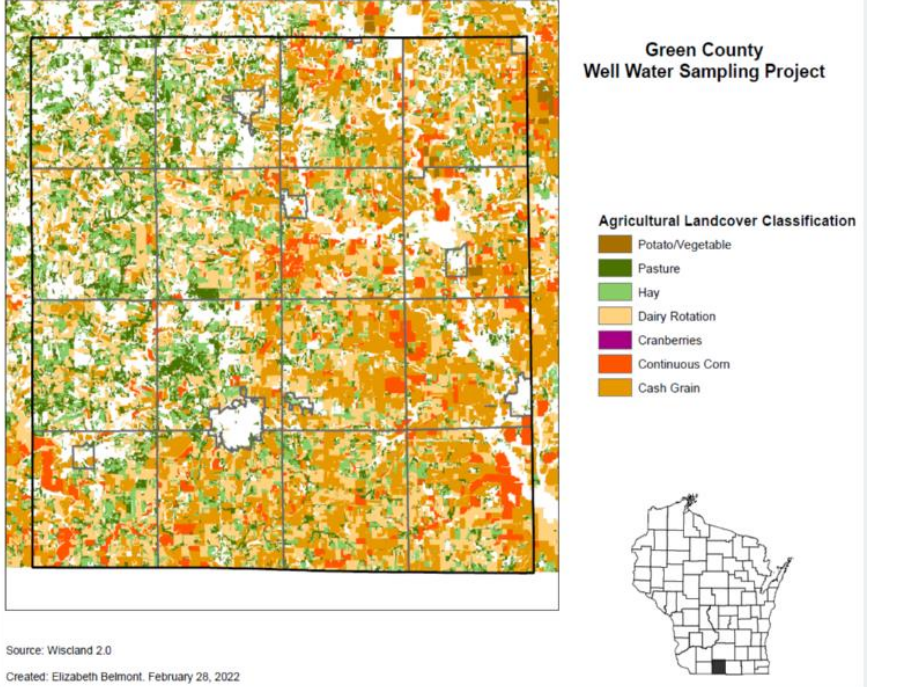
Annual Nitrate-Nitrogen Results

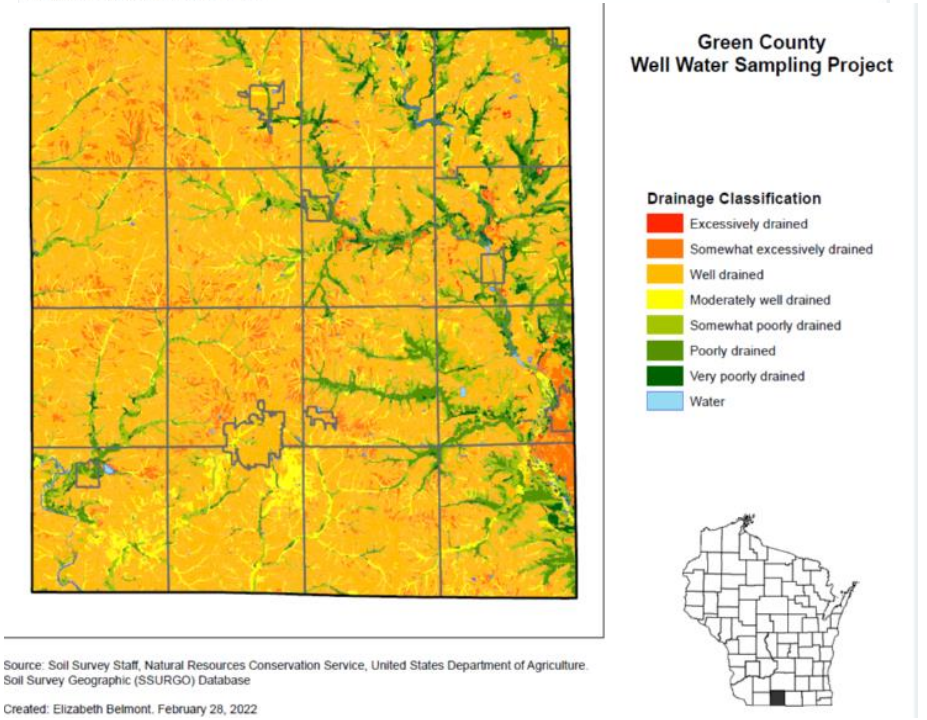
	2019	2020	2021	2022	2023	2024
	Nitrate-N (mg/L)					
Average	5.4	5.7	5.8	5.5	5.5	5.6
Median	5.0	5.0	5.0	4.9	5.0	5.1
Minimum	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Maximum	26.8	27.3	27.1	23.7	22.0	23.3
Greater than 10	15%	18%	19%	16%	15%	19%
Less than 2	28%	27%	27%	26%	26%	25%
N	348	323	307	294	269	260



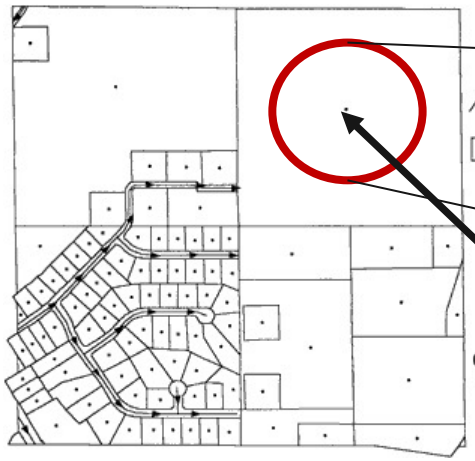
Modeling of Nitrate Risk

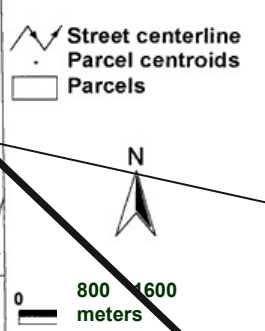


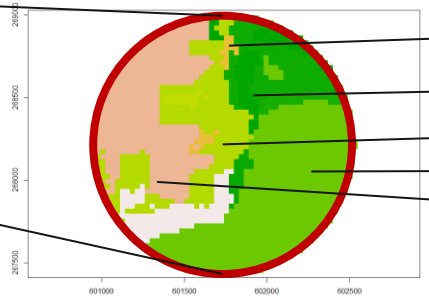




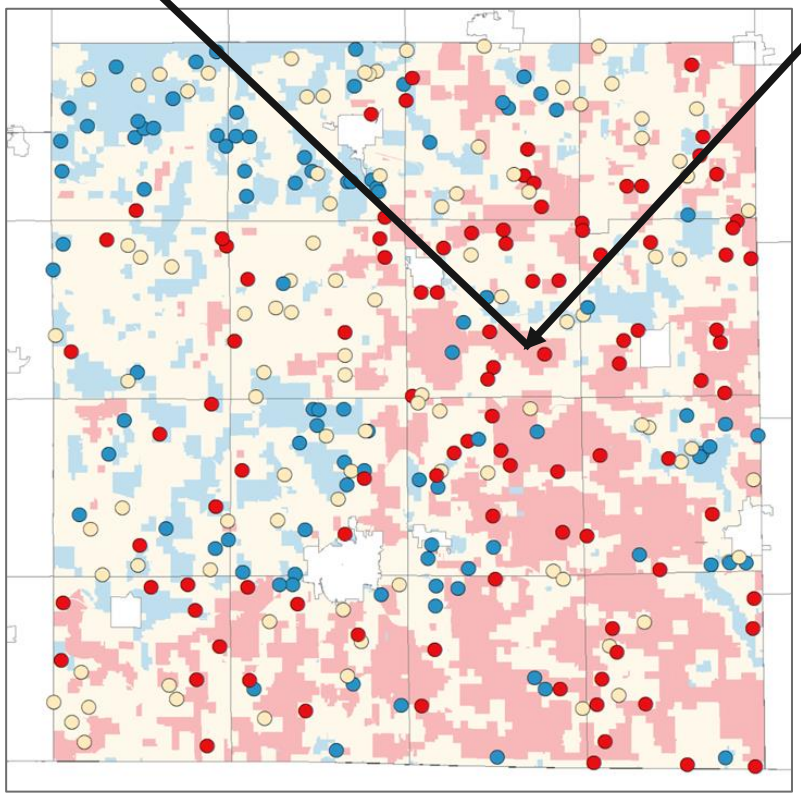
Applying that model to Green County

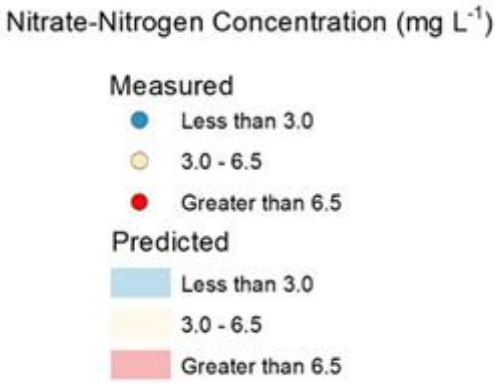






$$\sqrt{NO_3 - N} = Grain * x + CC * x + Dairy * x + Potato * x + Hay * x + Drainage\ Rank * x + b$$

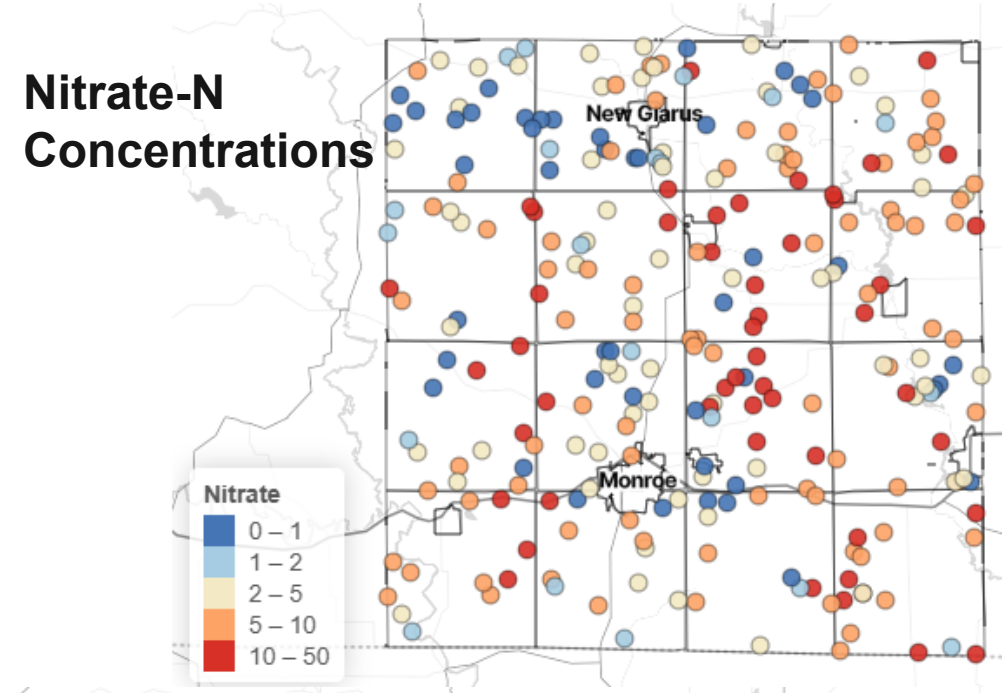




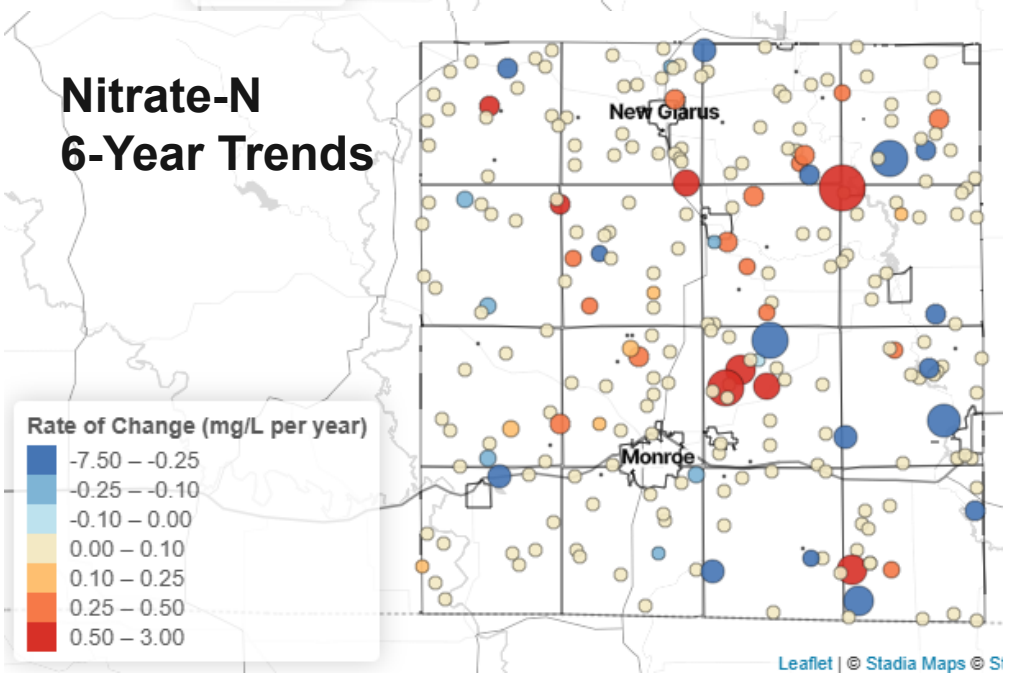
2024 Nitrate-Nitrogen Results

6 Year Trends		
Trend	# Wells	%
Decrease	24	9
No trend	204	78
Increase	32	12

Nitrate-N Concentrations



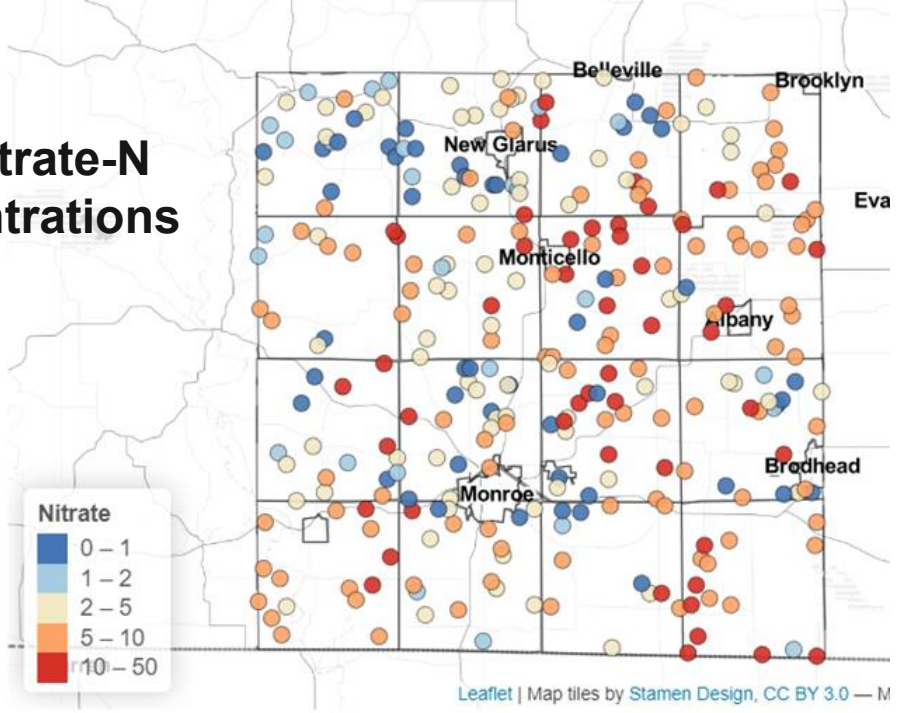
Nitrate-N 6-Year Trends



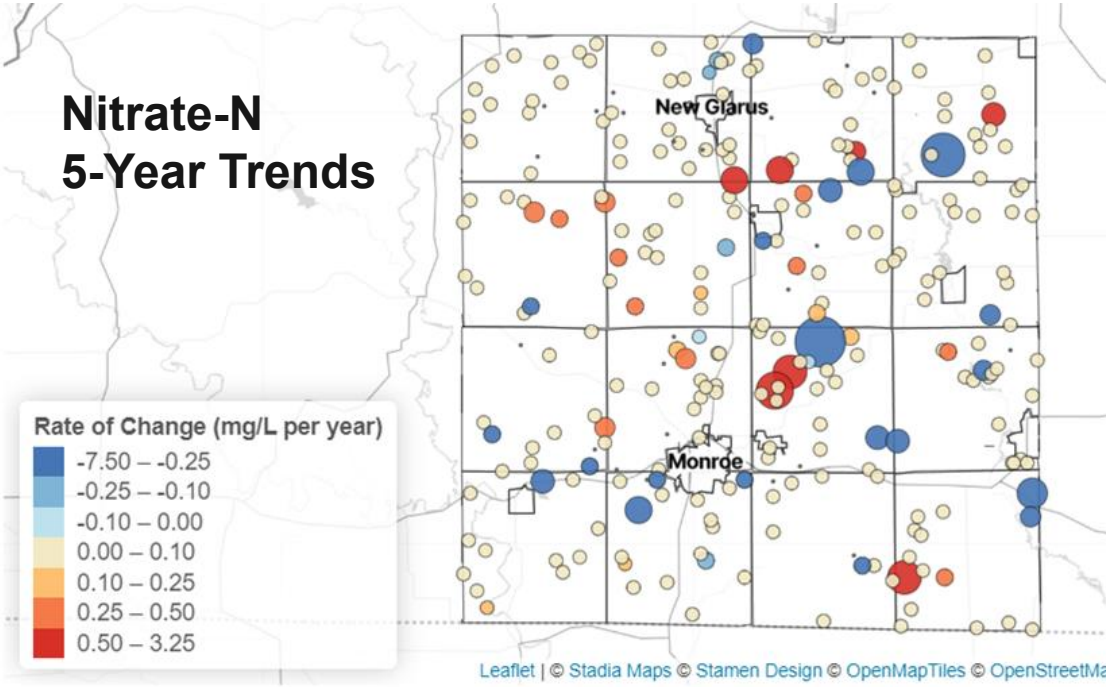
2023 Nitrate-Nitrogen Results

5 Year Trends		
Trend	# Wells	%
Decrease	26	10
No trend	219	81
Increase	24	9

2023 Nitrate-N Concentrations

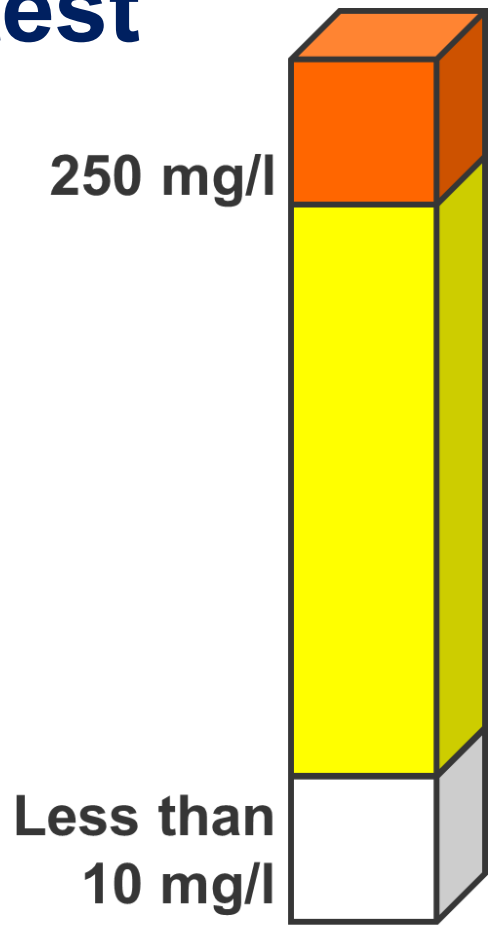


Nitrate-N 5-Year Trends



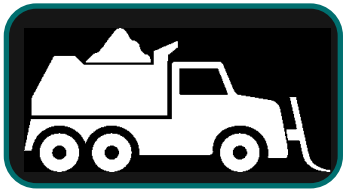
Interpreting your chloride test

- Greater than 250 mg/l
  - No direct effects on health
  - Salty taste
  - Exceeds recommended level
- Greater than 10 mg/l may indicate human impact
- Less than 10 mg/l considered "natural" in much of WI



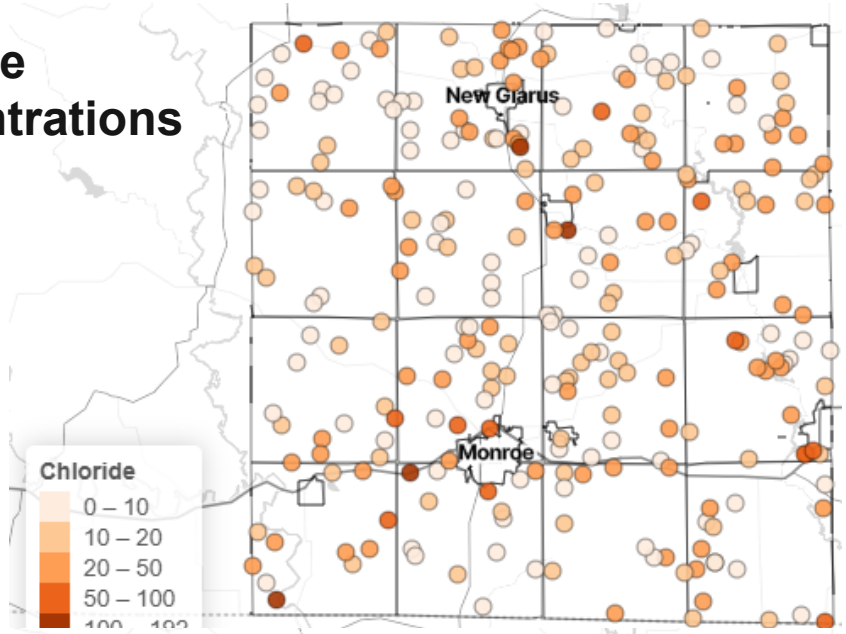
Sources:

Fertilizers / Septic Systems / Road Salt

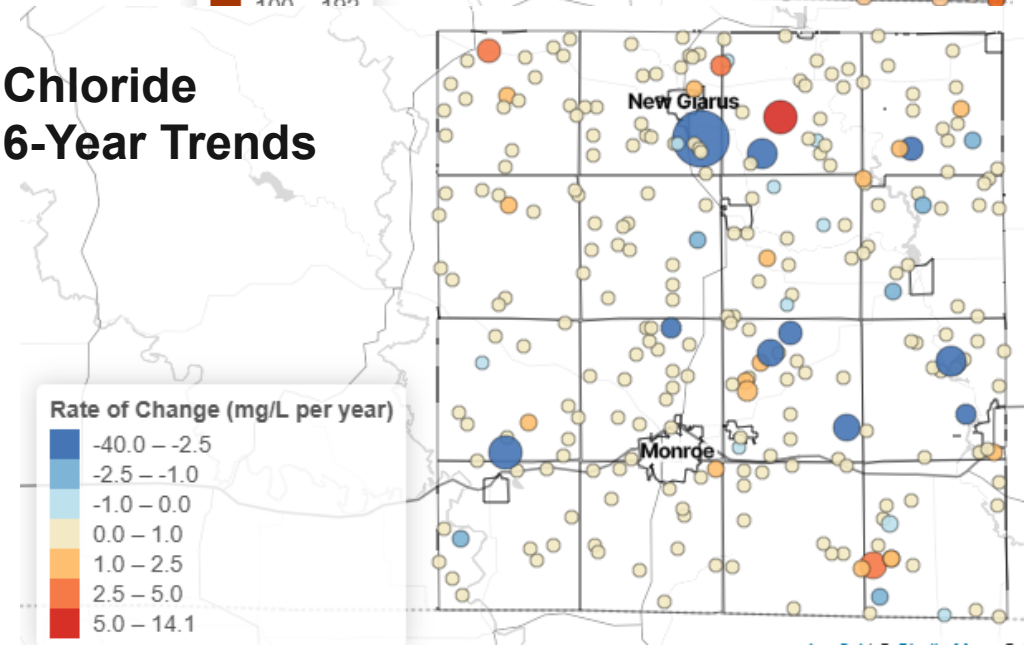


2024 Chloride Results

Chloride Concentrations



Chloride 6-Year Trends



Chloride Summary

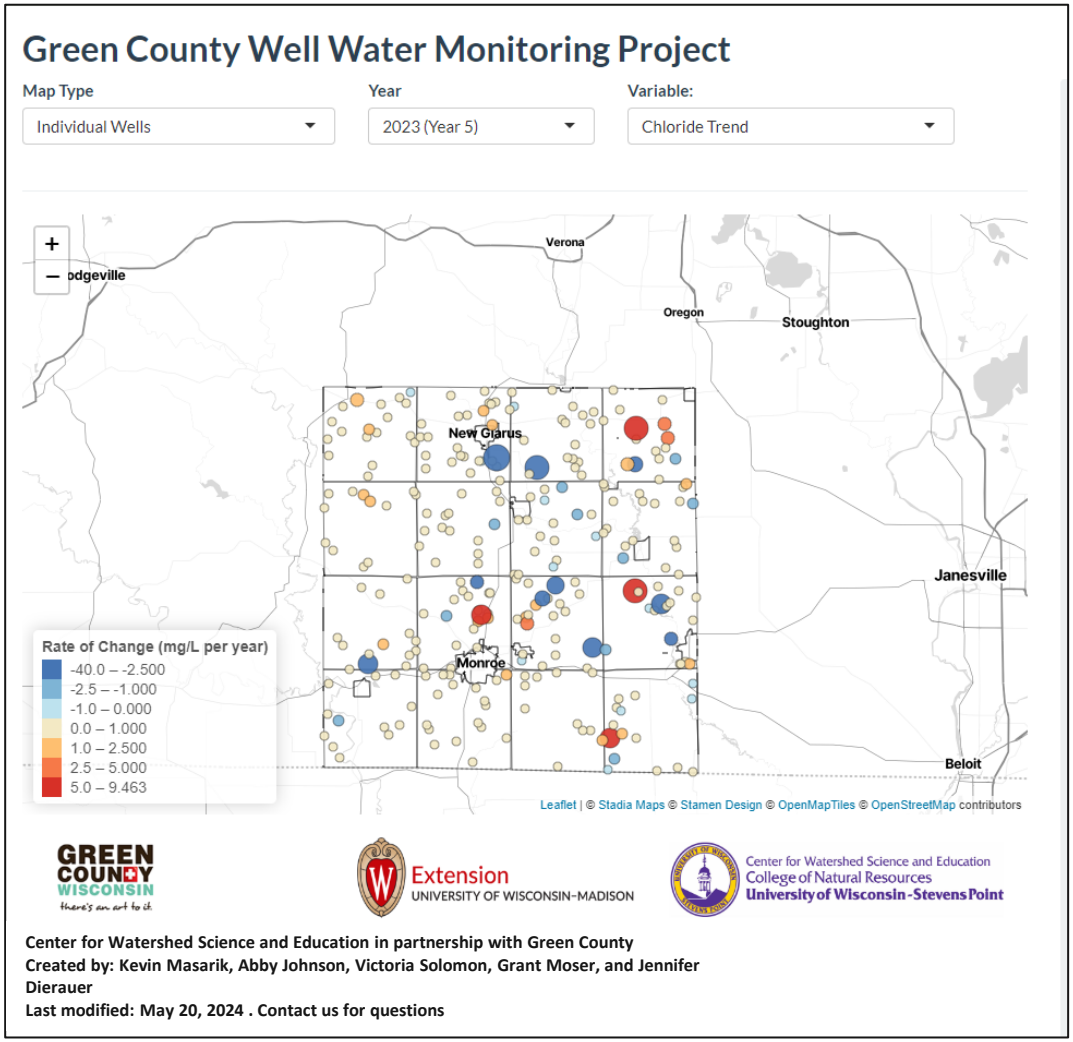
- 2% of wells tested greater than 100 mg/L
- 35% of wells tested less than 10 mg/L
- **Average:** 20.5 mg/L
- **Median:** 14.9 mg/L
- **Maximum:** 192 mg/L
- **Minimum:** 0.7 mg/L

6 Year Trends

Trend	# Wells	%
Decrease	35	13
No trend	204	78
Increase	21	8

What's next for the project?

- 2025 is the last year of the project (Year 7)
- Test kits for Year 7 will be sent in September
- Dashboard available online
- Transitioning to grassroots subscription based service



Access the Dashboard here:
http://68.183.123.75/wisconsinwater/County-Apps/Green/

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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Strategies to reduce nitrate in groundwater

- Applying fertilizer at the right rate, time, source, place will maximize profitability and minimize excessive losses of nitrogen to groundwater; additional practices may be needed to improve water quality in areas with susceptible soils and geology
- You may not need as much nitrogen fertilizer as you think, conduct your own on-farm rate trials to develop customized fertilizer response curves for your farm
- Utilize conservation incentive programs to take marginal land or underperforming parts of fields out of production
- Diversify cropping systems to include less nitrogen intensive crops in the rotation
- Explore and experiment with the use of cover crops, perennial cropping systems, or managed grazing to reduce nitrate losses to groundwater