Minnesota Drinking Water Action Plan

DRAFT FOR PUBLIC INPUT

September 2024

Minnesota Drinking Water Action Plan (DRAFT for Public Input)

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"Everything that happens on land impacts water, and everybody—to varying degrees—is impacted by water and how it is managed. Perhaps this is the most consistently and personally true when it comes to drinking water. Yet, despite acknowledging that clean water is vital for life and daily functioning, many Minnesotans may not know where their drinking water comes from, or if it is safe to drink. Drinking water management, as well as quality and quantity challenges are also not broadly understood."

-Eileen Kirby, Policy and Research Coordinator, Freshwater

Introduction

In 2023, the Minnesota Legislature and the Clean Water Council directed Minnesota Department of Health (MDH) to "…develop public health policies and an action plan to address threats to safe drinking water, including development of a statewide plan for protecting drinking water based on recommendations from the *Future of Drinking Water Report*" (Minnesota Laws of 2023, chapter 40, article 2, section 7e). MDH is coordinating the development of this Minnesota Drinking Water Action Plan (Plan) in response to that charge. The Plan is designed to be an actionable 10-year plan to ensure that everyone, everywhere in Minnesota has equitable access to safe and sufficient drinking water.

- **The Plan will serve every Minnesotan.** Every person in Minnesota should be confident their drinking water is safe, regardless of where their water comes from or where they live.
- **The Plan will be the State's commitment** to protect against existing and emerging threats that endanger safe drinking water.
- **The Plan builds on existing plans and reports.** Minnesota has many plans related to water, but none that specifically focus on drinking water. This plan focuses on drinking water, builds on other water-related plans, including the State Water Plan: Water and Climate (PDF) and the Clean Water Council's Strategic Plan. See Appendix B for a full list of plans reviewed in development of this Plan. This Plan is also a next step in carrying out recommendations from the 2020 The Future of Minnesota Drinking Water: A Framework for Managing Risk.
- **The plan incorporates diverse expertise and feedback.** Through partnership with the University of Minnesota Water Resources Center, Freshwater, and Clean River Partners, the Plan incorporates expertise and feedback from water professionals; state and local governments; researchers; and Minnesotans who drink water. We gathered feedback through community meetings, surveys, and discussions.

We released the first draft for comment in December 2023. Over 64 water professionals provided feedback (including people working in the private sector, state and local government, researchers, community public water systems, and advocacy organizations). MDH also held discussions with water-related agencies in the executive branch on their feedback. The current draft incorporates reviewers' comments and partners' perspectives and priorities and incorporates themes and findings from community meetings and an assessment of Minnesota's drinking water governance.

Community meetings

Part of the development of the Plan included contracting with partners at University of Minnesota Water Resources Center, Freshwater, and Clean River Partners to carry out community meetings around the topic of drinking water. From November 2023 through January 2024, these partners hosted seven community meetings in Austin, Faribault, Lewiston, Little Falls, Northfield, St. Cloud, and the Twin Cities with 190 residents participating. During these meetings, participants provided feedback on their personal drinking water habits and perceptions, and drinking water issues to address going forward.

Most meeting participants expressed trust in their tap water; however, some expressed distrust in their tap water, with the most common concerns being contaminants, chemicals, and water hardness. These

meetings demonstrated that community engagement is crucial for understanding Minnesotans' experiences with drinking water. They also emphasized that authentic community engagement requires cultural sensitivity and awareness, respecting the distinct needs of tribal partners, attending to the diversity of languages spoken, and prioritizing communication accessibility. We invite you access to the full report on findings at 2024-2033 Minnesota Drinking Water Action Plan Community Engagement Feedback Report. Throughout this Plan, we will use call-out boxes to highlight themes from community meetings.

Assessment of drinking water governance in Minnesota

Throughout 2022-2023, and concurrent to the development of the first draft of this Plan, the University of Minnesota's Humphrey School of Public Affairs and Water Resources Center worked with Freshwater to assess drinking water governance in Minnesota, using a tool called the Governance Assessment Framework. Partners recruited water supply professionals to participate in focus group discussions and a survey about how effective, efficient, and trustworthy Minnesota's governance structure for drinking water is. The responses indicate many ways to strengthen drinking governance. Key considerations include:

- Find ways to streamline and better coordinate drinking water governance.
- Make data more shareable across agencies and the public to ensure that drinking water management is data driven.
- Prioritize community engagement.
- Focus on professional development needs and building professional capacity.
- Increase financial resources for drinking water suppliers and provide guidance to help them make decisions among trade-offs for investing limited resources.
- Ensure a robust approach to source water protection.
- Support private well owners and users.
- Regularly review of the performance of Minnesota's drinking water governance system.

Recommendations and findings from the assessment are incorporated into the issues, strategies, and action in the Plan. Key findings and recommendations are also noted in sidebars throughout this document. The elements of the Governance Assessment Framework are listed in Appendix A. The full report on the process and findings is available at Lessons from Drinking Water Professionals: An Assessment of Drinking Water Governance in Minnesota (referenced as Calow and Lewandowski, 2023).

How to Use this Document

To emphasize the primary issues that drive the goals, strategies, and actions that will in turn safeguard drinking water, those topics are "front-loaded" in Section I of this report. For an overview of how Minnesota's drinking water is managed, regulated, and funded, please see Section III. For a quick overview of both topics, see Appendix C: Summary of the Minnesota Drinking Water Action Plan.

I. Issues and strategies from source to tap

The proposed goals, strategies, and actions in this section aim to build on existing strengths and address the issues that surfaced during the planning process. Some of the goals, strategies, and actions also pull directly from existing strategic plans (see Appendix B for a list of plans reviewed).

Vision: Everyone, everywhere in Minnesota has equitable access to safe and sufficient drinking water.

While much progress has been made toward achieving this vision, multiple challenges remain. A key challenge is the complex and multi-faceted nature of the drinking water system.

As shown in Figure 1, there are risks to our drinking water that extend from the source of drinking water (lake, river, stream, groundwater) through consumption at the tap, as well as issues around consumers' perceptions of drinking water and how their water should or should not be managed. The Lessons from Drinking Water Professionals: An Assessment of Drinking Water Governance in Minnesota highlighted that there are many opinions on the appropriate scale at which drinking water should be managed: the watershed, the municipality, or partnerships among jurisdictions. The multiple scales and the multiple actors in this system contribute to its complexity.

This plan addresses the challenges affecting the drinking water system through a framework of five broad goals. Under each goal, the Plan describes key issues that challenge meeting the goal and then lists strategies and actions to address the issues and achieve these goals.

Goals:

1. Protect sources of drinking water
2. Establish resilient drinking water infrastructure
3. Ensure safe tap water
4. Anticipate and manage emerging risks
5. Engage partners

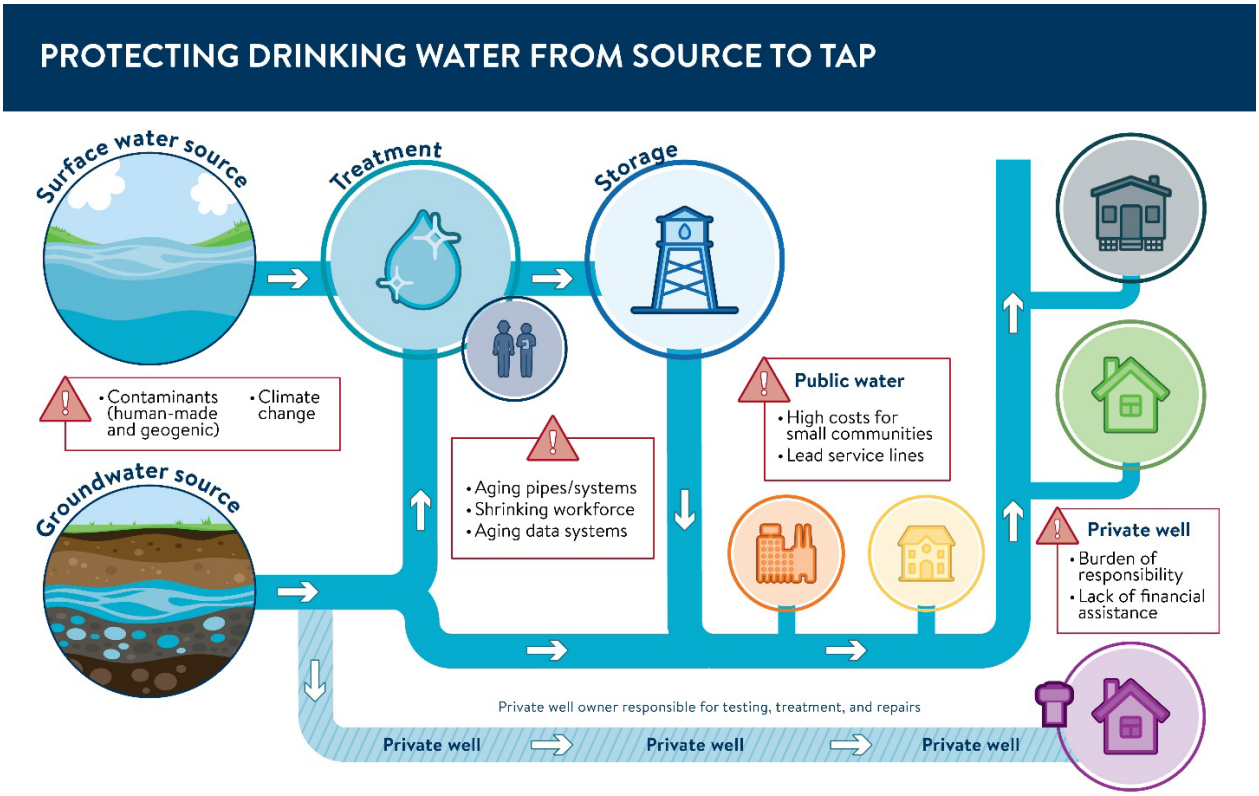


Figure 1: Key risks to safe drinking water as you move from the drinking water source to the tap.

Goal 1: Protect sources of drinking water

Protecting drinking water at the source reduces the burden on public water systems and private well users. Minnesota has many programs, partnerships, and regulations in place to help protect sources of drinking water. Key challenges for this work are to improve coordination among state agencies and partners, ensure that private wells are included in efforts, and pair short-term strategies to protect public health now with long-term strategies to restore water sources.

Issues to address at the source

- **Gaps exist between the Clean Water Act and Safe Drinking Water Act**. The Clean Water Act is the regulatory framework to protect surface waters from pollution, and the Safe Drinking Water Act ensures that public drinking water, whether from surface water or groundwater, is safe to drink. Proactively assessing how Clean Water Act activities, like permitting wastewater discharge, can affect downstream drinking water sources or address drinking water issues can amplify the benefits and public health impact of those activities. State agencies and other partners can coordinate to harmonize efforts and share information about water resource issues that affect drinking water sources.
- **Land use affects source water quality.** From cultivated crops to pasture, turf to urban development, land use can impact water quality. However, these impacts are not always fully recognized or considered when evaluating land use change.

- **Private well users have limited control over the quality of their well water.** A private well user's water quality can be affected by the geology and land use practices near their well, regardless of their own land use practices. Well users do not control what their neighbors do–even though their neighbors' actions may impact the well water quality. The Minnesota Well Code (Minnesota Statutes and Rules) helps protect groundwater and public health through proper well construction and sealing, but there are many wells in use that were constructed before the Well Code went into effect in 1974 that are more susceptible to contamination. At this point, there is no regulatory pathway for the private well user to be compensated for nonpoint source pollution.
- **There is no clear pathway to safe and sustainable water reuse.** Water shortages due to climate change may force the state to embrace water reuse and aquifer recharge. Health impacts need to be central to all discussions regarding these types of technologies. Chemical and microbial issues may be prohibitive unless addressed in a meaningful way.
- **Climate change may disproportionately affect private well users.** For example, high levels of groundwater use for irrigation in response to drought can draw down water levels in nearby private wells and can even leave households without drinking water. Flooding can make private wells temporarily unusable, and wells should be treated and tested before use after the flood event.

Key source water protection strategies and actions

Identify and manage potential threats around drinking water sources for public water systems and private wells.

- In addition to helping develop Source Water Protection Plans for both groundwater and surface water systems, support funding and implementation of specified action. Source Water Protection Plans define a protection area for drinking water sources, inventory water quality threats in the protection area, and identify strategies to monitor and manage the potential threats.
- Protect the approximately 400,000 acres of vulnerable lands within Drinking Water Supply Management Areas (DWSMAs) statewide by 2034. Protection methods can include land acquisition, long-term easements and incentives for crops that protect groundwater, and planning and zoning ordinances to encourage land use that benefits water quality.
- Assess the utility of designating aquifers that are impaired for drinking water as a parallel for the Clean Water Act designations for surface water. Since 75% of Minnesotans' drinking water come from groundwater, this may help define what actions are needed to address water quality issues in specific aquifers.
- Establish criteria for partner strategies to protect sources of drinking water. As part of this effort, develop a risk ranking framework that can be used to set priorities for public water systems and partners for addressing potential sources of contamination in DWSMAs.
- Implement the Groundwater Protection Rule in DWSMAs with nitrate concentrations above defined thresholds to help prevent public water supply wells from exceeding the drinking water standard for nitrate. The Groundwater Protection Rule is designed to minimize potential sources of nitrate pollution in groundwater and protects drinking water. The rule does this through restrictions on nitrogen fertilizer application and outlines voluntary and regulatory steps to take within DWSMAs based on the nitrate concentration in the corresponding public water system.

- Implement the Nitrogen Fertilizer Management Plan to prevent and minimize impacts of nitrogen fertilizer on groundwater. This plan outlines voluntary and regulatory strategies to address elevated nitrate in private wells.
- Identify where private wells are in Minnesota to help ensure private wells are considered when implementing activities to protect sources of drinking water. The County Well Index hosts water well information for over 533,000 water wells drilled in Minnesota. However, there are tens of thousands of private wells that are not in the database. Many of the missing wells were constructed prior to the Minnesota Well Code (prior to 1974).
- Improve support for private well owners to identify and manage potential threats around their well. This includes educating private well owners about Minnesota Well Code requirements and best practices for maintaining their well as a safe source of water. It will also need to include ways to address issues if the threat is on another's property.

Include drinking water considerations in land use planning and zoning decisions.

- Request county and city land use planners consider state approved DWSMA and their vulnerability when making zoning or permit recommendations to boards and councils.
- Require the identification of the primary drinking water source(s) and contaminant threats and issues in county and city comprehensive land use plans.
- Continue identifying, developing, and sharing resources and tools that promote land user practices and development decisions that enhance drinking water quality and quantity. This includes helping land use planners understand the land use and drinking water trade-offs.

Emphasize source water protection in watershed management plans

These plans include those developed under One Watershed, One Plan as well as the Metro Watershed Management Plan.

- Protect and restore land in the Upper Mississippi River headwaters basin.
- Encourage and prioritize watershed management projects that both protect or improve drinking water and meet a conservation objective.
- Prioritize implementation actions for townships in which private wells exceed the health risk limit of 10 milligrams per liter (mg/L) for nitrate.
- Provide financial assistance for source water implementation activities.
- Develop and share Groundwater Restoration and Protection Strategies (GRAPS) reports to provide guidance on key groundwater issues and ways to address them.

Ensure adequate supply of water for public water systems and private wells.

- Improve coordination between MDH, the Department of Natural Resources, and Metropolitan Council on water supply planning and water appropriations.
- Make the well interference reporting process easier to navigate for private well users. Well interferences can happen when a well that pumps a high volume of water pumps so much water that it makes the water level fall for surrounding wells. If those surrounding wells are not drilled as deep into the ground may not be able to pump out water until the water level rises again.
- Encourage and promote water conservation for all Minnesotans—including at homes and businesses.

Ensure laws, rules, and ordinances adequately protect sources of drinking water.

- Regularly review statute and rule language to ensure it is adequate, applicable, and efficient.
- Revise the Wellhead Protection Rule to better protect sources of drinking water while recognizing public water systems' capacity and cost limitations. The Wellhead Protection Rule was adopted in 1997 and defines how Minnesota will protect the groundwater that public water systems use to supply drinking water. The revision will simplify and streamline processes and improve prioritization and management approaches.
- Provide support to enforce and improve the Minnesota Well Code.

Goal 2: Establish resilient drinking water infrastructure

This goal refers to three types of infrastructure:

- **Physical infrastructure** (e.g., water pipes and treatment systems): As public water systems age and as we learn more about emerging contaminants and diseases in water, public water systems will need to update and upgrade their treatment and distribution systems.
- **Workforce:** The workforces for public water systems and well construction are shrinking. People are retiring or moving on from these professions, and there is minimal interest in filling these jobs. Yet, safe drinking water is not possible without water system operators and licensed well contractors.
- **Data:** Public water system water quality data is stored in aging and outdated data systems. Additionally, private well water quality data is disparate, limited, and not always integrated into other drinking water quality data or connected with well construction data. Updated and more integrated data systems will improve coordination among local and regional public water systems and improve access to private well data.

Issues to address with infrastructure

Physical infrastructure

- **Multiple new and revised federal regulations** make it challenging to provide necessary technical assistance to public water systems and challenging for public water systems to achieve and maintain compliance. Recent regulation and potential upcoming changes include:
  - Lead and Copper Rule Revisions now direct states and systems to conduct lead service line inventories,
  - PFAS Standards for Drinking Water includes enforceable standards (Maximum Contaminant Levels) for five PFAS chemicals and timeline by which systems will need to be in compliance.
  - Consumer Confidence Report (CCR) Rule Revisions have changed reporting requirements for systems to better support public education and clear communication with customers.
  - Potential Revisions of Microbial and Disinfection Byproducts Rules. The EPA is conducting analyses on eight byproducts to evaluate the need for regulatory change.
- **Funding to address legacy and geogenic contaminants in public water systems remains extremely limited.** While funding for public water systems to address contaminants of emerging concern has increased, there has not been an increase for chemicals that are still found in water sources from past contamination, such as nitrate. Some chemicals are no longer in use but are still found in water sources (legacy contaminants), including TCE and 1,4-Dioxane. Nor is there an increase in funding to address naturally occurring (geogenic) contaminants, including manganese and arsenic.

- **Disparities in cost of infrastructure improvements**. Needed infrastructure repair upgrades to meet new or updated requirements are often expensive. Those costs disproportionately affect smaller public water systems and their ratepayers because there is a smaller base across which to spread the cost. (Ninety percent of public water systems serve fewer than 3,300 customers.)
- **Very limited investment of public dollars for repairing private wells.** Millions of dollars come from federal and state government for public water infrastructure, but there is not proportionate funding for private wells. Likewise, compared to the public funds available for conservation practices on privately-owned agricultural land and for improvements to poorly constructed subsurface sewage treatment systems (SSTS), the public funds available for improvements to a private well are limited both in size and availability. See Financial Assistance for Home Water Treatment and Well Construction, Repair, and Sealing.
- **Cyber threats are evolving and becoming more complex and widespread.** Cybersecurity is a critical component of public water systems. Systems need the ability to resist and quickly recover from cyber threats.

Workforce

- **Workforce shortages and lack of capacity at the local level**, including finding skilled staff to replace retiring water operators and licensed well contractors, and variable local capacity to manage complex, regional groundwater issues and source water protection projects.
- **Lack of staff capacity to administer, process, and communicate about the influx of public water system funding** (e.g., federal infrastructure funding and state funding for lead service line replacement). Increased funding presents opportunities, but it is challenging to get the funding out the door due to staffing capacity.
- **Loss of institutional knowledge** in the workforce with retirements.
- **Finding, training, and retaining qualified new staff** is challenging, especially with changes in contemporary work settings and culture, such as remote work and more frequent job changes. The cost to become trained also presents a barrier.

Governance Assessment Findings

"If there is not sufficient staff capacity, funds will flow where there is staff ready to implement a project rather than where the biggest problems exist" (p. 20).

"Recruiting and retaining employees, especially in greater Minnesota, is a hardship many offices face consistently…" (p. 20).

"...offices with limited capacity have to pick and choose where their energy and time flows, which often means drinking water work is relegated to a lower rung of importance" (p. 20).

Data

- **Lack of access to timely and relevant water data**. Although the shift from county to watershed scale in planning for water resources has made water-related data more relevant, much of this data remains inaccessible due to privacy rules, or fragmented and difficult to find.
- **Aging and outdated data systems.** Some processes are still paper-based and then need to be entered into databases. Some systems are not able to incorporate full regulatory and reporting requirements. Several systems need updates to be compatible with evolving business needs.

- **Private well water quality and well construction data is not fully integrated into data systems**. A well is required to be tested when it is first constructed, but all future testing is voluntary, and test results are only shared between the private laboratory the well user selected and the well user. There are few well testing efforts. The efforts that do exist collect data in different ways and there is no established process for integrating test results into shared databases. There is also a need to link well construction data with water quality data.
- **Inequitable access to drinking water data and information.** There may be inequities due to language, education, and economic barriers among both customers or public water systems and private well users. For example, renters may occupy homes with a lead service line or private wells with unsafe drinking water but be unaware of the problem and lack ability to address the issue. Additionally, some populations are more vulnerable to being affected by contaminants in drinking water (e.g., pregnant people and young children), but we lack information on what percentage of public water system customers or private well households are made up of these groups and how to reach them.
- **Lack of maps and other visualizations of private well water quality** limits private well users' ability to understand well water quality and risks in their area. These visualizations are only possible if there are ample private well water quality data.

Key infrastructure strategies and actions

Support communities with asset management and resiliency planning for drinking water infrastructure.

- In addition to providing low interest loans through the State Drinking Water Revolving Fund to address aging infrastructure, support smaller cities and communities with developing asset management plans and funding critical improvements.
- Provide guidance and resources for public drinking water systems on cybersecurity.

Governance Assessment Recommendation
Increase financial resources for drinking water suppliers and provide guidance to help them make decisions among trade-offs for investing limited resources (p. 6).

Support and grow the public water system and licensed well contractor workforces.

- Support post-secondary training programs and scholarships for public water system and licensed well contractor workforces.
- Make public water system and licensed well contractor workforce and job importance visible. The MDH Invisible Heroes Videos or videos featuring important work people do, like High Pressure Water Main Repair, could be part of the approach. The water main repair video received over 390 million views.
- Support advertising, job shadowing, networking, and mentoring programs that encourage people to explore working with public water systems and/or licensed well contractors.

Governance Assessment Recommendation
Focus on professional development needs and building professional capacity. Ensure post-secondary training programs are available with the needed capacity and content. Identify ways to increase job

satisfaction and confidence, such as by facilitating networking with professionals across a region, promoting competitive salaries and job security, and promoting the profession of utility management (p. 6).

Transition from legacy data systems to modern, resilient systems.

- Transition from paper-based to electronic processes.
- Modernize and adapt current groundwater databases to improve access to foundational groundwater data.
- Modernize and adapt databases and tools used for public water system water quality data to improve functionality and accessibility.
- Modernize the Minnesota Well Index to improve how we make public data available and develop a mechanism to use, compile, and share private well water quality data that partners and the state are collecting.

Governance Assessment Recommendation

Make data more shareable across agencies and with the public. Consider an accessible, one-stop shop for drinking water-related data (p. 6).

Goal 3: Ensure safe tap water

We want all people in Minnesota to be confident in drinking the water that comes from their tap.

Issues to address at the tap/in the home

Public water systems

- **Water rates may create cost burdens** for under-resourced households, especially in small communities.
- **Lead in drinking water.** Houses constructed before 1986 may have lead parts in their plumbing system. Lead is a poisonous metal that can cause long-term health and behavioral problems. In collaboration with the University of Minnesota, MDH assessed the scope of the lead problem by examining the two main sources of lead: lead service lines and indoor plumbing. The resulting report estimates costs for removing these two most significant sources of lead to be between $1.52 billion and $4.12 billion over 20 years. However, the benefit in IQ and increased productivity is easily two times the cost. Read the report at Lead in Minnesota Water: Assessment of Eliminating Lead in Minnesota Drinking Water (PDF).

Private wells

Governance Assessment Finding

Governance, enforcement, outreach, coordination, and data acquisition are all inadequate at the moment for private well supply management (p. 17).

- **Limited monitoring and oversight of private wells** after the point of construction. The Minnesota Well Code applies to well location, construction, repair, and sealing; private well owners are supposed to make sure any repairs or changes to their well over the well's lifespan comply with the Well Code. However, there is not state funding to routinely inspect most existing private wells to

ensure they meet the Well Code. Additionally, there is no state or federal agency that oversees regular testing of private wells or mitigation of water quality issues in private wells.

- **Private well owners are responsible for making sure their water is safe to drink** for everyone in their household through regular voluntary testing, repairs, and mitigation. Private well owners essentially must act as their own well operators; this is a high burden of technical cost, capacity, and knowledge. There are knowledge, resource, and financial gaps for private well owners to carry out this work.
- **Limited financial assistance for private well owners and users.** There are a few state and federal grant and loan programs that can be applied toward home water treatment, well construction, repairs, and sealing. However, these programs have specific eligibility requirements, making many households ineligible. See Financial Assistance for Home Water Treatment and Well Construction, Repair, and Sealing.
- Current and future private well owners **may not know the general drinking water quality condition** of either current or potential groundwater sources at their home.
- There is **no legal support for addressing geogenic** (geology-based, not pollution-related) **contaminants** in private wells.
- Public water systems must communicate with their customers; **no parallel line of communication** exists for private wells.
- We **do not know the locations of all the private wells** in Minnesota, which limits ability to provide private well users with information and support.
- Private wells are private property. There is a **spectrum of perspectives on the government's role in addressing water quality issues with private wells.** Some believe it is inappropriate to use state dollars on private property; others believe it is inequitable that state dollars are used for the benefit of people on public water systems but not for people on private wells; some private well owners do not want any government involvement in relation to their private well.
- There are **limited accredited water testing laboratories** that accept samples from private well users.

Community Meeting Finding

64% of survey respondents agreed that it is appropriate for state government to help fund household testing and treatment for private wells. One respondent stated, "The scale of this issue is beyond individuals [sic] circumstances."

20% disagreed. (p. 27)

Unserved populations and inadequate drinking water supplies

- There are populations within Minnesota that **lack reliable access to safe drinking water**, such as unhoused or transient populations, but we lack reliable information as to their locations and needs.
- Some Minnesota households may also lack **full connections to indoor plumbing**, including water supply; further research will be needed to better understand this issue.

Key strategies and actions to ensure safe tap water

Prevent and resolve health-based violations in public water systems and private wells.

- **Prevent and resolve Well Code violations** to help ensure public and private wells are safe sources of drinking water at the time of construction and in the future.
- **Use a combination of identifying contaminant trends, prioritizing systems at highest risk, and targeting actions** based on known information. If there are health-based violations, resolve the violations through education, technical assistance, grants, and partnerships.

Reduce lead in drinking water.

- Replace water service lines containing lead.
- **Test for lead** in places where children learn and play and provide guidance on mitigation.

Establish equitable access to private well testing and mitigation.

- **Provide educational resources and technical assistance** to private well users for well testing and mitigation. This includes establishing a peer-to-peer learning network for private well owners.
- **Provide financial resources** for private well users for well testing and expand income-based financial assistance for mitigation, which could take the form of treatment, well repairs, a new well, and making an old well viable again.
- **Establish equitable access to laboratories** that accept water samples from private well users.

Empower Minnesotans to value drinking water and take actions to sustain and protect it.

- **Hold focused conversations and public meetings** with communities around the state to understand their concerns and priorities for drinking water. This requires incorporating concerns and ideas from meetings into our work going forward. The first round of community meetings conducted as a part of developing this Plan demonstrated that people are eager to engage about drinking water and like to be involved in ensuring safe drinking water going forward. The community meeting process also emphasized how important it is to collaborate with local partners who can reach specific communities and provide cultural context.
- Conduct a statewide assessment of private well users' knowledge, attitudes, and beliefs about well water, testing, mitigation, and general well stewardship.

Community Meeting Finding

Participants highlight collaboration as key, as highlighted in a few quotes (p. 33):

"That 'we are all one' and that we should work together to protect, take care of, and distribute the best we can so we have more and the best water. Thank you for this meeting."

"Continue to outreach and involve all stakeholders in decision-making processes."

Goal 4: Anticipate and manage emerging risks

Emerging issues to address

- There is a lack of investment in understanding and addressing **how multiple chemicals may exist and interact with each other** and affect human health. A common belief among Minnesotans that the state's waters are pristine can result in programs being tasked with "chasing zero" for contaminants. In these situations, there may be so much focus on eliminating a single contaminant of high public interest that other contaminants are overlooked.
- The focus on monitoring and addressing PFAS contamination may impede the **ability to assess health impacts** from other emerging chemicals or legacy chemicals in drinking water.
- **Risk assessment for chemicals found in drinking water is mostly reactive** due to funding and staffing issues. Once a chemical is found in drinking water, it is too late to prevent contamination and exposure. People have already been exposed.
- **Water shortages due to climate change** may force the state to embrace water reuse and aquifer recharge. Health impacts need to be central to all discussions regarding these types of technologies. Chemical and microbial issues may be prohibitive unless addressed in a meaningful way. At this point, there is no clear pathway to safe and sustainable water reuse.
- **Climate change** can lead to heavy precipitation, winds, drought, and loss of power, which disrupts the ability of public water supplies to provide safe drinking water and also impacts water quality and quantity for private well users. Additionally, uncertainties in future climate and water demand make it difficult to make informed decisions about groundwater use.

Key strategies and actions to address emerging risks

Monitor drinking water sources for emerging contaminants and pathogens.

- Establish and maintain an ongoing, proactive monitoring of public and private well drinking water sources for contaminants of emerging concern and priority contaminants that is supplemental to standard procedures implemented under the Safe Drinking Water Act.

Understand how people's health may be affected by emerging contaminants and risks

- Continue developing health-based guidance (Health Risk Limits, Health-Based Values, and Risk Assessment Advice) for contaminants found in drinking water.

Prioritize emerging risks that present the largest public health burden in the context of established contaminants.

- Incorporate comparative risk assessment methodologies to identify and prioritize emerging risks.
- Evaluate the need for Minnesota-specific regulatory values for drinking water that are more protective than federal Safe Drinking Water Act values. If Minnesota-specific regulatory values for drinking water are needed, determine a process to develop those values.

Community Meeting Finding
Approximately two-thirds of participants supported the development of new state drinking water standards for Minnesota, which would be stricter than federal standards. (p. 4)

Advance laboratory capacity and methods to deal with emerging risks.

- Ensure the State Public Health Laboratory has capacity to maintain methods and instrumentation.
- Support the State Public Health Laboratory developing new methods in collaboration with laboratory scientists when needed.
- Provide checklists and other tools for laboratories accredited through the Minnesota Environmental Laboratory Accreditation Program to ensure submission of reliable and consistent data.

Coordinate efforts and advance policies to manage emerging risks to drinking water.

- Develop tools, provide training, and interpret findings that assist MDH and partners' (including Minnesota Department of Agriculture; Minnesota Pollution Control Agency) needs to assess potential health risks posed by drinking water contaminants.
- Assess emerging risks associated with climate change and advance policies to encourage innovation and increase statewide resilience and public health preparedness.

Address drinking water risks related to climate change.

- Build public water systems' resilience to climate-change-related disruptive events through ensuring emergency power and well redundancy (a back-up well if something happens with the primary well).
- Update statewide data resources informing floodplain mapping to help identify flood-prone areas where preventive actions should be implemented in anticipation of flooding.
- Provide guidance and technical assistance for private well users on how to protect their private well water before, during, and after floods, droughts, and wildfires.

Goal 5: Engage partners

Issues to address through engagement

- **Improve communications**: There is opportunity to improve drinking water communications (including risk communication) with the public at large. This includes communications with private well users, public water systems, and the media. Likewise, due to water's complex nature, responsibilities for water and drinking water are shared with many agencies, programs, and units of government. There is a need to strengthen communications on agency and programs efforts.
- **Identify and communicate trade-offs:** A key part of communications is helping identify trade-offs for safe drinking water. Complex economic, policy, social, and capacity-related factors drive local land use and water resource decisions. Those decisions have implications for drinking water sources and the potential public health effects. We need to have clarity around what those trade-offs and risks are.
- **Improve documentation** of Minnesota's drinking-water-related policies, practices, and procedures to make them more understandable to multiple audiences.
- **Overcome complacency:** Various audiences have a sense of complacency toward drinking water. There is a need to raise awareness of drinking water issues and encourage actions to reduce risks to source water quality and consumers' health.
- **Private well users need allies.** Private well users live throughout Minnesota, and their realities vary. Groups, such as the Minnesota Well Owners Organization and the Minnesota Water Well

Association, work to represent the concerns and needs of private well users, and additional partnership would provide further voice and support for private well users.

Key strategies

Communicate with and support the regulated community.

- Continue to educate external partners and the regulated community to reduce health-based violations.
- Implement new agreements to strengthen processes and relationships with delegated well programs.

Provide partners and residents with data on risks and challenges to safe drinking water.

- Community water suppliers provide annual water quality reports (Consumer Confidence Reports) to their customers.
- Help the public and decision-makers understand health risks for various contaminants found in drinking water.
- Connect private well owners and users with available private well water quality data so they can make data-based decisions for their household.

Facilitate outreach, education and assistance to communities affected by drinking water contamination.

- Provide remediation and alternate drinking water supplies when a contaminated site is found.
- Maintain and build capacity and capability to receive requests for drinking water advisories from partners and issue Well Advisory Letters to private well owners.

Leverage advisory councils to understand and prioritize challenges to safe drinking water.

Continue convening the Advisory Council on Wells and Borings and the Advisory Council on Water Supply Systems and Wastewater Treatment Facilities.

Create more public-facing (toward residents) explanations of the Minnesota drinking water system.

- Collaborate with partners to include drinking water in public facing outreach around water, such as We Are Water and the State Fair Eco Experience.
- Develop an infographic communicating the water governance system in Minnesota.
- Assess the need for an online communications hub that can serve as a repository for outreach language and templates.

Governance Assessment Recommendation

Proactively create more public facing explanations of the drinking water supply system, how it is managed, and how to access and use the quality reports. This might be state level communications, or resources that utilities can use for local communication. (p. 6)

II. Goals, strategies, actions, and measures

This section outlines the key actions under each strategy and corresponding goal to help ensure equitable access to safe and sufficient drinking water in Minnesota. The tables also include proposed measures to show progress on carrying out the action and to show where additional focus is needed. The tables will eventually include the current measurement (the actual number/percent); we are still building out that component.

Goal 1: Protect sources of drinking water.

Strategy 1.1: Identify and manage potential threats around drinking water sources for public water systems and private wells.

Actions	Measures	Lead	Status
Help develop source water protection plans, for both groundwater and surface water systems.	■ % of groundwater community public water systems with a prepared DWSMA ■ % of surface water community systems with completed source water assessments ■ % of non-community public water systems serving at-risk populations with completed source water protection plans.	MDH	*Will be updated soon*
Develop a risk ranking framework that can be used to set priorities for public water systems and partners for addressing potential sources of contamination in DWSMAs.	*In development*	MDH	*Will be updated soon*
Protect the approximately 400,000 acres of vulnerable land surrounding DWSMAs statewide by 2034.	% of acres protected or current land use does not present a risk		*Will be updated soon*
Implement the Nitrogen Fertilizer Management Plan in vulnerable areas as defined by township testing results.	*In development*	MDA	*Will be updated soon*
Implement the Groundwater Protection Rule in DWSMAs with nitrate concentrations above defined thresholds.	*In development*	MDA	*Will be updated soon*
Assess the utility of designating aquifers that are impaired for drinking water as a parallel for the Clean Water Act designations for surface water.	*In development*	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
Identify where private wells are in Minnesota.	Number of active private wells in Minnesota Well Index compared to the anticipated number of private wells when using tax parcel data.	MDH	*Will be updated soon*
Develop a toolkit of projects and practices that can be implemented at a local level and help ensure safe drinking water for private well users.	Establish a workgroup in 2025. Review existing resources, create consensus on targeted projects and practices, and develop a toolkit by 2027.	MDH and BWSR	*Will be updated soon*
Improve support for private well owners in identifying and managing potential threats around their well.	Complete an initial assessment of knowledge, attitudes, and behaviors of private wells owners by the end of 2025.		*Will be updated soon*

Strategy 1.2: Include drinking water considerations in land use planning and zoning decisions.

Actions	Measures	Lead	Status
Request county and city land use planners to incorporate state approved DWSMAs and their vulnerability when making zoning or permit recommendations to boards and councils.	*In development*	MDH and Met Council	*Will be updated soon*
Require the identification of the primary drinking water source(s) and contaminant threats and issues in county and city comprehensive land use plans.	*In development*	MDH and Met Council	*Will be updated soon*
Identify and develop information, tools, and guidance for planners and implementors to promote land use practices and development decisions that enhance water quality and quantity.	*In development*	MDH	*Will be updated soon*

Strategy 1.3: Emphasize source water protection in watershed management plans.

Actions	Measures	Lead	Status
Provide financial assistance for source water implementation activities, with grants satisfying 50% of demand.	% of demand satisfied through grants	MDH	*Will be updated soon*
Protect 100,000 acres and restore 100,000 acres in the Upper Mississippi River headwaters basin by 2034.	% of 100,000 acres protected % of 100,000 acres restored		*Will be updated soon*
Develop Groundwater Restoration and Protection Strategies (GRAPS) reports for all 60 One Watershed One Plan boundaries by 2034.	% of One Watershed One Plan boundaries with a completed GRAPS report	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
Determine if Natural Resources Conservation Service could prioritize Farm Bill funding for townships with elevated nitrate in private wells.	*In development*		*Will be updated soon*
Prioritize implementation actions for townships in which private wells exceed the health risk limit of 10 milligrams per liter (mg/L) for nitrate.	*In development*		*Will be updated soon*

Strategy 1.4: Ensure adequate supply of water for public water systems and private wells.

Actions	Measures	Lead	Status
Improve coordination with MDH, DNR, and Metropolitan Council on water supply planning for water appropriations.	*In development*		*Will be updated soon*
Encourage and support water conservation.	Downward trend in annual total and per capita water use	DNR	*Will be updated soon*
Establish a clear process for promoting stormwater capture and use that is safe, economical and contributes to water sustainability.	*In development*		*Will be updated soon*
Support efforts to manage water appropriations and use to protect adequate water supply for both public and private wells.	*In development*		*Will be updated soon*
Make the well interference reporting process easier to navigate for private well users.	*In development*		*Will be updated soon*

Strategy 1.5: Ensure laws, rules and ordinances adequately protect sources of drinking water.

Actions	Measures	Lead	Status
Regularly review statute language to ensure it is adequate, applicable, and efficient.	*In development*		*Will be updated soon*
Improve drinking water protection planning and implementation for municipal systems by revising Wellhead Protection Rule requirements.	Revise by 2027	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
Provide support to enforce and improve the Minnesota Well Code.	*In development*		*Will be updated soon*

Goal 2: Establish resilient drinking water infrastructure.

Strategy 2.1: Support communities with asset management and resiliency planning for drinking water infrastructure.

Actions	Measures	Lead	Status
Continue to provide low interest loans and grants through the Drinking Water Revolving Fund to address aging infrastructure.	Number of drinking water infrastructure projects funded annually $ amount provided through affordability grants	MDH and PFA	*Will be updated soon*
Support smaller systems in developing asset management plans, adapting technical assistance, and funding critical improvements.	*In development*	MDH	*Will be updated soon*
Provide guidance and resources for public drinking water systems on cybersecurity.	% of public water systems with Operational Technology that certified they conducted an annual cybersecurity self-assessment.	MDH	*Will be updated soon*

Strategy 2.2: Support and grow the public water system and licensed well contractor workforces.

Actions	Measures	Lead	Status
Support post-secondary training programs and scholarships for public water system and licensed well contractor workforces.	*In development*	MDH	*Will be updated soon*
Make public water system and licensed well contractor workforce and job importance visible.	*In development*		*Will be updated soon*
Support job shadowing, networking, and mentoring programs encouraging people to explore working with public water systems and/or licensed well contractors.	*In development*		*Will be updated soon*

Strategy 2.3: Transition from legacy data systems to modern resilient systems.

Actions	Measures	Lead	Status
Transition from paper-based processes in the Well Management Section to electronic processes.	■ Well data information and inspection processes migrate to an online electronic process. ■ Migration allows for efficient flow of public health information available to the public and our partners.	MDH	*Will be updated soon*
Upgrade and modernize the Drinking Water Protection Section's Public Water Supply (PWS) program data systems so they are robust, incorporate full regulatory and reporting requirements, incorporate electronic exchanges, and include public-facing components.	■ Near-term upgrades to Minnesota Drinking Water Information System (MNDWIS) data system, as well as EPA Reporting module, are completed to allow for full implementation of existing regulations and reporting, and to incorporate new/revised regulations. ■ Successor data system(s) to replace and improve upon MNDWIS are identified and implemented. ■ Any new data system(s) incorporate improved connections/visibility for public water systems (PWSes), laboratories, US EPA, and the public at large (i.e., a public-facing component is integrated), while maintaining appropriate security. ■ Records, reports, results, payments, and operator certification applications are accepted electronically into any new data system(s). ■ Inspection/site visit reports can be completed and submitted electronically. ■ Structures (technical, personnel, funding) are in place both within DWP and MNIT to ensure ongoing support and updating of any successor data system(s).	MDH	*Will be updated soon*
Modernize Source Water Protection regulatory compliance systems and related data management systems so they are resilient to hardware, software and security upgrades	■ Software platform for SWP Tracker meets operational standards set by MNIT ■ GIS scripts, online utilities and related tools that improve and standardize internal workflow are rewritten to operate in ArcGIS PRO or equivalent spatial management software. ■ EQuIS is used to store all new and legacy non regulatory water quality data. ■ WCHEM is retired as a water quality data system.	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
Adapt existing data systems to meet evolving business workflow and reporting needs for the Source Water Protection (SWP) program.	■ SWP Tracker can store, manage, and query data required to report on MDH progress as required for performance metrics to external partners (e.g., EPA, CWC). ■ MDH or MNIT staff have capacity and capability to meet ongoing data management business needs.	MDH	*Will be updated soon*
Modernize and adapt current groundwater databases (County Well Index and Minnesota Well Index application) to improve access to foundational groundwater data.	■ Coordinated well construction record data entry and well location capture between CWI and Well Management e-license-based data management systems. ■ Guided by stakeholder governance, CWI data system and workflow compatible with delegated well program data management systems, state agency and LGU well location management, and geologic interpretation by MGS. ■ Updated MWI application that links CWI database via unique identifier to water quality databases (e.g. EQuIS) and water level data (DNR Obwell). Application also provides graphic of well construction – casing and well depth, and hydrogeologic setting – geology and static water level for individual wells.	MDH	*Will be updated soon*

Goal 3: Ensure safe tap water.

Strategy 3.1: Prevent and resolve health-based violations in public water systems and private wells.

Actions	Measures	Lead	Status
Conduct sanitary surveys for community water systems once every 18 months.	*In development*	MDH	*Will be updated soon*
Collect required water samples for public water systems.	*In development*	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
Identify contaminant trends in public water systems and prioritize actions based on systems at highest risk	*In development*	MDH	*Will be updated soon*
Resolve Safe Drinking Water Act violations in public water systems through technical assistance, grants, and partnerships.	*In development*	MDH	*Will be updated soon*
Prevent and resolve Well Code violations.	*In development*	MDH	*Will be updated soon*

Strategy 3.2: Reduce lead in drinking water.

Actions	Measures	Lead	Status
Replace water service lines containing lead by 2033.	■ % of public community water systems that have completed an inventory of water lines ■ % of lead service lines replaced	MDH	*Will be updated soon*
Test for lead in drinking water in childcare centers, public and charter schools and remediate when lead is 5 ppb or more.	■ % of facilities that tested for lead of the approximately 4,000 schools and child care centers who are required ■ % of samples reported that test at 5 ppb or higher ■ Remediation grant dollars awarded each year	MDH	*Will be updated soon*

Strategy 3.3: Establish equitable access to private well testing and mitigation.

Actions	Measures	Lead	Status
Provide educational resources and technical assistance to private well users for well testing and mitigation.	■ % of key educational materials available in languages beyond English ■ Number of private well brochures ordered by partners	MDH	*Will be updated soon*
Provide financial resources to private well owners for well testing and income-based mitigation.	■ % of private well households offered free well testing ■ There is state/federal funding for income-based mitigation	MDH	*Will be updated soon*
Establish a Minnesota Private Well Stewardship Network.	■ % of counties served by a private well steward ■ # of educational events ■ # of private well stewards ■ # of private well users who have connected with a steward	UMN	*Will be updated soon*

Actions	Measures	Lead	Status
Establish equitable access to laboratories that accept water samples from private well users through increasing the number of laboratories accepting samples from private well users and the number of laboratories providing courier services.	■ # of accredited labs accepting samples from private well users ■ # of accredited labs accepting samples from private well users providing courier services	MDH	*Will be updated soon*

Strategy 3.4: Empower Minnesotans to value drinking water and take actions to sustain and protect it.

Actions	Measures	Lead	Status
Hold focused conversations and public meetings with communities around the state to understand their concerns and priorities for drinking water.	# of meetings	MDH	*Will be updated soon*
Incorporate concerns and ideas from meetings into our work going forward.	*In development*		*Will be updated soon*
Conduct a statewide assessment to better understand private well users' knowledge, attitudes, and beliefs about well water, testing, and mitigation.	Complete initial assessment by 2025 with ongoing measurement of changes	MDH and U of MN	*Will be updated soon*

Goal 4: Anticipate and manage emerging risks.

Strategy 4.1: Monitor drinking water sources for emerging contaminants and pathogens.

Actions	Measures	Lead	Status
Establish an ambient monitoring program of drinking water sources.	# of private wells sampled # watersheds sampled # with 3D model	MDH	*Will be updated soon*

Strategy 4.2: Understand how humans may be affected by unregulated contaminants and emerging risks.

Actions	Measures	Lead	Status
Continue to develop health-based guidance for contaminants found in drinking water.	*In development*	MDH	*Will be updated soon*

Strategy 4.3: Prioritize emerging risks that present the largest public health burden in the context of all contaminants.			
Actions	**Measures**	**Lead**	**Status**
Incorporate comparative risk assessment methodologies to identify and prioritize emerging risks.	*In development*	MDH	*Will be updated soon*
Evaluate the need for and establish the approach for Minnesota-specific regulatory values for drinking water.	Evaluate the need by the end of 2026	MDH	*Will be updated soon*
Develop tools, provide training, and interpret findings that assist partners' need to assess potential health risks posed by drinking water contaminants.	*In development*	MDH	*Will be updated soon*

Strategy 4.4: Advance laboratory capacity and methods to analyze for emerging risks.			
Actions	**Measures**	**Lead**	**Status**
Ensure the State Public Health Laboratory has capacity to maintain methods and instrumentation.	*In development*	MDH	*Will be updated soon*
Support the State Public Health Laboratory developing new methods in collaboration with laboratory scientists when needed.	*In development*	MDH	*Will be updated soon*
Provide checklists and other tools for laboratories accredited through the Minnesota Environmental Accreditation Program to ensure submission of reliable and consistent data.	% of assessments have repeat violations at the time of the assessment or application	MDH	*Will be updated soon*
Offer and create tools to help laboratories seeking accreditation.	*In development*	MDH	*Will be updated soon*

Strategy 4.5: Address drinking water risks related to climate change.			
Actions	**Measures**	**Lead**	**Status**
Implement a grant program for community water systems to install a back-up well.	% of community public water systems with more than one well for their water source	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
Implement a grant program for community water systems to establish emergency power backup systems.	% of community public water systems with emergency power backup systems	MDH	*Will be updated soon*
Enhance floodplain mapping.	*In development*		*Will be updated soon*
Assist public water systems in evaluating options to reduce flooding impacts on drinking water supplies and infrastructure.	*In development*	MDH	*Will be updated soon*
Provide guidance and technical assistance for private well users on how to protect their private well water before, during, and after floods, droughts, and wildfires.	■ # of webpage views ■ # of inquiries related to natural disasters ■ Audience reached by any flood-related communications/press releases/social media posts ■ % of flooded well test kits that meet holding times (if there was a flooding event)	MDH	*Will be updated soon*

Goal 5: Engage partners

Strategy 5.1: Communicate with and support the regulated community.

Actions	Measures	Lead	Status
Provide education for the regulated community to reduce health-based violations.	*In development*	MDH	*Will be updated soon*
Implement new agreements to strengthen processes and improve relationships with delegated well programs.	Establish in-person visits in a year with each delegated program to determine a consistent process of upholding the well code with a measurable outcome of building relationships with delegated well programs.	MDH	*Will be updated soon*

Strategy 5.2: Provide partners and residents with data on risks and challenges to safe drinking water.

Actions	Measures	Lead	Status
Make drinking water quality data accessible to the public and partners in easy-to-understand ways.	*In development*	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
Continue finding alignment among other agencies and partners.	*In development*		*Will be updated soon*
Connect private well owners and users with available private well water quality data so they can make data-based decisions for their household.	Maps or other visualizations for arsenic, manganese, and nitrate in private wells are available online	MDH	*Will be updated soon*
Community water supplier**s** provide annual water quality reports (Consumer Confidence Reports) to their customers.	% of community water systems that submit a Consumer Confidence Report each year	Community water supplies	*Will be updated soon*
Help the public and decision-makers understand health risks, protection strategies, and interventions for contaminants found in drinking water.	*In development*		*Will be updated soon*

Strategy 5.3: Facilitate outreach, education and assistance to communities/residents affected by drinking water contamination.

Actions	Measures	Lead	Status
Provide remediation and alternate drinking water supplies when a contaminated site is found.	*In development*	MPCA	*Will be updated soon*
Maintain and build capacity and capability to receive requests for drinking water advisories from partners and issue Well Advisory Letters to private well owners.	*In development*	MDH	*Will be updated soon*

Strategy 5.4: Leverage advisory councils to understand and prioritize challenges to safe drinking water.

Actions	Measures	Lead	Status
Convene the Advisory Council on Wells and Borings to advise MDH on technical matters related to the construction, repair, and sealing of wells and borings and the licensure of well and boring contractors.	Meet quarterly	MDH	*Will be updated soon*
Convene the Advisory Council on Water Supply Systems and Wastewater Treatment Facilities to advise MDH and MPCA regarding classification of water supply systems and wastewater treatment facilities, qualifications and competency evaluation of water supply system operators and wastewater treatment facility	Meet quarterly	MDH	*Will be updated soon*

Actions	Measures	Lead	Status
operators, and additional laws, rules, and procedures that may be desirable for regulating the operation of water supply systems and of wastewater treatment facilities.			

Strategy 5.5: Create more public facing (residents) explanations of the drinking water supply system.

Actions	Measures	Lead	Status
Develop an infographic communicating the water governance system in Minnesota	*In development*	MDH	*Will be updated soon*
Assess the need for an online communications hub that can serve as a repository for outreach language and templates.	*In development*	MDH	*Will be updated soon*

Strategy 5.6: Elevate drinking water concerns to elected officials.

Actions	Measures	Lead	Status
Help decision-makers understand health risks, protection strategies, and interventions for contaminants found in drinking water.	*In development*	MDH	*Will be updated soon*
Provide subject matter expertise to identify tradeoffs and considerations for balancing public health benefits with costs.	*In development*	MDH	*Will be updated soon*

III. An overview of Minnesota's drinking water system

Context

Safe, reliable, and affordable drinking water is essential for the health of all Minnesotans and our economy. Countless activities are necessary to protect drinking water, including protecting source water; educating consumers; training, certifying, and supporting water operators and well contractors; inspecting and assisting public water systems; testing water; addressing threats; ensuring compliance with state laws and local ordinances, and funding improvement projects. MDH is responsible for protecting drinking water at the almost 7,000 public water systems across the state and for ensuring proper construction and sealing of public and private wells. MDH also works to improve, educate about, and enforce rules that protect and restore groundwater and source water.

MDH began as the Minnesota State Board of Health in 1872, largely because of waterborne and foodborne diseases. Typhoid fever, a waterborne disease, was taking a significant toll on lives. Advances in improving drinking water quality were rapid; the results were dramatic. By the early 1900s, treatment and disinfection of drinking water resulted in the virtual elimination of waterborne diseases such as cholera, typhoid, dysentery, and hepatitis.

More than a century later, the importance of safe and sufficient water remains as strong as ever, and the challenges toward achieving this goal emerge in new and different manners. The passage of the federal Safe Drinking Water Act in 1974 established a national program of regulations and standards covering all public water systems in the United States. Since 1974, the EPA has been responsible for regulating the nation's public water supply systems, under the federal Safe Drinking Water Act (SDWA). However, almost all states, including Minnesota, have assumed responsibility for enforcing the act within their own borders. Minnesota became one of the first states to achieve primacy and began regulating public water supply systems at the state level, in 1976.

The Minnesota Well Code, established by statute in 1974, benefits both private well users and public water system customers by regulating the construction, repair and sealing of drinking water wells and licensing well contractors.

Drinking water systems that serve Minnesotans

When classifying drinking water systems, one initial question is "what is the source of the water?" As shown in Figure 2, groundwater is the source for 76% of Minnesotans, drawn from subsurface aquifers. However, some of the largest public water systems in the state rely on surface water, drawn from the Mississippi River, Lake Superior, and a handful of smaller water bodies, such as mine pits. Although surface water and groundwater are often hydrologically connected, they are managed differently – a topic we review later in this section.

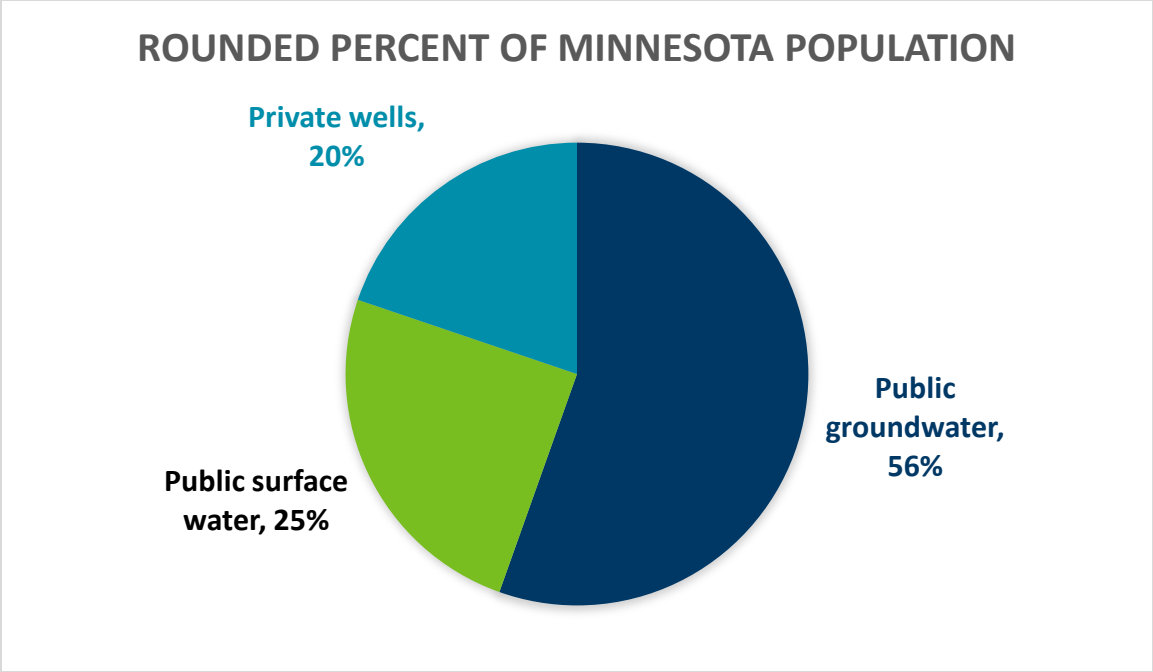


Figure 2: Source of drinking water for people in Minnesota.

Public water systems

The definition of "public water system" in the SDWA is broad. To be considered "public," a water supply system must have its own water source and provide water to 25 or more people or have 15 or more service connections.

Public water systems in Minnesota are diverse, varying in size, treatment, and water source. As of 2023, Minnesota has 6,589 public water systems. MDH's Drinking Water Protection (DWP) program works with partners to ensure residents and visitors have safe drinking water where they live (community water systems) and where they learn, work, and play (noncommunity water systems).

- Of those systems, 969 are community systems, which provide water to people in their homes or places of residence. Community water systems serve over 4.5 million Minnesotans. Most of these community systems use groundwater from underground sources, tapped by wells, as their source of water. However, 23 of these systems, including the municipal systems that serve the state's largest cities, use surface water drawn from lakes or rivers.
- Of these community water systems, 731 are municipal systems, serving towns or cities. The rest of the community systems provide water to people in various residential locations, including manufactured home parks, apartment buildings, housing subdivisions, and correctional facilities.
- The rest of the state's 5,620 public water systems are noncommunity systems, also subdivided into two categories. "Transient noncommunity systems" provide water to an ever-changing "transient" population at places such as restaurants, resorts, and highway rest stops. Other noncommunity systems may provide water to relatively stable population groups in nonresidential locations such as schools, workplaces, and day-care facilities. These facilities are considered "nontransient" noncommunity systems.

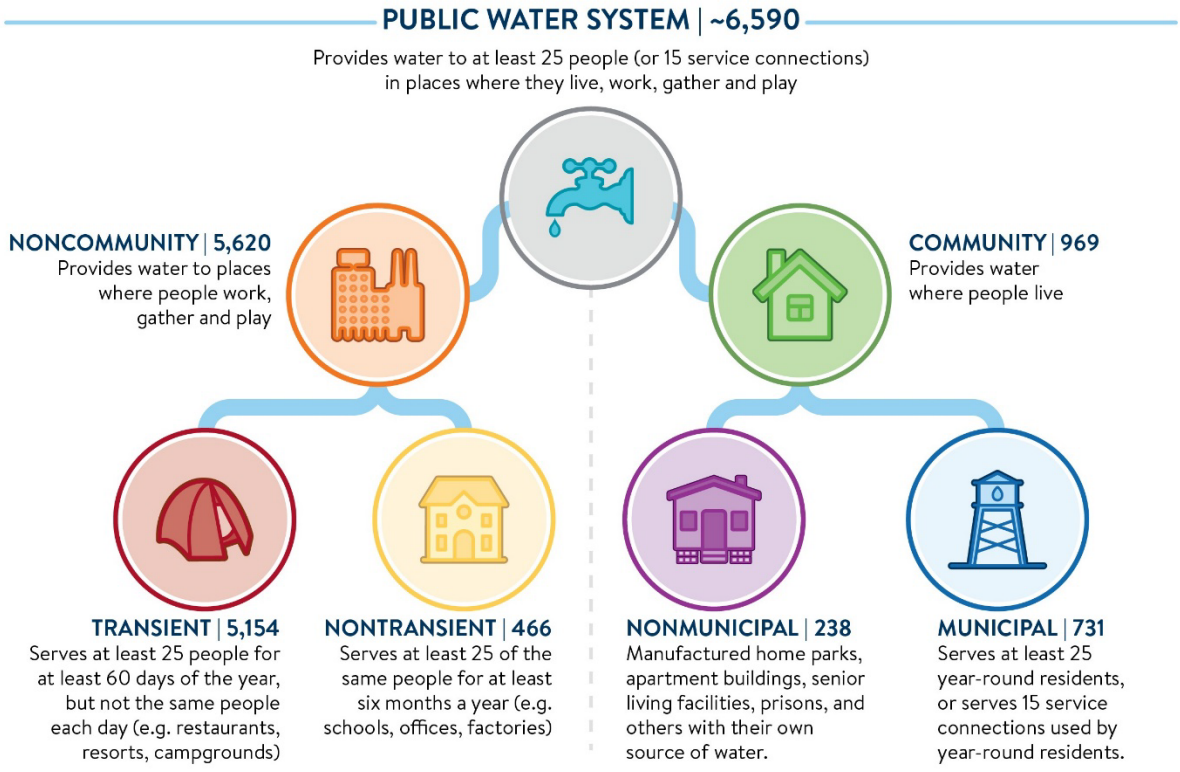


Figure 3: How types of water systems are categorized according to the Safe Drinking Water Act.

Private drinking water systems

As shown in Figure 4, there are over 457,000 private wells in Minnesota providing drinking water to over 1.1 million people. (This figure does not include wells used for irrigation, groundwater monitoring, or industrial purposes.)

While most private wells serve just one household, some serve small clusters of households that fall below the 25 people/15 service connection threshold for public water systems. The number of such multi-household wells is not known.

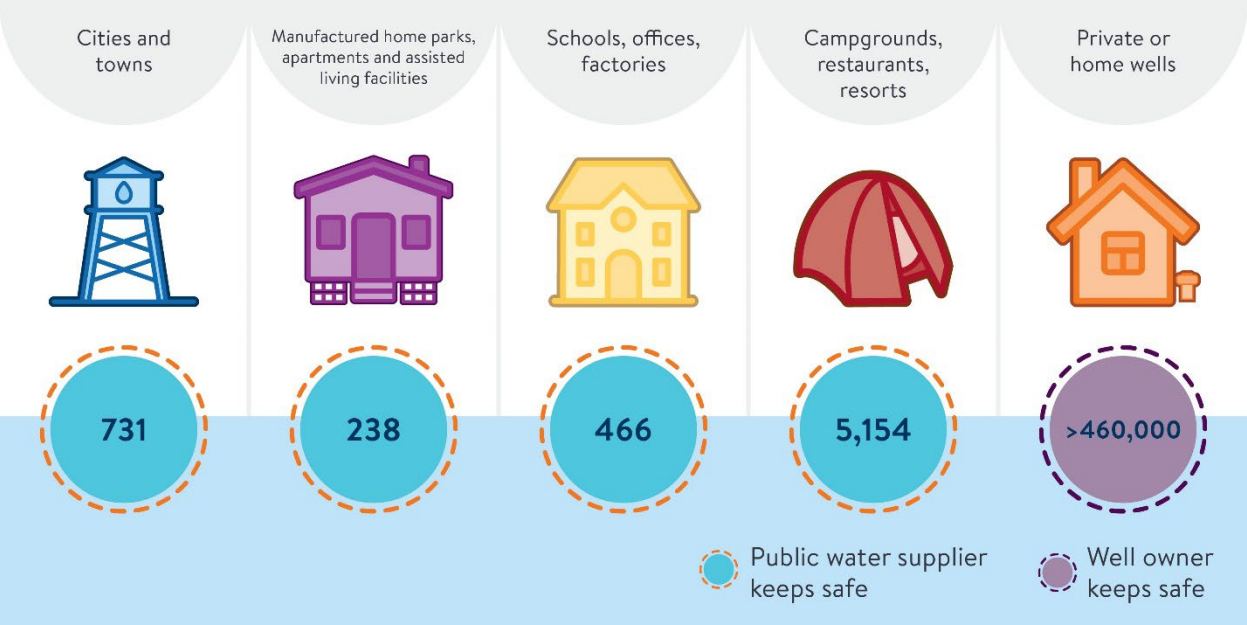


Figure 4: Types and numbers of water systems in Minnesota. There are fewer regulations to ensure safe drinking water as you move from left to right.

How drinking water is managed and governed

It's important to recognize that drinking water is managed as part of a larger system of water governance that stretches across multiple state and federal agencies and local governments. Starting with a summary of MDH's role, this section explores the interrelated authorities and responsibilities of state agencies, local governments, and partnering organizations to protect and ensure the supply, quality, and sustainability of drinking water.

Drinking water management at MDH

Within MDH, the Environmental Health Division is responsible for drinking water management and assessment. As noted above, the Drinking Water Protection (DWP) Section oversees public water systems, while the Well Management Section (WMS) oversees the proper construction, repair, and sealing of public and private wells.

The WMS works to protect both public health and groundwater by assuring the proper construction of new wells and borings – including both private wells and public water supply wells – and the proper

sealing of unused wells and borings. The WMS also works with licensed well contractors and well owners to promote safe operation and maintenance. The Commissioner of Health has the authority to delegate specific responsibilities for the regulation of water wells to local boards of health. There are 10 boards of health that have responsibility for wells within their jurisdictions. See Delegated Well Programs.

The MDH Water Policy Center (WPC), formed in 2022, champions water policies and practices to protect public health. Their work includes providing support to private well users for the voluntary aspects of well ownership and innovating and incubating policies and programs that address water-related risks to public health, including development of this Plan. The WPC is funded largely through the Clean Water Fund and works with other agencies, research institutions, and local units of government on water-related initiatives.

Other sections within the division and across the agency also play a variety of roles:

- The Environmental Surveillance and Assessment (ESA) Section develops guidance on potential health risks posed by drinking water contaminants, including development of Health Risk Limits (thresholds) and health-based guidance values for various contaminants and assessment of Chemicals of Emerging Concern (CECs).
- The Food, Pools, and Lodging Services (FPLS) Section and delegated local agencies license and inspect license and inspect food, beverage, lodging, manufactured home parks, recreational camping areas, swimming pools and youth camp establishments in Minnesota (including water supply inspections). They also assist with testing water supplies in vacation home rentals that are not public water supplies.
- The Minnesota Laboratory Accreditation Program accredits environmental laboratories to ensure laboratories submit reliable and consistent data to Minnesota's various environmental programs.
- The Public Health Laboratory analyzes water samples for contaminants and diseases and develops methods to analyze for emerging contaminants.
- The Waterborne Diseases Unit studies and investigates waterborne diseases in Minnesota as part of the MDH Infectious Disease Epidemiology, Prevention and Control Division.

Drinking water management in Minnesota

As noted above, groundwater and surface water are managed under different but overlapping authorities.

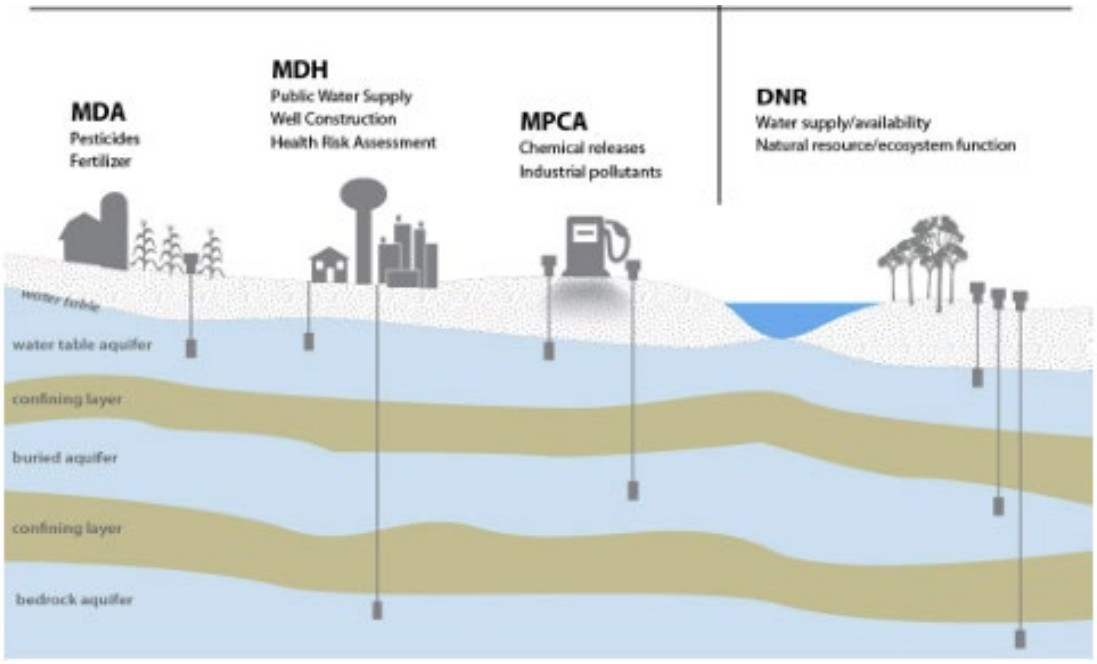


Figure 5: Overview of how groundwater is managed across state agencies.

Figure 5 provides a simplified overview of state agency roles in managing groundwater. In addition to MDH's roles discussed above, other agencies and government have distinct and legislatively mandated responsibilities for management of both groundwater and surface water, as summarized in the table on the next page.

Minnesota state agencies' roles in managing groundwater and surface water

Agency	Groundwater	Surface Water
MN Department of Natural Resources (DNR)	■ Regulates groundwater withdrawals through a system of water appropriation permits. ■ Investigates well interferences. ■ Tracks water conservation data from permittees ■ Operates a network of observation wells. ■ Partners with MN Geological Survey to prepare county geologic atlases for groundwater sustainability. ■ Provides preliminary review of proposed wells through its water appropriation permitting system. (MDH is notified before wells are constructed.)	■ Monitors stream flow and surface – groundwater interactions. ■ Implements state drought plans. ■ Operates a network of stream gages. ■ Monitors stream and lake ecology and ecosystem functions.
MN Department of Agriculture (MDA)	■ Regulates the sale, use and disposal of pesticides and the use, storage management and licensing of fertilizers and soil/plant amendments. ■ Manages a statewide network of groundwater pesticide water quality monitoring wells, primarily in agricultural areas, to assess potential pesticides and fertilizer impacts. ■ Administers the **Groundwater Protection Rule**, which restricts fall fertilizer application in areas with vulnerable groundwater or DWSMAs with high nitrate levels and can entail additional requirements for agricultural practices in those highly vulnerable DWSMAs (Part 2 of the Groundwater Protection Rule).	■ Manages Surface Water Pesticide Water Quality Monitoring program; identifies pesticide impairments; designates surface water pesticides of concern. ■ Manages Discovery Farms Minnesota: a farmer-led program to protect water. ■ Conducts and supports research on agriculture best management practices.
MN Pollution Control Agency (MPCA)	■ Under the federal Clean Water Act and state rules, MPCA establishes water quality standards for groundwater, identifying seven "beneficial use classes." Class 1 includes all water used for domestic consumption. All groundwater is assigned Class 1 status. ■ Maintains a network of approximately 270 shallow monitoring wells located in non-agricultural areas overlying vulnerable aquifers (see Groundwater monitoring). Analyzes wells for contaminants of emerging concern.	■ Under the federal Clean Water Act and state rules, MPCA establishes water quality standards for surface water. ■ Coordinates many elements of Minnesota's watershed approach to water quality, which promotes increased collaboration and a common vision for planning and implementation activities.

Agency	Groundwater	Surface Water
	■ Maintains the Minnesota Groundwater Contamination Atlas in partnership with MDH and MDA. ■ Regulates pollutants that may impact groundwater through programs such as feedlot regulation; brownfield remediation; and how septic systems are designed, installed and managed.	■ Manages watershed monitoring and assessment, including Watershed Restoration and Protection Strategy (WRAPS) reports. ■ Nutrient Reduction Strategy [note that it will also reference groundwater] ■ Assesses surface waters for compliance with specific pesticide limits listed in state rule (chapter 7050).

The following groups play key roles in managing drinking water, but their roles are not specifically defined by groundwater or surface water.

Minnesota Public Facilities Authority (PFA)

PFA is a multi-agency authority that makes low-interest loans and grants available for public infrastructure projects. Member agencies include MDH, MPCA, MDA, MnDOT and DEED.

- **Drinking Water Revolving Fund:** Administered jointly by the PFA and MDH, provides low interest loans to help communities build drinking water storage, treatment and distribution systems that comply with standards in the Safe Drinking Water Act. Projects must be included on the MDH's Project Priority List and the PFA's Intended Use Plan.
- 2023 legislative appropriation of $240M for **replacement of lead service lines**, leveraging additional federal funds under the Infrastructure Investment and Jobs Act (IIJA). Water suppliers must complete an inventory of lead service lines by October 2024.
- **Water Infrastructure Fund**: provides matching grants for wastewater and drinking water projects to communities that meet affordability criteria and receive PFA loans or financing from USDA's Rural Development Program.
- **Lead Service Line Replacement Grant Program**: State program and funding approved in 2023 to combine with federal IIJA funds for replacement of lead service lines. The Program also includes funding to help communities conduct lead service line inventories.

Board of Water and Soil Resources (BWSR)

BWSR is the state soil and water conservation agency, responsible for comprehensive local water management, easement and habitat programs, and the Wetland Conservation Act as it relates to private land. In relation to drinking water, BWSR:

- Oversees the **One Watershed, One Plan** program, which can identify drinking water-related issues and provide locally directed funds (Watershed-Based Implementation Funding) at a major watershed scale, depending on the outcome of the planning process.
- Provides multiple competitive grants supported by the Clean Water Fund, including **Projects and Practices** and **Wellhead Protection Partner Grants** (see below under Grant and Loan Programs).

Department of Labor and Industry (DLI)

DLI administers the Minnesota Plumbing Code, which regulates design and installation of plumbing systems statewide for all buildings (new, additions, alterations, repair and replacement). The Code includes requirements for all water supply and distribution systems, including nonpotable rainwater catchment systems. MDH works closely with DLI to inform people and organizations about water quality requirements within buildings. Learn more about the plumbing code at 2020 Minnesota State Building Codes.

Clean Water Council

The Clean Water Council was created to advise the Legislature and the Governor on the implementation of the 2006 Clean Water Legacy Act, make policy recommendations, and distribution of the Clean Water Fund under the Clean Water, Land and Legacy Amendment. The Council represents multiple interests and agencies, including all those listed above, as well as the Metropolitan Council, environmental, business and farm organizations, legislators and local and tribal governments. The Council's Clean Water

Council Strategic Plan includes many drinking water-related goals and policies. See Clean Water Fund information below under Grant and Loan Programs.

Similar to the Clean Water Council, the agencies receiving funding from the Clean Water Fund have formed the Interagency Coordination Team which meets once a month to collaborate on water resource management and Clean Water Fund initiatives. The Interagency Groundwater Drinking Water Subteam is one of the specialized workgroups under the "umbrella" of the ICT and is charged with coordinating drinking water protection and groundwater sustainability efforts across the agencies.

Metropolitan Council

As the regional planning agency for the Twin Cities metropolitan area, the Met Council is responsible for developing an overall regional approach to water planning and management, through surface water monitoring, wastewater management, and watershed and local water planning. The Met Council promotes Integrated Planning of wastewater, water supply, and surface water management. Water supplies in the metro area include both surface water and groundwater resources.

The Met Council works with MDH and DNR on source water protection, water supply planning, and general water supply issues.

Tribal governments' roles in drinking water management

The state of Minnesota is home to eleven federally recognized Indian Tribes with elected Tribal government officials. The State acknowledges and supports the unique status of the Minnesota Tribal Nations and their absolute right to existence, self-governance, and self-determination. The EPA is the regulatory authority for public water systems that are managed by the sovereign nations. MDH works with tribal nations to review drinking water protection plans but lacks the authority to approve these plans; EPA holds that authority. The Minnesota Well Code regulations do not apply to sovereign nations. MDH works with sovereign nations on well construction, repair, and sealing when support is requested.

Local/regional authorities and NGO partners in water management

A broad range of local governments, advisory councils, and regional authorities are important partners who play multiple roles in drinking water management, most directly as managers and operators of water supply systems, but also as watershed managers and planners, local public health officials and advocates.

- **Soil and Water Conservation Districts** (SWCDs) and **Watershed Districts** (WDs) and **Watershed Management Organizations** (WMOs) often play specific roles as the lead organizations for watershed-scale planning and implementation and as primary decision-makers on the use of state funds for activities such as well-sealing, described below under Grant and Loan Programs.
- **Community health boards (CHBs)** are the legal governing authorities for local public health activities across Minnesota, working to prevent diseases, protect against environmental health hazards, promote healthy behaviors and communities, and prioritize community health needs and services. CHB duties include monitoring air and water quality. As of 2023, there are 51 CHBs in Minnesota, serving single and multiple counties and cities. CHBs play varied roles in drinking water protection.

Some CHBs help provide private well testing, have water testing laboratories, and help reach out to private well users. Learn more about CHBs at Minnesota's public health system: History and context.

- The **Advisory Council on Wells and Borings** is an 18-member body authorized by statute to advise MDH on technical matters related to the construction, repair and sealing of wells and borings and the licensure of well and boring contractors. The Council's activities also include review of new products and technologies, codes and standards, and suggestions for improvements to department procedures.
- The **Advisory Council on Water Supply Systems and Wastewater Treatment Facilities** is composed of 11 members and is authorized by statute to advise MDH and MPCA on classification of water supply systems and wastewater treatment facilities, qualifications and competency evaluation of water supply system operators and wastewater treatment facility operators, and additional laws, rules, and procedures that may be desirable for regulating the operation of water supply systems and of wastewater treatment facilities.
- The **Minnesota Geological Survey**, part of the University of Minnesota, provides basic public information on the geology of the state. This includes many activities and products used by state, tribal, county, and regional agencies to provide information on the surface and subsurface physical setting for water resource planning. County Geologic Atlases, produced in collaboration with the Minnesota Department of Natural Resources, provide aquifer maps and estimates of pollution sensitivity of groundwater. Other examples include data management and geologic interpretations for the widely used County Well Index, watershed-scale geologic models for the MDH-led GRAPS program, and reports conveying research results on aquifer system properties that are used in groundwater models.

Several non-governmental organizations partner with and assist local water suppliers, well drillers and well owners.

- The **Minnesota Section of the American Water Works Association** (MN AWWA). The national association is the world's largest association of water professionals. The MN AWWA is a nonprofit scientific and educational association that promotes public health, safety, and welfare through research and dissemination of information and by supporting educational development of its members.
- The **Minnesota Ground Water Association** promotes groundwater education for the future protection and safety of drinking water, including development of white papers on groundwater-related subjects.
- The **Minnesota Rural Water Association (MRWA)**, an affiliate of the National Rural Water Association, provides professional on-site assistance and trainings to water and wastewater system personnel. MRWA provides technical support for managerial, financial, and operation and maintenance issues, working closely with MDH, other state agencies, and the NRCS.
- The **Minnesota Suburban Utility Superintendents Association (SUSA)** aims to provide information, education, networking, and charitable opportunities to water and wastewater professionals to promote public health, safety, and welfare.
- The **Minnesota Water Well Association**, an affiliate member of the National Groundwater Association, is a nonprofit comprising water well drilling and pump contractors, geologists, hydrologists, groundwater industry suppliers, manufacturers, and other professionals.

- The **Minnesota Well Owners Organization (MNWOO)** is a nonprofit organization for private well owners, focusing on education, technical and legal services, and advocacy to ensure the safety of those who use private wells for drinking water. MNWOO promotes well testing to ensure those well users are informed of the quality of their drinking water.
- The **Source Water Protection Collaborative** brings together diverse public and private interests sector groups to advance collective action for protecting drinking water. The collaborative, founded in 2019, is convened by Environmental Initiative and supported by MDH. As of 2023, the Collaborative is exploring the connections between art, civic engagement, drinking water and environmental health, through a pilot project in Little Falls: From Tap to Tapestry: Using Art and Creativity to Protect Drinking Water.

How drinking water is regulated and managed in statute and rule

Drinking water is regulated by the federal, state, and (to some extent) local governments. The primary federal authority for drinking water regulation comes from the Safe Drinking Water Act, with additional authorities based on the Clean Water Act.

Federal

- **Federal Safe Drinking Water Act** (SDWA): Established federal regulations for public water systems and standards for approximately 100 contaminants in drinking water.
  - US Code, Title 42, Chapter 6A, Subchapter XII
  - National Primary Drinking Water Regulations and Implementation *(Title 40, Code of Federal Regulations, Parts 141 and Part 142)*
- **Federal Clean Water Act** (CWA)**:** Designates beneficial uses for surface waters, numeric and narrative water quality standards, and antidegradation protections.
  - US Code, Title 33, Chapter 26, Section 1251 et seq.

State

Public water system regulations

- Statutory authority for the Minnesota Department of Health Drinking Water Protection Program *(Minnesota Statutes, chapter 144)*
- Minnesota rules governing the public water systems *(Minnesota Rules, chapter 4720)*

Drinking Water Revolving Fund

- Statutory Authority for Drinking Water Revolving Fund *(Minnesota Statutes, chapter 446A.081)*
- Minnesota rules governing Minnesota Department of Health's administration of the Drinking Water Revolving Fund *(Minnesota Rules, parts 4720.9000 to 4720.9080)*

Operator certification

- Minnesota rules governing water supply systems and operator certifications *(Minnesota Statutes, sections 115.71 – 115.77)*
- Minnesota rules regarding water treatment certification and classifications of systems and facilities *(Minnesota Rules, chapter 9400)*

Source Water Protection

- Statutory authority for Minnesota's Wellhead Protection Program (Minnesota Statutes, chapter 103I section 103I.101, subdivision 5[8])
- Minnesota Wellhead Protection Program Requirements (*Minnesota Rules, chapter 4720, parts 4720.5100-5590*)
- Minnesota Well Code governing the construction, maintenance, and sealing of wells *(Minnesota Rules, chapter 4725)*

Groundwater protection and health risk limits

- The 1989 Groundwater Protection Act gives MDH the authority to create Health Risk Limits (HRLs) (2023 Minnesota Statutes chapter 103H, section 103H.201).
- The 2001 Health Standards Statutes (144.0751) mandates that MDH include a reasonable margin of safety in creating HRLs to protect vulnerable subpopulations (infants, children, **pregnant adults, etc.)** ***(Minnesota Statutes, section 144.0751)***

Plumbing Code

The 2020 Minnesota Plumbing Code is incorporated by reference in *Minnesota Rules, chapter 4714*.

Surface water quality standards

- Waters of the State (Minnesota Rules, chapter 7050)
- Lake Superior Basin Water Standards *(Minnesota Rules, chapter 7052)*

How drinking water is funded

The Governance Assessment report notes, "…financial sources have been fairly minimal for drinking water management historically, Minnesota has seen an increase in funding opportunities over the last 10 years that is continuing to grow." (Calow and Lewandowski, 2023) It is important to note these funding opportunities have primarily been geared toward public systems, not private wells.

State funding sources for drinking water protection include the annual Safe Drinking Water Fee assessed on service connections to municipally-owned community public water systems, the Clean Water Fund, and other state appropriations. Federal funding sources include the annual Public Water Supply Supervision Grant, Safe Drinking Water Revolving Fund (and its associated set-asides), and Water Infrastructure Improvements for the Nation (WIIN) Grants.

The Well Management Section collects fees for construction of wells and borings and for geothermal and other heat exchange devices, well maintenance and well sealing, variances, contractor licenses, and well disclosure certificates. Fees are credited to the state government special revenue fund.

Customers of public systems pay regular fees into the system through their water bills, which may be their most visible connection to their water systems. Water rates include the annual Safe Drinking Water Fee, also known as the service connection fee, used by MDH to cover required testing for over 100 drinking water contaminants. Water rates vary greatly across communities.

Grant and loan programs

Watershed resources

Groundwater Restoration and Protection Strategies (GRAPS) reports are funded through the CWF to help prioritize local planning efforts and One Watershed, One Plan plans to protect and restore groundwater resources. A GRAPS report identifies key groundwater quality and quantity concerns using existing data and information about groundwater and land-use practices in the watershed. The report also suggests targeted strategies to restore and protect groundwater. GRAPS reports complement the Watershed Restoration and Protection Strategies (WRAPS) reports prepared by the MPCA that address surface water quality. Over 20 GRAPS reports have been completed since 2015. In 2021, MDH received funding from the Clean Water Fund to accelerate development of GRAPS to build capacity for groundwater project implementation. Since then, 16 Accelerated Implementation Grants have been awarded, with about $250,000 available annually. The program is anticipated to continue as long as the funding and demand are there.

Public supplies

- The state Drinking Water Revolving Fund (DWRF) program provides below market rate loans to support approved drinking water infrastructure projects statewide, utilizing federal revolving loan funds. The fund is managed collaboratively by the Public Facilities Authority (PFA) and DWP.
- The CWF offers Source Water Protection Grants, which aid public water systems in implementing wellhead protection plans and in preventing & resolving water quality issues. Grants can be used for activities such as public education, installing monitoring wells, inspection, emergency response planning, and connecting private users to a public water supply.
- Projects and Practices Grants from the BWSR support groundwater/drinking water protection for both public and private supplies through a Drinking Water sub-grant allocation. Funding is provided through the CWF. Grants to SWCDs fund sealing of unused wells (also noted below) and other protective land treatment practices in vulnerable DWSMAs.
- BWSR also supports Wellhead Protection Partner Grants to local governments to establish permanent or long-term protection of land in wellhead protection areas with highly vulnerable drinking water supplies. These grants are intended to allow for alternative land uses to protect groundwater while allowing the partner more flexibility than a state-held easement through the CREP or RIM easement programs.
- Watershed-Based Implementation Funding (WBIF) is becoming a larger source of funds for local watershed partnerships than the competitive grant programs listed above. These large non-competitive grants are made available to watershed partnerships with approved Comprehensive Watershed Management Plans (CWMPs) to implement activities identified in those plans. If source water protection activities are identified in a CWMP for a specific watershed, then WBIF may be available for such activities.
- Source Water Protection: Federal funds can also be available for drinking water protection. At least 10% of the 2018 Farm Bill funding for conservation programs (excluding the Conservation Reserve Program) is allocated towards state source water protection priorities. Among the regionally-focused programs that distribute these funds are the Mississippi River Basin Healthy Watershed Initiative and the National Water Quality Initiative.

Private wells

A limited number of federal and state loan and grant programs are available for home water treatment and well construction, repair, and sealing, although eligibility is often income-limited. See Financial Assistance for Home Water Treatment and Well Construction, Repair, and Sealing.

- Agriculture Best Management Practices (BMP) Loan Program: Loans can be used for home water treatment, well replacement, connecting to public water, well sealing, and other practices that prevent water pollution. Financing is available for existing private wells that provide drinking water for people or livestock.
- CWF-supported Source Water Protection Grants, fund sealing of unused private wells in DWSMAs, since unsealed wells can act as a pathway for contaminants.
- Clean Water Fund Competitive Grants from BWSR (also known Projects and Practices grants) also fund sealing of unused private wells in DWSMAs. Funds are disbursed to Soil and Water Conservation Districts (SWCDs).
- Very low-income families living in rural areas and small communities may qualify for home water treatment and well construction, repair, and sealing, with funds provided through the U.S. Department of Agriculture's Rural Development office.
- Fix Up Home Improvement Loan Program: Loans are available to homeowners with low to moderate incomes for home water treatment and well construction, repair, and sealing through the Minnesota Housing Finance Agency.

Appendices

Appendix A: Governance Assessment Framework Criteria

Calow, Peter; Lewandowski, Marcelle. (2023). Lessons from Drinking Water Professionals: An Assessment of Drinking Water Governance in Minnesota.

Effectiveness:

1. Jurisdictional policy **clearly defines the roles and responsibilities** of each agency with regard to drinking water management, programming, and policy making, for both private wells and public systems.
2. Drinking water is managed at appropriate scales, using an integrated major watershed approach and emphasizing coordination between management at different scales.
3. Drinking water policy is coherent and **coordinated horizontally and vertically** across administrative and economic sectors and jurisdictions, including but not limited to health, environment, energy, agriculture, and industry.
4. Drinking water management entities have adequate professional capacity and training for the scale of their responsibilities.

Efficiency:

5. Processes and institutions are in place generating **scientifically robust data** about the drinking water supply **that is timely, relevant, and accessible** in a way that is suitable to guide policy development and assessment.
6. Governance mechanisms ensure financial sources are adequate, appropriately structured, and transparently, efficiently, and equitably allocated for drinking water management.
7. Sound regulatory frameworks for drinking water management are effectively implemented and enforced.
8. Governance processes across jurisdictions **incentivize and foster innovation and flexibility** in finance, sharing information, assessment, and engagement.

Trust and Inclusiveness:

9. Drinking water management entities have **functional, systematic mechanisms** established to maintain integrity and transparency **for greater accountability and trust**.
10. Drinking water stakeholders, and the nature of their stake, have been clearly identified. **Stakeholders are systematically engaged** in interpreting needs and designing solutions to drinking water concerns **at a level appropriate to their jurisdictional authority**.
11. Frameworks exist and are implemented to **identify trade-offs and prioritize options** across sectors and generations of non-human and human water users.
12. Drinking water programs and institutions are **regularly and transparently monitored and evaluated** for their effectiveness and fairness in managing drinking water.

Appendix B: List of key plans reviewed

- **Clean Water Council's Strategic Plan** focuses on activities within the Council's statutorily defined roles for the Clean Water Legacy Act and the Clean Water Fund.
- **DRAFT Metropolitan Council Water Policy Plan (PDF)**: A plan within the Metropolitan Council's Regional Development Guide. The aim of this plan is to guide the region towards a present and future where water is clean and plentiful, the benefits of water and water services are maximized and equitable, and risks and negative outcomes are eliminated or minimized.
- **MDH DRAFT Strategic Plan:** Internal document.
- **Minnesota Climate Action Framework**: This plan sets a vision for how our state will address and prepare for climate change. It identifies immediate, near-term actions we must take to achieve our long-term goal of a carbon-neutral, resilient, and equitable future for Minnesota.
- **Minnesota Nitrogen Fertilizer Management Plan**: The state's blueprint for the prevention or minimization of the impacts of nitrogen fertilizer on groundwater.
- State Water Plan: Water and Climate (PDF)**:** A comprehensive long-range water resources plan for the state every ten years. The 2020 state water plan focused on the intersection of water and climate. The purpose of the plan is to establish a framework for aligning state agencies, legislative priorities, and local government policy, programs, and actions for the coming decade.

Appendix C: Minnesota Drinking Water Action Plan Overview

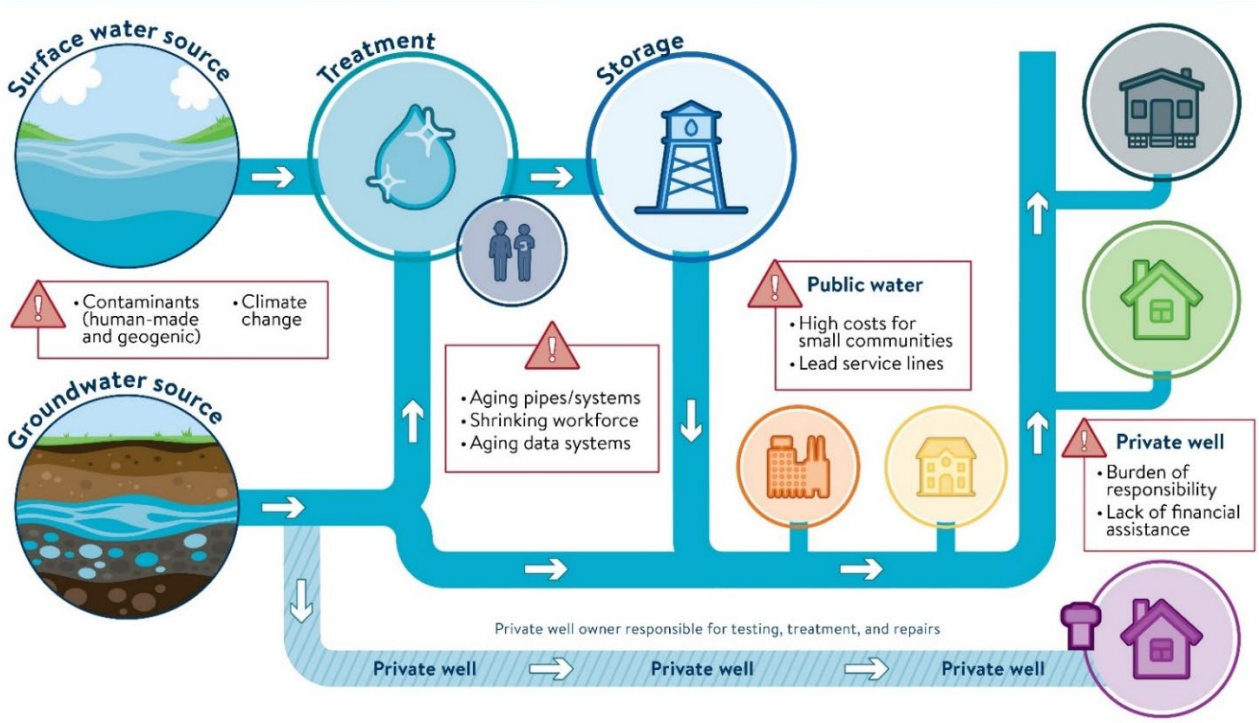
A 10-YEAR ACTION PLAN TO ENSURE THAT EVERYONE, EVERYWHERE IN MINNESOTA HAS EQUITABLE ACCESS TO SAFE AND SUFFICIENT DRINKING WATER

Provide input on the DRAFT Plan by October 17, 2024

You are invited to review the *DRAFT Minnesota Drinking Water Action Plan* (the Plan) and provide input. The current version incorporates expertise and feedback from water professionals; state and local governments; researchers; and Minnesotans who drink water. We gathered input and feedback through community meetings, surveys, and discussions.

Access the DRAFT Plan, feedback form, and the reports that informed the Plan at **Future of Drinking Water** (www.health.state.mn.us/communities/environment/water/cwf/fdw.html).

There are risks to our drinking water, from source to tap



Goals and strategies to address key risks

Protect sources of drinking water

- Identify and manage potential threats around drinking water sources for public water systems and private wells.
- Include drinking water considerations in land use planning and zoning decisions.
- Emphasize source water protection in watershed management plans.
- Ensure adequate supply of water for public water systems and private wells.
- Ensure laws, rules, and ordinances adequately protect sources of drinking water.

Establish resilient drinking water infrastructure

- Support communities with asset management and resiliency planning for drinking water infrastructure.
- Support and grow the public water system and licensed well contractor workforces.
- Transition from legacy data systems to modern, resilient systems.

Ensure safe tap water

- Prevent and resolve health-based violations in public water systems and private wells.
- Reduce lead in drinking water.
- Establish equitable access to private well testing and mitigation.
- Empower Minnesotans to value drinking water and take actions to sustain and protect it.

Anticipate and manage emerging risks.

- Monitor drinking water sources for emerging contaminants and pathogens.
- Understand how people's health may be affected by emerging contaminants and risks.
- Prioritize emerging risks that present the largest public health burden in the context of all contaminants.
- Advance laboratory capacity and methods to analyze for emerging risks.
- Address drinking water risks related to climate change.

Engage partners

- Communicate with and support public water suppliers and licensed well contractors.
- Provide partners and residents with data on risks and challenges to safe drinking water.
- Facilitate outreach, education and assistance to communities/residents affected by drinking water contamination.
- Leverage advisory councils to understand and prioritize challenges to safe drinking water.
- Create more public-facing (toward residents) explanations of the drinking water supply system.
- Communicate with elected officials at all levels of government regarding drinking water concerns.

Legislative direction

The 2023 Minnesota Legislature provided Clean Water Fund dollars to Minnesota Department of Health (MDH) to "…develop public health policies and an action plan to address threats to safe drinking water, including development of a statewide plan for protecting drinking water…" (Minnesota Laws of 2023, chapter 40, article 2, section 7e [https://www.revisor.mn.gov/laws/2023/0/Session+Law/Chapter/40/]).

Appendix D: Glossary

Acronyms

- **BWSR:** Board of Water and Soil Resources
- **CHB:** Community Health Board
- **CWA:** Clean Water Act
- **CWMP**: Comprehensive Watershed Management Plans
- **DLI:** Department of Labor and Industry
- **DNR:** Department of Natural Resources
- **DWRF:** Drinking Water Revolving Fund
- **DWSMA**: Drinking Water Supply Management Area
- **GRAPS:** Groundwater Restoration and Protection Strategies
- **HRL:** Health Risk Limit
- **IIJA:** Investment and Jobs Act
- **MDA:** Minnesota Department of Agriculture
- **MDH:** Minnesota Department of Health
- **MPCA:** Minnesota Pollution Control Agency
- **MN AWWA:** Minnesota Chapter of the American Water Works Association
- **MNWOO:** Minnesota Well Owners Organization
- **MRWA:** Minnesota Rural Water Association
- **SDWA:** Safe Drinking Water Act
- **SWCD:** Soil and Water Conservation District
- **WBIF:** Watershed Based Implementation Funding
- **WD:** Watershed district
- **WIIN:** Water Infrastructure Improvements for the Nation
- **WMO:** Watershed Management Organization
- **WRAPS:** Watershed Restoration and Protection Strategies

Terms

- **Accredited water testing laboratories:** Laboratories that are accredited by the Minnesota Environmental Laboratory Accreditation Program.
- **Advisory Council on Water Supply Systems and Wastewater Treatment Facilities:** Council that advises MDH and MPCA regarding classification of water supply systems and wastewater treatment facilities, qualifications and competency evaluation of water supply system operators and wastewater treatment facility operators, and additional laws, rules, and procedures that may be desirable for regulating the operation of water supply systems and of wastewater treatment facilities.
- **Advisory Council on Wells and Borings:** The council advises the Minnesota Department of Health (MDH) on technical matters related to the construction, repair, and sealing of wells and borings and the licensure of well and boring contractors.

- **Asset management plans:** A process water utilities can use to make sure that planned maintenance can be conducted and capital assets (pumps, motors, pipes, etc.) can be repaired, replaced, or upgraded on time and that there is enough money to pay for it.
- **Clean River Partners:** A Minnesota membership organization based in Northfield, MN that has worked for over 30 years to protect Minnesota waterways, particularly the Cannon River watershed in southeast Minnesota.
- **Clean Water Act:** The federal regulatory framework to protect surface waters from pollution.
- **Clean Water Council:** A 28- member council that represents organizations with a major role in achieving clean water; the Council advises the Legislature and the Governor on the administration and implementation of the 2006 Clean Water Legacy Act.
- **Comparative risk assessment:** A standardized approach to estimate the burden of disease that an environmental risk causes.
- **Consumer Confidence Report:** Community water suppliers must prepare annual water quality reports, known as Consumer Confidence Reports, for their customers. The reports must be published by July of each year. The reports tell where drinking water comes from, what's in it, and how you can help protect it.
- **County Well Index:** A database that contains subsurface information for over 533,000 water wells drilled in Minnesota.
- **Drinking Water Supply Management Areas:** Areas containing the wellhead protection area but outlined by clear boundaries, like roads or property lines. The DWSMA is managed in a wellhead protection plan, usually by a city.
- **Eco Experience:** Interactive exhibits at the Minnesota State Fair on renewable energy, green technology, organic agriculture, transportation alternatives, healthy cooking, and clean air and water.
- **Freshwater:** A Minnesota nonprofit on a mission to inspire and empower people to value and preserve water.
- **Future of Drinking Water Report (2020):** MDH contracted with the University of Minnesota Water Resources Center and Humphrey School of Public Affairs to assess threats and barriers to Minnesota's safe drinking water system and translate emerging science into protective public health policy and action.
- **Governance Assessment Framework:** Using a set of 12 criteria related to effectiveness, efficiency, and trustworthiness to describe how well something is governed.
- **Groundwater Protection Rule:** A Minnesota rule that minimizes potential sources of nitrate pollution to the state’s groundwater and protects our drinking water. The rule restricts the application of nitrogen fertilizer in the fall and on frozen soils in areas vulnerable to contamination, and it outlines steps to reduce the severity of the problem in areas where nitrate in public water supply wells is already elevated.
- **Groundwater Restoration and Protection Strategies:** Reports developed by MDH that 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.
- **Health Risk Limits**: The concentration of a chemical in drinking water that, based on the current level of scientific understanding, is likely to pose little or no health risk to humans, including

vulnerable subpopulations. This concentration is a function of how toxic a chemical is (that is, the minimum quantity that will cause health effects), the duration of exposure, and the amount of water individuals drink during the exposure period. In addition, a HRL value incorporates several adjustment factors to account for uncertainty in our understanding of a chemical's health risks; chemicals with fewer studies will tend to have a higher degree of conservatism built into the HRL value to compensate for the higher degree of uncertainty. These values are then promulgated.

- **Health-Based Values:** The concentration of a chemical (or a mixture of chemicals) that is likely to pose little or no risk to human health. Values calculated using the methodology adopted in the Health Risk Rules. Health based values meet the same data requirements as health risk limits but have not been promulgated.
- **Metro Watershed Management Plan:** Plans to protect water resources in the seven county metro area.
- **Minnesota Environmental Laboratory Accreditation Program** helps ensure laboratories submit reliable and consistent data to Minnesota's various environmental programs. MNELAP offers accreditations designed to accommodate the needs of many state and federal environmental programs including testing required by the Underground Storage Tank Program, Clean Water Act, Resource Conservation and Recovery Act and the Safe Drinking Water Act.
- **Minnesota Well Code:** This refers to Minnesota Statutes, chapter 103I and Minnesota Rules, chapters 4725 and 4727. These regulations are legally enforceable requirements and standards for well and boring construction and sealing, and water quality testing. These regulations apply to public and private wells to protect both public health and groundwater.
- **Minnesota Well Index:** An online platform that provides basic information about wells and borings, such as location, depth, geology, construction, and static water level.
- **One Watershed, One Plan:** A program to help develop comprehensive watershed management plans that aligns local water planning on watershed boundaries to create a systematic, watershed-wide, science-based approach to watershed management.
- **Private well user:** Someone who gets their drinking water from a private well; they could own the well or rent the property.
- **Risk Assessment Advice:** Technical guidance concerning exposures and risks to human health. Risk Assessment Advice may be quantitative (e.g., a concentration of a chemical that is likely to pose little or no health risk to humans) or qualitative (e.g., a written description of how toxic a chemical is in comparison to a similar chemical). Generally, risk assessment advice contains greater uncertainty than HRLs and HBVs because the available information is more limited.
- **Safe Drinking Water Act** federal standards that ensure that public drinking water, whether from surface water or groundwater, is safe to drink.
- **Sanitary survey:** An on-site review of the adequacy of the water source, facilities, equipment, operation and maintenance of a public water supply system for producing and distributing safe drinking water.
- **Source Water Protection Plans:** These plans define a protection area for drinking water sources, the Drinking Water Supply Management Area and include an inventory of water quality threats in the DWSMA such as abandoned wells, septic systems, aging infrastructure, or fertilizer application. Public water implement strategies outlined in the Plan to monitor and manage these potential threats over time. Source Water Protection Plans are required for all public water systems that use groundwater, but the activities in the Plan are voluntary.

- **Water service lines:** The water line that brings water from the water main into a home.
- **We Are Water:** A network of partnerships, a traveling exhibit, and public events to deepen connections between the humanities and water.
- **Well Advisory Letters:** A letter that the Minnesota Department of Health sends recommending that a private well household not use the water from the well.
- **Well interferences:** When the pumping of one well affects the availability for water in another well.
- **Wellhead Protection Area:** Areas surrounding public water supply wells that contribute groundwater to the well. In these areas, contamination on the land surface or in water can affect the drinking water supply.

Resources

2020 Minnesota State Building Codes (www.dli.mn.gov/business/codes-and-laws/2020-minnesota-state-building-codes)

2023 Minnesota Statutes chapter 103H, section 103H.201 (https://www.revisor.mn.gov/statutes/cite/103H.201)

2024-2033 Minnesota Drinking Water Action Plan Community Engagement Feedback Report (https://hdl.handle.net/11299/264013)

Accelerated Implementation Grants (www.health.state.mn.us/communities/environment/water/groundwater/accimpgrant.html)

Advisory Council on Water Supply Systems and Wastewater Treatment Facilities (www.health.state.mn.us/communities/environment/water/wateroperator/advisorycouncil.html)

Advisory Council on Wells and Borings (www.health.state.mn.us/communities/environment/water/wells/lwcinfo/advisory.html)

Agriculture Best Management Practices (BMP) Loan Program (www.mda.state.mn.us/agbmploan)

Clean River Partners (https://www.cleanriverpartners.org/)

Clean Water Council (www.pca.state.mn.us/air-water-land-climate/clean-water-council)

Clean Water Council Strategic Plan (PDF) (www.pca.state.mn.us/sites/default/files/wq-cwc1-26.pdf)

Consumer Confidence Report (CCR) Rule Revisions (https://www.epa.gov/ccr/consumer-confidence-report-rule-revisions)

Delegated Well Programs (www.health.state.mn.us/communities/environment/water/wells/delegated.html)

Discovery Farms Minnesota (www.mda.state.mn.us/protecting/cleanwaterfund/onfarmprojects/discoveryfarmsmn

DRAFT Metropolitan Council Water Policy Plan (PDF) (https://metrocouncil.org/Council-Meetings/Committees/Environment-Committee/2024/07-23-2024/Water-Policy-Plan-Clean-Version.aspx)

Drinking Water Revolving Fund (www.health.state.mn.us/communities/environment/water/dwrf/index.html)

Eco Experience (www.mnstatefair.org/location/eco-experience/)

Fees (www.health.state.mn.us/communities/environment/water/wells/feesched.html)

Financial Assistance for Home Water Treatment and Well Construction, Repair, and Sealing (www.health.state.mn.us/communities/environment/water/wells/sealing/loans.html)

Fix Up Home Improvement Loan Program (Home Improvement Programs) (www.mnhousing.gov/homeownership/improve-your-home.html)

Freshwater (https://freshwater.org/)

From Tap to Tapestry: Using Art and Creativity to Protect Drinking Water (https://environmental-initiative.org/news-ideas/from-tap-to-tapestry-using-art-and-creativity-to-protect-drinking-water/)

The Future of Minnesota Drinking Water (https://hdl.handle.net/11299/212014)

Groundwater monitoring (www.pca.state.mn.us/air-water-land-climate/groundwater-monitoring)

Groundwater Pesticide Water Quality Monitoring (www.mda.state.mn.us/groundwater-pesticide-water-quality-monitoring)

Groundwater Protection Rule (www.mda.state.mn.us/nfr)

Groundwater Restoration and Protection Strategies (GRAPS) (www.health.state.mn.us/communities/environment/water/cwf/localimplem.html)

High Pressure Water Main Repair (https://youtube.com/shorts/pRf2JHw9LQg?si=4Z8OJm0-AAP8Uar-)

Humphrey School of Public Affairs (https://www.hhh.umn.edu/)

Integrated Planning (https://metrocouncil.org/Wastewater-Water/Planning.aspx)

Invisible Heroes Videos (www.health.state.mn.us/communities/environment/water/videos.html)

Lead and Copper Rule Revisions (www.health.state.mn.us/communities/environment/water/rules/lcrr.html)

Lead in Minnesota Water: Assessment of Eliminating Lead in Minnesota Drinking Water (PDF) (https://www.health.state.mn.us/communities/environment/water/docs/leadreport.pdf)

Lessons from Drinking Water Professionals: An Assessment of Drinking Water Governance in Minnesota (https://hdl.handle.net/11299/259166)

Metro Watershed Management Plan (https://bwsr.state.mn.us/metro-watershed-management-plan)

Minnesota Climate Action Framework (https://climate.state.mn.us/minnesotas-climate-action-framework)

Minnesota Geological Survey (https://cse.umn.edu/mgs)

Minnesota Ground Water Association (https://www.mgwa.org/)

Minnesota Groundwater Contamination Atlas (www.pca.state.mn.us/about-mpca/minnesota-groundwater-contamination-atlas)

Minnesota Laws of 2023, chapter 40, article 2, section 7e (https://www.revisor.mn.gov/laws/2023/0/Session+Law/Chapter/40/)

Minnesota's public health system: History and context (www.health.state.mn.us/communities/practice/about/history.html)

Minnesota Rural Water Association (MRWA) (https://www.mrwa.com/)

Minnesota Section of the American Water Works Association (https://www.mnawwa.org)

Minnesota Suburban Utility Superintendents Association (SUSA) (http://mnsusa.org/)

Minnesota Water Well Association (https://mwwa.org)

Minnesota Well Owners Organization (MNWOO) (https://mnwoo.org/)

Nitrogen Fertilizer Management Plan (www.mda.state.mn.us/pesticide-fertilizer/minnesota-nitrogen-fertilizer-management-plan)

One Watershed, One Plan (https://bwsr.state.mn.us/one-watershed-one-plan)

PFAS Standards for Drinking Water (www.health.state.mn.us/communities/environment/water/pfasvalues.html)

Part 2 of the Groundwater Protection Rule (www.mda.state.mn.us/pesticide-fertilizer/part-2-groundwater-protection-rule)

Potential Revisions of Microbial and Disinfection Byproducts Rules (https://www.epa.gov/dwsixyearreview/potential-revisions-microbial-and-disinfection-byproducts-rules)

Projects and Practices Grants (https://bwsr.state.mn.us/grant-profile-projects-and-practices)

Safe Drinking Water Fee (www.health.state.mn.us/communities/environment/water/com/scf.html)

Soil and Water Conservation Districts (https://bwsr.state.mn.us/soil-water-conservation-districts)

Source Water Protection (https://www.nrcs.usda.gov/programs-initiatives/source-water-protection)

Source Water Protection Collaborative (https://environmental-initiative.org/our-work/source-water-protection-collaborative/)

Source Water Protection Grants (www.health.state.mn.us/communities/environment/water/swp/grants.html)

State Water Plan: Water and Climate (PDF) (https://www.eqb.state.mn.us/sites/eqb/files/2020%20State%20Water%20Plan.pdf)

Surface Water Pesticide Water Quality Monitoring program (www.mda.state.mn.us/pesticide-fertilizer/surface-water-pesticide-water-quality-monitoring)

University of Minnesota Water Resources Center (https://wrc.umn.edu/)

Watershed approach to water quality (www.pca.state.mn.us/air-water-land-climate/watershed-approach-to-water-quality)

Watershed-Based Implementation Funding (https://bwsr.state.mn.us/watershed-based-implementation-funding-program)

Watershed Districts (https://bwsr.state.mn.us/watershed-districts)

Watershed Management Organizations (https://bwsr.state.mn.us/watershed-management-organizations)

We Are Water (https://www.mnhum.org/program/we-are-water-mn/)

Well interferences (www.dnr.state.mn.us/waters/watermgmt_section/appropriations/interference.html)

Wellhead Protection Partner Grants (https://bwsr.state.mn.us/node/8906)

Wellhead Protection Rule (www.health.state.mn.us/communities/environment/water/rules/wellhead.html)