

## Township Testing Program Update-May 2022

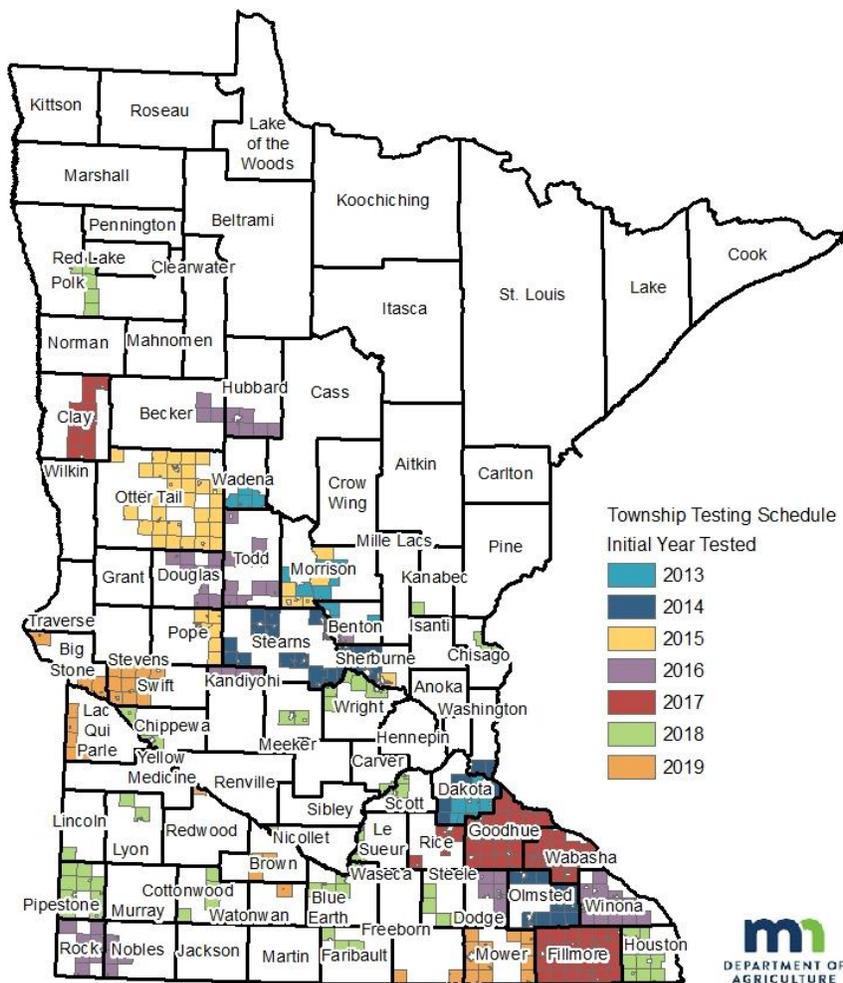
In a seven-year statewide effort, the Minnesota Department of Agriculture (MDA) offered nitrate-nitrogen (Nitrate-N) tests to private well owners. This extensive sampling effort was conducted as a result of a major revision of the Nitrogen Fertilizer Management Plan (NFMP). The NFMP called for an assessment of nitrate conditions at the township scale. In response, a statewide Township Testing Program (TTP) was established to assess the nitrate-nitrogen (Nitrate-N) concentrations in private wells.

Townships that are vulnerable to groundwater contamination and have significant row crop production were selected for nitrate testing. Some factors that make groundwater vulnerable are

soil type and geology, which control how quickly nitrate can travel from the root zone to groundwater.

More than 90,000 private well owners were offered nitrate testing in 344 townships in years 2013 to 2019 for initial testing (Figure 1). Additional testing follow up continued through 2020.

The TTP was a substantial multi-year sampling effort to evaluate water quality in drinking water wells in areas vulnerable to ground water contamination from agricultural sources across the entire state and was a significant step towards addressing nitrate in groundwater in Minnesota. The data gathered is used to inform well owners about the water they are drinking and can be used to prioritize future work to address nitrate concerns, as described in the NFMP. Find more information about the NFMP at [www.mda.state.mn.us/nfmp](http://www.mda.state.mn.us/nfmp).



**Figure 1. Township Testing Schedule**

*In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711. The MDA is an equal opportunity employer and provider.*

### Initial Results

The MDA works with local partners such as counties and soil and water conservation districts (SWCDs) to coordinate private well nitrate testing using Clean Water Funds. In the initial sampling, all township homeowners using private wells were sent a nitrate test kit and the homeowner collected the sample.

From 2013-2019, 344 vulnerable townships from 50 counties participated in the initial TTP sampling. In the 344 townships tested, 143 (41%) had 10% or more of the wells over the Health Risk Limit (HRL) of 10 mg/L for Nitrate-N (Figure 2 & 3).

Through the TTP 32,217 private wells were tested for nitrate. Of the wells tested, 2,925 (9.1%) exceeded the HRL for Nitrate-N (Table 2). The minimum nitrate result was less than the detection limit and the maximum result was 159 mg/L Nitrate-N (Table 2). These initial results reflect nitrate concentrations in private well drinking water regardless of nitrogen sources, or well construction.



### Final Results

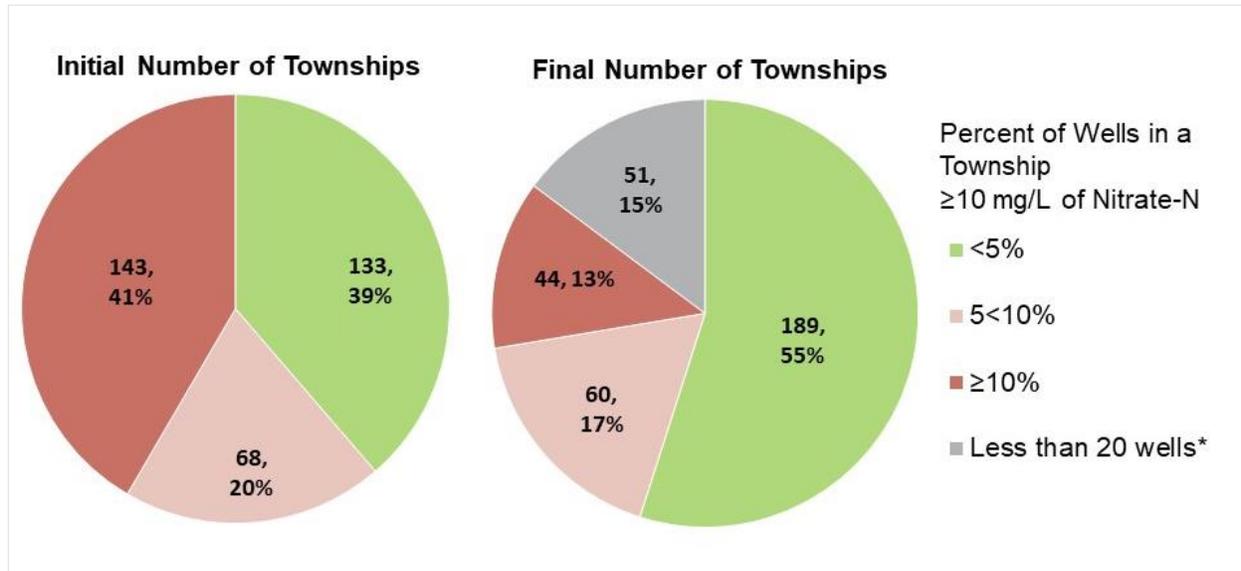
If nitrate was detected in the initial sample, the homeowner was offered a follow-up nitrate test, pesticide test, and well site assessment. Trained MDA staff visited willing homeowners to collect the follow-up nitrate and pesticide water samples and conduct well site assessments, between 2014 and 2020. Once completed, the MDA analyzed the results and prepared a final report for each county. Final results were determined using two rounds of sampling and a process to remove wells with construction concerns, insufficient construction information, and those near potential non-fertilizer sources of nitrate. Final results represent wells that are potentially impacted by a fertilizer source.

For the final dataset, it was determined that 44 (13%) townships had 10% or more of the wells over the HRL for Nitrate-N, with the majority of these townships occurring in southeast Minnesota. For the final results, townships with less than 20 well were categorized separately because MDA considers less than 20 wells inadequate to characterize a township for the purposes of the NFMP (Figure 2 & Figure 4).



In the final dataset of 28,932 wells, 1,359 (4.7%) exceeded the HRL for Nitrate-N (Table 2). The minimum nitrate result was less than the detection limit and the maximum result was 69.8 mg/L Nitrate-N (Table 2). Detailed sampling results for each county are available at: <https://www.mda.state.mn.us/township-testing-program>. A detailed final report on statewide and regional data comparisons will be available in 2023.

Pesticide results were analyzed separately through the Private Well Pesticide Sampling Project, more information is available at: [www.mda.state.mn.us/pwps](http://www.mda.state.mn.us/pwps)



**Figure 2. Initial and final number of townships and percent of townships in each nitrate category.**  
 \* Townships with less than 20 well were categorized separately because MDA considers less than 20 wells inadequate to characterize a township for the purposes of the NFMP

**Table 1. Initial and final number of wells and percent of wells in each nitrate concentration range.**

Township	Total Wells	Number of Wells <3*	Number of Wells 3<10*	Number of Wells ≥10*	Percent of Wells <3*	Percent of Wells 3<10*	Percent of Wells ≥10*
Initial	32,217	24,791	4,501	2,925	77.0%	14.0%	9.1%
Final	28,932	24,512	3,061	1,359	84.7%	10.6%	4.7%

\* Nitrate-N mg/L or parts per million (ppm)

**Table 2. Township testing program summary statistics for initial and final well dataset**

Township	Total Wells	Min Value*	Max Value*	Mean Value*	50th Percentile <sup>2*</sup> (Median)	75th Percentile <sup>2*</sup>	90th Percentile <sup>2*</sup>	95th Percentile <sup>2*</sup>	99th Percentile <sup>2*</sup>
Initial	32,217	<DL <sup>1</sup>	159	3.5	1.7	4.5	9.4	13.9	22.2
Final	28,932	<DL <sup>1</sup>	69.8	1.8	0.6	2.1	5.1	8.1	14.6

<sup>1</sup><DL means that this value is less than detection limit of the lab, which is typically between 0.03 and 0.25 mg/L nitrate-N.

<sup>2</sup>The 50<sup>th</sup> percentile (75<sup>th</sup>, 90<sup>th</sup>, 95<sup>th</sup>, and 99<sup>th</sup>, respectively) is the value below which 50 percent (75%, 90%, 95% and 99%) of the observed values fall

\* Nitrate-N mg/L or parts per million (ppm)

## Initial Township Testing Private Well Nitrate Results

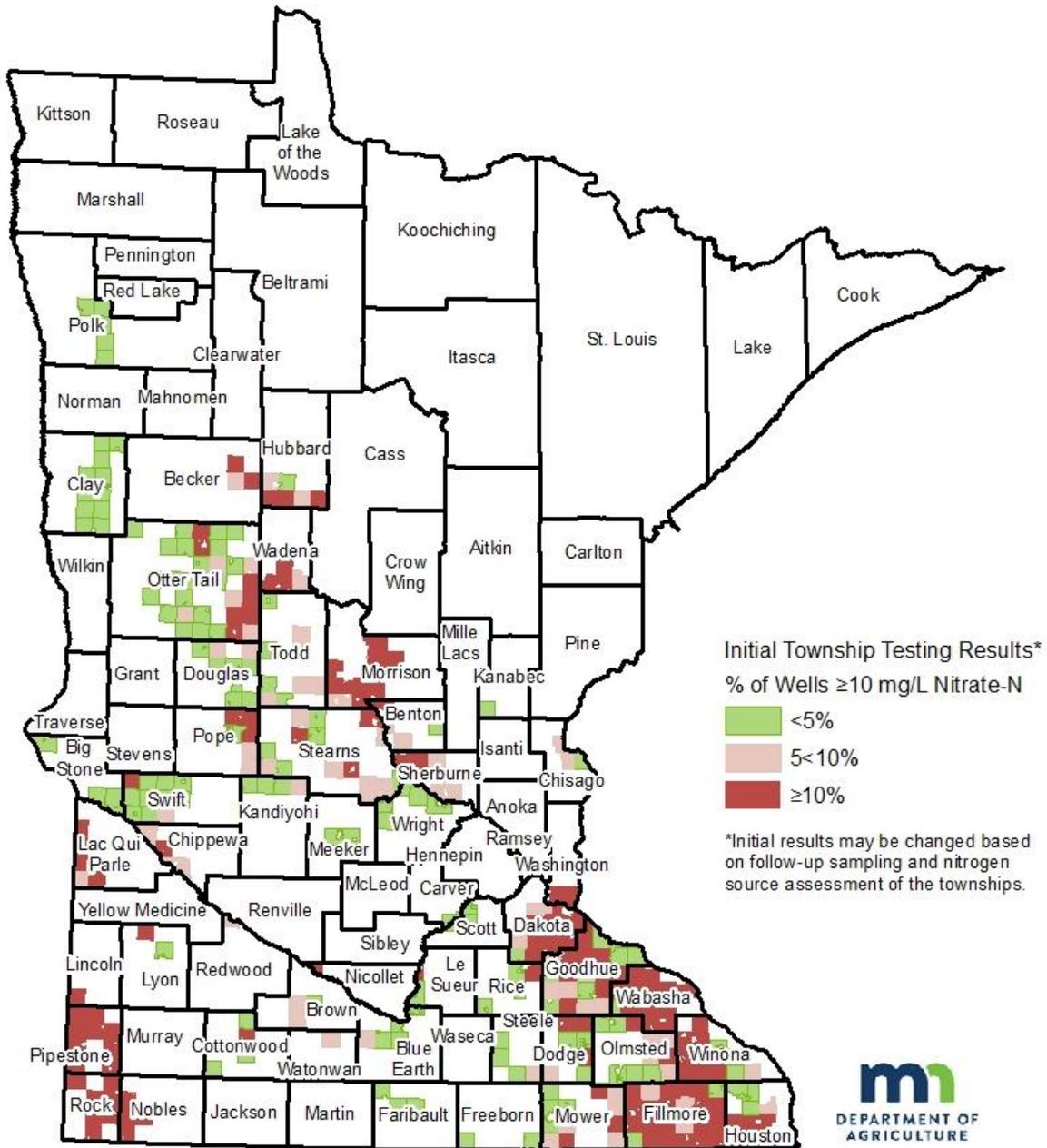


Figure 3. Initial Township Results Updated May 2022

## Final Township Testing Private Well Nitrate Results

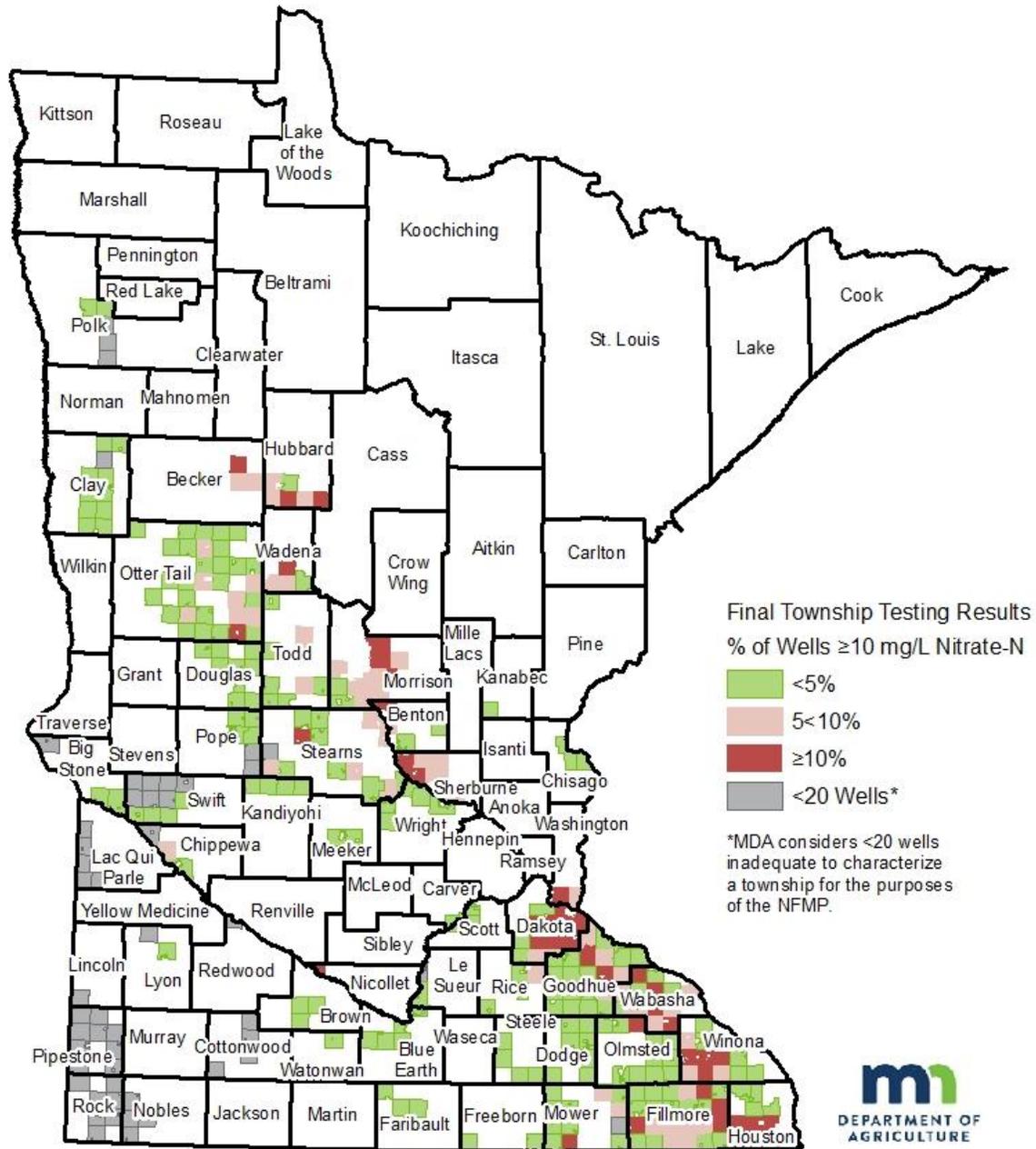


Figure 4. Final Township Results Updated May 2022