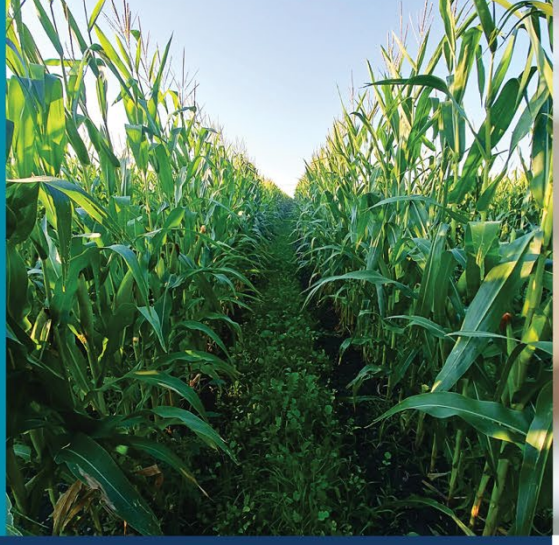
JANUARY 2026



Working together to protect Minnesota's waters from nitrate

MINNESOTA

METROPOLITAN COUNCIL

CLEAN WATER LAND & LEGACY AMENDMENT

Working together to protect Minnesota's waters from nitrate

January 2026

More information about the work on nitrate summarized in this report can be found on the websites listed in footnotes.

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Foreword

Working together to protect Minnesota's waters from nitrate explains how state and regional government agencies are working together to reduce nitrate pollution in Minnesota's waters. The report highlights efforts underway in 2025 to protect drinking water and groundwater across the state and downstream.

The report was prepared by members of the Clean Water Fund Interagency Coordination Team's sub team on groundwater and drinking water. It is the group's first report and provides a look at how agencies are coordinating their work to address excess nitrate in groundwater and drinking water.

The report outlines why high nitrate levels are a concern and outlines what state agencies and the Metropolitan Council (Met Council) are doing to monitor water quality and reduce nitrate water pollution in our state. Actions include programs, plans, and rules aimed at lowering nitrate levels in areas of concern.

Agencies developed these approaches together and will continue working with partners to protect water quality and further focus their nitrate-reduction initiatives. This report reflects coordination efforts through spring 2025.

This document describes problems with high levels of nitrate in the environment and the work of state agencies and Met Council (collectively referred to as "the agencies") to monitor water resources and develop strategies to address areas of concerns in Minnesota. Programs, plans and rules include some of the strategies to reduce nitrate. The agencies worked together to develop the approaches and will continue working together, and with partners, to address challenges and further focus initiatives to address nitrate.

Why is nitrate a problem?

Nitrate is a problem in Minnesota's rivers, lakes, and groundwater when it reaches harmful levels. The agencies, along with our local partners, are working together to protect human health and the environment from the impacts of too much nitrate in Minnesota's surface water and groundwater.

Human health impacts

Consuming too much nitrate can affect how blood carries oxygen and cause methemoglobinemia (blue baby syndrome). Bottle-fed babies under six months old are at the highest risk. Methemoglobinemia can result in serious illness or death. It can cause the lips and skin to turn a bluish color but may be difficult to detect in infants. Symptoms will often resolve once the nitrate source is removed. People with glucose-6-phosphate-dehydrogenase deficiency or other metabolic conditions may also be at higher risk of getting this illness.

The U.S. Environmental Protection Agency (EPA) standard for nitrate in drinking water is 10 milligrams of nitrate (measured as nitrogen) per liter of drinking water (mg/L). Based on the data available at this time, this drinking water standard protects infants against methemoglobinemia. Infants are the most sensitive group of people for known health effects.

Science has emerged recently describing possible health impacts of long-term exposure to nitrate in drinking water at concentrations below the current regulatory standard. Potential health impacts include associations with thyroid problems, adverse pregnancy outcomes, and cancers (particularly colorectal). Further research is necessary to confirm these observations. Minnesota Department of Health (MDH) continues to follow the research and will provide updated guidance when adequate data are available. For more information, visit: Nitrate in Drinking Water - MDH.

Environmental impacts

Nitrate contamination can affect local drinking water, nearby lakes, or farther downstream in regional lakes and rivers. High levels of nitrate can be directly toxic to the aquatic life (fish, shellfish, and bugs) that live in our lakes and streams. In addition, nitrogen (along with phosphorus) as a nutrient can, when present at excess levels, result in excessive algae growth and low levels of oxygen. Nutrients leaving Minnesota via the Red River contribute to algae problems in Lake Winnipeg. Nutrients transported via the Mississippi River contribute to a large oxygen-depleted zone in the Gulf of Mexico, affecting commercial and recreational fishing and the overall health of the gulf.

Sources of nitrate

Nitrate is a water-soluble compound composed of nitrogen and oxygen that can occur naturally in groundwater at low levels. Natural background levels of nitrate are typically less than one part per million (ppm[1]). Human activities, such as crop fertilization, sewage disposal, wastewater effluent, and

[1] DNR is currently working with Minnesota Geological Survey and others to gather references and create a report or memo on natural background concentrations. See references at end of document for further information.

Subsurface Sewage Treatment Systems (SSTS) can elevate the level of nitrate in surface waters and groundwater.

How do we prevent nitrate problems in water?

There are several steps in understanding and preventing health and environmental problems from nitrate in Minnesota's surface and groundwater. First, we must understand the levels of nitrate that are occurring and whether they are of concern. The state agencies work together to monitor nitrate in water.

If there is a concern, there are two approaches to protect human health: reducing the sources of nitrate in water and reducing people's exposure to high levels of nitrate in their drinking water. The state agencies have existing programs and authorities that both regulate nitrate to minimize what goes into our water resources and work to make sure people are not exposed to high nitrate in drinking water. The following section discusses state water monitoring programs.

Monitoring

Understanding nitrate in Minnesota's waters

Water quality monitoring measures the concentrations of nitrate in surface and groundwater, to determine if they are approaching levels of concern. Understanding geology and sensitivity to pollution helps us understand how waters and nitrate move across the land, through soils, and into surface and groundwater.

Minnesota Department of Agriculture

The MDA designed the Township Testing Program to determine current nitrate concentrations in private wells. **The MDA conducted private well testing for nitrate in** townships across the state that are vulnerable to groundwater contamination and have significant row crop production. Through 2019, the MDA sampled private wells in 344 townships in 50 counties in cooperation with local partners. To date, 32,217 wells have been sampled, and approximately
9.1 percent of the wells have nitrate exceeding the drinking water standard, although this can be much higher in some townships. Results from the Township Testing Program show areas of the state where private wells are most impacted by nitrate and where conservation practices should be implemented at the local level to reduce nitrate in groundwater.

In addition to township testing, the MDA supports two regional monitoring networks in areas of the state where groundwater is vulnerable to nitrate contamination: the Central Sands Private Well Network and the Southeast Volunteer Nitrate Monitoring Network. Each private well network helps determine the trend of nitrate levels in regional groundwater over time. Long-term regional networks will help answer the question: Are nitrate concentrations in private drinking water wells increasing, decreasing, or staying the same?

The MDA has established monitoring well networks in three Drinking Water Supply Management Areas (DWSMAs) to support the Groundwater Protection Rule. The MDA has installed networks in the St. Peter DWSMA, Hastings DWSMA, and Rock County Rural Water District DWSMA. These networks will be sampled for nitrate at least three times a year and used to monitor trends in shallow groundwater under agricultural fields. Visit the Groundwater Protection Rule webpage for more information on these programs.

The goal of DWSMA networks is to determine changes in nitrate levels and trends following the implementation of nitrogen fertilizer best management practices (BMPs), vegetative cover, and other crop management practices. The scale and feasibility of these monitoring networks are currently being determined.

Minnesota Department of Health

The MDH programs and staff seek to understand the occurrence and distribution of nitrate in both drinking water supply sources and the water delivered to the tap at the homes of Minnesotans. The Minnesota Well Code requires that a nitrate sample be collected from all potable water-supply wells upon their completion. Additionally, MDH is working to build the capacity of local partners to provide for more regular private well testing for nitrate and other key parameters. The data compiled from these efforts helps private well users understand the safety of consuming water from their well and the areas in the state susceptible to nitrate contamination. These data have helped establish that well construction requirements in the Minnesota Well Code have helped reduce the incidence of nitrate contamination of new wells compared to those constructed before the code.

Nitrate is a regulated contaminant under the federal Safe Drinking Water Act (SDWA), and MDH conducts regular compliance sampling for nitrate at thousands of public water systems annually. Data are used to ensure that water delivered to customers by public water systems meets the federal drinking water standard for nitrate. The regular sampling has allowed MDH to accumulate time series trends for nitrate for many public water systems. These data have established that land use changes and nearby point sources can directly affect nitrate concentrations.

In certain circumstances, when nitrate levels have been observed to fluctuate or are close to water quality standards, MDH will conduct supplemental monitoring. This helps water system operators understand the seasonal or climatic factors that may influence nitrate concentrations in their water supply and provide early warning if rising concentrations may require mitigation of some kind.

Minnesota Department of Natural Resources

The DNR has primary responsibility for inventorying and managing the state's public waters and wetlands and regulating any activities that obstruct or alter these waters. The DNR establishes permissible lake or stream levels (ordinary high-water levels) and is also responsible for water allocation and use, including groundwater appropriations.

Additionally, the DNR is a partner in the state's Groundwater Degradation Prevention Goal (Minn. Stat. § 103H.001). Under Subdivision 2 of 103H.101 (Protecting Sensitive Areas), the DNR is statutorily required to work in consultation with the Minnesota Geological Survey (MGS) to map and characterize sensitive areas of the state. The DNR accomplishes this collaborative work through the Groundwater Atlas Program. The Groundwater Atlas Program creates maps and reports identifying the direction of groundwater flow, aquifer properties, groundwater chemistry, and pollution sensitivity of aquifers. The pollution sensitivity data are available at a statewide scale through the Minnesota Hydrogeology Atlas Series.

Additionally, the Groundwater Atlas Program works in southeastern Minnesota, where karst geology and intensive row crop agriculture have led to nitrate contamination of groundwater. Groundwater Atlas maintains karst databases (the Karst Features Inventory, Minnesota Springs Inventory, Minnesota Groundwater Tracing Database) and completes karst mapping and collaborative studies with the MGS, other agencies, and the University of Minnesota.

Minnesota Pollution Control Agency

The MPCA monitors water quality in lakes, streams, watersheds, and groundwater. The watershed pollutant load (water chemistry and flow) monitoring network is established at the basin, major watershed, and subwatershed scales to evaluate water quality variability and pollutant sources in rivers and streams across Minnesota. Watershed condition monitoring is performed to understand the basic ambient condition of our lakes, rivers, and streams, and to measure progress in restoring and protecting waters. It is conducted at the major watershed scale and involves sampling lakes, rivers, and streams for biology (fish and invertebrates), and water chemistry.

The MPCA conducts ambient groundwater sampling from a network of roughly 270 wells located in population centers, as well as some remote forested locations. The network is designed to provide an "early warning" about changes in the quality of shallow groundwater. The network also includes wells that sample some deeper aquifers that serve as principal drinking water sources to detect pollutants introduced at the surface from land use and wastewater disposal practices.

Metropolitan Council Environmental Services

The Met Council and predecessor organizations have monitored regional rivers for water quality in the seven-county metro region since the 1920's with intensive monitoring beginning in 1976. To better understand nonpoint pollution, monitoring efforts were expanded to regional lakes in 1980 and tributary rivers and streams in 1989. With these long-term intensive monitoring efforts, the Met Council and its monitoring partners can track water quality progress of the region and demonstrate success of local watershed management and regional policy implementation in the Twin Cities region. Water quality trend reports, fact sheets, and regional water policy information can be found at Water Quality Management.

Groundwater pollution is a growing concern for the Met Council and regional communities, particularly nitrogen pollution that contaminates drinking water sources. The Met Council is working with community water suppliers across the region through sub-regional working groups to collaboratively better understand and address the unique local challenges in groundwater management for that subregional area.

Action

Reducing nitrate in Minnesota's water

This section covers existing programs that serve to reduce nitrate and nitrogen in Minnesota's water resources.

Minnesota Nutrient Reduction Strategy

More than 100 experts from state, federal and local agencies and the University of Minnesota have worked together to develop the *Minnesota Nutrient Reduction Strategy* (Minnesota NRS), which includes goals and milestones for reducing nitrogen and phosphorus. The 2014 Minnesota NRS and the five-year progress report (2020) can be found on the Minnesota Nutrient Reduction Strategy website as well as other updated materials, progress tracking displays, and webinar recordings from the 2025 NRS revision process. Below are the Minnesota NRS nitrogen reduction goals and timelines.

Major basin	Nitrogen reduction goal — 2025 Minnesota NRS	Timeline for nitrogen goal
Lake Superior	No increase above 2,670 metric ton/year average (no net increase)	Maintain protection
Lake Winnipeg	53% reduction from 1996-2000 baseline	2010 – 2025: Achieve 13% reduction goal (Red River); Manitoba and the International Join Commission have not yet determined a target end-date for goals. Until such a goal is set, Minnesota will use the NRS 2040 timeline.
Mississippi River	45% reduction from average 1980–1996 conditions	2010 – 2025: Achieve 20% reduction from baseline 2025 – 2040: Achieve 45% reduction from baseline
Statewide groundwater/source waters	Meet Groundwater Protect Act goals and reduce groundwater nitrate baseflow into major rivers to help achieve TN load reduction goals at state lines.	The timeframe for **practice adoption** to achieve this goal is 2040. However, river monitoring efforts will not reflect such reductions until several decades following changes on the land, due to slow groundwater transport times to rivers

Board of Water and Soil Resources

The BWSR functions as the state soil and water conservation agency and is authorized to direct private land soil and water conservation programs through the action of soil and water conservation districts (SWCDs), counties, cities, townships, watershed districts, and watershed management organizations. The BWSR board is appointed by the governor, and it includes citizens, commissioners of the MDA, MDH, DNR, MPCA, local governments, and the University of Minnesota.

The BWSR is the primary source of guidance, oversight, and on-the-ground project funding for local governments, private landowners, and other partners on local water plans, wetland protection efforts under the Wetland Conservation Act, and soil and water conservation programs.

Easements

- Reinvest in Minnesota (RIM) Reserve in Wellhead Protection Areas focuses on land use protection in wellhead protection areas.
- Conservation Reserve Enhancement Program (CREP) in Wellhead Protection Areas ensures land use in area enrolled protects wells. The CREP is a voluntary, federal-state funded natural resource conservation program that uses a science-based approach to target environmentally sensitive land in 54 counties in southern and western Minnesota. This is accomplished through permanent protection by establishing conservation practices via payments to farmers and agricultural landowners.

Grants

- Partner Protection Grants in Wellhead Protection Areas provide an array of protective choices for land use that may be more flexible and attractive for landowners.
- Watershed Based Implementation Funding is intended to provide local governments throughout Minnesota with efficient, transparent and stable funding.
- SWCD Conservation Delivery grants provide each SWCD with funds for the general administration and operation of the district. The grants are intended to provide districts a certain degree of funding stability.
- Clean Water Fund Projects and Practices Grant focuses on the implementation of projects and practices to protect soil and water resources.

Water planning

- One Watershed, One Plan focuses on local water planning on major watershed boundaries with state strategies toward prioritized, targeted, and measurable implementation plans. It is a voluntary program, but necessary if requesting funds from BWSR.
- Watershed management plans (metro and nonmetro) are required of watershed districts and water management organizations.
- Metro county groundwater plans allow counties to set priorities, address issues, and build local capacity for the protection and management of groundwater (voluntary).

Minnesota Department of Agriculture

The MDA is statutorily responsible for the management of pesticides and fertilizer, other than manure, to protect water resources. The MDA implements a wide range of protection and regulatory activities to ensure that pesticides and fertilizers are stored, handled, applied, and disposed of in a manner that will protect human health, water resources, and the environment. The MDA works with the University of Minnesota to develop pesticide and fertilizer BMPs to protect water resources. It also works with farmers, crop advisers, farm organizations, other agencies and many other groups to educate, promote, demonstrate, and evaluate nitrogen fertilizer BMPs, and promote vegetative cover and other advanced nitrogen fertilizer management practices.

Groundwater Protection Rule

The Minnesota Groundwater Protection Rule went into effect on June 24, 2019. It minimizes potential sources of nitrate pollution to the state's groundwater and protects drinking water. Minnesota's Groundwater Protection Rule includes two parts: 1) it restricts nitrogen fertilizer applications in the fall and on frozen soils in both vulnerable groundwater areas and DWSMAs with elevated nitrate, and 2) a process to address community water supply wells with elevated nitrate, intended to take action to reduce nitrate levels. The rule combines voluntary and regulatory efforts designed to work with local farmers and their agronomists on solutions tailored to their specific situations. There are four mitigation levels in Part 2 of the rule. Levels 1 and 2 are voluntary, and 3 and 4 are regulatory. The response always starts at a voluntary level, only moving to a regulatory level if recommended practices are not adopted or the water quality worsens. Under mitigation levels 2, 3, and 4, the Commissioner of Agriculture will work with local advisory teams to consider appropriate recommended and required management practices for the area.

The MDA is working to ensure that DWSMAs with elevated nitrate are a high priority for implementation funds. The goal is that no additional municipal water supply wells will exceed the drinking water standard for nitrate. The MDA will work with a local advisory team in level 2 DWSMAs to promote the adoption of the nitrogen fertilizer BMPs and other practices, which may reduce nitrate levels in groundwater, such as precision agriculture, perennial crops, forages, cover crops, nitrification inhibitors,

new hybrids, real-time sensors, or taking targeted land out of production. These other practices are collectively referred to as alternative management tools (AMTs).

Groundwater modeling of nitrate is underway to evaluate nitrate losses to groundwater from different cropland and nitrogen management scenarios. EPIC and SWAT computer models provide a predictive tool to estimate changes in nitrate loading based on changes in cropland use and a range of nitrogen management practices.

Nitrogen Fertilizer Management Plan

The MDA developed the Nitrogen Fertilizer Management Plan (NFMP) as the state's blueprint for preventing and minimizing the impacts of nitrogen fertilizer on groundwater. The MDA uses results from the Township Testing Program to prioritize areas of the state to implement the NFMP and protect private wells. The NFMP was developed using a multi-stakeholder advisory committee and a public review process. It emphasizes involving local farmers and agronomists in problem-solving for local groundwater concerns when nitrate from fertilizer is a key contributor.

The NFMP process includes supporting local advisory teams and promoting existing nitrogen fertilizer BMPs and alternative practices. The MDA works with local farmers and crop advisers to demonstrate and implement practices that can protect and mitigate the impact of nitrate on groundwater. This includes using computer modeling tools and surveys of practices to estimate reductions in nitrate loading to groundwater and conducting groundwater monitoring to determine actual changes in nitrate levels in groundwater over time.

Minnesota Agricultural Water Quality Certification Program

The Minnesota Agricultural Water Quality Certification Program (MAWQCP) is designed to accelerate adoption of on-farm practices that protect Minnesota's waters. The MAWQCP is a voluntary opportunity for farmers and agricultural landowners to take the lead in implementing conservation practices that protect our water. Trained conservationists conduct comprehensive risk assessments to identify all risks to water quality, including nitrate leaching and runoff. If a risk exists, in field and edge of field mitigation measures are implemented as part of the certification agreement. A farmer certified through the MAWQCP is deemed to comply with the Groundwater Protection Rule for the duration (10 years) of the water quality certification.

Minnesota Department of Health

The MDH follows up with owners of unused wells to have them put back into use or sealed. Unsealed wells can become pathways for nitrate and other surface or shallow contaminants to reach groundwater aquifers. Ensuring unsealed wells are located and permanently sealed with approved grout reduces the amount of nitrate and other contaminants in groundwater.

The MDH regulates the construction of new wells through the Minnesota Well Code. The Minnesota Well Code contains well construction requirements directed at stopping the movement of shallow groundwater that may contain elevated nitrate to deeper groundwater aquifers. Examples of well construction requirements include sealing the annular space around and between well casings during well construction and prohibiting well construction that connects aquifers separated by less pervious clay and bedrock layers (confining layers).

Minnesota Pollution Control Agency

The MPCA is responsible for implementing much of the federal Clean Water Act in Minnesota, including establishing state water quality standards, assessing the quality of all waters, identifying waters that fail

to meet state water quality standards, and administering the federal National Pollutant Discharge Elimination System (NPDES) Permitting Program.

The MPCA is required to develop total maximum daily loads (TMDLs), which provide an allowable pollution budget for each impaired water body segment that results in the water body not being impaired), Watershed Restoration and Protection Strategies (WRAPS), and WRAPS Updates, which provide a plan for achieving the identified goals. The MPCA issues and manages wastewater permits for municipal and industrial users; stormwater permits for municipal, construction, and industrial activities; and works with local units of government to implement a statewide Subsurface Sewage Treatment System Program. The MPCA also regulates the collection, transportation, storage, processing, and use of animal manure and other livestock operation wastes as fertilizers.

Water quality standards

The MPCA designates all groundwater and some surface waters as "Class 1 waters" that need to be protected so they can be used as a source of drinking water. The 10 mg/L nitrate MCL applies to these waters. The MPCA is considering whether more surface waters should be designated as Class 1 waters, including surface waters that may directly impact groundwater. The MPCA is working on this as part of a rulemaking to update the Class 1 water quality standards.

The MPCA has also developed a draft of a technical support document for a new nitrate water quality standard to protect aquatic life. Before adopting the new standard, the agency is pursuing a holistic, stepwise approach to reduce nitrogen levels statewide. The first step, developing a detailed Wastewater Nitrogen Reduction and Implementation Strategy with targeted actions to reduce nitrogen from wastewater treatment plants (WWTPs) to protect drinking water and aquatic life and meet the NRS's point source goals, is complete. Since April 1, 2024, WWTP designs must include the treatment units and hydraulic capacity necessary to achieve future nitrogen effluent limits to maximize the benefits of impending investments and achieve nitrogen reductions as soon as possible. The second step is completing a 10-year revision of the NRS, updated with enhanced strategies and actions designed to achieve reductions in nonpoint and point sources of nitrogen. The 2025 NRS will be completed in fall/winter 2025. Following its completion, the MPCA plans to restart its work moving forward with the proposed nitrate standard. An updated review of toxicity information and a revision to the technical support document will be completed prior to publishing a Request for Comments on the proposed nitrate standard.

Feedlot rules and permitting

The MPCA implements rules that regulate the management of animal manure and other livestock operation wastes (Minn. R. ch. 7020). In 50 counties these rules are implemented through a cooperative arrangement between the MPCA and county government for smaller facilities that are not subject to state or federal operating permit requirements. Proper manure management, including land-application is important to minimize nutrients in waters. As such, the MPCA and delegated counties monitor compliance of land application of manure practices, including records and in-field inspections.

Animal manure management is one of several sources of nitrate contamination. In 2025, the MPCA added nitrate BMPs designed to reduce nitrate leaching from land application of manure to the general NPDES and State Disposal System (SDS) feedlot permits. These permits are issued to the state's largest feedlots. In March 2025, the MPCA also initiated a rulemaking process to amend the state's feedlot rules to address changes in livestock and poultry operations and business practices, improve land application of manure practices to address nitrates and *E. coli* bacteria, and establish additional technical standards to protect water quality and avoid fish kills. See the MPCA Feedlots webpage for further information.

Septic system programs

The 2014 NRS also noted septic system upgrades as a needed area of continued work through the ongoing state program. The fraction of septic systems that are considered an Imminent Threat to Public Health and Safety, which includes direct outlets to the land surface has continued to decrease and now represents less than 4 percent of all septic systems (down from 11 percent in 2008). Please visit the MPCA Septic system website for more information.

Point-nonpoint trading

Water quality trading is a market-based tool for achieving improved water quality. To offset its pollutant discharges, an entity required to control a pollutant in a watershed can trade water quality credits with another entity in the same watershed to lower its pollution-control costs. Water quality trading can enhance pollution reduction efforts while offering flexibility and cost savings to regulated municipalities and industries. Point-nonpoint trading continues throughout Minnesota, with 13 permittees utilizing water quality trading. Current trading projects focus on phosphorus, but new nitrogen NPDES permit conditions are expected to generate interest in nitrogen trading. This expected demand for nitrogen credits could provide additional reduction incentives beyond voluntary implementation from nonpoint sources. Demand will likely focus on areas of interest to NPDES permittees, such as wastewater, MS4, and DWSMA entities. Please visit the MPCA Water quality trading website for further information.

Southeast Minnesota Nitrate Strategies Collaborative Work Group

In April of 2023, petitioners requested that the EPA exercise its emergency powers under Section 1431 of the federal SDWA to address groundwater nitrate contamination that presents a risk to the health of the residents in eight counties of the Southeast Karst Region2 (Karst Region) of Minnesota. In January of 2024, MDH, MDA, and MPCA submitted to the EPA a workplan outlining next steps. There are three phases to this workplan: Phase 1 – immediate response (led by MDH); Phase 2 – public health intervention (led by MDH); Phase 3 – long-term nitrate strategies (led by MPCA and MDA). This working group is one action of Phase 3 of the workplan, where the MPCA and MDA jointly lead (with MDH and BWSR partnering in the effort) a work group to address nitrate in southeast Minnesota.

The work group consisted of 19 residents and local leaders from the southeastern Minnesota counties of Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Wabasha, and Winona. Work group members met 11 times between July 2024 and June 2025. The desired outcome of this work group was to come to consensus on recommendations for improving, prioritizing, and implementing strategies, including strengthening communication and engagement activities, policy or funding proposals, or collaborative strategies to accelerate prevention and mitigation activities. These recommendations will be documented in a report completed by July of 2025.

The Addressing nitrate in southeastern Minnesota webpage is regularly updated with the work group's progress.

Protection

Ensuring people are not exposed to harmful levels of nitrate

Minnesota Department of Health

The MDH is responsible for protecting public drinking water quality under the federal SDWA. MDH performs source water assessments for public water supply systems (facilities that serve more than 25 people on a regular basis) and administers the State's Source Water Protection Program. The MDH also

establishes health risk limits for groundwater contaminants, working with MPCA and MDA. In addition, the MDH regulates well construction by examining and licensing well contractors and overseeing the location, installation, modification, repair, and sealing of wells. The MDH also provides technical assistance for private well users on how and when to test their private wells and what their results mean.

Minnesota Well Code

Authority in Minnesota Well Code (Minn. Stat. ch. 103I and Minn. R. ch. 4725) allows MDH to prevent sources of contamination within close proximity to water-supply wells. The rules require minimum isolation distances between water-supply wells and sources of contaminants, including nitrogen. Isolation distances vary depending on the source. For example, sewage holding tanks and soil absorption areas must be at least 50 feet from water-supply wells, and animal feedlots of more than 300 animal units must be at least 100 feet from water-supply wells. A full listing of the isolation distance requirements can be found at Isolation Distances From a Water-Supply Well - MDH.

The Minnesota Well Code requires a licensed well contractor who constructs a new potable water-supply well to have a water sample collected from the well and tested for bacteria, nitrate, and arsenic by an MDH-accredited laboratory. Copies of the results must be sent to MDH and the well owner. The MDH sends additional information to well owners if they have a nitrate detection in their well above 1.5 mg/L.

Groundwater Restoration and Protection Strategies

The MDH coordinates a broad interagency effort called Groundwater Restoration and Protection Strategies (GRAPS). This effort helps local units of government identify potential sources of groundwater contamination and appropriate implementation activities to manage or eliminate the sources through local comprehensive watershed planning efforts. Known sources of nitrogen contamination (including feedlots) would be included within the scope of GRAPS efforts. The GRAPS reports contain maps and data describing groundwater conditions in the watershed. The reports identify local groundwater concerns and outline strategies and programs to address them. Local organizations can use GRAPS reports to develop their water management plans. This can include nitrate monitoring and implementation efforts within the watershed.

Safe Drinking Water Act

The federal SDWA gives MDH the authority to enforce water quality standards that prevent public water systems from delivering drinking water with nitrate levels over 10 mg/L. To prevent exposure to drinking water above the established limits, MDH administers compliance monitoring at public water systems around the state. These data are used to prevent the use of drinking water sources or the operation of systems that may result in the public's exposure to drinking water with nitrate contamination above the limit of 10 mg/L. Should levels rise above that level, MDH staff work with public water systems to implement strategies to bring the system back into compliance with the water quality standards. Approaches can involve developing new sources of supply, avoiding the use of specific wells, and treatment. Public notification and communication are a key part of the required response.

Compliance monitoring is done regularly for all public water systems in the state. Therefore, MDH has good information on nitrate occurrence and trends for individual systems. It is common that MDH staff are engaged with public water system staff anytime its nitrate levels are above 5 mg/L. Early interventions often help to avert compliance or enforcement situations that are disruptive and expensive to resolve.

Private wells

The MDH conducts outreach and education to encourage private well users to test for nitrate every year (along with regular testing for bacteria, arsenic, manganese and lead). Through Clean Water Fund appropriations, the Private Well Initiative has provided 10 grants to local units of government to provide free/low-cost well testing (including for nitrate) and some programs have a component to provide income-based mitigation assistance if nitrate (or another contaminant) is above health-based guidance.

In 2023, the EPA (in response to a petition) requested MDH, MDA, and MPCA develop a coordinated and comprehensive work plan to reduce nitrate contamination of drinking water in eight southeastern Minnesota counties, with a specific focus on private wells. The requests led the state agencies and local partners to develop a three-phase work plan, and the 2024 Minnesota Legislature appropriated funding to MDH for testing private wells for nitrate and conducting outreach to promote well testing.

Resources

Across the State of Minnesota there are numerous resources on nitrate pollution in our water. The listed on-line resources were recommended by the authors.

- Draft of a technical support document for aquatic life water quality standards (https://www.pca.state.mn.us/sites/default/files/wq-s6-13.pdf)
- Feedlots (https://www.pca.state.mn.us/business-with-us/feedlots)
- Groundwater Protection Rule (https://www.mda.state.mn.us/nfr)
- Isolation Distances From a Water-Supply Well (https://www.health.state.mn.us/communities/environment/water/wells/construction/isolate.html)
- Nitrate in Drinking Water (https://www.health.state.mn.us/communities/environment/water/contaminants/nitrate.html)
- MDH accredited laboratory (https://eldo.web.health.state.mn.us/public/accreditedlabs/labsearch.seam)
- Minnesota Agricultural Water Quality Certification Program (https://www.mda.state.mn.us/environment-sustainability/minnesota-agricultural-water-quality-certification-program)innesota-agricultural-water-quality-certification-program)
- Minnesota's Nutrient Reduction Strategy (https://www.pca.state.mn.us/air-water-land-climate/minnesota-nutrient-reduction-strategy)
- Water quality trading (https://www.pca.state.mn.us/business-with-us/water-quality-trading)

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