



Work Plan: Addressing Nitrate in Southeast Minnesota

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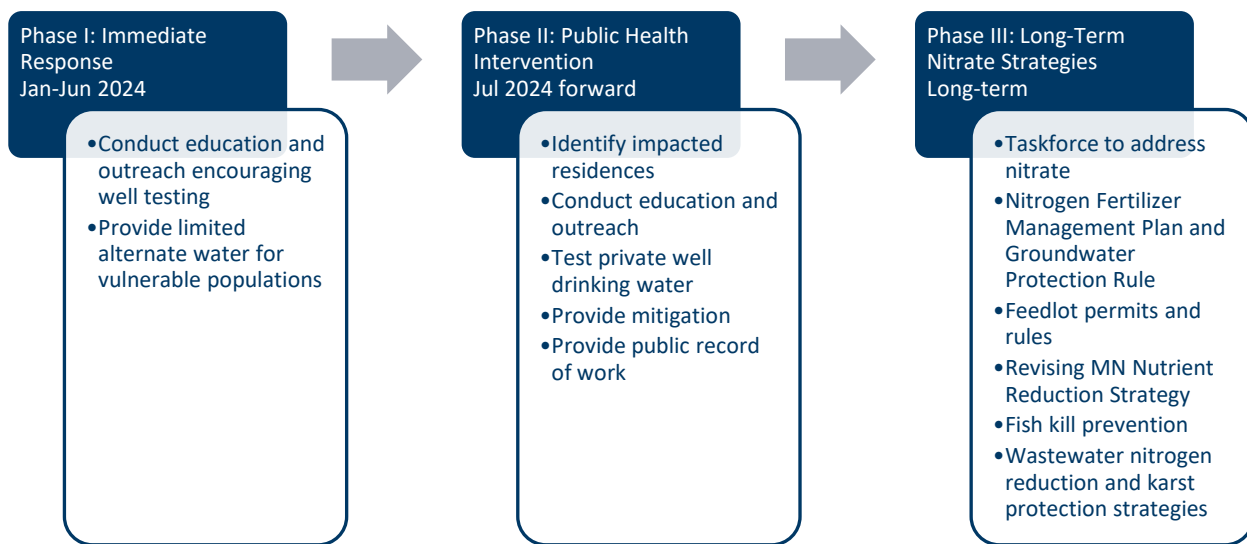
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Introduction

This work plan is in response to long-standing concerns about elevated nitrate in groundwater and drinking water in southeast Minnesota and in response to the 2023 [EPA Letter to Minnesota State Agencies Regarding Southeast Minnesota \(PDF\)](#). The letter directs the Minnesota Departments of Health (MDH) and Agriculture (MDA) and the Pollution Control Agency (MPCA) to take immediate action to address nitrate contamination in private wells in the following eight counties in southeast Minnesota: Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Wabasha, and Winona. MDH, MDA, and MPCA are addressing the requests in the U.S. Environmental Protection Agency’s (EPA) letter in three phases, as is illustrated in the graphic below.¹



MDH is the lead agency for Phase I: Immediate Response and Phase II: Public Health Intervention. MDA and MPCA are the lead agencies for Phase III: Long-Term Nitrate Strategies.

Phase I work can be funded through existing Clean Water Fund appropriations to agencies. Phase II requires additional funding to carry out the work; agencies are exploring funding options. Aspects of Phase III are currently underway while additional funding is required to fully support and accelerate this work.

Agencies are working with partners to develop key measures and milestones and further refine the strategies and action steps.

¹ Initiatives in Phase III are a snapshot and do not represent all long-term strategies.

About the population in southeast Minnesota

In this southeast region, about 300,000 people rely on 93 community water systems and about 93,805 people rely on their own private well. Those relying on community water systems can be confident their water utility regularly tests and treats for nitrate. Of these private well users, an estimated 9,218 people are at risk of consuming water with nitrate at or above the maximum contaminant level (MCL) of 10 mg/L. Additional sociodemographic data about people who live in the region (regardless of their drinking water source) from the American Community Survey that help inform strategies include:

- About 9% of the population reports incomes below the federal poverty threshold.
- About 10% speak a language other than English at home, with Spanish, Somali, or Hmong being the most common.
- About 6% of the population is 5 years of age or younger (this helps identify the portion of the population particularly vulnerable to nitrate contamination).

High-Level Workplan and Timeline for Phases I and II

Below is the general timeline for the public health strategies in this work plan.

Key Activities	Jan-Mar '24	Apr-Jun '24	Jul-Sep '24	Oct-Dec '24	Jan-Mar '25	Apr-Jun '25
<i>Phase I</i>						
Conduct education and outreach encouraging well testing	X	X				
Provide limited alternate water for most vulnerable populations	X	X				
<i>Phase II</i>						
Get contracts in place with local partners			X			
Identify impacted residences				X	X	X
Conduct education and outreach about well inventory, well testing, and mitigation				X	X	X
Test private well drinking water				X	X	X
Provide mitigation				X	X	X
Launch public dashboard				X		

Phase I: Immediate Response (January 2024-June 2024)

The focus of Phase I: Immediate Response is to provide education and outreach about the importance of private well testing and how households can use an accredited laboratory to get their water tested. Agencies and partners are working to find ways to provide alternate water for vulnerable populations—private well households with an infant under one year of age or pregnant person in the home. This will also be the timeframe to establish ongoing and effective communications with residents, petitioners, and local partners. The education and outreach strategies will be funded through the FY24-25 Clean Water Fund appropriation for the Private Well Initiative.

Phase I: Goals and Strategies

Goal 1: Conduct education and outreach

Provide notice to newly and previously impacted residents and continue to provide notice as long as contamination persists at or above the MCL for nitrate.

What we will continue doing:

- **When a well is first constructed**, it is tested for coliform bacteria, nitrate, and arsenic (per Minnesota Well Code). MDH will continue sending letters to the well address that explain their initial well water quality results and point owners to more information about nitrate (and other contaminants) and guidance on ways to protect their health.
- **When the local water testing laboratory provides results to private well owners**, they include a reference sheet “The Meaning of Water Test Results” and links/URLs to additional key MDH resources. The laboratory also hosts an interactive online “[Meaning of Your Water Test Results](#)” tool, where a person can enter their test results and learn what they mean.
- **When there is an exceedance in a public water system**: Public water systems are required to provide public notice to consumers about the exceedance within 24 hours and take actions to resolve the violation.
- **Provide information online**. The MDH website hosts information for both private well users and public water system users. The MDA also maintains information related to monitoring nitrate in groundwater on their website. This includes information on “how to test my well” that is consistent with messaging provided by the MDH.
- **Provide necessary equipment, standard operating procedures, and support to local partners who can provide free water screening** at the local office or locally organized events. The MDA has multiple spectrophotometers on loan to partners in the southeast region to support a “walk-in” style of water screening clinic with the goal of increasing public awareness of nitrate contamination.

What will be a new focus:

MDH will work closely with local partners to encourage residents in southeast Minnesota to “know the quality of their drinking water”. This means encouraging community water system customers to be confident in their water quality and check their annual Consumer Confidence Report and encouraging private well users to test their well water for nitrate (along with coliform bacteria, arsenic, lead, and manganese²). Below are key education and outreach strategies MDH and local partners will carry out. MDH developed these strategies with input from 20 local partners working in local public health, soil and water conservation districts, and county government; there is at least one representative from each of the eight counties that provided input.

- **Print and mail private well educational materials to partners** who work with households that likely have a baby or pregnant person in the home. Partnerships we will seek out include Women Infants and Children clinics; childcare centers/in-home childcare; OBGYN clinics; pediatric clinics; family practice clinics; community action agencies, and early childhood family education programs. Partners can also order brochures for free on the MDH website at any point.
- **Enhance information online:** Review and clarify existing information online so that it is easy for people to understand if their private well may be at risk of nitrate contamination and what they can do about it right now.
- **Launch a paid social media campaign** focused on people of childbearing age, southeast geographic area, and people working in health professions.
- **Radio spots** for reminding people to regularly test their well water.
- **Media releases** to all local television, print, and radio news outlets.
- **Translate educational materials** into Spanish, Somali, and Hmong. These are the top three languages partners requested. Other languages will be provided as requested.
- **Minnesota Private Well Education and Steward Network:** MDH is working with University of Minnesota Water Resources Center to establish a program to enhance education and outreach to private well users and local government staff and leaders about well safety and groundwater. The program will include a Minnesota Private Well Steward Network—a peer-to-peer learning and support network for private well users. The Network may also help coordinate well screening clinics. Southeast Minnesota will be an area of early focus, with a planned expansion statewide. The Network’s efforts will enhance education and outreach to private well users.

² Coliform bacteria, nitrate, arsenic, lead, and manganese are the five main contaminants MDH recommends every private well owner tests for because they are common in well water; present short- and long-term health effects; and cannot be tasted, seen, or smelled.

Goal 2: Provide alternate water for vulnerable populations

The EPA requests that the State “offer alternate drinking water as soon as practicable to each residence where water tests show an exceedance of the MCL for nitrate in the private well, with priority given to homes with infants or a pregnant person.”

At this point, State agencies are still exploring funding and distribution mechanisms for centralized or bottled water for residences where water tests show an exceedance of the MCL for nitrate in the private well with priority for vulnerable populations (e.g., homes with infants, pregnant person).

The goal of the activities described below will be to identify wells with elevated nitrate and offer a reverse osmosis system to reduce the risk for vulnerable populations located in southeastern Minnesota. Although southeastern Minnesota will be prioritized in the initial phase of this mitigation effort, the intent will be to expand these efforts to residents in other areas with vulnerable groundwater in the future.

- **Develop outreach materials specifically targeting previously sampled wells that indicated elevated nitrate concentration (10 mg/L or above).** The goal is to reconnect with previous participants, make them aware of the new information and opportunities for alternative water, and collect additional information about their water use status for prioritization. Specific outreach materials will be developed for well owners with elevated nitrate data that is less than 5 years old (collected after 2017). These materials will include questions (check boxes) regarding water use by pregnant women, infants, and economic need for homes with children, to aid in prioritization. In general, wells with nitrate concentration levels of 10 mg/L or higher collected before 2018 (>5 years old) will be prioritized for re-sampling and then possible treatment.
- **Assess available data from the Township Testing Program (TTP) and identify private wells that have exceeded the nitrate drinking water guidance value (10 mg/L).** Due to limited available funding, participants in the TTP program (approximately 1,300 in southeast) are considered in this initial response while a larger population of residents could be included during the intermediate response period (starting July 1, 2024).
- **Establish prioritization criteria for well owners seeking cost sharing for mitigation.** Prioritization will be for particularly vulnerable populations.
- **Develop and execute an Interagency Agreement (MDH) or Joint Powers Agreement** with local water resource or public health managers to provide funding and direction for a mitigation program implementation to provide reverse osmosis (RO) treatment systems to prioritized well owners.
- Using established protocols and criteria, the **local partner will conduct outreach activities, compile and evaluate potential participants, select well owners for cost sharing based on the prioritization process, coordinate treatment system installation and be the boots on the ground administering and delivering the program to area residents.**

- **Develop a protocol and audit of installed RO treatment systems** to evaluate effectiveness at reducing risk to acceptable levels with an emphasis on wells with pre-treatment nitrate concentrations over 30 mg/L.

Goal 3: Engage stakeholders and develop partnerships

Leverage the expertise and elevate the work of the TAP-IN³ Collaborative. The TAP-IN Collaborative is an existing group of primarily local public health and soil and water conservation districts (SWCDs) that implemented a pilot grant from MDH to offer free well testing and income-based remediation to private well owners in southeast Minnesota. MDH has been in weekly calls with both TAP-IN leadership and the larger TAP-IN group to gather input and recommendations for strategies to protect private well users. We will continue relying on this group to help design and implement strategies.

Provide regular updates and opportunities to dialogue about public health approaches with petitioners: MDH regularly meets with the Minnesota Well Owners Organization and the Minnesota Ground Water Association to discuss private wells, including efforts in southeast Minnesota. These meetings will continue. MDH will also provide regular updates to Minnesota Center for Environmental Advocacy.

Provide regular updates and opportunities to dialogue about nitrate in groundwater with local government partners: State agency leadership will meet with district managers from SWCDs in the southeast region to share updates, discuss programs, and look for opportunities for further collaboration and innovation. State agencies will also explore opportunities to meet with leadership at cities, counties, and townships to share information and gather feedback. These discussions may be one-on-one, small group, or board discussions.

Host townhall meetings in southeast Minnesota. By June 2024, MDH, in collaboration with local partners, will host three townhall meetings in southeast Minnesota. These meetings will be an opportunity to share what the proposed strategies are and respond to questions from residents.

Phase I: What Resources Are Needed

- Phase I work, as outlined above, can be funded through existing Clean Water Fund appropriations to agencies.
- Agencies are still exploring funding options for centralized or bottled water as an immediate response.

³ [TAP-IN](#) stands for Test your water, Ask a professional, Protect your water quality, Inspect your well and septic system, and Note important information.

Phase I: Roles and Responsibilities

	Responsible ⁴	Accountable	Consulted	Informed
Education and Outreach	MDH	MDH	Local partners General public Petitioners	Local partners General public EPA MPCA, MDA
Provision of alternate water	MDH/MDA	MDH/MDA	Local partners Petitioners	Local partners General public EPA MPCA

Phase I: Activities and Timeline

Activity	Responsible	Jan	Feb	Mar	Apr	May	Jun
<i>Conduct education and outreach</i>							
Data collection to inform outreach	MDH	X	X	X	X	X	X
Print and mail private well educational materials to partners	MDH		X	X	X	X	X
Launch and maintain a paid social media campaign	MDH		X	X	X	X	X
Radio spots	MDH		X				
Media releases	MDH	X					X
Translate educational materials	MDH			X			
Start Minnesota Private Education and Steward Network	UMN						X
<i>Provide alternate water</i>							

⁴ **Responsible** is directly in charge of the work. **Accountable** oversees overall task completion. **Consulted** reviews and signs off on the work. **Informed** is informed about the progress and completion of work.

WORK PLAN: ADDRESSING NITRATE IN SOUTHEAST MINNESOTA

Activity	Responsible	Jan	Feb	Mar	Apr	May	Jun
Initial Mitigation Effort	MDA	X	X	X	X	X	X
<i>Engage stakeholders and develop partnerships</i>							
Leverage the expertise and elevate the work of the TAP-IN Collaborative	MDH	X	X	X	X	X	X
Host townhall meetings in southeast Minnesota	MDH			X	X		
Provide monthly updates and opportunities to dialogue about public health approaches with petitioners	MDH	X	X	X	X	X	X

Phase II: Public Health Intervention Work Plan (July 1, 2024 forward)

This phase focuses on conducting a well inventory to identify all the private wells in the area, offering free well testing for all private well households, providing mitigation for eligible households, and education and outreach about these efforts. We aim to test 10% of all private wells in the region in the first year. MDH is exploring funding options to conduct a well inventory, test private wells, and mitigate water quality issues. Much of the additional education and outreach in this phase can be funded through existing Clean Water Funds appropriated to the Private Well Initiative.

Phase II: Goals and Strategies

Goal 1: Identify impacted residences

Identify each residence that obtains drinking water from a private well. The identification process will combine existing information with a project to add missing information.

Existing information

The [Minnesota Well Index \(MWI\)](#) is an online database that provides basic information about wells and borings, such as location, depth, geology, construction, and static water level. There are about 27,000 private wells in MWI that are within the counties of focus. However, most wells constructed before 1974 are not in the database (this was the year MDH began licensing well contractors and requiring submittal of well records). MDH and partners estimate that MWI only has record for about 60% of the private wells in the southeast area. To identify the remaining private wells, counties will conduct a well inventory.

New project: well inventory

MDH, in collaboration with local partners and the Minnesota Geological Survey (MGS), will conduct a well inventory to:

- Identify additional private wells that are not in MWI, including pre-code wells before 1974 that have no geologic or well construction information but are still active.
- Incorporate the private wells into MWI.

The strategies used for this inventory are informed by three counties' experience with conducting inventories in their counties. Key strategies include:

- Use GIS to identify properties that may have a private well but are not in MWI. The general concept is to identify all parcels that have a building value above \$50,000 and are outside public water system service areas. The assumption is these parcels likely rely on a private well for drinking water.
- Cross-reference the GIS-identified parcels with what is already entered into MWI.

- Send a cover letter explaining the well inventory program with a postage paid return postcard to GIS-identified parcels that are not in MWI. The request is for the recipient to self-report if there is a well and the location of the well on their property. They can either self-report by returning the postage-paid postcard or through an online form.
- Provide the self-reported information to MGS to add to MWI.

Goal 2: Conduct education and outreach

Provide notice to newly and previously impacted residents and continue to provide notice as long as contamination persists at or above the MCL for nitrate.

What we will continue doing:

We will continue with the strategies outlined for the Phase I: immediate Response: send information about nitrate when a new well is constructed; notification from public water systems if there is an elevated nitrate concentration; information available through the MDH and MDA websites; and information shared through testing laboratories. We will also continue sharing educational materials in multiple languages through partners, paying for social media posts, and leveraging radio spots and media releases.

What will be a new focus:

A program coordinator will work with an advisory council to determine additional educational topic areas, resources needed, and integration into new or existing outreach events to residents. At this point, the plan would be to expand the message from encouraging residents in southeast Minnesota to “know the quality of your drinking water” to also include messages about how people can get their well water tested for free, the well inventory project, and how to apply for alternate drinking water if there is elevated nitrate in their private well water.

This outreach and education program will include culturally and linguistically accessible materials and will focus immediate efforts on vulnerable populations of private well homes with pregnant persons and children under one year of age, and low-income households. Once these focus populations are reached, we will expand efforts to all residents in the area. These efforts will include local support from SWCDs, local public health, community-based organizations, non-governmental organizations, University, and possibly tribal partners.

Below are additional strategies that will be added to the approaches from Phase I:

- **Direct mailing to private well households** about how to access free testing and alternate water if needed.
- **Billboards** about well testing, well inventory, and alternate water.
- **Paid radio spots/streaming services** (e.g., Pandora) messages about well testing, well inventory, and alternate water.

- **Publicize and expand opportunities to support local partners who can provide free water screening at the local office or locally organized events.** There are several state-owned spectrophotometers that could be loaned out on a short-term or permanent basis.

Goal 3: Test private well drinking water

Offer nitrate analysis of drinking water samples from any private well users in the Karst Region that request testing. The aim is to test at least 10 percent of the private wells during this first year.

When funding is identified, most of the funding would be passed through to the TAP-IN Collaborative to carry out the testing strategies. The following are the key strategies we will use for testing drinking water from private wells. These strategies are informed by approaches the Township Testing Program and TAP-IN Collaborative found most successful in previous work and additional ideas from the Collaborative.

- MDH, in collaboration with local partners, will send a postcard to all suspected private well households to alert them free testing is available (this is dependent on completing the well inventory). This will be done in multiple rounds to incorporate additional wells identified through the well inventory process. Postcard recipients can:
 - Return the postcard to have a test kit mailed to them;
 - Bring the postcard to a local site (e.g., county offices, soil and water conservation district offices) to pick up a prepared well test kit.
 - Use the QR code on the postcard to request a test kit be mailed to them; or
- Well users can return the test kits directly to the laboratory or through a pre-paid mailer.
- The laboratory will analyze the sample for nitrate.
- The laboratory will send results to the well user via email or mail (per the well users' preference) and include info sheets on what their results mean, whom they can contact with more questions, and how they can access alternate water if necessary.
- MDA may offer follow-up nitrate and pesticide sampling for private wells that have a nitrate detection during the initial sampling.
- The laboratory will track the residences that request test kits and those that return test kits.
- MDH, in coordination with local partners, will conduct an education and outreach campaign to notify residents free testing is available (using approaches outlined under "education and outreach").
- MDH will provide technical assistance in answering questions about well water testing and what the results mean via phone and email.

Goal 4: Provide alternate water (mitigation)

Drinking water will be offered as soon as practical to each residence where water tests show an exceedance of the MCL for nitrate in the private well. When funding is identified, most of the funding will be passed through to the TAP-IN Collaborative. The following are strategies we will use for providing alternate water. These strategies are informed by approaches the TAP-IN Collaborative found most successful and lessons learned in previous work and additional ideas from the Collaborative.

- MDH will mail a communication to all private well households that have a known nitrate test result from an accredited laboratory that was above the nitrate MCL in the past 5 years; the communication will alert households they may be eligible for alternate water if they have not yet addressed the nitrate in their drinking water and will have clear instructions on how they can get help. Existing test results include test results through the MDA Township Testing Program, test results from when a well is first constructed, and test results the Southeast Minnesota Water Analysis Laboratory has on record.
- Laboratories will include an information sheet about nitrate and immediate and longer-term alternate water options and how to access those options if nitrate is above health guidance when providing analysis results.
- MDH, in coordination with local partners, will conduct an education and outreach campaign to notify residents relying on private wells that they may be eligible for alternate water if their drinking water exceeds the MCL for nitrate (using approaches outlined under “education and outreach”).
- When sending water analysis results, the laboratory will also include information about how the household can access alternate water if necessary.
- Private well households with a nitrate concentration above the MCL can connect with a mitigation navigator. The navigator will help assess the best mitigation approach for the household: point-of-use treatment, well repairs, or a new well.⁵
- The private well household is then responsible for getting a quote from a well contractor or water treatment professional and submitting the quote to the local agency for approval. MDH will maintain a public reference list of well contractors and water treatment professionals in the area who are ready to assist.
- Once approved, the vendor can begin the work. When work is complete, the vendor will submit an invoice to the local agency for payment. Mitigation installed without approval or prior to this new effort will not be reimbursed.

⁵ To help inform the best mitigation options for different scenarios, a workgroup will be formed to develop a general decision tree. Workgroup members will include a licensed well contractor, water treatment specialist, and members of the TAP-IN Collaborative.

Goal 5: Provide public record of work

This goal has three main components and separate strategies. The components and strategies are below:

- **Maintain and regularly publish records** such that Minnesota residents and the general public can better understand the scope and severity of nitrate contamination in the Karst Region: the State will publish visualizations of cumulative well testing results (likely through existing platforms, including the [MN Data](#) portal and [Watershed Health Assessment Framework](#) tool).
- **Measure Minnesota's progress** in implementing its response plan: MDH will host a public dashboard that includes key metrics, percent of private well households who have tested their well water and percent of eligible households who have received alternate water.
- **Effective way to communicate updates to the general public:** MDH will post updates on the following webpage: [Response to EPA Nitrate Letter for Southeast Minnesota](#). We will also rely on communication strategies listed in the education and outreach goal, including media releases and radio spots.

Goal 6: Engage stakeholders and develop and maintain partnerships

We will continue engaging stakeholders and partners by elevating the work of the TAP-IN Collaborative and providing regular updates and opportunities to dialogue about public health approaches and nitrate in groundwater.

This phase may also include forming an advisory council consisting of petitioners, local government leaders, and other local partners to help guide the public health intervention work.

Phase II: What Resources Are Needed

Funding available through Clean Water Fund dollars appropriated for the Private Well Initiative that can support much of the education and outreach to private well users. However, additional staff and funding are necessary to carry out the identification of impacted residences, free drinking water testing, and provision of alternate water. MDH is exploring funding options.

Phase II: Roles and Responsibilities

	Responsible	Accountable	Consulted	Informed
Identify impacted residences	Funded local entities	MDH	Local partners	Local partners General public EPA MPCA, MDA
Conduct education and outreach	MDH	MDH	Local partners General public	Local partners General public EPA MPCA, MDA
Test private well drinking water	Funded local entities	MDH	Local partners MDA	Local partners General public EPA MPCA
Provide mitigation	Funded local entities	MDH	Local partners MDA	Local partners General public EPA MPCA
Provide public records	MDH	MDH	MPCA, MDA Local partners	Local partners General public EPA MPCA, MDA

Phase II: Activities and Timeline

Activity	Responsible	Jul-Sep '24	Oct-Dec '24	Jan-Mar '25	Apr-Jun '25
Set up contract with local partner(s)	MDH/Local Partner	X			
Identify impacted residences: Conduct well inventory	Funded local partners		X	X	X
Education and outreach:	MDH in collaboration with local partners	X	X	X	X
Well testing: Mail notification that free well tests available	Local partners		X	X	X
Alternate water: home water treatment, repairs, or new well	Local partners		X	X	X
Launch public dashboard			X		

Phase III: Long-Term Nitrate Goals and Strategies

Areas of work for 2024/2025

As noted in the December 1, 2023, letter that we sent to EPA, many state agencies and dozens of local units of government have important ongoing efforts to reduce nitrate in surface and groundwater. Reducing nitrate contamination of drinking water wells will require overlapping approaches that include both regulatory and voluntary actions that are science-based and will reduce all sources of nitrogen to our waters, and work at the state, regional, and local levels. The MDA and MPCA are committed to implementing long-term environmental and conservation strategies to reduce nitrate concentrations in surface waters and in the aquifers that provide drinking water to Minnesotans. The goal is to advance current efforts, adapt and innovate, and realize greater nitrate reduction outcomes over time.

Below we provide some details of nitrate work that will be advancing within 2024/2025 and is led by state agencies, some specifically targeted to southeastern Minnesota. We anticipate updating EPA on these efforts during our routine check-ins.

Task Force to Address Nitrate in SE Minnesota (MPCA/MDA)

The MPCA and MDA intend to develop and jointly lead a task force to address nitrate in southeast Minnesota. The MDH and the Board of Water and Soil Resources will partner on this effort.

The goals of this task force include providing a forum for discussing concerns and answering questions; developing a shared understanding of nitrate in surface water and groundwater in southeast Minnesota; developing recommendations for reducing nitrate in southeast Minnesota; and providing input on ongoing nitrate work within MDA and MPCA.

The task force will be comprised of residents and local leaders who live in southeast Minnesota and represent a variety of sectors. MPCA and MDA plan to have nitrate reduction recommendations for southeast Minnesota by June 2025. More detailed plans are in development. Once completed, they will be shared publicly and can be discussed at the next check-in with EPA.

Nitrogen Fertilizer Management Plan and Groundwater Protection Rule (MDA)

The MDA has developed the Nitrogen Fertilizer Management Plan (NFMP) and Groundwater Protection Rule, which outline a process to prevent or minimize the impact of nitrogen fertilizer on groundwater. In combination they provide a comprehensive effort to address nitrate in groundwater through voluntary adoption of practices and regulation. The MDA believes this is the best long-term strategy for addressing nitrate in groundwater, that the work is moving in

the right direction, and can accelerate and adapt current work in southeastern MN to make greater progress.

- **Focus on professional development needs at regional and local level to address groundwater and drinking water concerns.** This includes staff at LGUs, crop retailers and other partners to perform on-farm “walkovers” and meet one-on-one with crop and livestock farmers and crop advisers. Also, new staff positions with agricultural retailers (conservation agronomist / nutrient management specialist) that are trusted consultants with a combination of expertise in agriculture and a knowledge of practices to reduce nitrate leaching.
- **Hire additional administrative staff to streamline and accelerate cost-share processing.** These efforts would simultaneously compliment, and address goals set forth by the Minnesota Ag Water Quality Certification Program, Nutrient Reduction Strategy, and One Water One Plan program.
- **Continue to implement the Groundwater Protection Rule and support local advisory teams.** Next steps for teams in southeastern MN are to: review modeling data to assess nitrate leaching losses under current practices, develop a list of BMPs required for the Drinking Water Supply Management Areas (DWSMA), and focus on alternative practices to reduce nitrate leaching. If practices are not adopted, the MDA could move to regulation and require certain practices within DWSMAs.
 - **Develop new Alternative Management Tools (AMTs) for manure management** focusing on operations that apply both manure and commercial fertilizer.
- **Accelerate voluntary action at the township scale through the NFMP framework-** focusing on townships that had elevated nitrate in Township Testing Program (22 townships / 10 combined work areas) and utilize the local advisory team model with greater emphasis on one-on-one interactions with landowners for practice adoption.
- **Accelerating the NFMP in southeastern MN will build on successful approaches** (ex. Root River Field to Stream Partnership, Minnesota Ag Water Quality Certification, conservation agronomist model, Olmsted County Cover Crop Program, “Batch and Build” approach, and other simplified and streamline processes) that acknowledge and enhance efforts through local water planning to promote and enhance adoption of practices to protect groundwater.
 - The most effective strategies will include **increasing vegetative cover (alfalfa and other perennials and cover crops), extended crop rotations including small grains, and addressing total nitrogen rate and timing.**
 - **Further promote the Minnesota Ag Water Quality Certification Program (MAWQCP)** with emphasis on nitrogen management practices and additional support for producers to attain the soil health endorsement in this program.
 - **Enhance and leverage existing grant opportunities in the region** including the Board of Soil and Water’s Drinking Water subgrant and Wellhead Partner

- Protection grant, soil health grants, MDA’s Soil Health Equipment grant and Continuous Living Cover Market and Supply Chain Development grant.
- **Partner with the agricultural organizations and local crop retailers.**
- **Partner with the Forever Green Initiative** to create and support local market and supply chains for new crops.
- **Explore opportunities for a RCPP grant** related to manure storage in the region and regional manure methane digester plants, and manure to fertilizer facilities.
- **Update guidance on manure management** (University of Minnesota) for areas where surface water or groundwater is vulnerable to nitrate losses. This may include adjustment of practices based on vulnerability such as coarse textured soils, soils with shallow bedrock and/or karst geology. Additional research is needed.
- **Manure management training and outreach** (University of Minnesota) including coordination with soil and water conservation districts and Commercial Animal Waste Technicians (CAWT) to bridge the gap between applicators and crop retailers related to total nitrogen management.
- **Support the University of Minnesota update to the Statewide Nitrogen Fertilizer Best Management Practices (BMPs)** with some consideration of regional recommendations specific to southeastern MN where groundwater is vulnerable to nitrate losses.
- **Additional on-farm trials, demonstrations, and modeling tools-** On-farm trial and demonstration of management changes combined with research and modeling tools to validate the groundwater protection they provide. Programs like the MDA’s Nutrient Management Initiative provide support for farmers to test changes in nitrogen management on their own farm.
- **Surrogate performance metrics** – Recognizing the challenge of using well nitrate monitoring trends to track performance in the near-term due to decadal groundwater residence times, surrogate performance metrics will be needed. Some of these include:
 - Percent of farm acres in vulnerable townships that have been assessed and are water quality certified.
 - Area and percentage of cover crops planted, commercial and manure nitrogen 4R practices, stabilizer use, etc.
 - New acres of perennials and other low nitrogen input crops.

Strategies to truly advance and accelerate work will require maintaining and building additional trust and relationships with local farmers, landowners, and the broader agricultural community. Partnerships with local farmers, crop retailers, and private industries at both corporate and local levels will be paramount. Active participation and demonstrated outcomes are critical to supporting a voluntary approach.

Revising the Minnesota Nutrient Reduction Strategy (Multi-agency effort)

As noted in the December 1 letter to EPA, the State is in the process of updating the Nutrient Reduction Strategy (NRS), a critical guiding document that lays out water quality goals for nutrients in surface water and provides a road map to Minnesota's nutrient reduction work for both point source and nonpoint source areas.

The same organizations that developed the original NRS are involved with the revision process, which is coordinated by the MPCA and funded in part by appropriations from the federal Bipartisan Infrastructure Law. The organizations most directly involved in the NRS revision process include:

- Minnesota Pollution Control Agency
- Minnesota Department of Agriculture
- University of Minnesota
- Minnesota Board of Water and Soil Resources
- Minnesota Department of Natural Resources
- Minnesota Department of Health
- Metropolitan Council
- Natural Resources Conservation Service
- U.S. Geological Survey

State and federal agencies serve on a leadership Steering Team and agency staff serving on topic-focused technical coordination and advisory teams (TCATs). Working groups focus on: Agriculture BMP Science, Agriculture BMP Adoption Scale-up, Urban Nutrients, River Loads/goals/sources/priority areas, Watershed Scale-Integration Tools and Support, and Progress Tracking System.

A comprehensive stakeholder outreach and engagement plan is in development to ensure transparency and opportunity to provide input to the work through 2024 and 2025. Some stakeholder discussions are underway where there are close ties with stakeholders involved in each topic area mentioned above. The broader stakeholder outreach plan and a finalized timeline for the NRS revision will be completed and communicated by the end of February 2024.

Specific areas for the NRS update include the following and will be the focus of the working groups mentioned above:

- **A review of the latest science** on agricultural nutrient conservation BMPs and continuous living cover (CLC) options researched in the Upper Midwest led by researchers at the University of Minnesota.
- **A plan** to guide increased implementation of the most effective BMPs and CLC across the state to reduce nutrients. The Minnesota Department of Agriculture, in collaboration with other partners, will identify feasible alternative approaches reduce nutrient losses to waters from cropland areas.

- **A wastewater nitrogen reduction plan** that identifies actions to reduce nitrogen. Minnesota wastewater treatment plants have achieved large phosphorus load reductions and need to shift to optimize for both nitrogen and phosphorus reductions. The MPCA is leading this effort.
- **Remaining nutrient load reductions** to meet goals for state lines and individual watershed outlets. Priority watersheds for in-state nutrient needs will also be added to the existing priority watersheds for downstream needs. Data from several organizations are being used for the analyses.
- **Linking local watershed efforts** to statewide and regional goals. The Watershed Restoration and Protection Strategies and One Watershed, One Plans have created locally driven frameworks for achieving water quality goals in every major watershed in Minnesota. This foundation will be used to identify how the state can best support local watershed nutrient reduction efforts.
- **Shared ownership and accountability** through improved tracking dashboards. The NRS belongs to all Minnesotans, and advances in technology have made it possible for data to be more easily shared. Agency partners will design a dashboard to provide accessible and timely water quality and new practice adoption information as broadly as possible so anyone can see how efforts to improve our waters are faring.

Feedlot Permits (MPCA)

The General National Pollutant Discharge Elimination System (NPDES) and State Disposal System (SDS) permits that the MPCA administers to confined animal feedlots expire in 2025 (SDS) and 2026 (NPDES). Work to reissue these permits has begun. The MPCA is planning to concurrently public notice and issue the permits and intends to have consistent nutrient requirements in both permits, to the extent possible. For example, the SDS permit will incorporate the cover cropping and manure application requirements that reduce nitrate leaching that were included in the 2021 General NPDES permit. As part of the permit development, MPCA is considering monitoring, as directed by EPA, and approaches used by other states that address nitrate contamination.

A virtual stakeholder meeting to discuss the draft permits will take place on January 29, 2024, after which the draft permits will be sent to EPA for review. We anticipate a formal public comment period and a public meeting in spring 2024. The permit reissuance process will continue throughout 2024.

Feedlot Rules (MPCA)

Starting in 2024, the MPCA plans to conduct a multi-year process to review state feedlot rules (Minnesota Rules, Chapter 7020) and will include extensive research and consideration of:

- Additional requirements for transferred manure

- Additional best management practices (BMPs) for land application in sensitive areas such as:
 - Vulnerable drinking water supply management areas
 - Areas with shallow depth to karst bedrock
 - Areas with coarse textured soils
- Manure storage to ensure manure application at time that avoid high risk of runoff
- Submittal of manure management plans for smaller feedlots
- Increasing manure application setbacks
- Changing nutrient rate requirements for manure application

A schedule for this rule review is in development.

Wastewater Nitrogen Reduction and Karst Protection Strategies (MPCA)

MPCA has regulatory requirements in place to protect drinking water from discharges of nitrogen from wastewater plants. The MPCA Wastewater Karst Guidance has been in place for many years and applies to the construction and permitting of wastewater systems located within karst geology. The guidance includes a technical review process to ensure potential risks are characterized and addressed. In addition, wastewater systems statewide monitor for nitrogen, and limits are assigned where needed to ensure protection of the 10 mg/L nitrate water quality standard (WQS) set for the protection of drinking water.

In anticipation of the promulgation of a nitrate WQS for the protection of aquatic life, MPCA convened an external stakeholder group in 2022-2023 to develop a Wastewater Nitrogen Reduction Strategy. The MPCA expects to finalize the Strategy in Q1 2024, after which implementation will begin. The Strategy will include the completion of Nitrogen Management Plans and additional actions in wastewater permits to ensure progress in reducing nitrogen throughout the state can be made in advance of the promulgation of an aquatic life nitrate standard. Developing a nitrate WQS for the protection of aquatic life is on the MPCA's rulemaking docket. The schedule will be shared when the timing of the rulemaking is known.

Fish Kill Prevention Recommendations (Multi-agency effort)

The MPCA, MDH, MDA, and the Minnesota Department of Natural Resources are submitting fish kill prevention recommendations focused on southeast Minnesota to the Minnesota Legislature in January 2024. Some of these recommendations may also address nitrate more broadly. The agencies will share this report with EPA soon.

Exploring Additional Resources

As noted above, we are exploring many possible changes to regulatory programs and to accelerate adoption of voluntary actions to reduce nitrate in the environment. Concurrently, we are searching for state and federal funding to support Phase III work. During the last Legislative session, we were successful in securing funding for many important program efforts through the state's Clean Water Fund. We have also applied for and received a grant from the Bipartisan Infrastructure Law to support the NRS revision. The MDA has submitted a \$1 million supplemental budget request to the Clean Water Council to support accelerating the Nitrogen Fertilizer Management Plan and related activities in southeastern Minnesota. In 2024, MDA and MPCA plan to investigate federal sources of funding through Natural Resources Conservation Services (NRCS) and through EPA to accomplish work laid out in this plan. As nitrate pollution is widespread across the nation, MPCA, MDH and MDA encourage EPA to advocate for federal funding that can provide critically needed support to states.