# Groundwater Testing in Western Dane County

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Land Conservation Division

# Project Overview

### Free Nitrate Sampling

For private well owners located within the Blue Mounds, Perry, Primrose, & Springdale townships (2024) and Mazomanie, Black Earth, Vermont, Cross Plains, Berry & Roxbury townships (2025)

### Nitrate Result Analysis

Examination of nitrate sample results and mapping the sampled wells in ArcGISPro

### Target Areas for Conservation

Identifying targeted areas for conservation practices such as nutrient management, cover crops, and continuous cover

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# Why Nitrate?

## Negative Health Effects

Exposure to high levels of nitrate can have negative health impacts:

- Blue baby syndrome
- Increased risk of certain birth defects, thyroid disease, and certain types of cancer

## Agricultural Derivation

Sources of contamination include fertilizer and manure applications, septic systems, and lawn fertilizer applications. Agricultural land use occupies 64% of the total land area in Dane County. [1]

## Target Conservation Practices

Identify targeted areas for conservation practices such as nutrient management, cover crops, and no-till in Nutrient Reduction Strategy Watersheds

[1]. 2022 Dane County Farmland Preservation Plan

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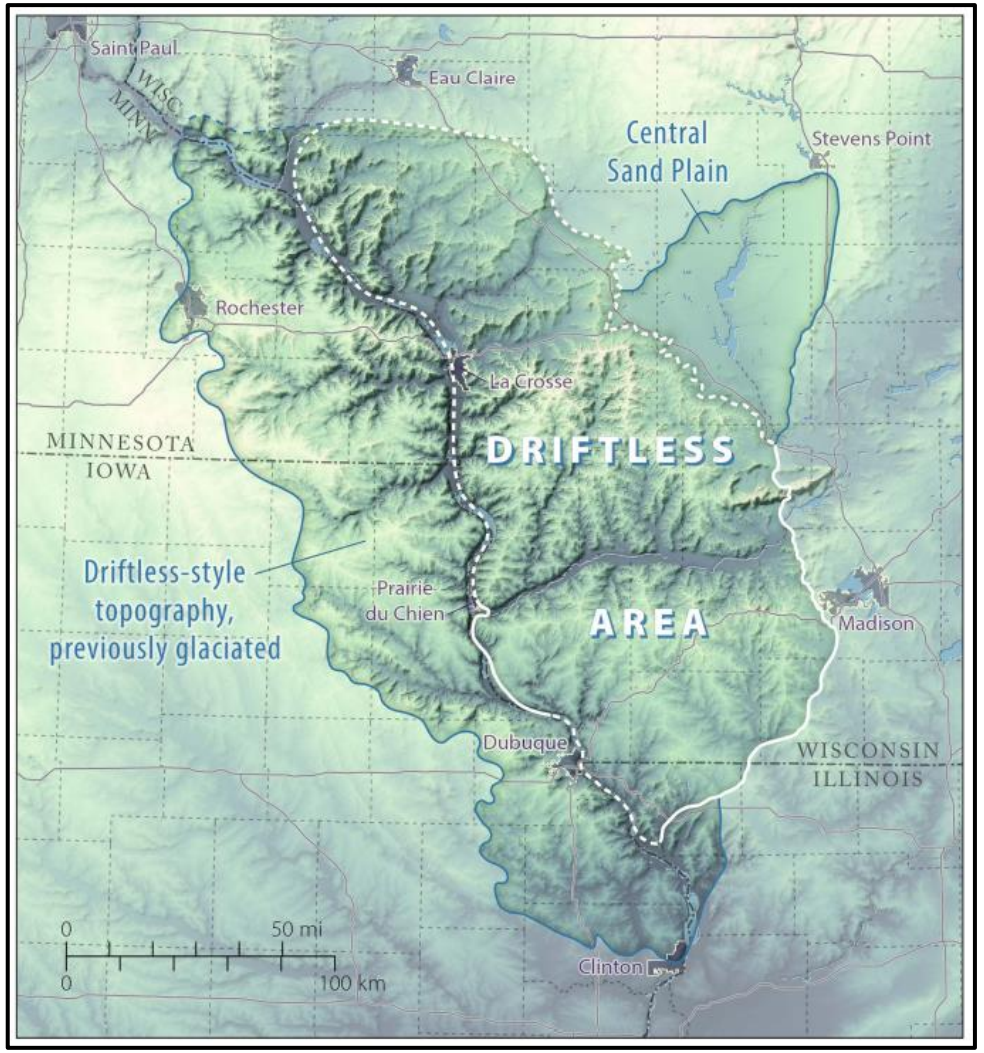
# Why the Driftless Area?

- Lack of groundwater data and continuation of driftless area groundwater testing
- Susceptibility to groundwater contamination due to topography
- Agricultural presence
- Challenging area to implement conservation practices

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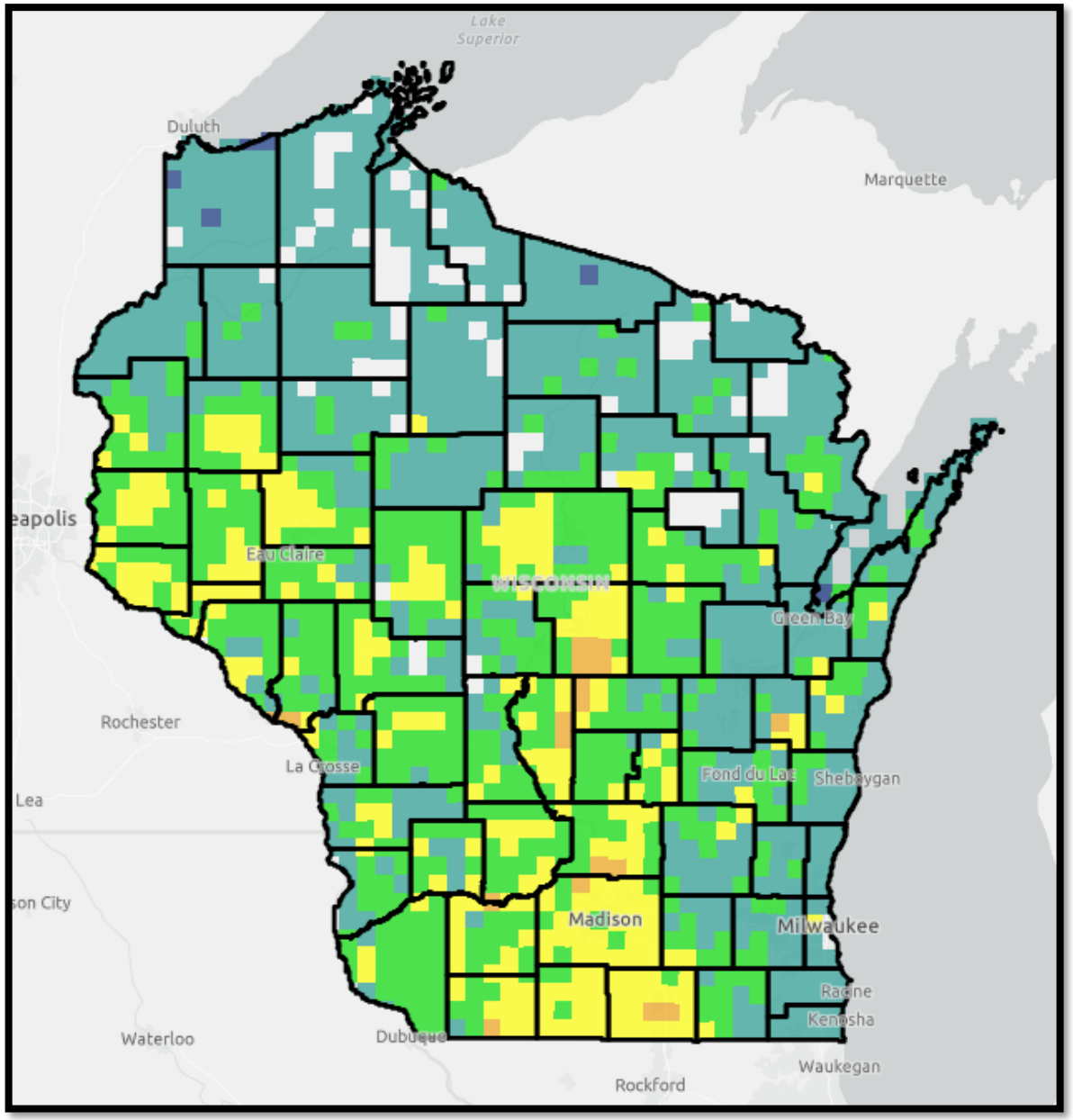


# WI Well Water Quality Viewer

## Township Level

**Nitrate**

AVERAGE

- 20.1+
- 10.1 - 20.0
- 5.1 - 10.0
- 2.1 - 5.0
- Less than 2.0 mg/l as N
- None Detected
- No Data

# Survey Participants


- Public Health Madison & Dane County's list of Private Septage Owners
- Project letter & nitrate info flyers
- ~4400 mailed out, ~1300 responses
- Scheduled first come, first served until funds were depleted

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# Sample Collection

- Locate outdoor wellhead or spigot
- Run water 1-2 minutes
- Collect sample bottle of water
- Document sample date, time, and location
- Sample to WSLH for analysis

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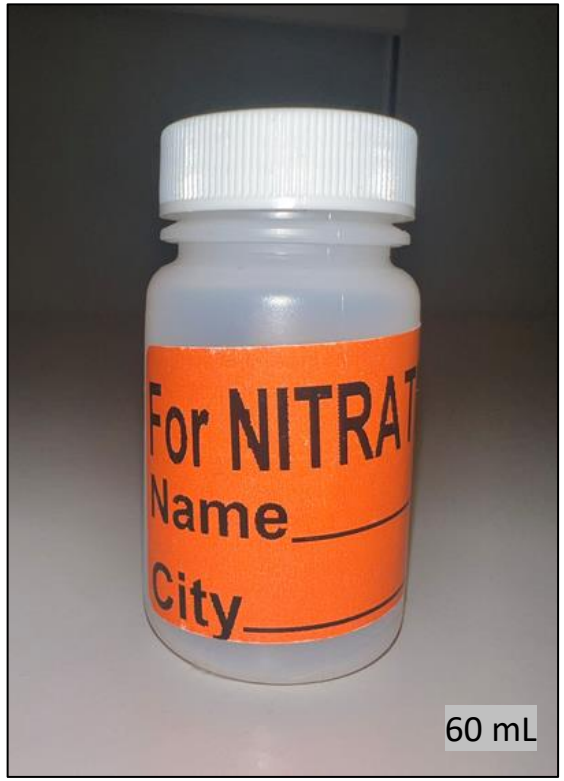
# Sample Bottles & Sheets




Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN-MADISON

☐ **RUSH**
Select RUSH for expedited service.
Test price will be double.

Environmental Health Division
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
http://www.slh.wisc.edu/environmental
(608) 224-6202 (800) 442-4618

## Total Coliform Bacteria, Nitrate, Fluoride

***Do not send payment with samples.*** You will be billed for each test performed; see the price list for test pricing.

**Test Request(s)** *(Please select)*

- ☐ Total Coliform bacteria*
- ☐ Nitrate
- ☐ Fluoride

*If no test is selected, Total Coliform bacteria will be performed.*
*Rush testing is not available for this test.

**Additional Information**

**Sample(s) must be analyzed within 48 hours of the time of collection.**

Check with your local post office or commercial carrier to ensure that sample(s) will be delivered on time.

**Customer Information ( Report / Bill to)** *Please complete all fields.*

Name DANE COUNTY PARKS, LAND AND WATER RES
Address 1 5201 FEN OAK DR ROOM 208
Address 2
City MADISON
State WI ZIP 53718
Phone
Email address

*Please note: Test results are delivered fastest by E-mail. Without an E-mail address, results are sent by US Mail.*

Customer ID *(for lab use only)* 347874

**Collection Information**

Date Time ☐ AM ☐ PM
Collected By
County
Professional License # *(if applicable)*
☐ Municipal Supply
☐ Private Well *Well ID (only for private well)*

**Location Information**

Address Sampled ☐ (Check if same as Report/Bill to)
Well Owner
Address
City
State ZIP
*(Ex. ABC123)*

**Reason for test**

- ☐ Annual Test (A)
- ☐ Investigation (I)
- ☐ New Well (N)
- ☐ Real Estate (E)
- ☐ Other (O)

**Sample Source**

- ☐ Kitchen Tap (PK)
- ☐ Pressure Tank Tap (PP)
- ☐ Bathroom Tap (PT)
- ☐ Sample Faucet (PD)
- ☐ Other (O)

**Laboratory Use Only**

- ☐ Total Coliform ABSENT
- ☐ Total Coliform PRESENT
  - ☐ E. coli PRESENT
  - ☐ E. coli ABSENT

**Shipping Information**

Use the Red and White label for commercial delivery service

UPS 800-742-5877
FedEx 800-463-3339
Spee-Dee 800-862-5578

Use the Orange label for US Postal Service

Your kit may include a Priority Mail label. These labels are not postage. You will be responsible for the cost of postage.
US Postal Service 800-275-8777

*WSLH Test Request Part - EHD001* *Shipment: 10016078* *Bacteria - Revision: 2023-10-09*

# Notes on Results

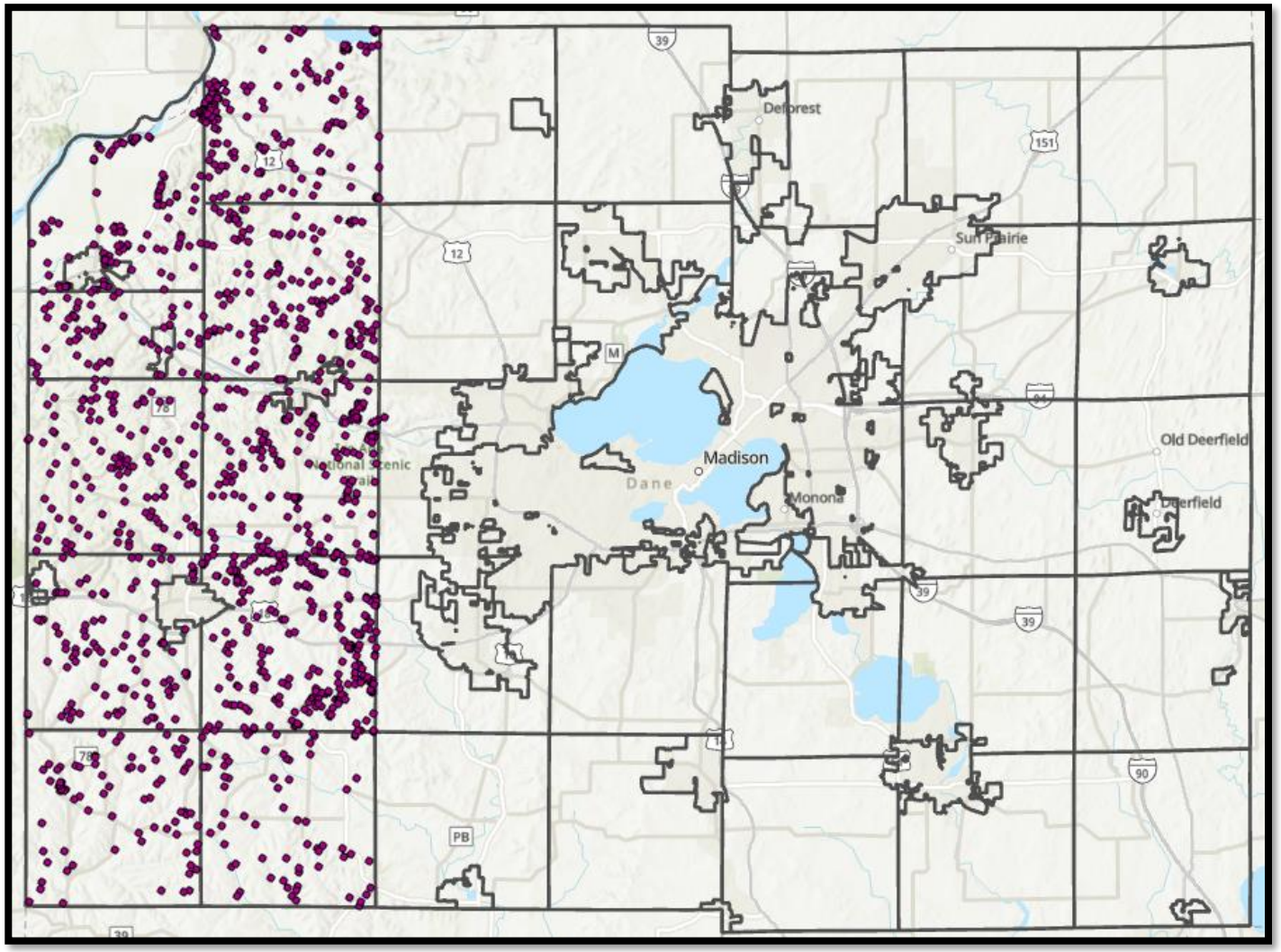
- MCL = Maximum contaminant level
  - MCL for nitrate is 10 mg/L
  - Set by the U.S. Environmental Protection Agency
  - This is the same standard for public drinking water systems and bottled water

- Nitrate levels at or below 2 mg/L are generally considered naturally occurring [2].
  - Above that shows impact from land use

[2]. Mueller, et al. *Nutrients in Ground Water and Surface Water of the United States-An Analysis of Data through 1992*. 1995.

# Point Distribution

- Blue Mounds
- Perry
- Primrose
- Springdale
- Mazomanie
- Black Earth
- Vermont
- Roxbury
- Berry
- Cross Plains

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# Results Overview

- **1292** samples in total (**490** in 2024 and **802** in 2025)
- Average: **4.85 mg/L**
- Median: **4.06 mg/L**
- Highest Results (**1.2%** above 20 mg/L)
  - **26.7 mg/L**
  - **26.3 mg/L**

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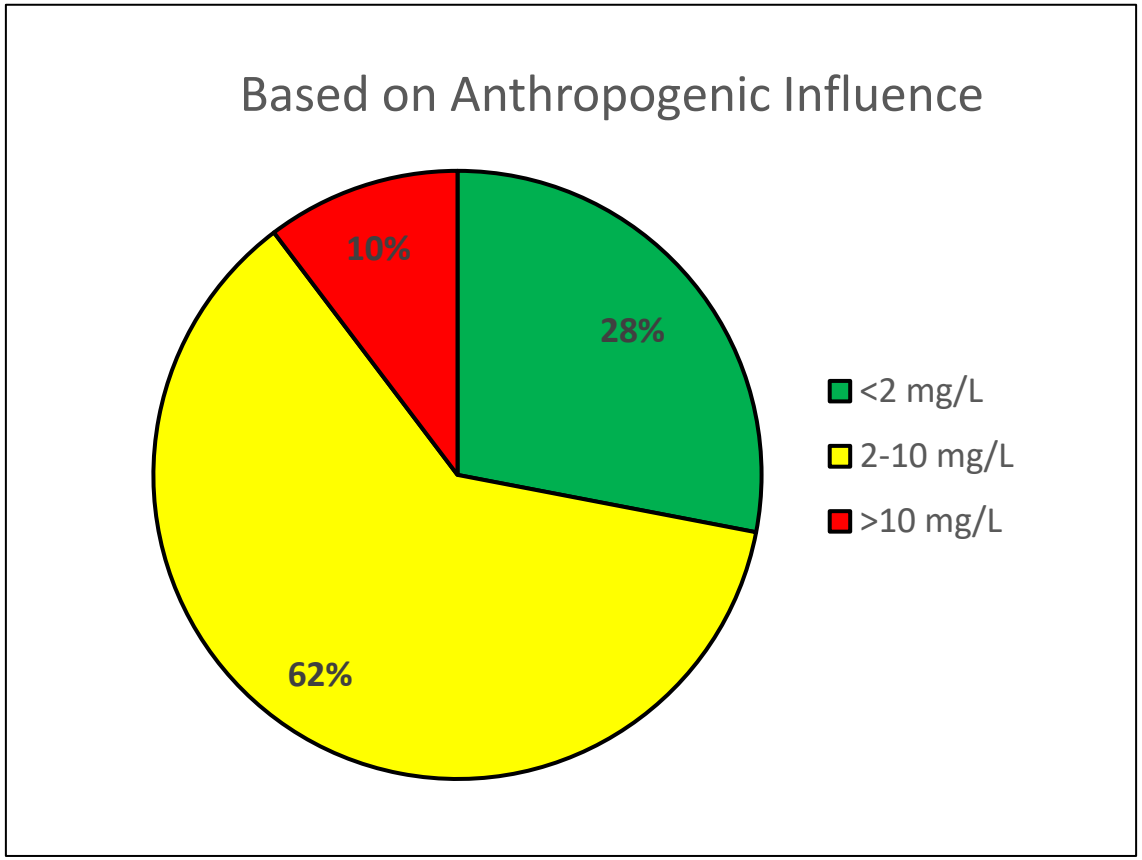
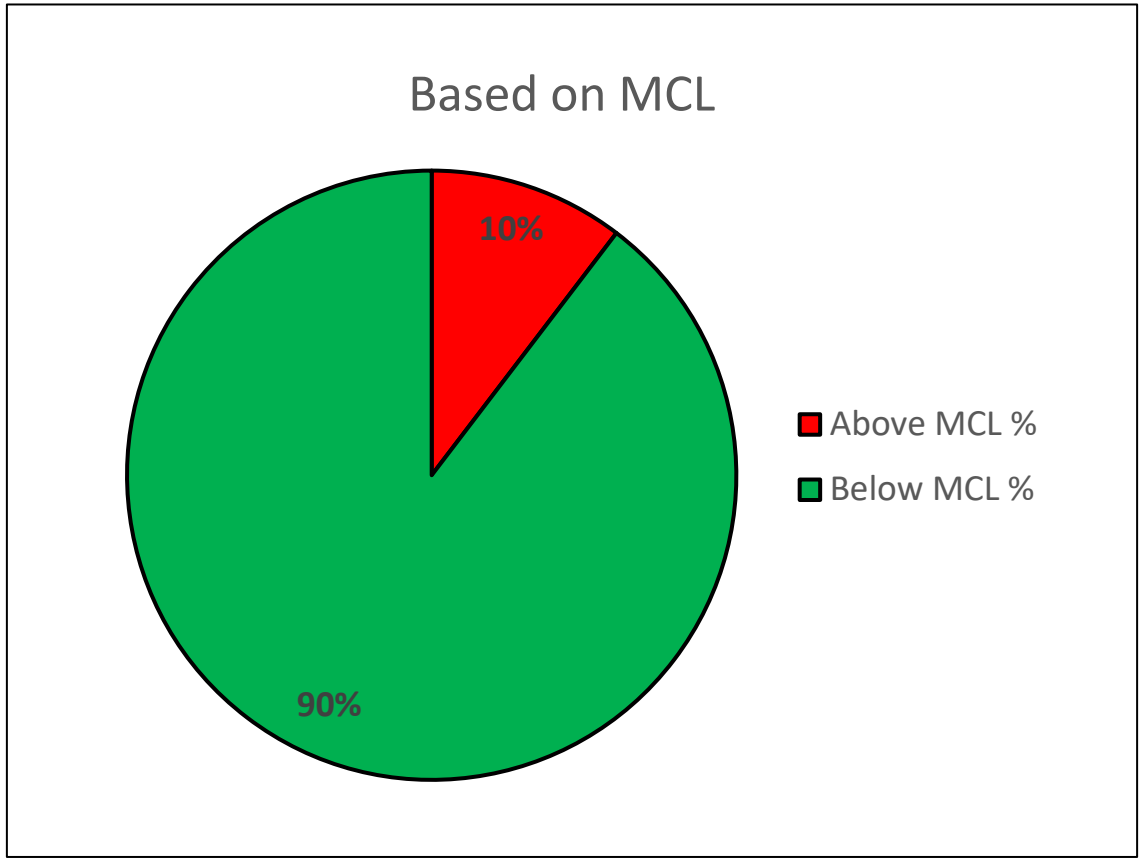
# Results Overview




MCL = Maximum Contaminant Level = 10 mg/L

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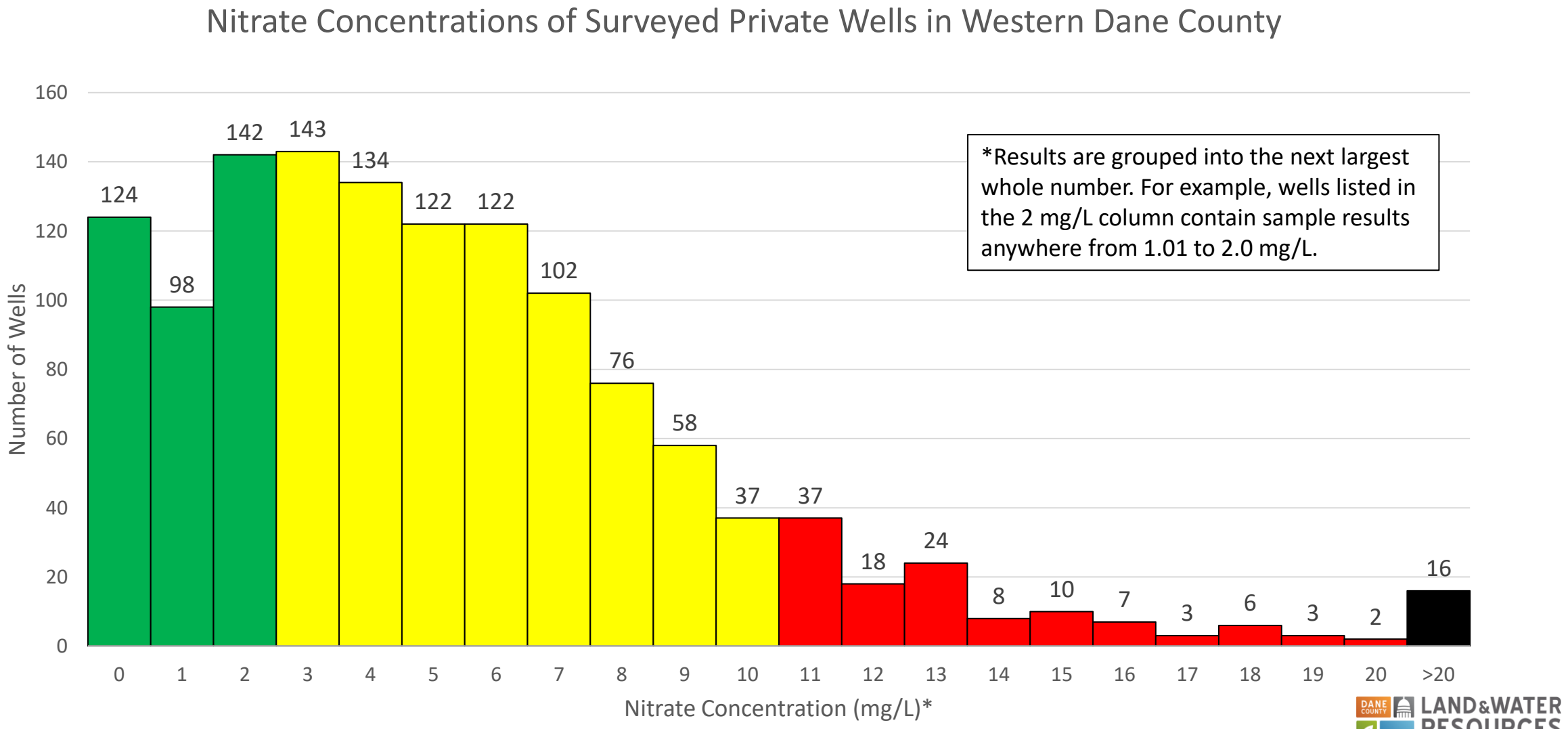
# Results continued

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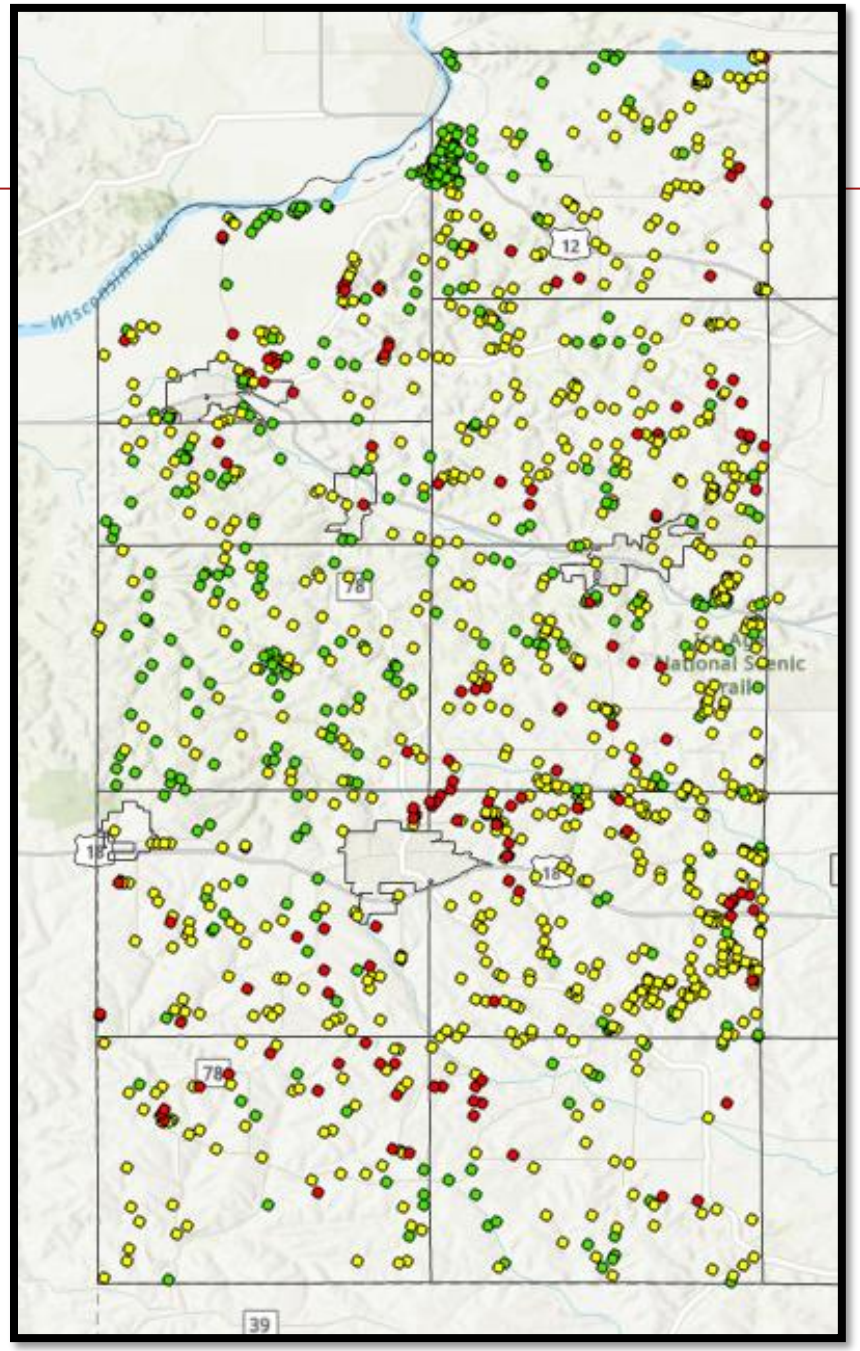
# Spatial Data

Nitrate Concentration

- 0-2 mg/L
- 2-10 mg/L
- >10 mg/L

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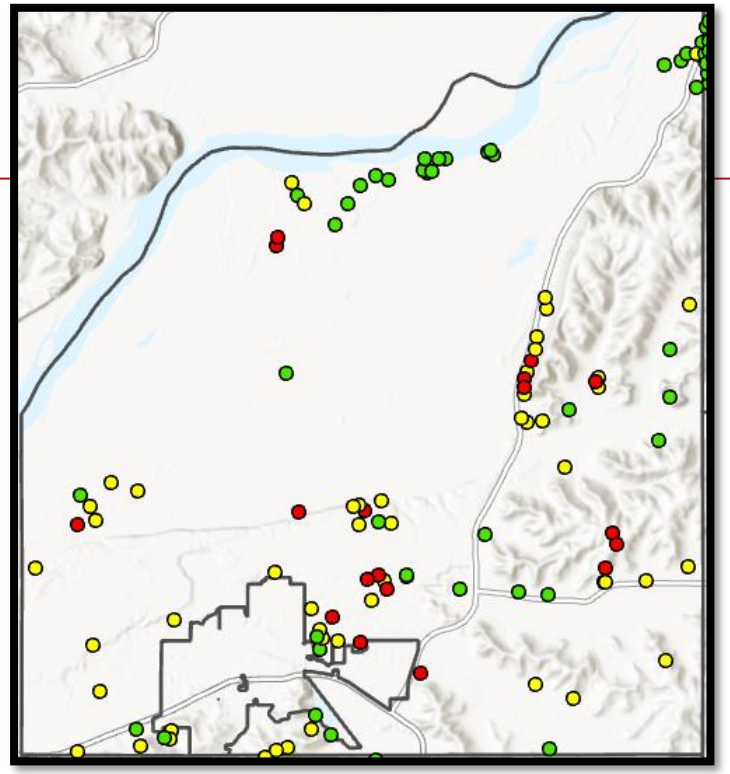
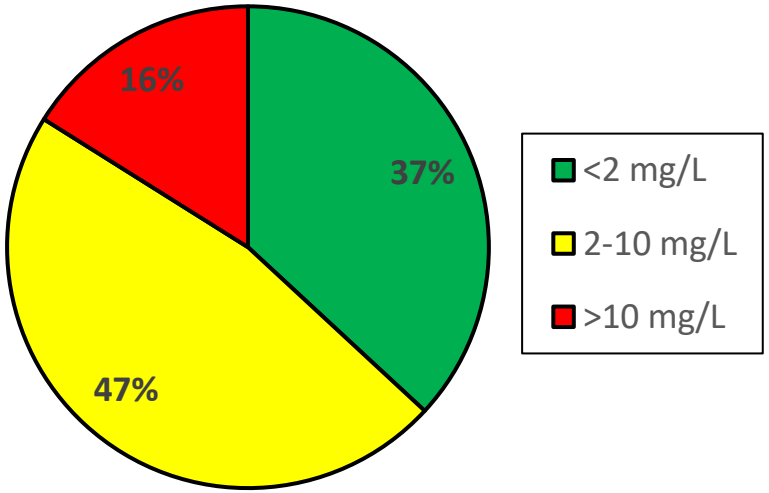
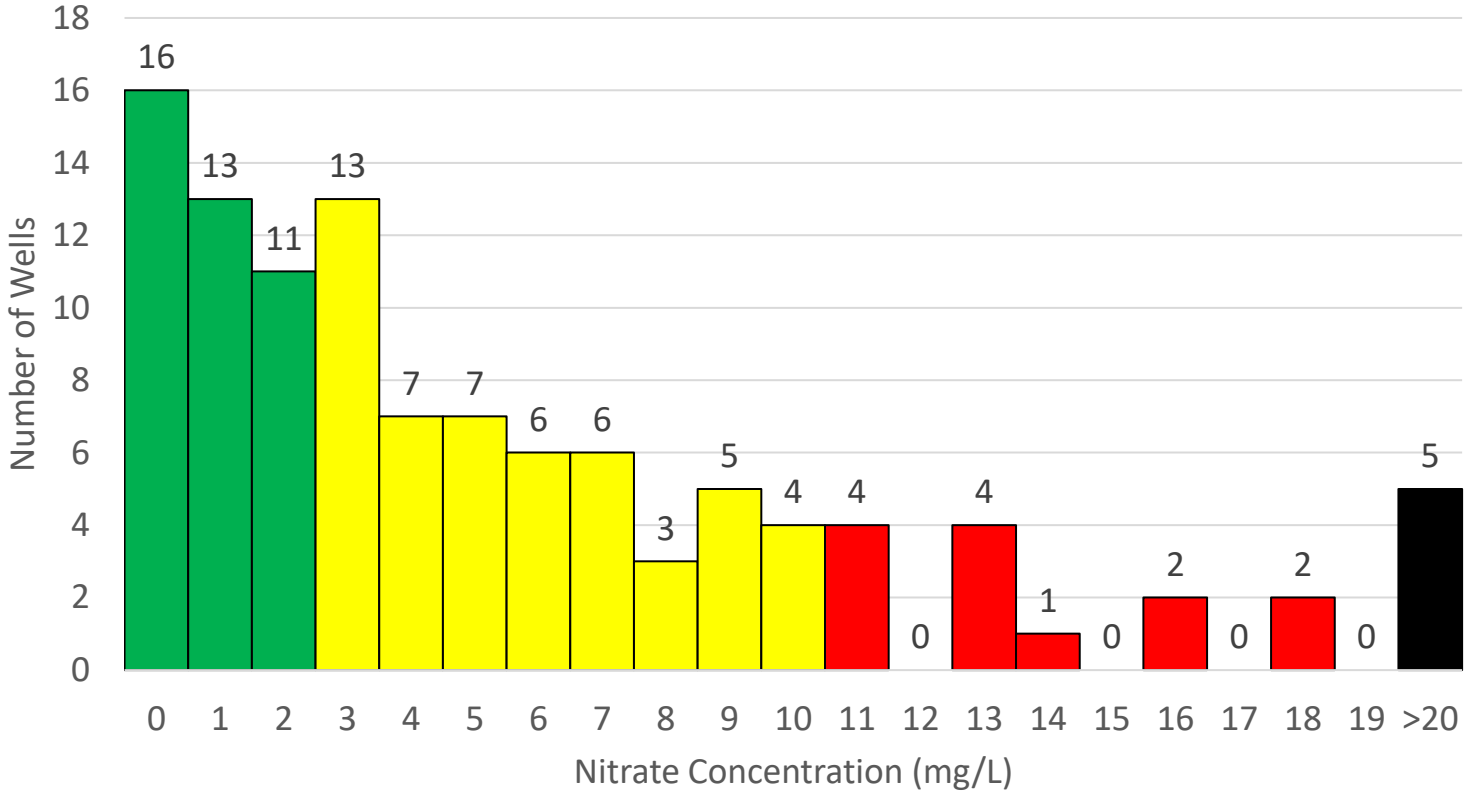
# Town of Mazomanie






Total sampled: 109
Average: **5.27 mg/L**

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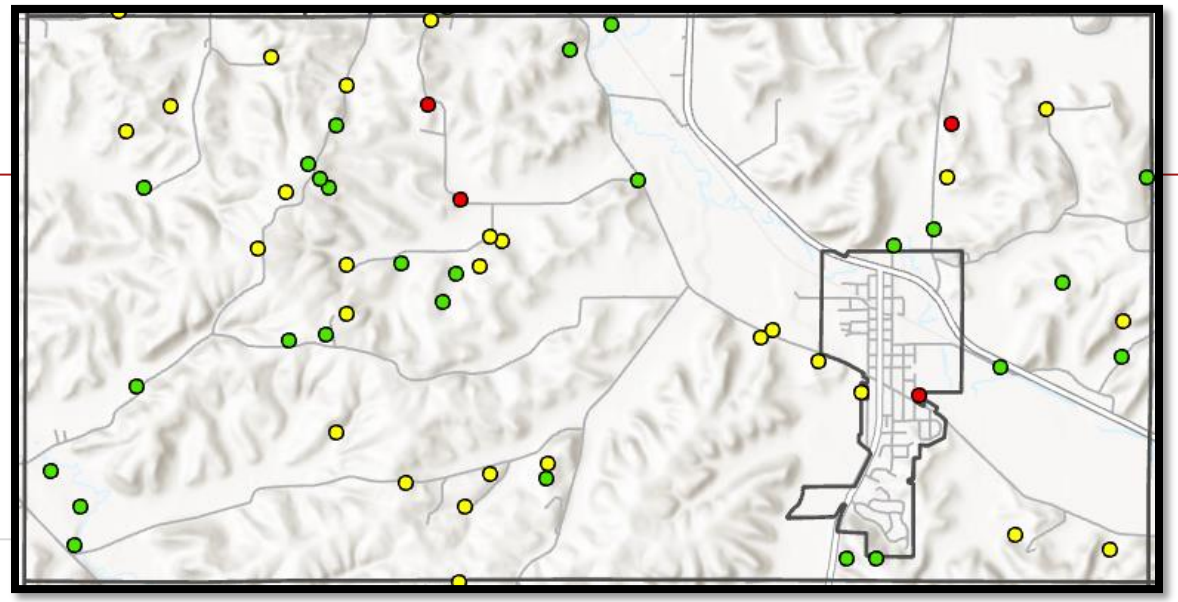
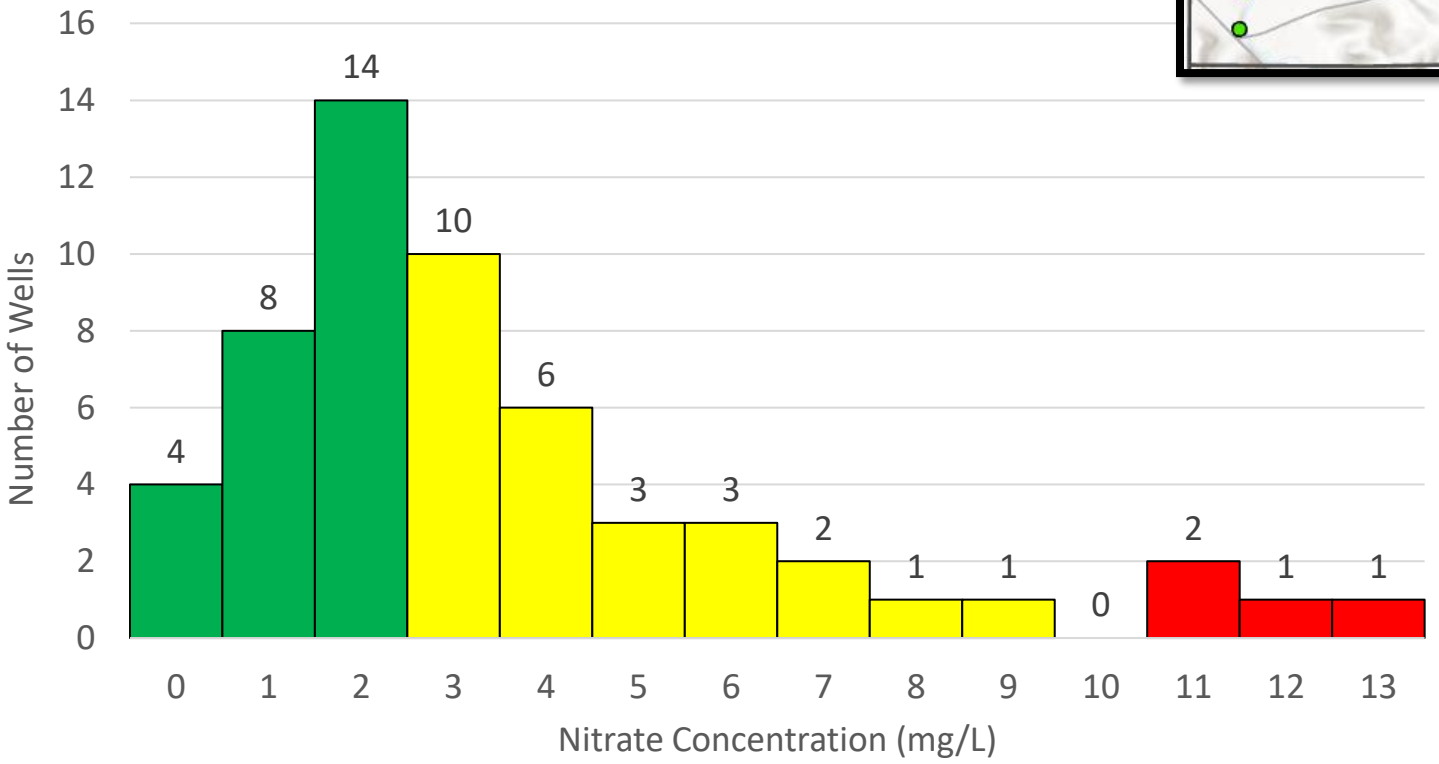
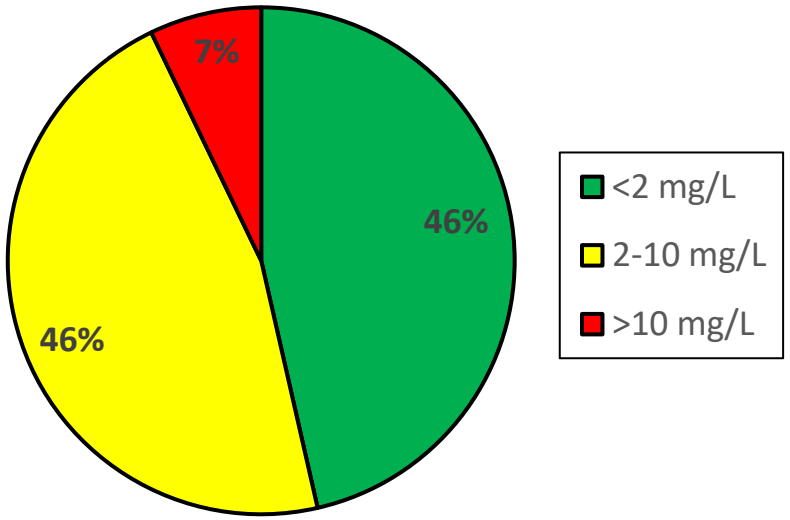
# Town of Black Earth



Total sampled: 56
Average: **3.13 mg/L**

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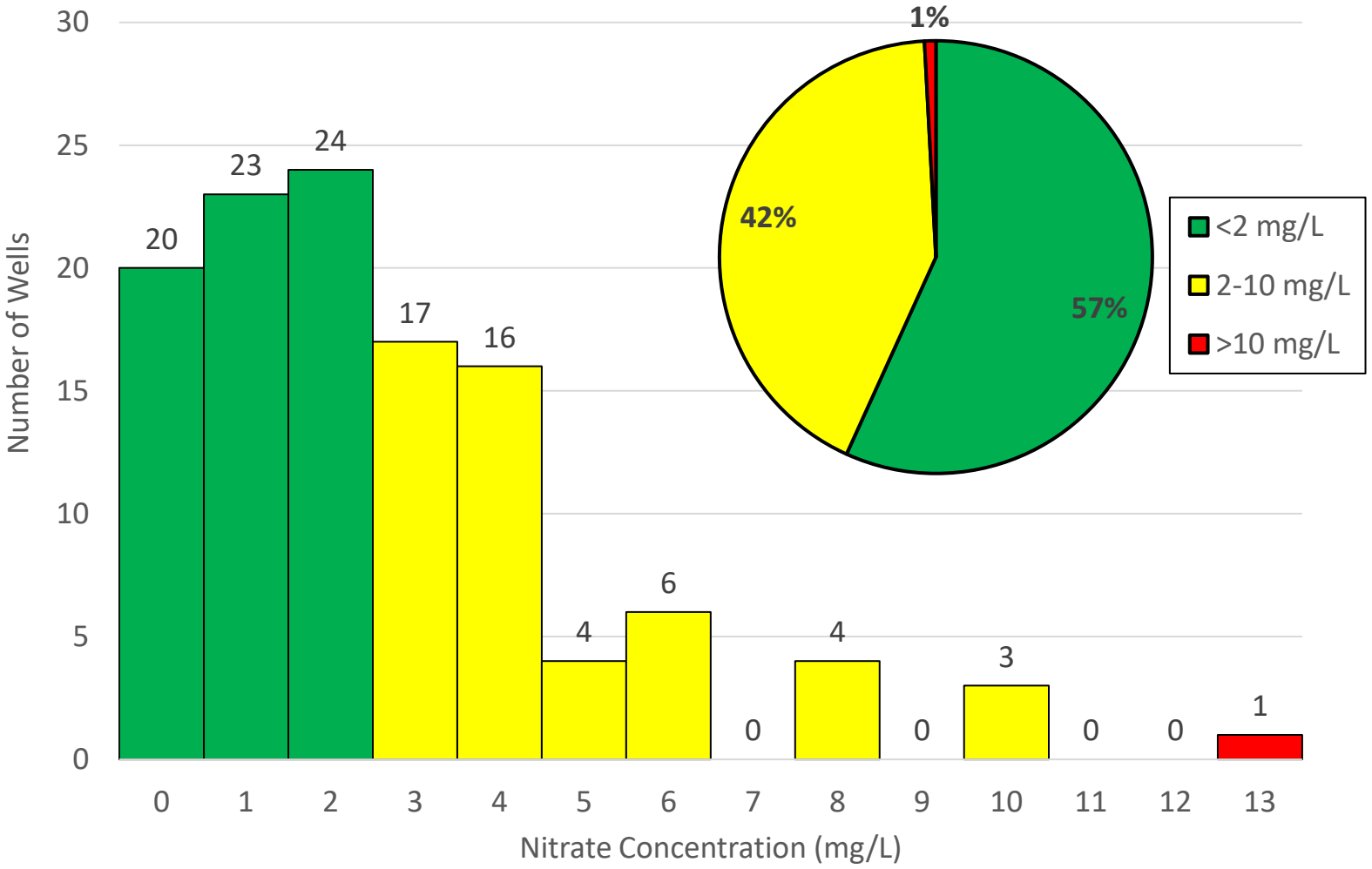
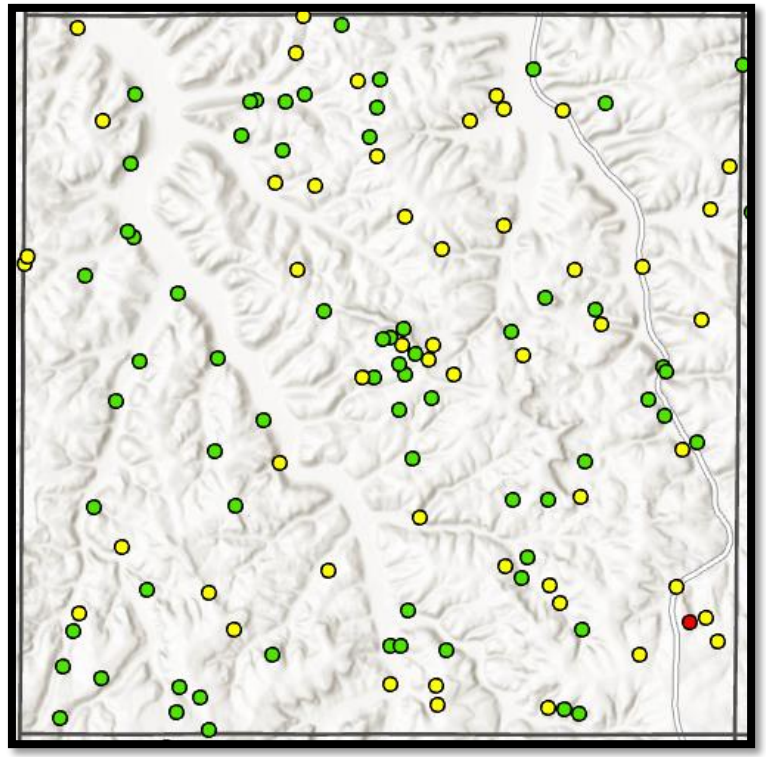
# Town of Vermont

Total sampled: 118
Average: **2.26 mg/L**









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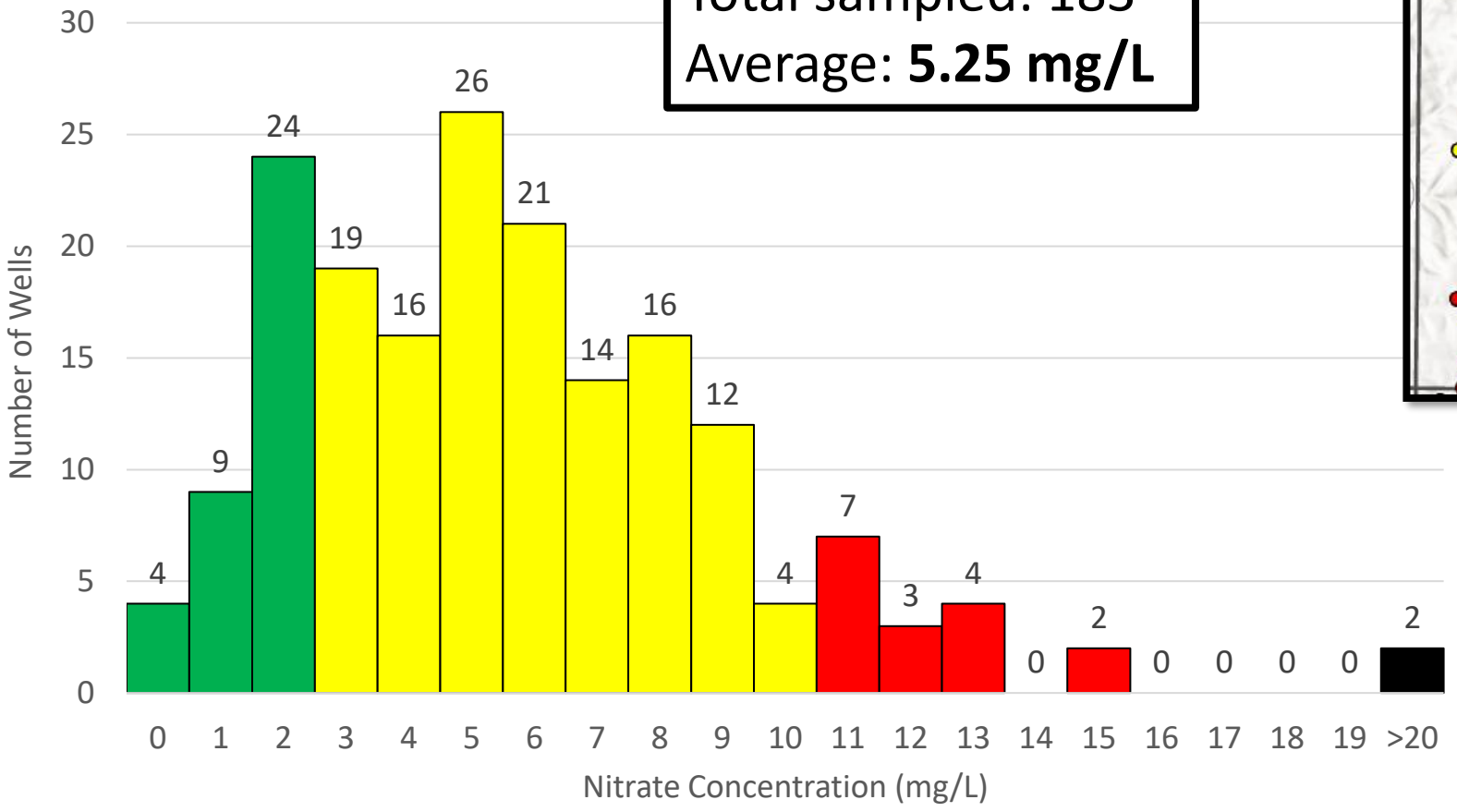
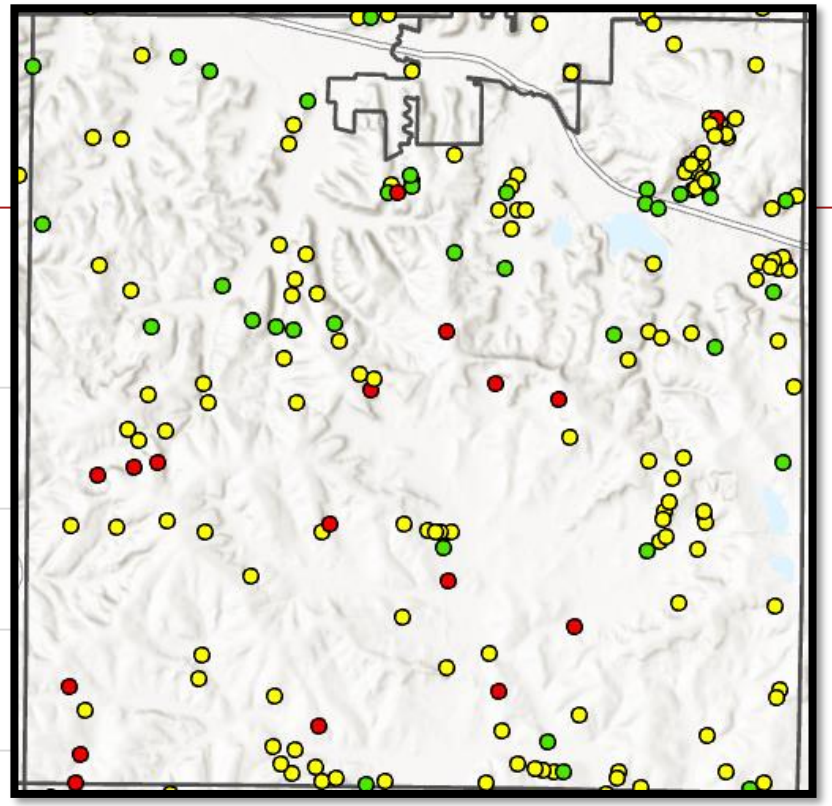
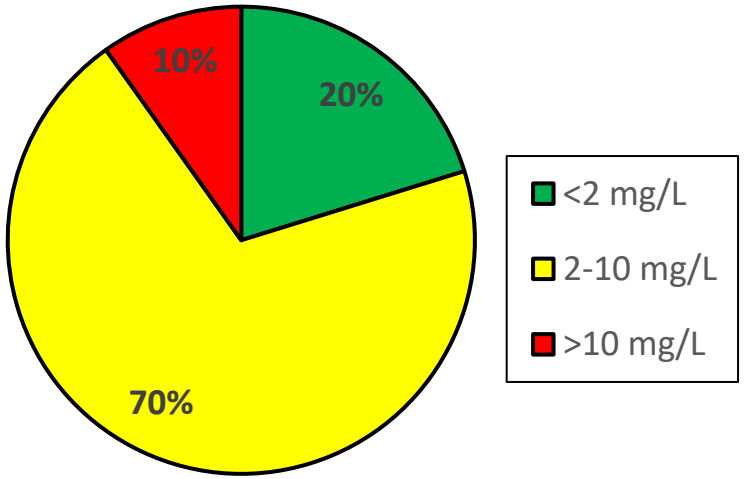
# Town of Cross Plains

Total sampled: 183
Average: **5.25 mg/L**



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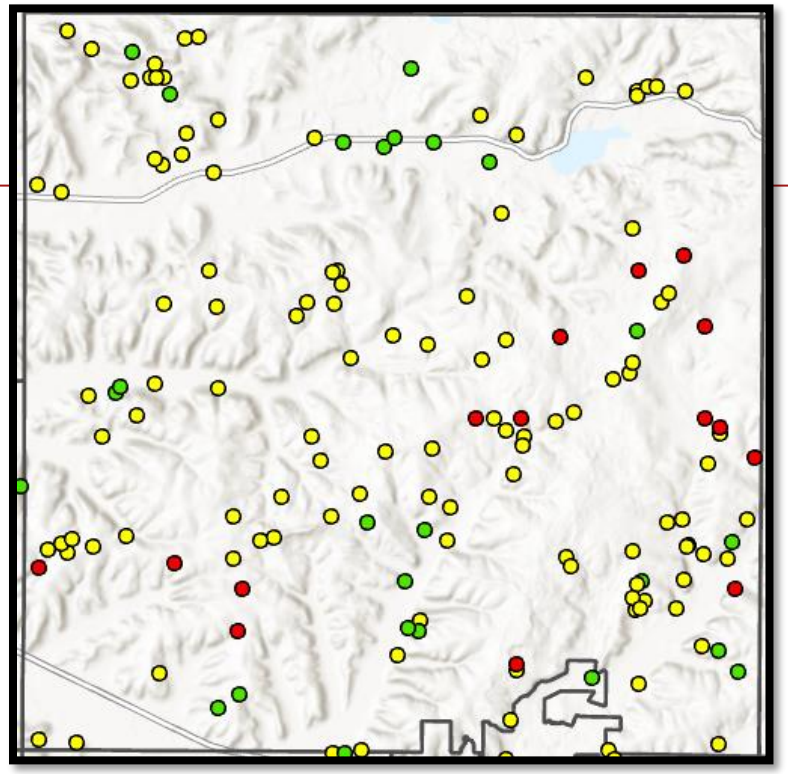
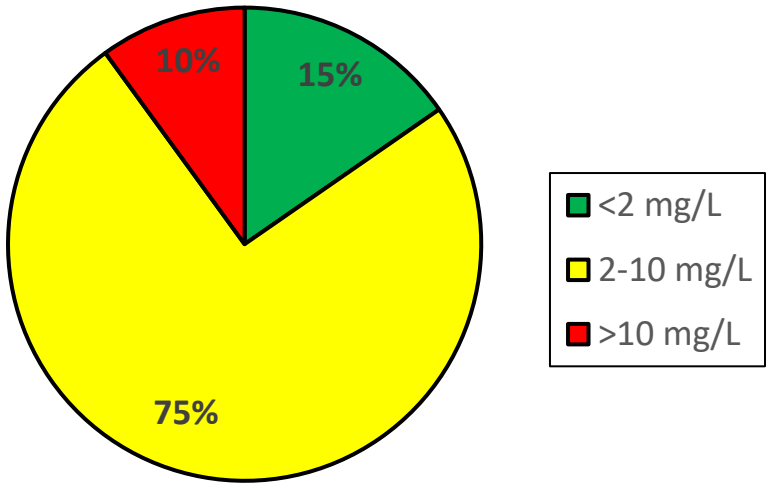
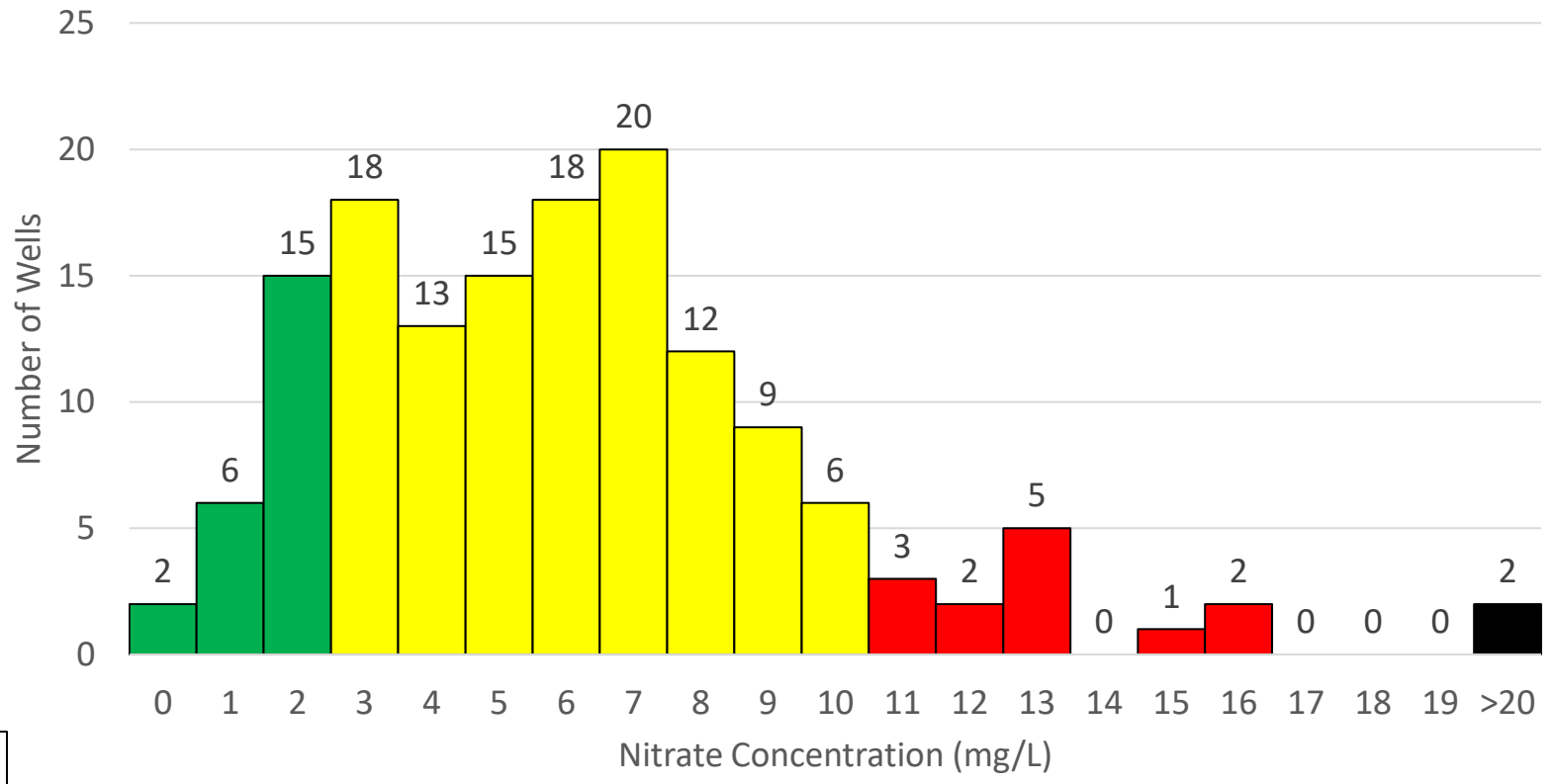
# Town of Berry






Total sampled: 149
Average: **5.69 mg/L**

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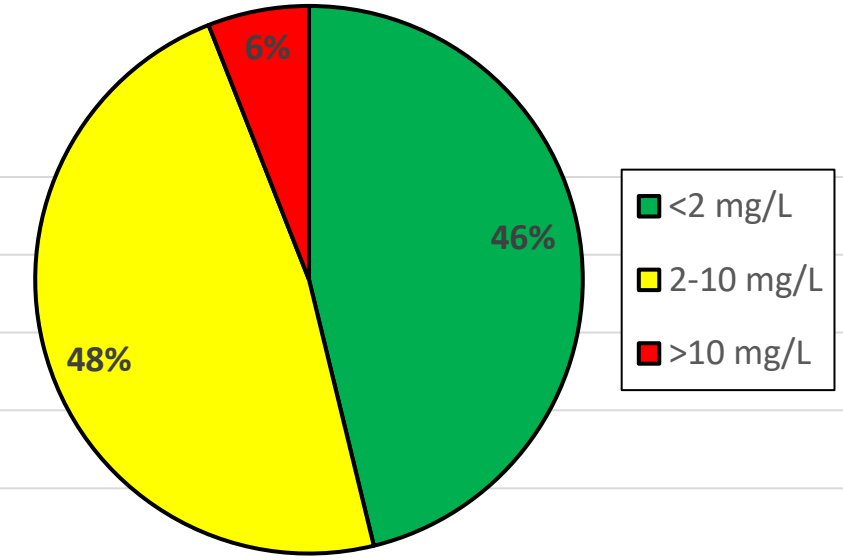
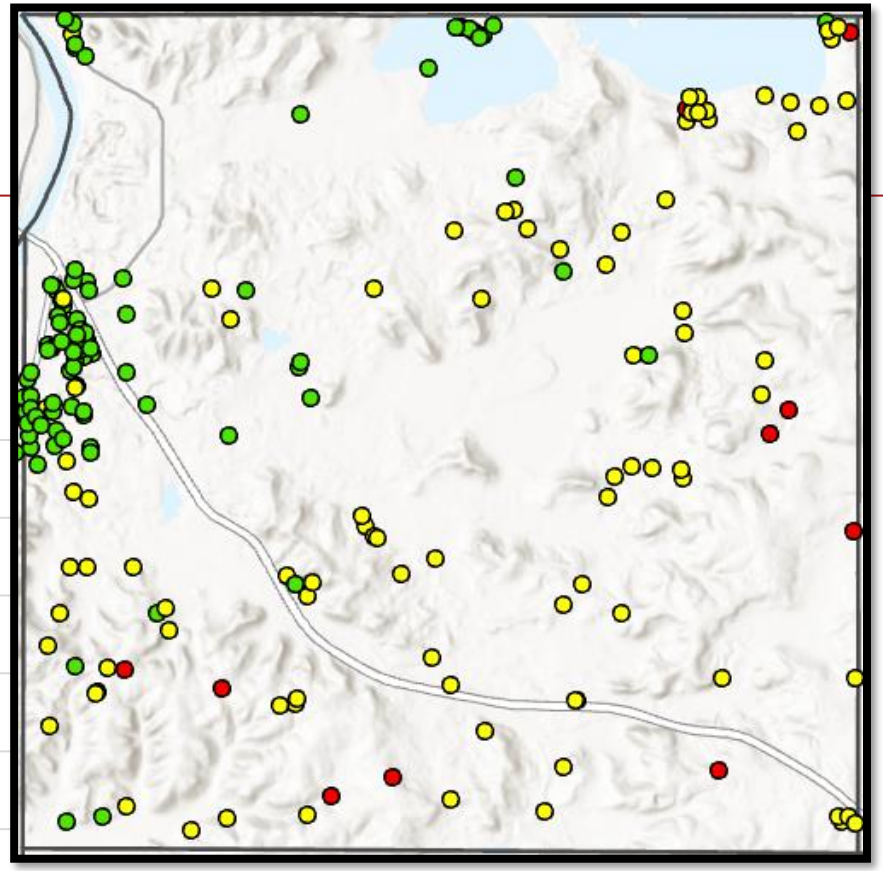
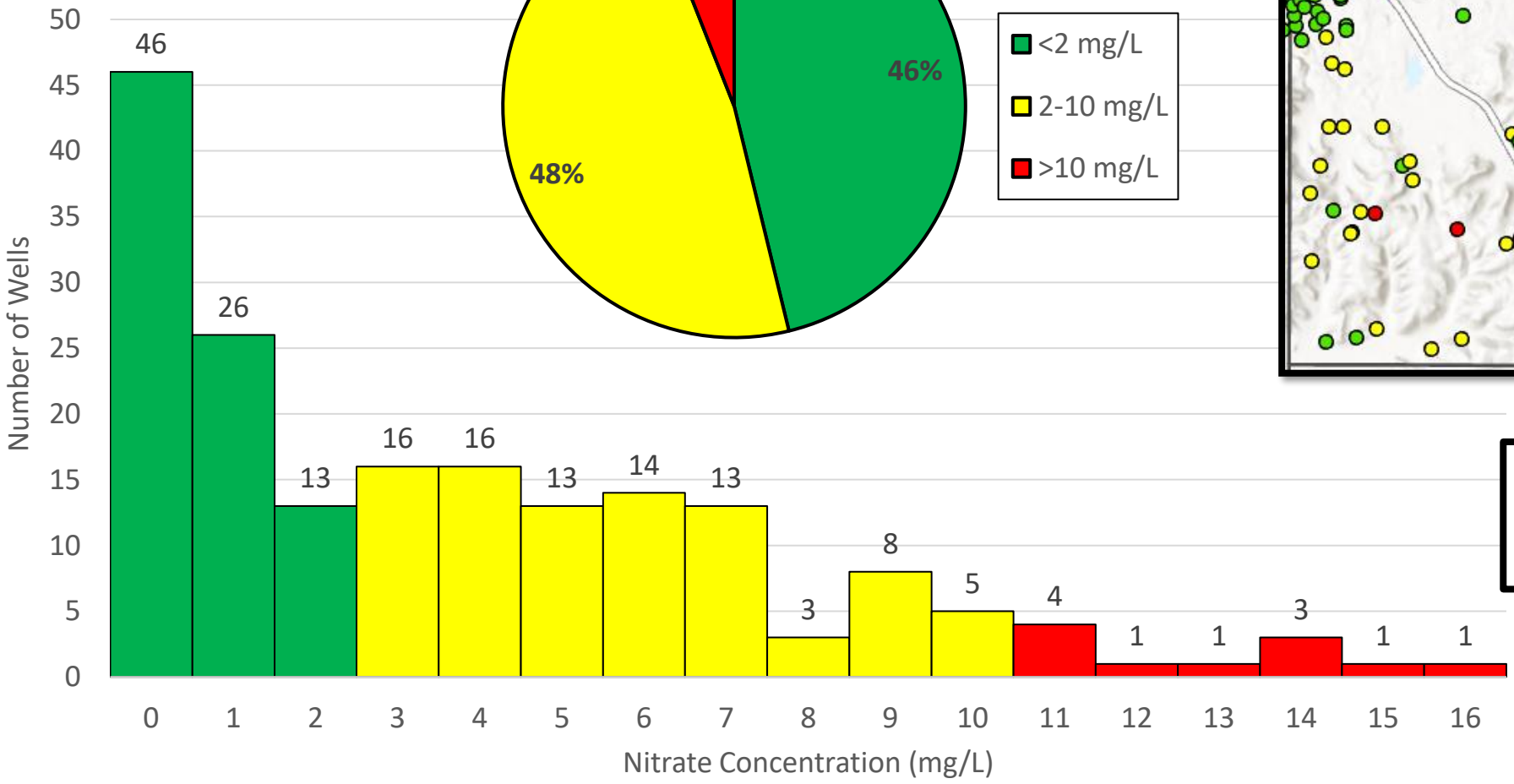
# Town of Roxbury






Total sampled: 184
Average: **3.38 mg/L**

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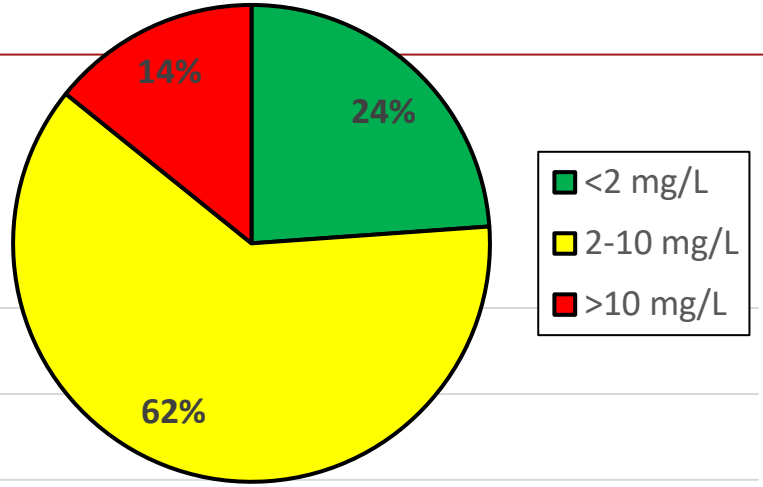
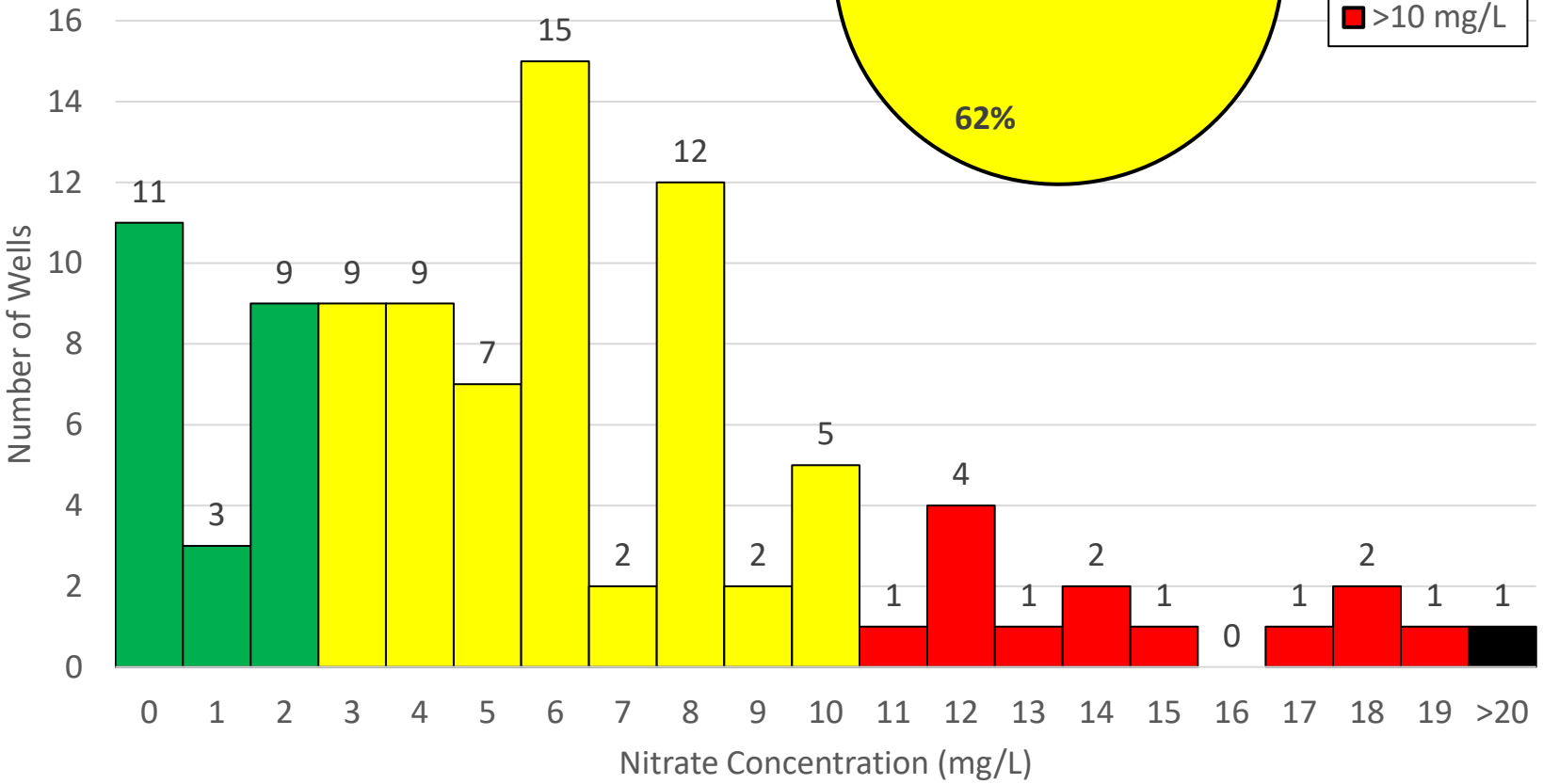
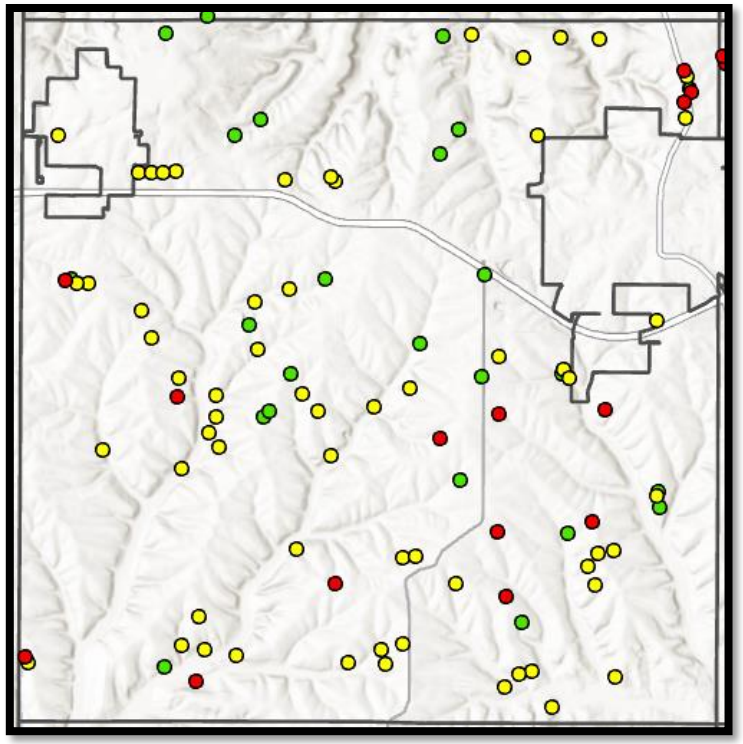
# Town of Blue Mounds

Total sampled: 98
Average: **5.63 mg/L**



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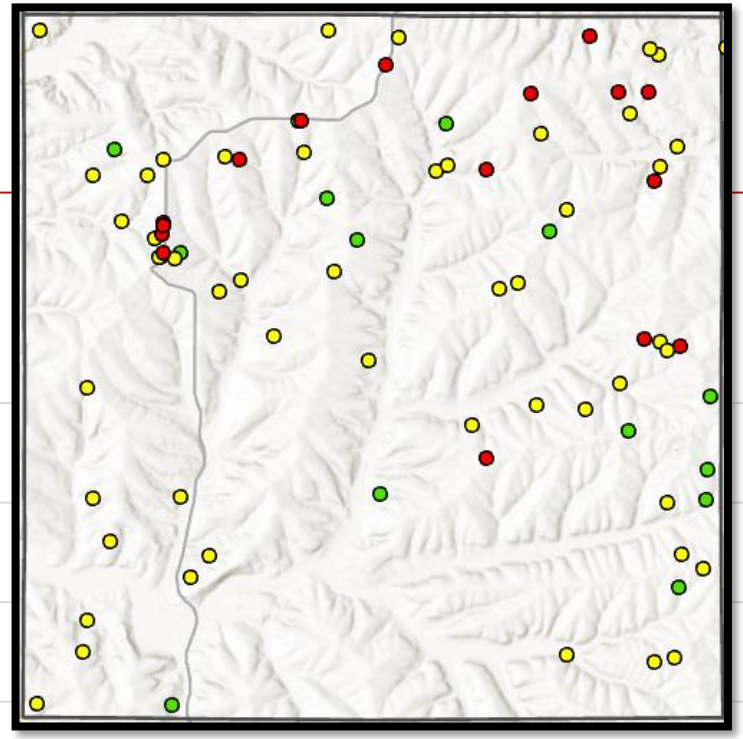
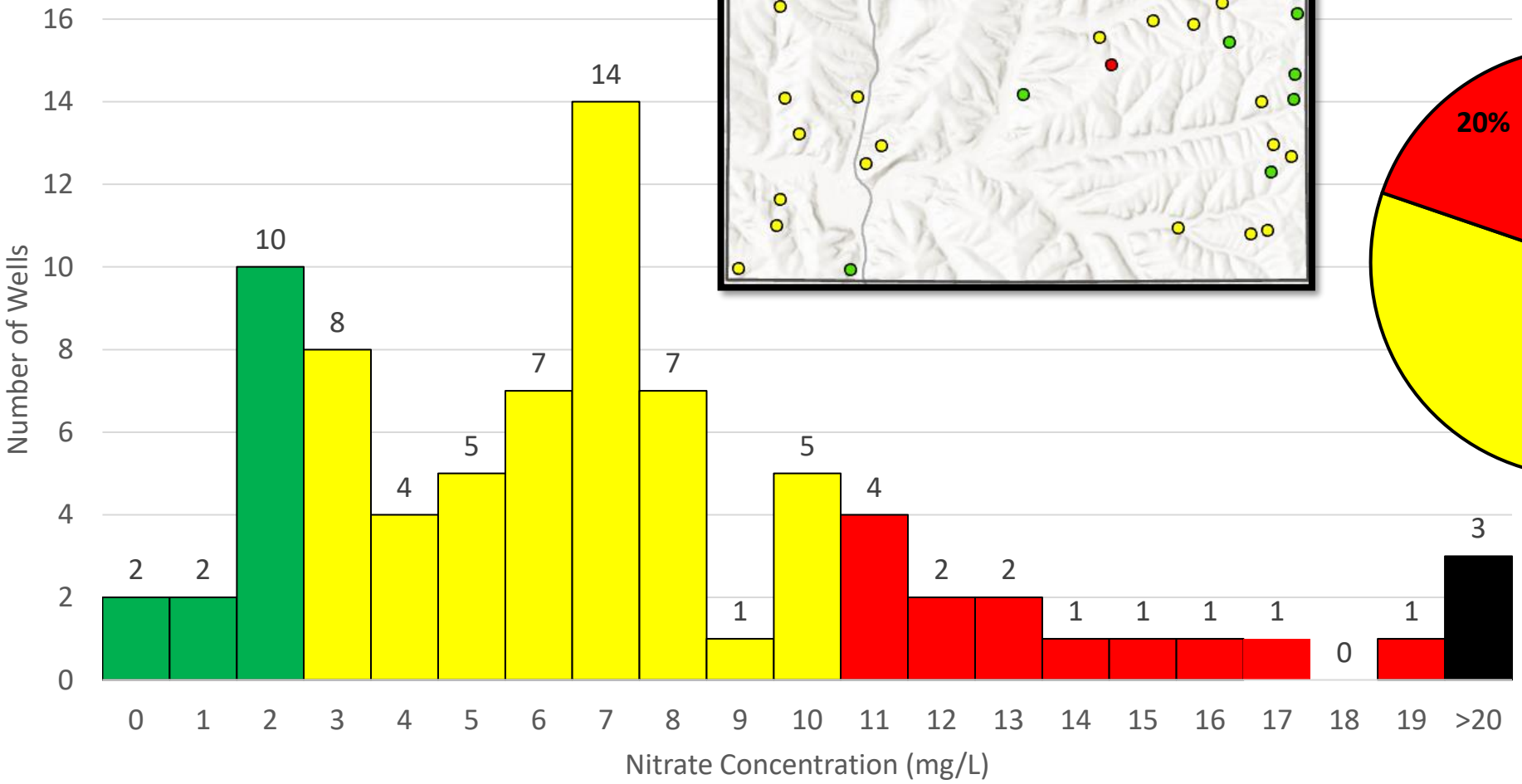
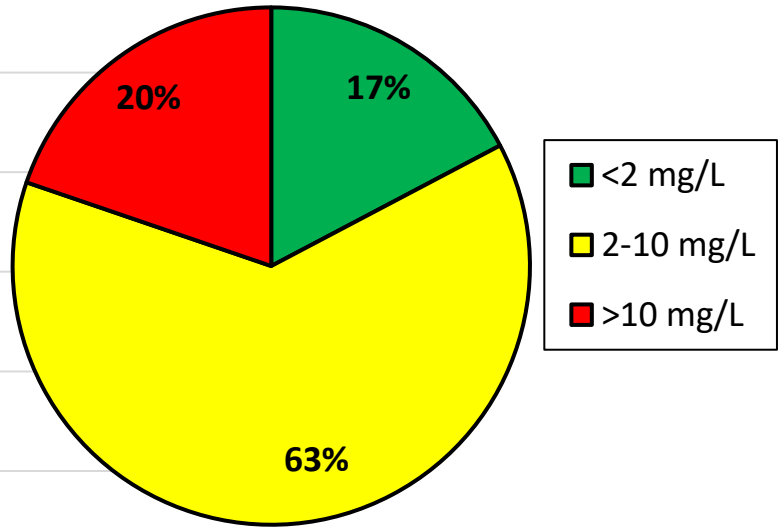
# Town of Perry



Total sampled: 81
Average: **6.79 mg/L**

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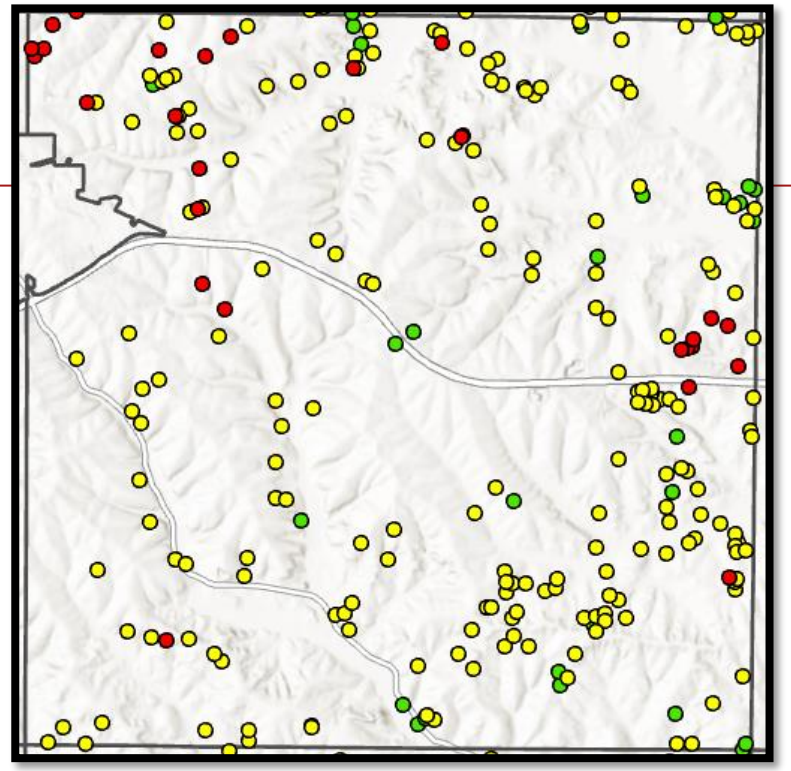
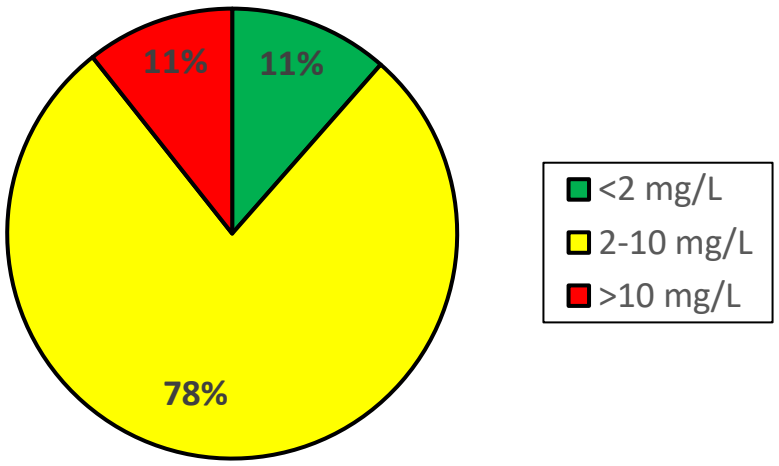
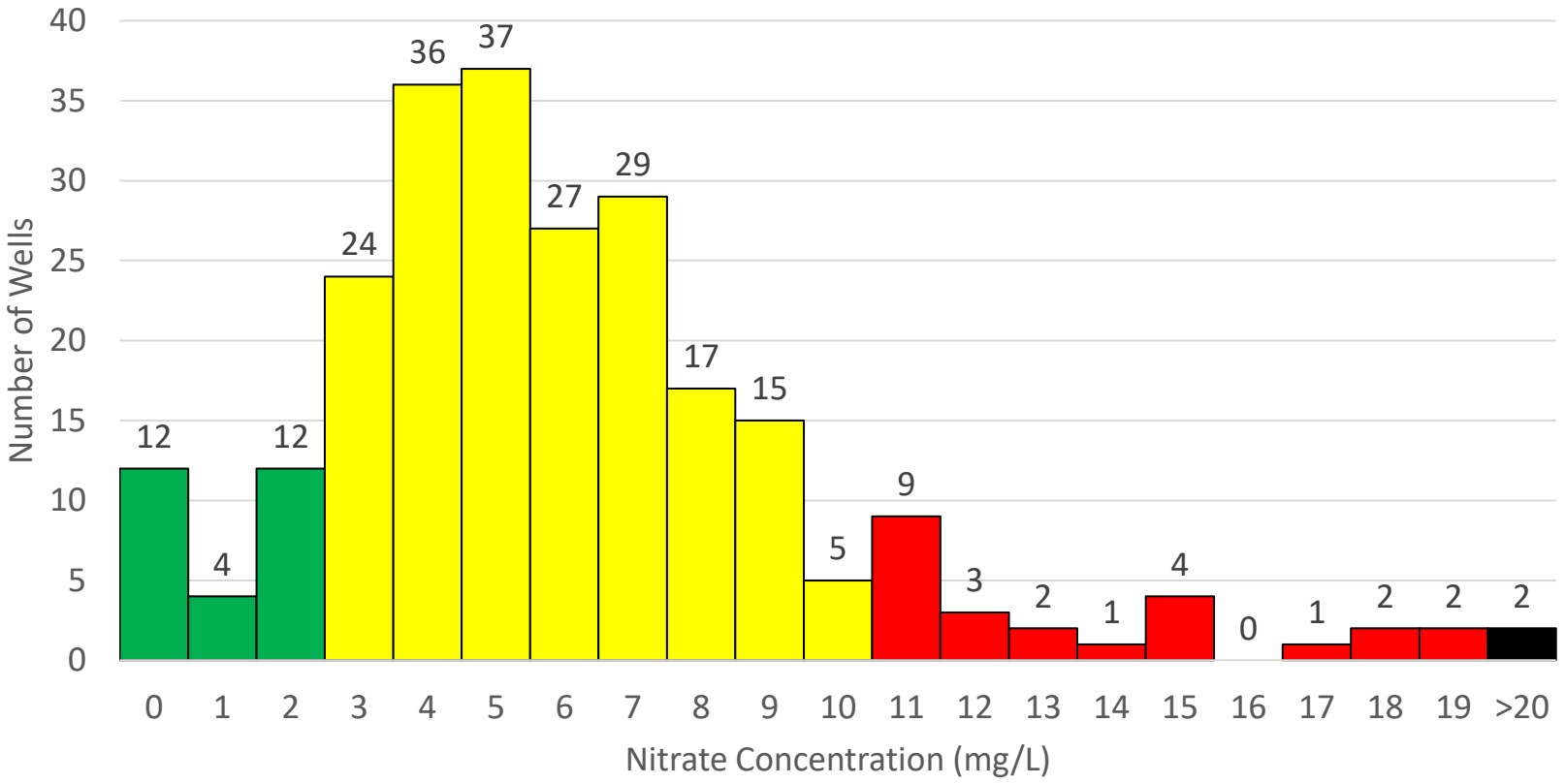
# Town of Springdale






Total sampled: 244
Average: **5.63 mg/L**

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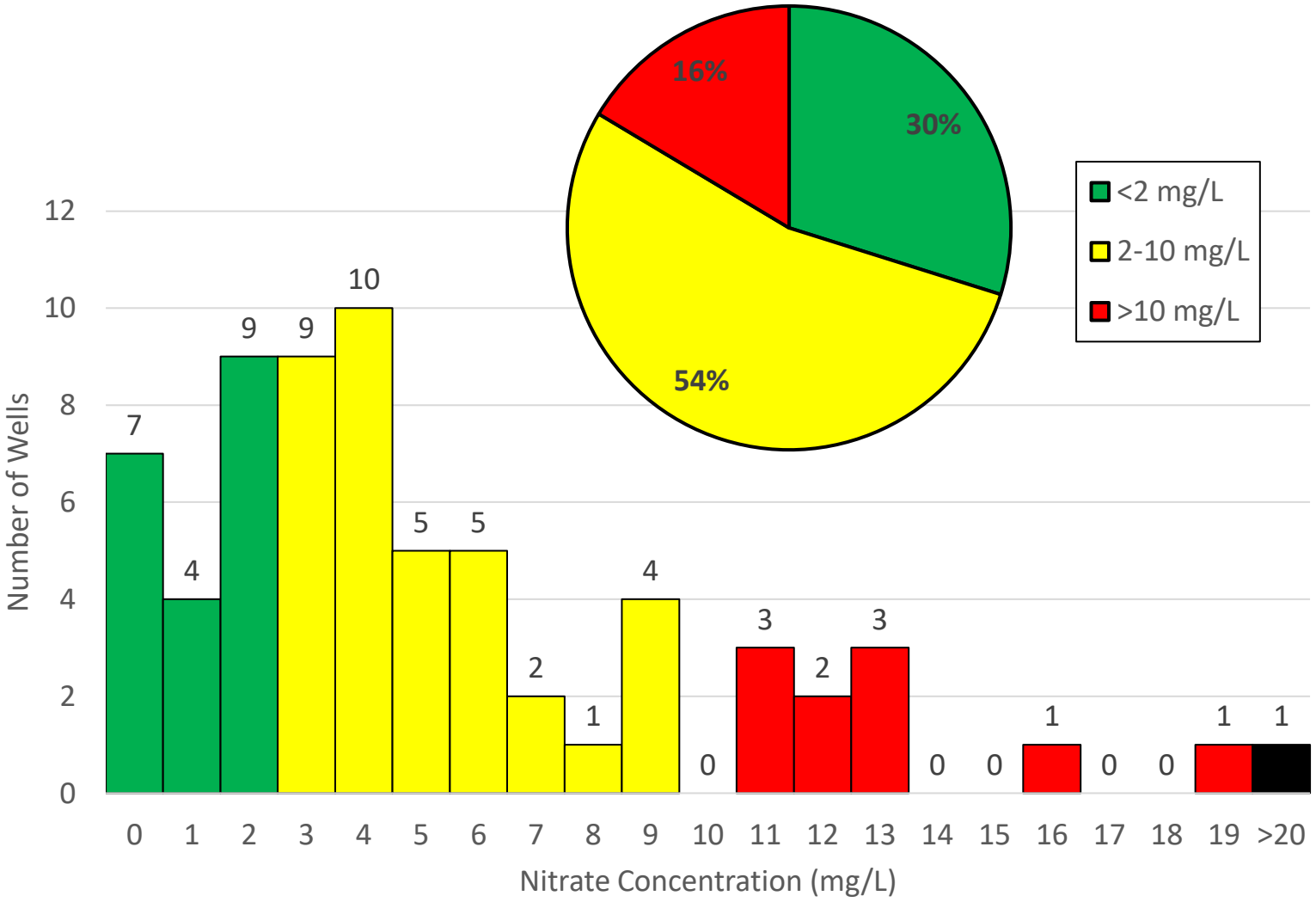
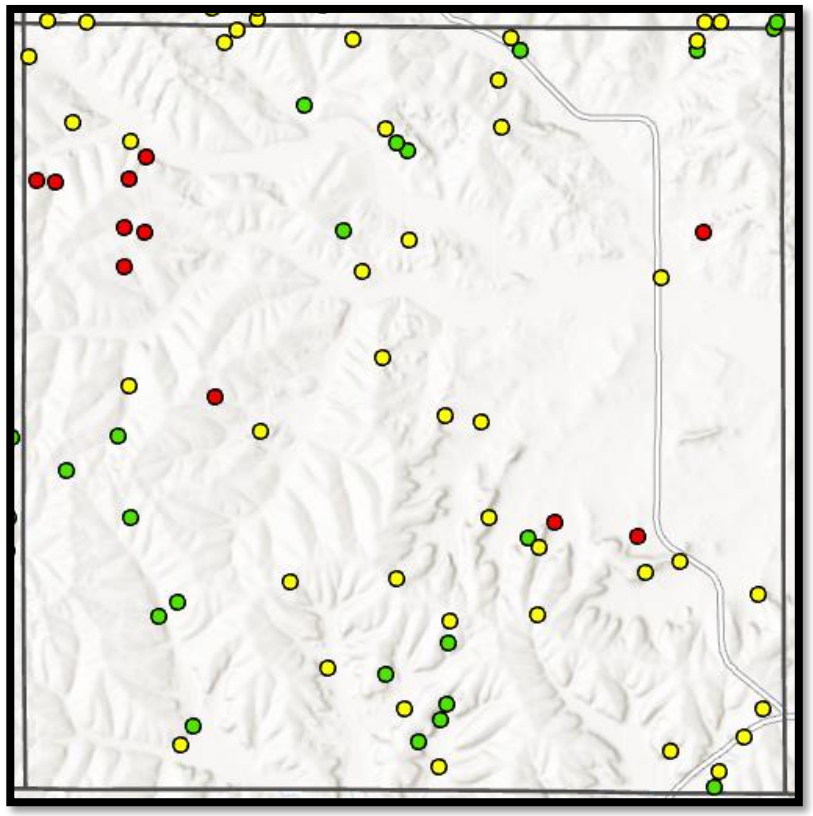
# Town of Primrose

Total sampled: 67
Average: **4.87 mg/L**



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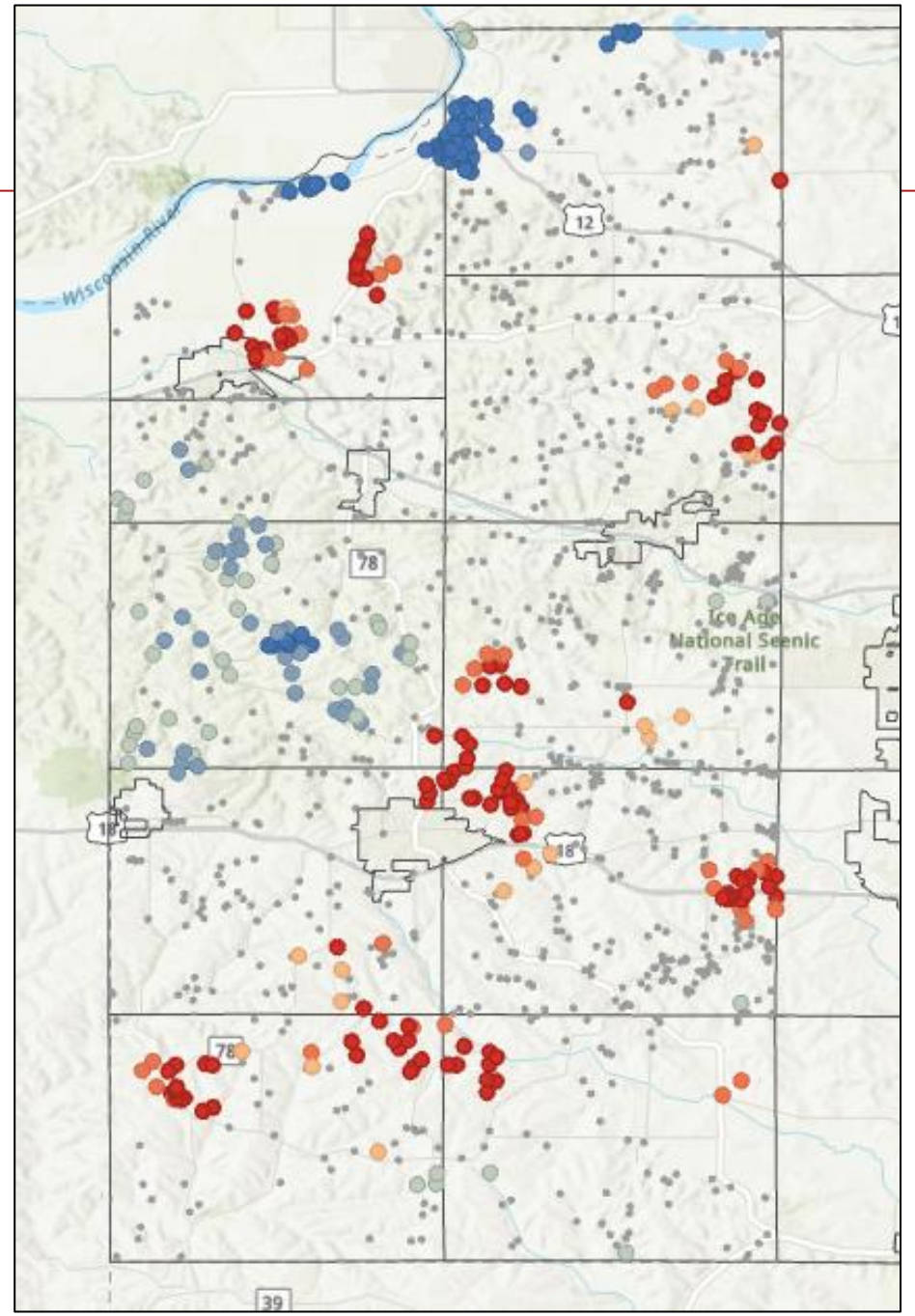
# Hotspot Analysis

- Identifies statistically significant spatial clusters
- To be statistically significant, a point will have a high value and be surrounded by other points with high values as compared to the whole dataset
- The more data points we have in an area, the more accurate this tool is – not as effective where there aren't as many houses with wells

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# Results Summary

- **72%** of sampled wells showed elevated levels of nitrate due to land use
- **10%** of sampled wells are above the nitrate MCL of 10 mg/L
- Wells exhibiting nitrates above MCL display some clustering – potential for targeted improvements
- Project data aligns with findings of WI Well Water Quality Viewer

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# Ongoing Work

### WGNHS Groundwater Flow Model

Project data can be used with the Flow Model to get a sense of where contaminant particles come from & the capture zone

### Target Conservation Practices

Use data and flow model results to aid in targeting agricultural conservation practices such as cover crops, nutrient management, and no-till

### Continued Result Analysis

Review well reports to see if there is any correlation between specific aquifers and increased nitrate levels

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# QUESTIONS?

DANE COUNTY
LAND&WATER RESOURCES DEPARTMENT

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