



Land and Water Conservation

GROUNDWATER PROGRAM ANNUAL REPORT

2025

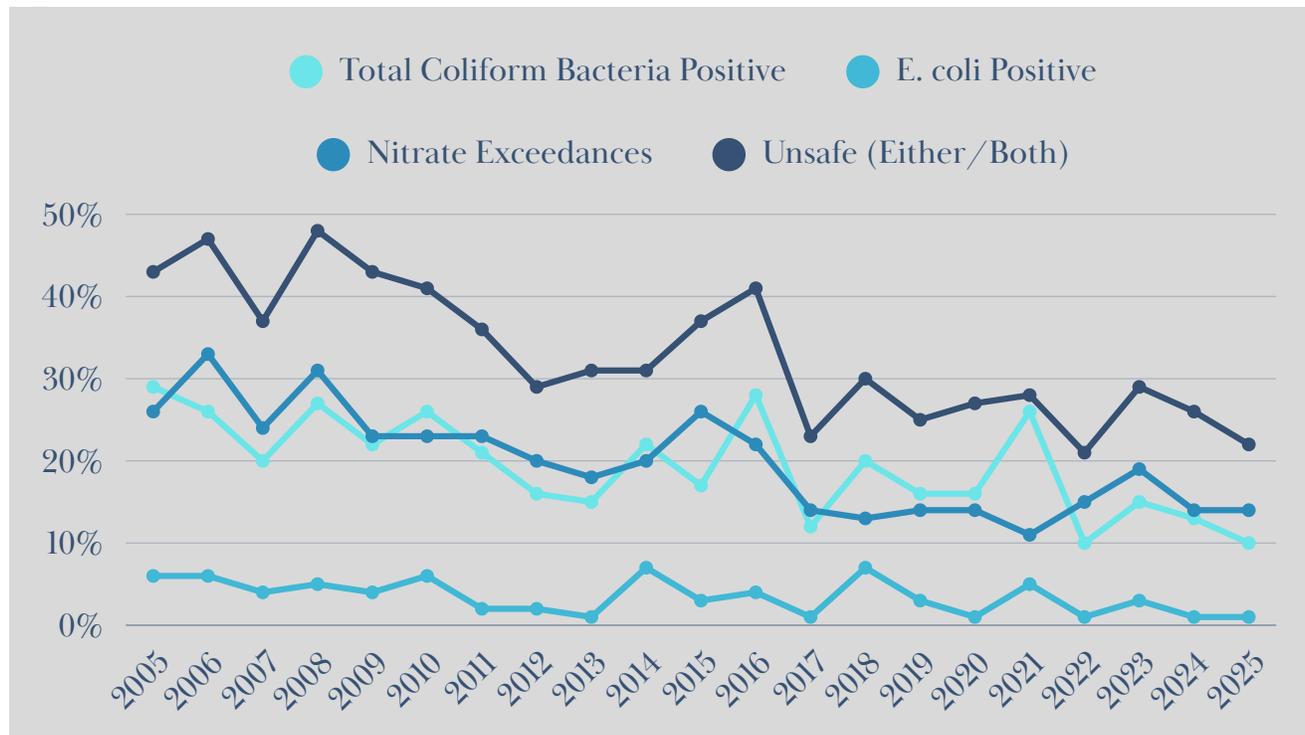
September 2025

Groundwater is a valuable resource to Calumet County residents. Most residents, businesses, and municipalities rely on groundwater for drinking water and other uses. The Wisconsin Department of Natural Resources estimates that there are over 4,000 private wells serving homes, cottages, businesses, and churches. Most private wells are not required to perform annual testing, though it is recommended.

The Calumet County Land and Water Conservation Department (LWCD) has administered a private well program for over 20 years. The purpose of the program is to encourage private well owners to regularly sample their drinking water, as well as to help Calumet communities and well owners understand local groundwater quality and the safety of private wells. Since 2005, 1,990 wells have submitted over 5637 samples. Sampling results from private wells in Calumet County have shown that between 20% and 30% of wells can be unsafe due to coliform bacteria and/or nitrate contamination in a given year. In some neighborhoods, over 50% of wells can exceed safe drinking water standards.

Figure 1 shows the annual percentage of samples that exceeded the safe drinking water standard for nitrate, total coliform bacteria, and E. coli. Note that the data may represent multiple samples from wells.

Figure 1



NITRATE

Nitrate is frequently tested for in drinking water, both in private wells and municipal water supplies. Sources of nitrate include commercial fertilizer, animal waste, and human waste. Nitrate readily moves through sandy or silt loam soils, two soil types that are found throughout portions of Calumet County. Consumption of drinking water with high nitrates can lead to:

- Blue Baby Syndrome (Infant Methemoglobinemia)
- Birth Defects and Conception Challenges
- Increased risk of thyroid, colon, and other cancers.

Over the past 20 years, approximately 7% of private wells statewide have exceeded safe drinking levels of nitrate, which is greater than 10 mg/L.¹ Calumet County private well data indicate that 14% of wells exceed 10 mg/L. Several counties in Wisconsin average more than a 20% exceedance rate. Calumet County averaged above 20% of unsafe samples for nitrate from 2005 to 2016.

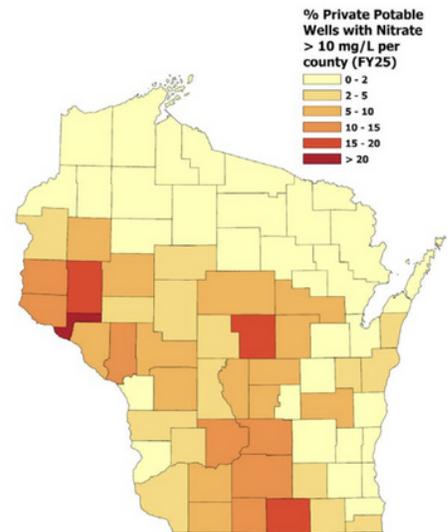
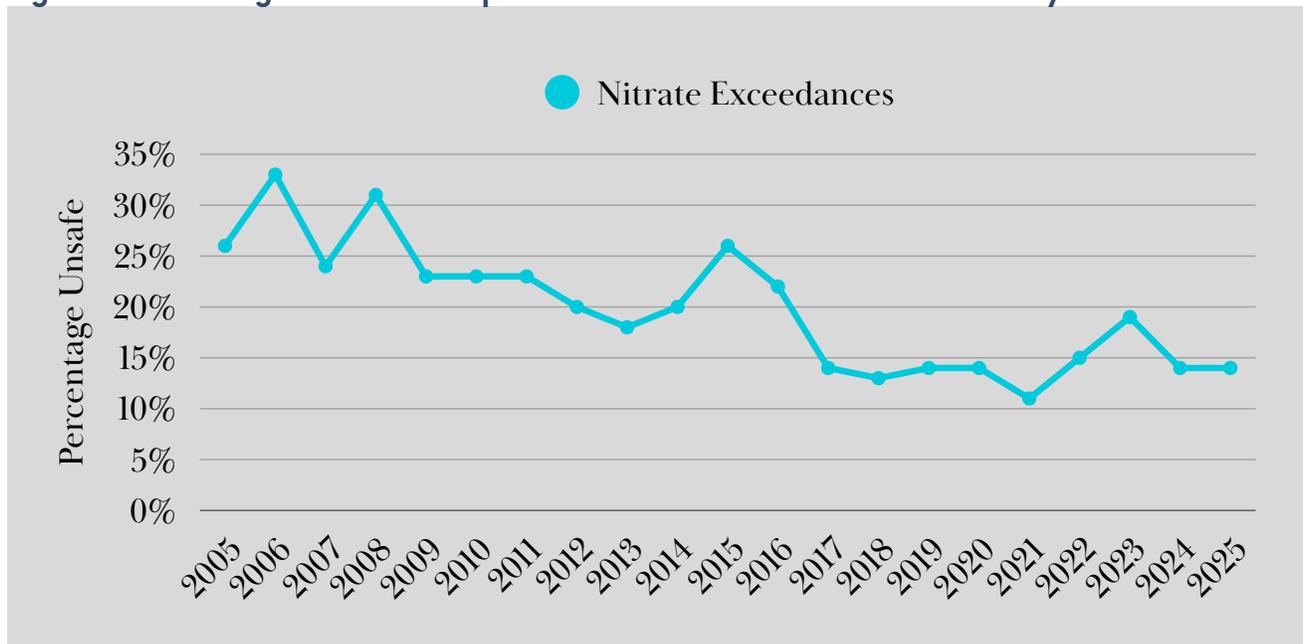


Figure captured from the [Wisconsin Coordinating Council Annual Report, 2025](#). Data represents samples taken from July 1, 2024 - June 30, 2025

Figure 2: Percentage of unsafe samples for nitrate taken from Calumet County Private Wells



1. [Wisconsin Coordinating Council Annual Report, 2025](#)

TOTAL COLIFORM BACTERIA & E.COLI

Total Coliform Bacteria (TC) is another parameter that is frequently tested for in drinking water, both in private wells and municipal water supplies. Coliform bacteria is commonly found in the environment, however it should not be present in groundwater. Therefore, a TC test is used as an indicator that there is something wrong with the well or contaminated from surface pollutants. E.coli is one of type of fecal coliform bacteria - a subgroup of coliform bacteria that is present in animal or human waste. The presence of E.coli indicates that the groundwater is contaminated from a fecal waste source.

Annual sampling of Calumet County private wells shows the annual percentage of TC samples is declining below statewide averages. With the exception of 2021, bacteria presence has been below 20% since 2017. Statewide sampling results of TC indicate that 17% to 23% of private wells test positive for TC.¹

Statewide, private wells average 3% positive rate for E.coli.¹ Calumet County results are depicted in Figure 3.

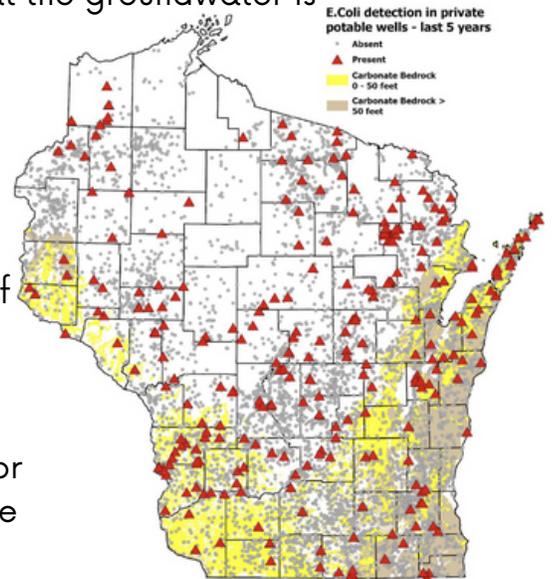
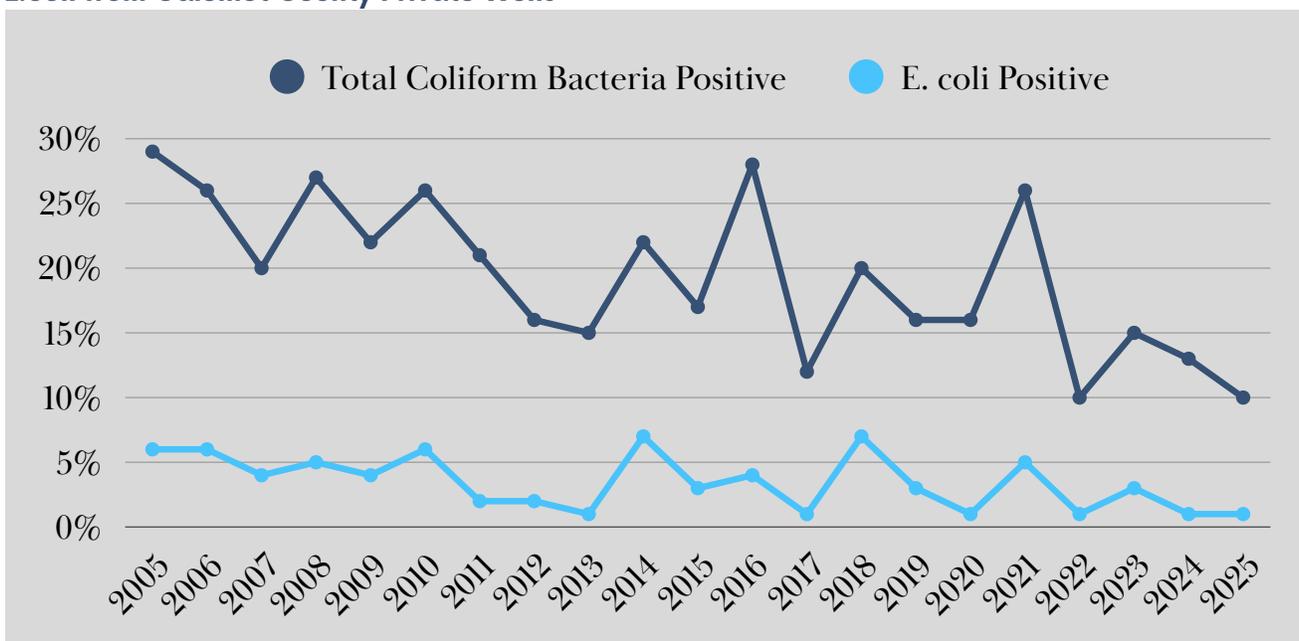


Figure captured from the Wisconsin Coordinating Council Annual Report, 2025.

Figure 3: Annual percentage of samples that tested positive for Total Coliform Bacteria and E.coli from Calumet County Private Wells



1. Wisconsin Coordinating Council Annual Report, 2025

ANNUAL PRIVATE WELL TESTING DAY 2025 PARTNERS:

Towns of Brillion, Chilton, and Village of Harrison

Unlike public drinking water supplies, private wells are not required to be tested to ensure the water is safe to drink. It is up to the private well owner to take it upon themselves to test their well. But what should the well be tested for? How does a well owner obtain a testing kit? How often should the well be tested?

In an effort to encourage private well owners to test wells, the LWCD offers an annual group testing program. The program targets two towns or villages each year, rotating between 7 of the 8 municipalities in the County on a four-year rotation. The Town of Chilton provides free testing annually and is offered during the group testing program.

The program encourages all participants to sample for bacteria and nitrates at a minimum. Metals kits are also provided, which are recommended at least once on a well. A pesticide screen (DACT) is recommended on wells that have a high nitrate history.

Benefits of the program include bottle pick-up & drop-off convenience, free shipping, and an education night held approximately 7 weeks after the sampling day. The education night is an opportunity to learn how to interpret results and options to resolve any problems with water quality, including plumbing, proper well maintenance, and at-home practices to improve your drinking water.

In 2025, the LWCD targeted private well owners in the Town of Brillion and the Village of Harrison through the group testing program. Additional residents on the County Groundwater Mailing List were also included.



MAY 2025 PRIVATE WELL TESTING PROGRAM

And the July Groundwater Education Night



Results from the annual group testing program held in May 2025 are presented in Table 1. In total, 255 samples were analyzed. All samples were analyzed for coliform bacteria, E.coli and nitrate. One hundred and twenty-three (123) samples were analyzed for metals, and 99 were analyzed for atrazine and its by-products (DACT screen). Fifty-seven new wells were new to the county program; many of these wells were likely last sampled at the time of sale or never sampled. Nitrate results from treatment systems were not included in the data analysis.

Table 1

| | Sample Number | Bacteria Positive | Bacteria Positive (%) | E. coli Positive | Nitrate Exceedance (>10mg/L) | % Nitrate Exceedance |
|-------------|---------------|-------------------|-----------------------|------------------|------------------------------|----------------------|
| Chilton | 106 | 9 | 8% | 0 | 23 | 22% |
| Brillion | 41 | 4 | 10% | 0 | 1 | 2% |
| Harrison | 67 | 9 | 13% | 1 | 0 | 0% |
| County Wide | 255 | 24 | 9% | 1 | 29 | 11% |

Overall, the percentage of bacteria positives was below both statewide and county averages. In Wisconsin, 17% to 23% of samples test positive for total coliform bacteria. One sample tested positive for E.coli, an indicator of fecal waste.

Nitrate continues to challenge Calumet County well owners, with 11% of the samples exceeding the safe drinking water standard of 10 mg/L. Exposure to drinking water with high levels of nitrate is critical for infants, pregnant women, and women who are trying to become pregnant. The Wisconsin Department of Health (DHS) recommends that everyone should avoid long-term exposure to nitrate in drinking water due to the potential associations with thyroid disease and certain types of cancer, including lymphoma, gastric, bladder, ovarian, and colon cancer.

MUNICIPAL TRENDS OVER THE YEARS

Brillion and Harrison

Private well owners in the Town of Brillion and Village of Harrison are targeted every four years as part of the Calumet County annual group testing program. Data from the five events are tabulated below. Data from other years are not included due to the low participation rates during non-targeted years. The County offers the annual testing program county-wide.

TABLE 2: BRILLION PRIVATE WELL RESULTS FROM GROUP TESTING PROGRAMS

| | Sample Number | Bacteria Positive | Bacteria Positive (%) | E. coli Positive | Nitrate Exceedance (>10mg/L) | % Nitrate Exceedance |
|------|---------------|-------------------|-----------------------|------------------|------------------------------|----------------------|
| 2025 | 41 | 4 | 10% | 0 | 1 | 2% |
| 2021 | 42 | 17 | 40% | 3 | 3 | 7% |
| 2017 | 20 | 1 | 5% | 1 | 1 | 5% |
| 2013 | 13 | 2 | 15% | 0 | 0 | 0% |
| 2009 | 33 | 17 | 52% | 3 | 3 | 9% |

TABLE 3: HARRISON PRIVATE WELL RESULTS FROM GROUP TESTING PROGRAMS

| | Sample Number | Bacteria Positive | Bacteria Positive (%) | E. coli Positive | Nitrate Exceedance (>10mg/L) | % Nitrate Exceedance |
|------|---------------|-------------------|-----------------------|------------------|------------------------------|----------------------|
| 2025 | 67 | 9 | 13% | 1 | 0 | 0% |
| 2021 | 62 | 16 | 26% | 1 | 1 | 2% |
| 2017 | 45 | 6 | 13% | 0 | 0 | 0% |
| 2013 | 20 | 2 | 10% | 0 | 0 | 0% |
| 2009 | 47 | 12 | 26% | 2 | 1 | 2% |

Well owners are encouraged to sample for bacteria and nitrates annually as part of routine maintenance of their private drinking water supply.

TOWN TRENDS OVER THE YEARS

Chilton

The Town of Chilton has offered free testing to well owners since 2006, where well owners sample more frequently than the County and State average. The presence of coliform bacteria is trending downward (as well as reporting of brown water events). Nitrate exceedances (as percent unsafe) are generally presenting a downward trend. However, there remains hotspots where nitrates appear to be increasing. The greatest concerns are in areas where nitrate levels are approaching 30mg/L or higher which can exceed the capabilities of treatment devices.

TABLE 4: CHILTON PRIVATE WELL RESULTS FROM GROUP TESTING PROGRAMS

| | Sample Number | Bacteria Positive | Bacteria Positive (%) | E. coli Positive | Nitrate Exceedance (>10mg/L) | % Nitrate Exceedance |
|------|---------------|-------------------|-----------------------|------------------|------------------------------|----------------------|
| 2008 | 85 | 7 | 8% | 1 | 32 | 38% |
| 2009 | 107 | 15 | 14% | 4 | 35 | 33% |
| 2010 | 72 | 17 | 24% | 5 | 20 | 28% |
| 2011 | 80 | 23 | 29% | 2 | 19 | 24% |
| 2012 | 70 | 18 | 26% | 4 | 17 | 24% |
| 2013 | 65 | 11 | 17% | 0 | 16 | 25% |
| 2014 | 74 | 18 | 24% | 7 | 17 | 23% |
| 2015 | 86 | 14 | 16% | 2 | 21 | 24% |
| 2016 | 68 | 16 | 24% | 3 | 21 | 31% |
| 2017 | 81 | 12 | 15% | 1 | 22 | 27% |
| 2018 | 78 | 18 | 23% | 9 | 17 | 22% |
| 2019 | 99 | 15 | 15% | 1 | 20 | 20% |
| 2020 | 44 | 7 | 16% | 0 | 16 | 36% |
| 2021 | 61 | 16 | 26% | 5 | 17 | 28% |
| 2022 | 114 | 8 | 7% | 1 | 24 | 21% |
| 2023 | 125 | 15 | 12% | 2 | 20 | 16% |
| 2024 | 108 | 5 | 5% | 0 | 17 | 16% |
| 2025 | 106 | 9 | 8% | 0 | 23 | 22% |

57 private wells participated for the first time in the Calumet County Groundwater Program. Over 2000 of the estimated 4000 private wells in the County have participated in the Groundwater Program since 2002.

KARST AREAS

There are areas in the County that are more susceptible to groundwater contamination. These areas are delineated on the Silurian Dolomite Aquifer Susceptibility Map (Right Map: red and blue areas). These areas are defined as moderately to highly susceptible to contamination due to the proximity of bedrock to the surface, the presence of karst features characteristic of the dolomite (limestone) aquifer, and/or thin textured soils.

Well data indicate that contamination percentages increase in karst areas of Calumet County; 38% of wells tested unsafe for bacteria and/or nitrate, compared to 16% outside the karst areas. Maps of sampling results are included further down in this report.

The unique geology and soils of Calumet County present challenges in protecting groundwater.

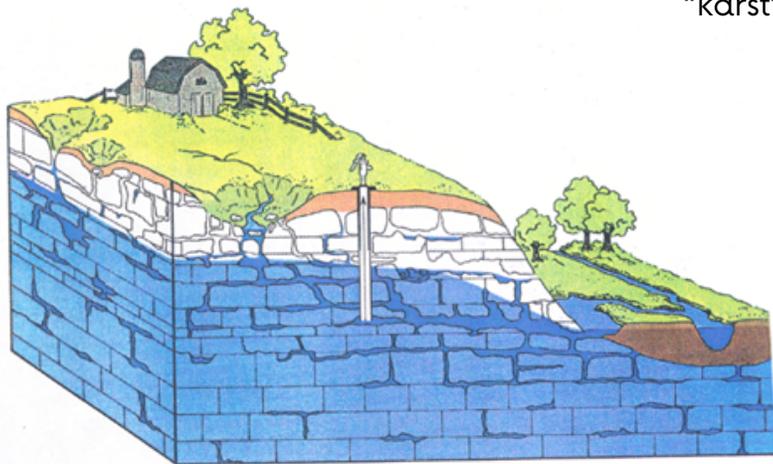
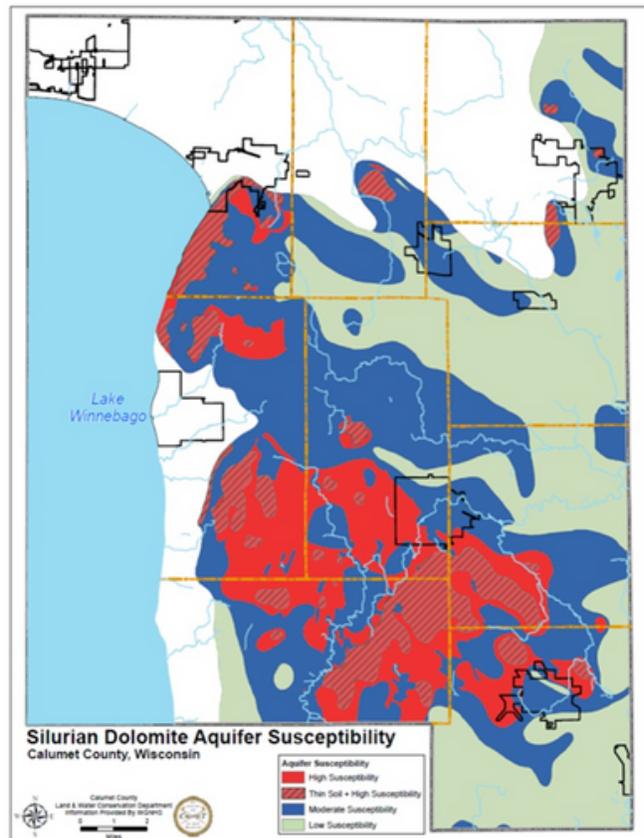


Diagram of a karst landscape showing how a private well intersects fractures that are connected to a karst feature at the surface, such as a sinkhole.



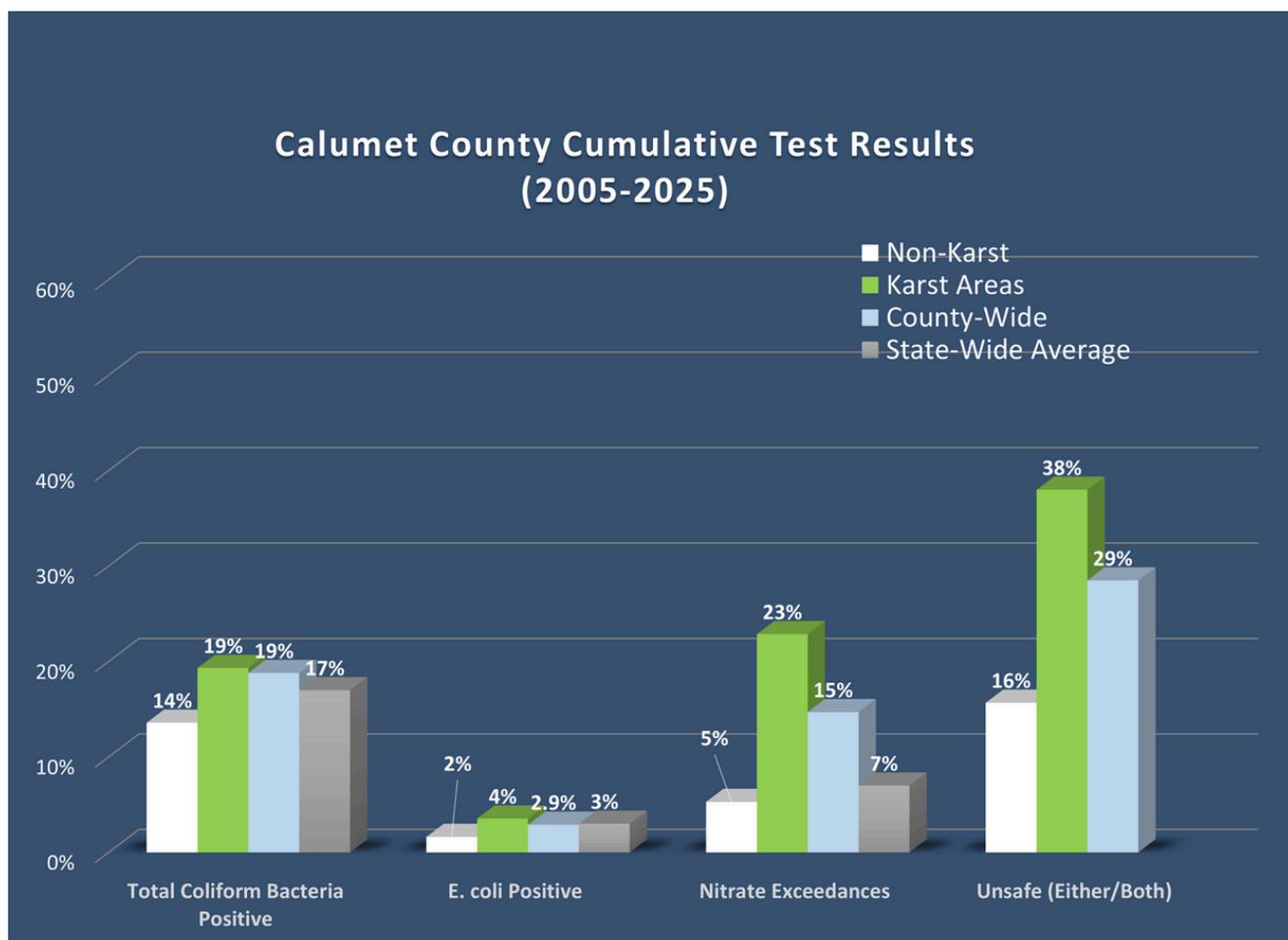
The upper layer of bedrock is a type of rock that is easily dissolved by water. Extensive networks of vertical and horizontal fractures (cracks) in the bedrock are continuously forming. These features, such as sinkholes, disappearing streams, and surface fractures, are called “karst” features.

Groundwater typically moves less than 1 foot per day, but in areas of thin soil and fractured bedrock, water and pollutants can move 100 feet or more per day. If a private well is connected to a fracture that has a direct conduit to the surface (karst feature), the well can be easily impacted by any land use near the karst feature.

KARST AREAS

of Calumet County

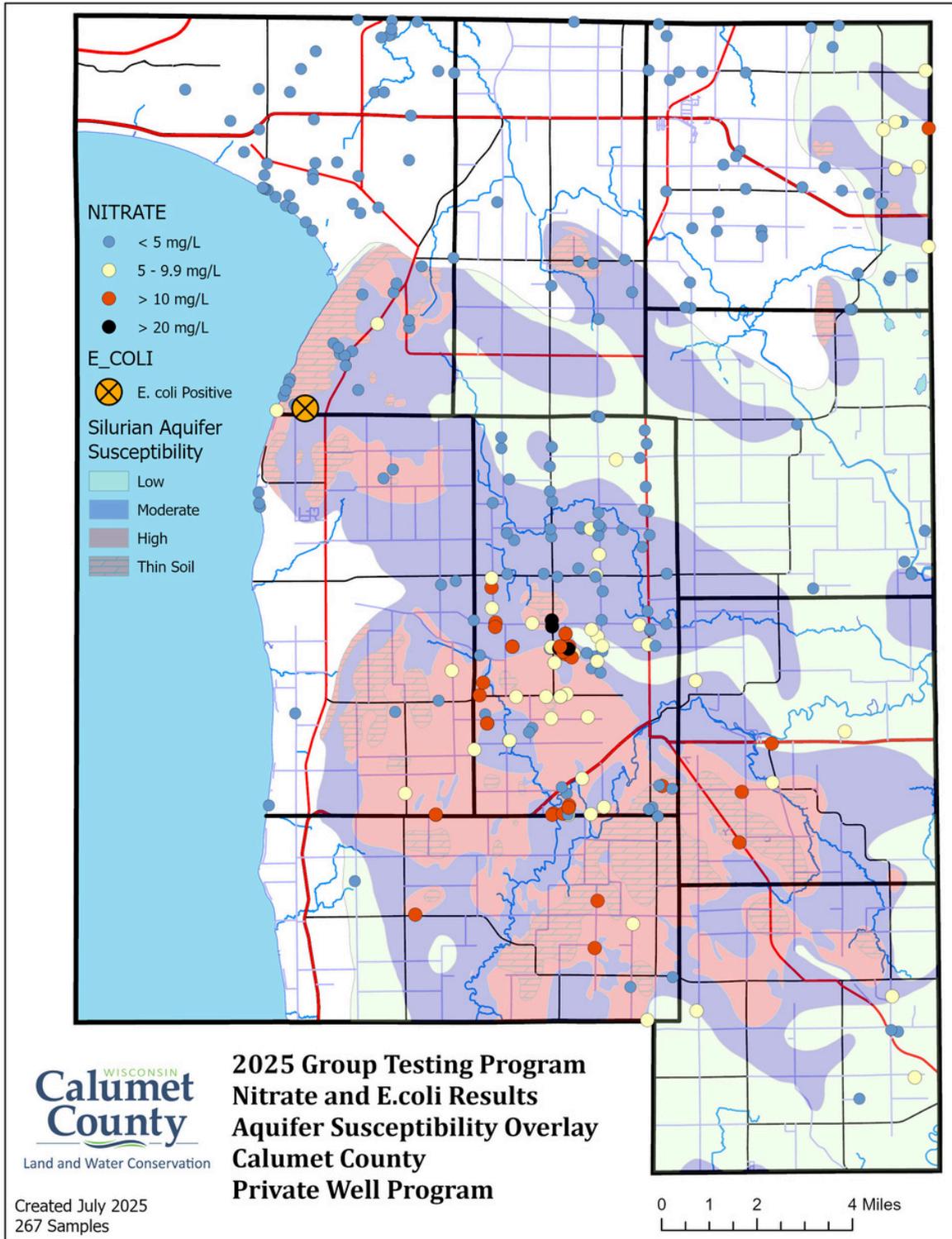
The bar graph below depicts the cumulative results from private wells as defined by the most recent sample from a well. 1990 wells have submitted at least one sample. Only the latest results from wells sampled annually or more frequently are included in this analysis. Cumulative data indicate that wells located in karst areas have a higher probability of producing water with coliform bacteria and/or nitrate contamination at unsafe levels. Only 5% of wells located outside of the Karst Area have exceeded the nitrate drinking water standard of 10 mg/L, yet land use is generally agricultural throughout the entire County. This indicates that geology and soil type play a major role in the level of risk of well contamination.



MAPPED RESULTS

Nitrate Levels overlaying Silurian Vulnerability Layer

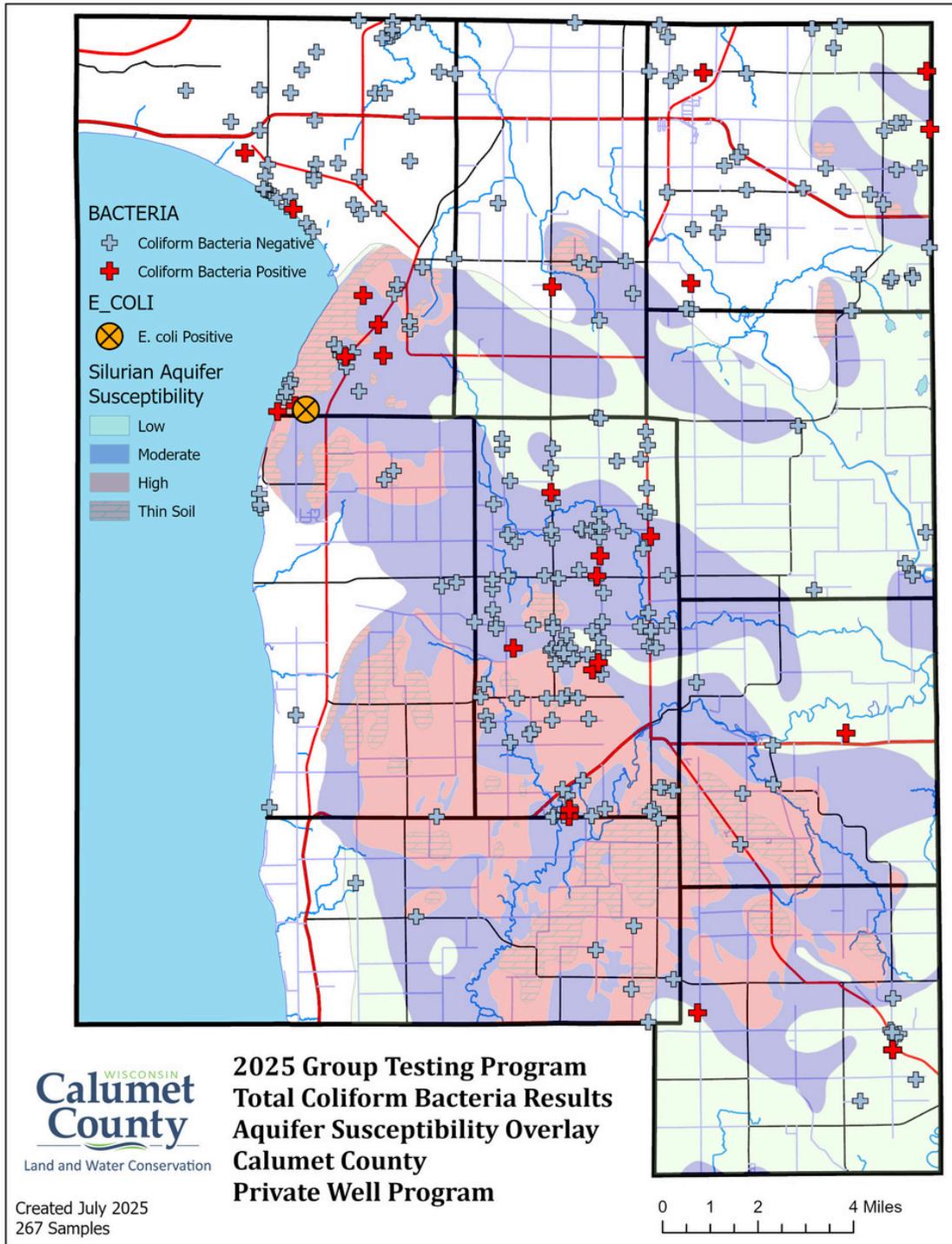
Nitrates results from 2025 program overlaying the groundwater susceptibility layer of the Silurian Aquifer. Nitrate exceedances (red, black dots) correlate to areas of moderate or high susceptibility (red and blue areas).



MAPPED RESULTS

Bacteria Results overlaying Silurian Vulnerability Layer

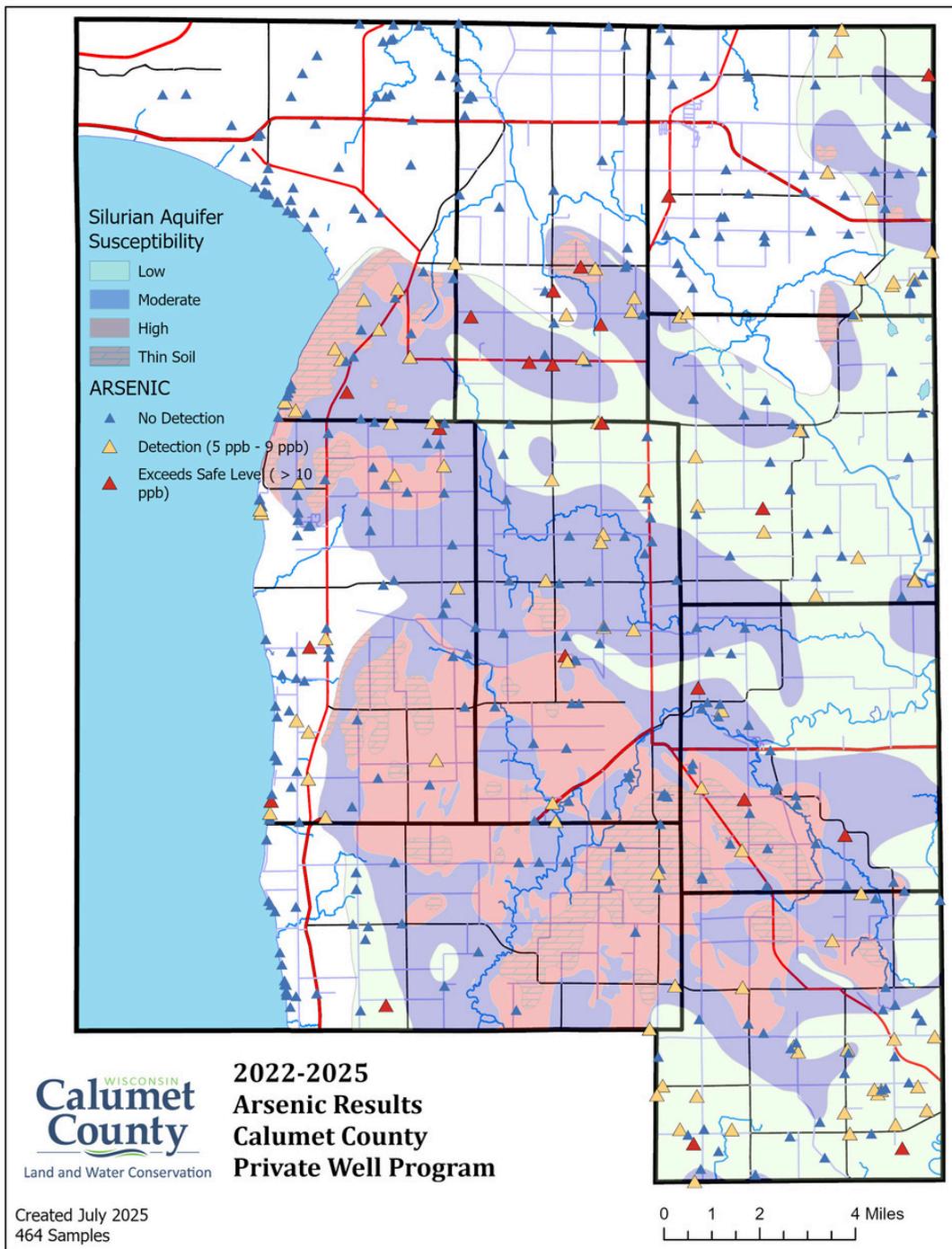
Coliform bacteria results from 2025 program overlaying the groundwater susceptibility layer of the Silurian Aquifer.



MAPPED RESULTS

Arsenic Detections

Arsenic can occur naturally in groundwater depending on the rock composition of the aquifer. Arsenic levels typically do not change but may increase over time if groundwater levels decrease. While 5% of samples exceed the safe drinking water standard of 0.01 mg/L, wells rarely exceed 0.02 mg/L (N=1933 samples).



METALS AND PESTICIDES

Optional tests offered only during annual testing program.

Some metals cause problems that are considered aesthetic in nature, including sulfate, iron, and sodium. Other metals are associated with health-related risks, such as arsenic, lead, and copper.

Wells in the northern part of the county and along the L. Winnebago shoreline typically rely on the lower St. Peter Sandstone Aquifer and are well known for having very hard water with a strong sulfur smell. Wells routinely test high for sulfate, sodium, hardness, and other inorganics in this aquifer, and some excessively exceed aesthetic limits. This can make it very challenging for a well owner to completely remove aesthetic problems with treatment devices.

Arsenic is found in some county wells, and levels occasionally exceed the safe drinking water standard of 10 parts per billion (ppb). However, most wells that do exceed safe drinking limits are rarely above 20 ppb, much lower than results in neighboring counties where wells test over 100 ppb (Outagamie, Winnebago). Well owners are encouraged to test for arsenic at least once. If found elevated, it is recommended to sample every 3-5 years to monitor for rising levels.

Arsenic levels may increase with declining water tables. A treatment system may be installed at the drinking water faucet to correct for high levels of arsenic.

Copper and lead are found in some homes in Calumet County. The presence of copper and lead is not related to geology or geographic distribution. The source of these two metals is primarily plumbing in the home. If levels exceed the safe drinking water standard, homeowners are encouraged to run the water for a few minutes prior to drinking to flush out water that has been in contact with the plumbing for an extended period of time.

Ninety-nine wells performed the DACT screen in 2025, which tests for triazines, a class of pesticides that include atrazine, simazine, and cyanazine. Seven wells detected levels of triazines, but no samples exceeded the safe drinking water standard set at 3.0 parts per billion.

RECOMMENDATIONS

For Private Well Owners

WHAT HAPPENS IF A WELL IS BACTERIA POSITIVE?

The test for total coliform bacteria is sensitive to many different coliform bacteria, including fecal coliforms. Most non-fecal coliforms are not a public health concern; rather, their presence in well water serves as an indicator that a well is susceptible to contamination from local sources or neighboring land use practices.

With a few exceptions, private well owners are not required to take corrective action. A well owner is encouraged to do one or more of the following:

- Perform a retest to ensure the result was not a false-positive result due to sampling error. A recent analysis of the County Infant Well Testing Program indicates a false-positive rate of 8%.
- Chlorinate the well. Well owners are encouraged to contact a professional to provide this service.
- Perform a well inspection. Audit the well and property by asking the following questions:
 - Is there a vermin-proof cap? Is the conduit cracked?
 - Are there landscaping features or structures around the well that would invite wildlife to nest near the well?
 - Is the area around the well graded to keep standing water away?
 - Does the well terminate at least 12 inches from grade?
 - Are there any contamination sources close to the well, including downspouts?
 - Is the well meeting state codes? Contact a well professional to inspect the casing and well. Consider upgrading or replacing dug wells or pit wells.
 - Is the private onsite waste treatment system (POWTS) functioning properly? What is the date of the last inspection?
 - Is there another unused or old well located on the property?

RECOMMENDATIONS

For Private Well Owners

WHAT HAPPENS WHEN NITRATE EXCEEDANCE OCCURS?

Short-term exposure to high nitrate levels is a concern for pregnant women, women who are trying to become pregnant, infants under 6 months of age, and others with compromised immune systems. It is recommended that all well owners reduce or eliminate long-term consumption (years). Well owners are encouraged to make sure their well is properly maintained, following the same guidelines and questions for bacteria-positive wells above.

Nitrate in groundwater tends to persist over time but can be treated with a point-of-use system such as a reverse osmosis or a distillation system. A homeowner is encouraged to make sure the device installed is certified by the Wisconsin Department of Safety and Professional Services and to test the device for efficiency if nitrate exceeds 15 mg/L.

Similar to total coliform bacteria, nitrate is used as an indicator to determine if the well is susceptible to contamination from local sources or neighboring land use practices. Sources of nitrate can include fertilizers (both domestic and agricultural) and onsite waste treatment systems.

HOW OFTEN SHOULD A WELL BE SAMPLED?

Private well owners are responsible for maintaining and testing their local drinking water supply. It is important to understand the quality of a private drinking water supply by testing annually for bacteria and nitrates—at a minimum. The programs offered by Calumet County are voluntary, and well owners are not required to take corrective action if a problem is discovered. Recommendations are provided based on well test results, location in the County, and general water quality in the area. On occasion, staff will conduct site visits upon request. Bottles are available year-round in the LWCD office, Room 133 of the Calumet County Courthouse.

Questions about this report, along with requests for presentations at meetings can be directed to Dani Santry at the contact information below.

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