Issue Briefs: MAWSAC Report

to the Minnesota Legislature and Metropolitan Council

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The following draft issue briefs are intended to support MAWSAC review, discussion and revision. Content is expected to be substantially revised following the June 11, 2026 meeting.

Issue brief topics:

1. Water quality & source water protection
2. Sustainable water quantity
3. Infrastructure & asset management
4. Groundwater-surface water interaction
5. Cost of water/affordability

Each issue brief includes:

1. Why the issue matters
2. Current conditions and emerging pressures
3. Potential risks and consequences
4. Why equity matters in this issue
5. Key policy questions
6. Policy options
7. Guidance for talking to constituents

Protecting Water Quality and Source Water for Public Health and Long-Term Resilience

Why protecting water quality and source water matters

Water contamination and its consequences impact public health, ecosystem function and regional economic competitiveness. Over the past century, federal and state water protection laws significantly reduced the amount of pollution in rivers, lakes, and streams nationwide, especially since the passage of the Clean Wate Act. However, the country and metro region have not met the ambitious Clean Water Act goal to provide drinkable, swimmable, and fishable water for all areas of the metro region[WQ-1].

Clean and reliable drinking water is essential to public health, economic stability, and quality of life in the Twin Cities metropolitan region. Communities throughout the region depend on groundwater, rivers, lakes, and aquifers [WQ-2] that can become more difficult and expensive to protect once contamination occurs.

Some contaminants can be treated relatively easily, while others require complex and costly long-term treatment systems once they reach groundwater, rivers, drinking water facilities, or wastewater systems.

Many communities are now facing rising costs related to PFAS[WQ-4] treatment, nitrate[WQ-5] concerns, aging treatment infrastructure[WQ-6], changing drinking water standards[WQ-7], cybersecurity expectations[WQ-8], and climate-related water quality impacts[WQ-9]. Preventing contamination and planning proactively for future treatment needs can reduce long-term costs and risks for residents, businesses, utilities, and natural resources [WQ-3].

Current conditions and emerging pressures

The Twin Cities metropolitan region faces increasing pressure to maintain safe drinking water while responding to evolving contaminants, aging infrastructure, climate impacts, and changing regulatory expectations.

Communities across the region are addressing contaminants that are increasingly difficult or expensive to manage, including PFAS [WQ-4], nitrate[WQ-5], chloride[WQ-10], and other pollutants affecting groundwater and surface water supplies.

The East Metro PFAS response illustrates how contamination can create long-term treatment and infrastructure costs that are difficult and expensive for communities to address after contamination has already occurred. Nitrate concerns in parts of the region highlight how contamination sources and the communities responsible for treatment costs are not always the same[WQ-11]. And chloride[WQ-10] is a growing regional concern because it is persistent in the environment and difficult to remove once it enters groundwater, surface water, and wastewater systems.

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Additional contaminants, including microplastics, pharmaceuticals, cyanotoxins, and other emerging compounds, may require future monitoring or treatment as scientific understanding and regulatory standards evolve [WQ-12].

Climate change may increase water-quality challenges by increasing stormwater runoff, flooding, harmful algal blooms, and pollutant movement into lakes, rivers, and aquifers [WQ-9].

These challenges highlight the importance of addressing contamination closer to its source whenever possible. Some contaminants can be reduced more effectively through pollution prevention, source control, improved land-management practices, or changes in industrial and consumer practices than through expensive long-term treatment after contaminants have entered regional water systems. Because groundwater, rivers, wastewater systems, and drinking water infrastructure are interconnected, contamination in one part of the system can create costs and risks for downstream communities and water users across the region.

In addition, cybersecurity threats aimed at critical infrastructure also create new public health and operational risks for water systems.

These issues are closely connected to infrastructure investment, groundwater and surface water interactions, long-term water affordability, and regional planning decisions.

Regional strengths

- Minnesota has strong drinking water, source water protection, and environmental monitoring programs.
- State agencies, local utilities, watershed organizations, and regional partners have established strong foundations for coordinated monitoring, planning, and source water protection.
- Many communities throughout the region already invest significantly in treatment, testing, and water-quality protection.
- Communities in the region are working to identify and replace lead service lines, but significant funding and coordination needs remain.
- The Minnesota Department of Health Source Water Protection program supports local planning and protection efforts.
- Utilities, watershed organizations, researchers, and agencies collaborate on many water-quality initiatives.
- Some communities in the East Metro and elsewhere have already implemented treatment responses for contaminants such as PFAS and nitrate.

Emerging challenges

- Water quality monitoring documents degraded water quality in parts of the region (examples: chloride, nitrate, PFAS, etc.).

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- Many systems lack timely, comprehensive and actionable data necessary to detect issues early, optimize treatment processes, or ensure compliance with evolving regulatory standards.
- As more advanced treatment methods are being implemented, some are generating residual wastes such as spent granular activated carbon or concentrated waste streams, that create additional disposal, cost, and environmental challenges.
- Many communities do not yet have sufficient long-term funding or technical capacity to proactively address evolving treatment and infrastructure needs.
- Many treatment facilities are aging and were not originally designed to address newer contaminants or increasingly complex treatment requirements.
- Some systems must now plan for major upgrades while also maintaining aging infrastructure and keeping water affordable.
- Some contaminants are becoming more expensive and technically challenging to treat.
- Detection limits, monitoring expectations, and treatment requirements continue to evolve.
- Stormwater runoff and impaired waters continue to create water-quality challenges across the region.
- Cybersecurity risks and expectations are increasing.
- Workforce shortages are making it more difficult to recruit and retain operators, technical staff, scientists, and infrastructure specialists.
- Private well users may face additional challenges where contamination monitoring, treatment funding, technical support, or access to alternative water supplies are more limited.

Potential risks and consequences for communities, businesses, and natural resources

Water-quality challenges can affect public health, aquatic habitats, economic activity, infrastructure costs, and public trust. Without proactive protection and planning:

- Public health may be affected.
- Aquatic health may be impacted.
- Communities may face increasingly expensive treatment upgrades and emergency responses.
- Contamination can spread across groundwater and surface water systems and become more difficult to clean up.

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- Long-term treatment and monitoring requirements can create ongoing operational and disposal costs that continue for decades after contamination occurs.
- Utilities may struggle to maintain affordable rates while meeting evolving standards.
- Public confidence in drinking water systems may decline.
- Climate change impacts on surface waters could increase contamination without proper planning.
- Flooding and stormwater runoff may increase pollutant loads in lakes, rivers, wetlands, and source water protection areas.
- Without advanced cybersecurity and trained staff to operate it, cyberattacks on water infrastructure could disrupt safe drinking water delivery and emergency response capabilities.
- Smaller or lower-capacity communities may have fewer resources to respond to emerging risks.

Preventing contamination and protecting source water is often more cost-effective than responding after contamination reaches drinking water supplies.

Why water equity matters for water quality and source water

Water-quality risks and treatment costs are not distributed evenly across communities. Some communities face contamination issues that require expensive treatment upgrades, while others do not. Some communities also face aging infrastructure or longstanding investment gaps that increase costs and complicate compliance with new treatment requirements. Communities with fewer financial resources may have greater difficulty responding to these challenges.

Ensuring that all communities have access to safe, reliable, and affordable drinking water is an important part of long-term water sustainability. Preventing contamination and protecting source waters can reduce future treatment costs and help avoid disproportionate financial burdens on households and communities.

Public trust also matters. Communities are more likely to support water investments and use public water systems when information is transparent, understandable, and responsive to community concerns.

Key policy question: are current tools strong enough for the future?

The region has strong water-quality programs and protections and a growing understanding of emerging contaminants and treatment needs. The key policy question is whether current planning tools, coordination systems, funding mechanisms, and

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regulations are strong enough to help communities protect source water, maintain affordable treatment systems, and respond proactively to emerging risks.

How do we make sure:

- We assist communities to properly plan and fund water treatment for PFAS, emerging contaminants, chloride, and nitrate; upgrade aging water treatment infrastructure; and replace all lead service lines while making water affordable for everyone?
- We improve source water protection of aquifers and surface water, decrease pollutant loads from stormwater runoff, and reduce and eliminate impaired waters in the metro region?
- We improve coordination across agencies, utilities, and communities so contamination risks can be identified and addressed earlier?
- Drinking water remains safe, reliable, and affordable as treatment requirements change?
- Contamination is prevented whenever possible rather than addressed only after major impacts occur?
- Communities can prepare proactively for future treatment and infrastructure needs?
- Water systems are resilient to cybersecurity threats, flooding, and climate-related risks?
- Smaller and lower-capacity communities can keep pace with changing expectations and costs?
- Water-quality planning, source water protection, and infrastructure investments are coordinated effectively?

Policy options: Practical steps to reduce risk and strengthen water security

Increase access and benefits of safe, plentiful, and affordable water

- Establish partnerships to advocate and address environmental injustices by working with overburdened communities and regional partner organizations
- Improve incentives for communities and agencies to advance overburdened communities to trust their public water systems and avoid purchasing bottled water
- Improve regulations and enforcement of groundwater and surface water contamination

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Prevent contamination before it reaches drinking water sources

- Improve strategies to identify and reduce nonpoint contamination sources before pollutants reach aquifers, rivers, drinking water supplies, and wastewater systems.
- Establish partnerships with stakeholder groups, state agencies, local utility organizations, researchers, and regional water professionals to address existing and new water quality standards to improve water quality.
- Improve incentives for farmers and other property owners to better protect source water protection areas and watersheds from contamination (e.g. nitrogen-based fertilizers, stormwater pollutants including chloride from road salt).
- Improve regulations and develop risk-based priorities for accelerated actions for PFAS source reduction.
- Support strategies that reduce chloride contamination from road salt, water softeners, and other sources because chloride is persistent and difficult to remove once released into water source and systems.
- Improve incentives that reduce contamination risks from stormwater runoff, road salt, fertilizers, industrial pollutants, and other sources.

Prepare communities for evolving treatment needs

- Support evaluation of which contaminants can be treated cost-effectively and which may require stronger prevention and source-control strategies.
- Support research and planning related to treatment, residual management and disposal challenges associated with advanced contaminant removal technologies.
- Support long-term planning for treatment upgrades related to PFAS, nitrate, emerging contaminants, and changing drinking water standards.
- Improve funding flexibility for communities facing significant treatment and infrastructure costs (example: more grants, criteria for bonding bill funding).
- Support regional technical assistance, research partnerships, and information-sharing related to treatment technologies and best practices.

Strengthen resilience of water treatment systems

- Establish partnerships with planning and water management organizations to address the effects of climate change on water quality, water utilities, and water services
- Improve incentives for academic institutions and other organizations to conduct research to generate metro area-specific climate change information, identify potential risks and benefits, develop new technologies and approaches to address challenges, and better understand future climate scenarios based on current science and models.
- Improve regulations to reduce emissions that affect climate change.

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- Support cybersecurity preparedness, risk assessment, and emergency response planning for water utilities and treatment facilities.
- Support workforce development, internships, apprenticeships, and career awareness efforts across the water sector.
- Improve coordination among utilities, agencies, and emergency management organizations during water-quality emergencies.

Improve monitoring, data sharing, and early warning systems

- Expand contaminant monitoring and coordinated data-sharing efforts across agencies and jurisdictions.
- Support research related to climate impacts, emerging contaminants, and long-term source water protection.
- Improve public access to understandable and transparent water-quality information.

Guidance for talking to constituents

When evaluating proposed legislation, regulations, investments, infrastructure projects, or other actions that could affect water quality and source water protection, policymakers may wish to explore the following questions:

- What water quality concerns matter most to you and your community?
- How can we help overburdened communities trust their public water supply systems, to avoid purchasing bottled water from retailers?
- What impacts do you see or worry about with climate change and water quality?
- How can communities and water utilities make drinking water more affordable for all constituents while still funding needed infrastructure improvements?
- When should the focus be on preventing contamination at the source versus investing in more advanced downstream treatment systems?
- What role should businesses, industries, residents, and government agencies play in protecting source water?
- How should costs for new contaminants and treatment requirements be shared?
- What information would help build trust and confidence in public water systems?

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Balancing Water Use to Protect a Sustainable Water Supply

Why water sustainability matters

The Twin Cities metropolitan region currently has relatively abundant water compared to many parts of the country, but water supplies are not unlimited. Water is a shared public resource that supports more than half of Minnesota's population, a major share of the state's economy, and many of the lakes, rivers, wetlands, and ecosystems that make the region a desirable place to live and work.

As the region grows and climate conditions become less predictable, balancing water use across communities, businesses, agriculture, industry, and natural systems is becoming more complex.

Decisions made today about water use, infrastructure, development, and conservation will influence whether the region can continue to support long-term economic growth, public health, and environmental sustainability while avoiding higher future costs and unintended consequences.

Current conditions and emerging pressures

Most communities in the Twin Cities metropolitan region rely primarily on groundwater for drinking water. Surface water from the Mississippi River also supports major municipal systems, industrial uses, power generation, and ecosystems throughout the region[S-1].

Regional groundwater modeling suggests that long-term sustainable groundwater use across the region may be in the range of approximately 400–500 million gallons per day under current conditions, although sustainable levels vary by location, season, aquifer conditions, and climate patterns[S-2]. In some parts of the region and during some seasons, water demand is already approaching levels that may create concerns for long-term sustainability[S-3].

At the same time, water demand is changing. Population growth, redevelopment, changing land use, climate conditions, irrigation demand, and emerging water-intensive industries may all increase pressure on shared water resources. Some individual facilities, including data centers, industrial facilities, manufacturing operations, and energy production systems, can use substantial amounts of water relative to surrounding communitie[S-1].

Climate change adds additional uncertainty. More precipitation may fall in larger storm events that increase runoff rather than groundwater recharge. Longer dry periods, warmer temperatures, and higher seasonal demand may increase stress on water supplies and infrastructure[S-4].

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These challenges are closely connected to other regional water issues, including aging infrastructure, groundwater and surface water interactions, and the long-term affordability of water systems.

Regional strengths

- Minnesota has strong regional planning, monitoring, and water management expertise.
- Water utilities, state agencies, watershed organizations, researchers, and communities already collaborate on many water sustainability planning efforts.
- Many communities have improved water efficiency and conservation program[S-5].
- Water use permitting and reporting systems provide important information about major water users[S-6].
- Regional planning scenarios suggest that if average water use remains near approximately 80 gallons per person per day by 2050, the region could accommodate significant growth with relatively limited increases in total water demand compared to around 2010.

Emerging challenges

- Some parts of the region already experience seasonal water-supply stress[S-3].
- Growth and redevelopment continue to increase demand in some communities.
- Communities, water suppliers, and regulatory agencies are giving increased attention to proposed and changing large-volume water uses as they evaluate long-term water-supply and infrastructure considerations.
- Climate uncertainty may make future recharge and demand patterns less predictable[S-4].
- Some existing planning tools don't fully account for cumulative impacts across jurisdictions or sectors.
- Some communities have fewer water supply alternatives than others.

Potential risks and consequences for communities, businesses, and natural resources

Balancing water use is important because water supply decisions in one location can affect people, infrastructure, and natural systems elsewhere.

If total water demand exceeds sustainable limits or is not managed carefully over time:

- Groundwater levels may decline, reducing well reliability and increasing pumping costs.
- Lakes, rivers, wetlands, trout streams, springs, and groundwater-dependent ecosystems may experience lower water levels or ecological stress.

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- Infrastructure costs may increase as utilities need deeper wells, expanded storage, additional treatment, or new supply systems.
- Water supply challenges may constrain future growth and economic development in some areas.
- Emergency water supply responses may become more costly than proactive planning.
- Competition among different water uses may increase during droughts or seasonal peak demand periods.

The region's water systems are interconnected. Water-use decisions can also affect infrastructure investments, water affordability, stormwater management, and long-term resilience to climate change.

Why water equity matters for this issue

Water supply challenges do not affect all communities or water users equally. Some communities have fewer alternative water sources, less financial capacity to expand infrastructure, or greater exposure to water supply risks.

Water equity means all communities should have access to safe, reliable, and affordable water supplies and should have opportunities to participate in decisions that affect their water future. Water management strategies should consider how costs, risks, and conservation expectations are distributed across communities, businesses, residents, and natural systems.

Some water-efficiency improvements and infrastructure investments are easier for larger or better-resourced communities to implement than for smaller systems or communities facing aging infrastructure and affordability pressures.

Key policy question: Are current tools strong enough for the future?

The region has a growing understanding of long-term water supply limits and risks. The key policy question is whether current planning tools, coordination systems, incentives, and regulations are strong enough to help the region balance competing water uses over time while protecting long-term sustainability.

How do we make sure:

- Total water use remains within sustainable limits over time?
- Communities can continue to grow and redevelop responsibly?
- Businesses and major employers can access reliable water supplies?
- Water systems remain affordable and resilient?
- Lakes, rivers, wetlands, aquifers, and groundwater-dependent ecosystems are protected?

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- Water planning accounts for climate uncertainty and changing demand?
- Decisions in one area do not create unintended impacts elsewhere?

Policy options: practical steps to reduce risk and strengthen water security

Improve regional planning and coordination

- Improve coordination between water-supply planning, land-use planning, infrastructure planning, and economic development decisions.
- Support regional planning scenarios and benchmarks that help communities evaluate long-term water demand and sustainability.
- Encourage evaluation of cumulative impacts from growth, redevelopment, and major water users across jurisdictions.

Support efficient and flexible water use

- Improve incentives for water conservation, reuse, reclaimed water systems, and water-efficient technologies across residential, commercial, industrial, and institutional sectors.
- Support evaluation of aquifer storage, recharge strategies, and alternative supply approaches where appropriate.
- Encourage planning approaches that reduce unnecessary outdoor water demand and seasonal peak use.

Improve monitoring, modeling, and transparency

- Expand groundwater, surface water, and water-use monitoring to improve understanding of long-term sustainability and changing conditions.
- Improve public access to regional water-use and water-supply information.
- Support continued research and modeling related to groundwater recharge, climate impacts, and long-term water demand.

Prepare for future supply constraints and tradeoffs

- Evaluate management triggers and contingency planning approaches before major shortages or conflicts occur.
- Improve coordination among agencies, communities, and utilities during droughts or periods of high demand.
- Support planning tools that help communities evaluate tradeoffs among growth, economic development, environmental protection, and long-term water sustainability.

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Guidance for talking to constituents

When evaluating proposed legislation, regulations, investments, development projects or other actions that could affect regional water use, policymakers may wish to explore the following questions:

- What concerns do people have about the long-term condition of aquifers?
- How do residents define a fair allocation of shared water resources during periods of water stress?
- What role should large water users play in protecting shared water resources?
- What outcomes do residents in my district most want to protect or achieve regarding water availability?
- What tradeoffs are constituents willing, or unwilling, to accept?
- What level of conservation and water efficiency is reasonable across different sectors and communities?

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Water Supply Infrastructure: Managing Aging Systems and Long-Term Investment Needs

Why this matters now

Water supply infrastructure supports public health, economic activity, housing, emergency response, and daily life throughout the Twin Cities metropolitan region. Communities depend on thousands of miles of water mains, wells, pumps, treatment facilities, storage systems, and control technologies that require continuous maintenance, replacement, and modernization[I-1].

Many of these systems were built decades ago and are approaching the end of their useful life[I-1]. At the same time, utilities face rising costs related to treatment upgrades, climate resilience, cybersecurity, and changing water demand[I-2]. Proactive asset management, infrastructure planning, and sustainable funding can help reduce long-term costs, improve reliability, and strengthen regional resilience.

Current conditions and emerging pressures

Water supply infrastructure across the region is aging. Many treatment facilities, water mains, storage systems, and other critical assets were built 50 to 100 years ago and require significant maintenance, rehabilitation, or replacement [I-1].

Communities are also evaluating how changing water availability, emerging contaminants, and climate impacts may affect future infrastructure needs. In some areas, land use changes, redevelopment, industrial growth, and proposed high-water-use facilities may require new infrastructure investments or evaluation of alternative water sources [I-3]. These combined pressures are increasing the need for sustained and strategic investment.

Some infrastructure investments may become more cost-effective when communities coordinate regionally or develop compatible systems, emergency interconnections, and shared resilience strategies. However, funding capacity and infrastructure needs vary significantly across communities.

These challenges are closely connected to water affordability, water quality, long-term water sustainability, and regional planning decisions.

Regional strengths

- Communities throughout the region continue to invest significantly in water infrastructure, supported by state programs and local funding.
- State bonding programs, the Clean Water Fund, and other financing tools help support infrastructure investment.
- Minnesota has strong technical expertise in utility management, engineering, and water planning.

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- Many utilities already use asset management and long-term capital planning practices.
- Existing interconnections and mutual aid agreements improve emergency response capacity in some areas.
- Many utilities already maintain long-range capital improvement plans and are increasingly incorporating resilience, asset management, and risk assessment into infrastructure decision-making.

Emerging challenges

- Replacement needs continue to increase faster than available funding in some communities.
- Treatment requirements related to contaminants may increase infrastructure costs significantly for some communities.
- Infrastructure systems may require substantial upgrades over the coming decades. Statewide funding programs identify billions of dollars in drinking water infrastructure needs.
- Infrastructure funding pressures may increase costs for local ratepayers.
- Key funding sources, including federal funding and the Clean Water Fund, may face increased pressure in the coming years.
- Some communities have limited technical, staffing, or financial capacity to tackle large projects.
- Climate-related flooding, drought, and storm events may place additional stress on existing systems.
- Climate change may increase stress on infrastructure through flooding, drought, storm intensity, and seasonal demand changes.
- Population growth and redevelopment may also shift where water demand occurs and where infrastructure investment is needed.
- There is growing awareness of the risks and costs associated with privately-owned wells.

Potential risks and consequences for communities, businesses, and natural resources

When water infrastructure falls behind community needs:

- Deferred maintenance and underinvestment can increase the risk of system failures, emergency repairs, water loss, service disruptions, and contamination concerns. Replacing infrastructure after failure is often more expensive and disruptive than proactive planning and scheduled replacement.
- Emergency repairs and system failures can become more frequent and costly.

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- Service disruptions may affect public health, businesses, housing, and economic activity.
- Water loss from leaks and failing infrastructure may increase unnecessary costs and demand.
- Communities may struggle to respond to droughts, flooding, contamination events, or infrastructure emergencies.
- Aging systems may become more vulnerable to cybersecurity risks and operational failures.
- Smaller or lower-capacity communities may have difficulty financing large infrastructure projects.
- Delayed investment can increase long-term costs for residents, businesses, and utilities.
- Communities may have fewer options to respond to changing water availability or contamination events.
- Future infrastructure investments may become more expensive if long-term planning and asset management are delayed.
- Limited funding capacity may force communities to defer needed renewal and replacement projects.

Reliable infrastructure is essential for maintaining safe and affordable water supplies and supporting long-term economic competitiveness.

Why water equity matters for this issue

Infrastructure costs and risks are not distributed evenly across the region. Some communities face higher treatment costs, aging infrastructure challenges, or limited funding capacity compared to others.

Water equity means all communities should have access to safe, reliable, and affordable water infrastructure regardless of local financial capacity or existing infrastructure conditions. Infrastructure planning and funding strategies should consider how costs and benefits are distributed across households, businesses, utilities, and communities.

Smaller systems and communities facing major treatment or replacement costs may need additional technical assistance, planning support, or funding flexibility to maintain long-term affordability and reliability.

Key policy question: Are current tools strong enough for the future?

Communities are primarily responsible for operating and maintaining water systems, but aging infrastructure, changing treatment needs, and climate pressures are increasing regional challenges.

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How do we make sure:

- Funding for water infrastructure is sufficient and reliable over time?
- Water rates are fair and shared equally from community to community?
- Communities can address aging infrastructure before major failures occur?
- Funding tools keep pace with growing replacement and treatment costs?
- Smaller or lower-capacity communities can manage large infrastructure investments?
- Water systems are prepared for future climate, cybersecurity, and emergency risks?

Policy options: Practical steps to reduce risk and strengthen water security

The region has strong infrastructure expertise, planning capacity, and financing tools. The key policy question is whether current funding mechanisms, planning approaches, and coordination systems are strong enough to help communities proactively manage aging infrastructure, adapt to changing conditions, and maintain affordable and resilient water systems over the long term.

Strengthen infrastructure funding tools

- Support stable, long-term funding for maintenance and replacement (may include state bonding, Clean Water Fund investments, and other funding mechanisms).
- Support financing approaches that balance infrastructure renewal needs with long-term rate affordability.

Support proactive asset management and long-term planning

- Expand support for asset management including infrastructure condition assessment and long-term capital planning.
- Encourage utilities and communities to evaluate lifecycle costs and long-term replacement needs proactively.
- Improve coordination between infrastructure planning, land-use planning, and water-supply planning.

Improve resilience and system coordination

- Support emergency interconnections, backup systems, and other shared resilience strategies where appropriate.
- Improve infrastructure planning to improve resilience to flooding, drought, power grid impacts, and climate-related risks.
- Provide technical assistance and workforce support for smaller systems and to develop coordinated infrastructure planning approaches

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Improve long-term affordability and sustainability

- Support infrastructure strategies that reduce long-term operation, maintenance, and emergency repair costs.
- Target high-need areas and improve technical assistance and planning support for those communities with limited staffing or financial capacity.

Guidance for talking to constituents

When evaluating proposed legislation, regulations, investments, infrastructure projects, or other actions that could affect water supply infrastructure, policymakers may wish to explore the following questions:

- What infrastructure improvements are most important for the community's long-term reliability and resilience?
- How much should water conservation and efficiency be used to reduce future infrastructure expansion and maintenance costs?
- How should communities balance new development against increased water infrastructure construction and maintenance costs?
- What role should state bonding and regional funding play in supporting local water infrastructure?
- How can communities balance affordability with the need for proactive investment?

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Understanding Groundwater and Surface Water Interactions for Long-Term Water Supply Sustainability

Why this matters now

Groundwater, lakes, rivers, wetlands, stormwater systems, and land use are interconnected parts of the Twin Cities region's water system. Decisions about groundwater pumping, stormwater management, land development, and infrastructure can affect nearby lakes, rivers, wetlands, aquifers, ecosystems, and water supplies in ways that are not always immediately visible.

In some parts of the region, groundwater and surface water interactions can influence the sustainability of water supplies, the condition of groundwater-dependent ecosystems, and the effectiveness of long-term water management decisions. Understanding where these interactions are most significant can help communities make better informed planning and investment decisions.

As the region grows and climate conditions change, understanding and managing groundwater and surface water connections is becoming increasingly important for protecting drinking water, supporting economic growth, reducing unintended consequences, and maintaining healthy ecosystems.

Current conditions and emerging pressures

The Twin Cities metropolitan region includes over a thousand lakes; three major rivers; many streams, wetlands, springs, and fens; and a groundwater system that supports communities, recreation, ecosystems, and economic activity. In many locations, groundwater and surface water are hydraulically connected, meaning changes in one system can affect the other.

Recent attention has been paid to groundwater-surface water interactions because some surface waters in the region have experienced changes that have had consequences for the people and communities that rely on them for social, cultural, and economic activities. In areas where significant groundwater pumping intersects with hydraulically connected surface water features, there is the potential for negative impacts to both groundwater and surface water.

Understanding these connections can be difficult because conditions vary significantly across the region depending on geology, land use, aquifer conditions, and local hydrology. In some locations, existing information is sufficient to support planning decisions, while in others additional monitoring, modeling, or field studies may be needed to better understand potential impacts.

The region has already experienced examples where coordinated planning was necessary to reduce unintended impacts. Collaborative efforts around the Savage Fen

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area demonstrate how communities, agencies, and utilities can work together to balance groundwater-dependent ecosystem protection with long-term water-supply needs.

As climate change increases precipitation variability, storm intensity, and development pressure, integrated water planning and coordinated monitoring are becoming more important.

Communities and regulators are also evaluating how groundwater-surface water interactions should be considered when reviewing proposed high-volume water uses, changing water demands, alternative water supplies, and other regional water management strategies. Better information can help identify where additional analysis or mitigation may be needed before impacts occur.

These issues are closely connected to water-use planning, source water protection, infrastructure investment, stormwater management, and long-term water affordability.

Regional strengths

- Minnesota and the metro region has strong groundwater, lake, stream, and water-quality monitoring programs.
- Minnesota has a strong regulatory framework to protect our waters, including wellhead protection, wetland rules, stormwater permits, and local ordinances.
- Nature-based infrastructure, restoration projects, and recharge-focused planning approaches are increasingly used throughout the region.
- Utilities, watershed organizations, agencies, researchers, and communities already collaborate on many water monitoring and planning efforts.
- The Board of Water and Soil Resources and other organizations support groundwater protection, recharge planning, and watershed-based approaches.
- Existing regional modeling and monitoring efforts provide important information about groundwater and surface water interactions.

Emerging challenges

At the same time, warning signs are increasing:

- Contaminants such as chloride, nitrate, and stormwater pollutants continue to affect groundwater and surface water resources.
- Some lakes, streams, wetlands, and groundwater-dependent ecosystems are showing signs of stress or changing conditions such as declining baseflows and water levels.
- Stresses on aging stormwater/sewer systems can lead to overflows, basement flooding, and pollutant loads during heaving storms.
- Long-term rises in road salt and nutrient runoff threaten drinking water treatment and aquatic health.

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- Monitoring and management have become stronger in some jurisdictions than other, leading to uneven protection and data gaps.
- Climate change may increase flooding, runoff, recharge variability, growing season and related water demand, and infrastructure stress.
- Urbanization and increasing impervious surfaces impacts infiltration and groundwater recharge in some areas.
- Existing planning systems do not always evaluate cumulative impacts across jurisdictions or water systems.
- In some areas, additional monitoring, field studies, or analysis are needed to better understand groundwater-surface water interactions and potential water supply impacts.
- Communities may not always have access to the technical resources needed to interpret monitoring data and incorporate groundwater-surface water interactions into local planning and decision-making.

Potential risks and consequences for communities, businesses, and natural resources

When groundwater and surface water connections are not fully understood or considered together:

- Contaminants from stormwater runoff, fertilizers, road salt, septic systems, or industrial sources may move between groundwater and surface water systems.
- Pumping groundwater may reduce flows to lakes, streams, wetlands, springs, or groundwater-dependent ecosystems.
- Flooding and stormwater runoff may increase infrastructure damage and pollutant movement.
- Ecosystems that rely on groundwater can be stressed or damaged, such as many Twin Cities wetlands, lakeshores, and cold-water streams.
- Cleanup and treatment costs may increase when contamination spreads across connected systems.
- Reduced recharge from development and impervious surfaces may affect long-term water availability.
- Water-management decisions in one jurisdiction may create unintended impacts elsewhere.
- Communities may make infrastructure or water supply decisions without sufficient information about potential impacts on connected water systems.
- Water supply-related challenges may not be identified until impacts become more difficult or expensive to address.

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Integrated planning can help reduce unintended consequences and improve long-term resilience.

Why water equity matters for this issue

Communities and residents do not experience water-related risks equally. Some communities are more vulnerable to flooding, water-quality impacts, infrastructure costs, or changes in nearby lakes, wetlands, and groundwater systems. In addition, communities with limited technical or financial resources may have fewer opportunities to conduct monitoring, modeling, or specialized studies needed to understand local groundwater-surface water interactions.

Water equity means communities should have access to information, technical resources, and planning processes that help them understand and respond to water-system risks and tradeoffs. Coordinated planning and shared data can help reduce situations where one community experiences unintended impacts from decisions made elsewhere.

Protecting groundwater recharge areas, lakes, rivers, wetlands, and ecosystems also supports long-term public health, recreation, economic activity, and environmental benefits that are shared across the region.

Key policy question: Are current tools strong enough for the future?

The region has strong scientific expertise, monitoring programs and planning partnerships. The key policy question is whether current monitoring, modeling, planning, and coordination tools are sufficient to help communities understand groundwater-surface water interactions and incorporate that information into long-term water supply decisions.

How do we make sure:

- Communities understand where water-supply-related risks and vulnerabilities exist?
- Monitoring, modeling, and data-sharing systems are coordinated across agencies and jurisdictions?
- Recharge areas, groundwater-dependent ecosystems, lakes, rivers, and wetlands are protected?
- Development and infrastructure decisions reduce unintended long-term impacts?

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Policy options: Practical steps to reduce risk and strengthen water security

Improve monitoring, modeling, and shared data

- Improve data sharing, transparency, and long-term modeling related to groundwater and surface water interactions.
- Support research partnerships and technical tools that help communities evaluate cumulative impacts and long-term risks.
- Prioritize monitoring, modeling, and field studies in locations where groundwater-surface water interactions may have significant implications for water supply sustainability, ecosystem health, or future infrastructure decisions.

Improve integrated planning and coordination

- Support watershed-scale and regional planning approaches that evaluate interconnected water systems together.
- Encourage collaborative planning efforts among utilities, agencies, communities, watershed organizations, and researchers.
- Encourage consideration of groundwater-surface water interactions when evaluating major new uses, alternative water supplies, and regional water management strategies.
- Support risk-based evaluation of projects that may affect connected groundwater and surface water systems.
- Support local planning tools and controls that help mitigate water supply-related challenges associated with groundwater-surface water interactions.

Protect recharge areas and sensitive ecosystems

- Support recharge-area mapping, groundwatershed mapping, and vulnerability assessment efforts.
- Improve protection of groundwater-dependent ecosystems, wetlands, springs, trout streams, lakes, and other sensitive resources.
- Encourage green infrastructure, infiltration practices, and land-use approaches that support long-term recharge and resilience.

Guidance for talking to constituents

When evaluating proposed legislation, regulations, investments, development, projects, or other actions that could affect groundwater and surface water resources, policymakers may wish to explore the following questions:

- How should communities balance growth, development, and protection of lakes, rivers, wetlands, and groundwater?

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- What level of investment is reasonable to better understand long-term water-system risks and connections?
- How should communities manage tradeoffs between stormwater infiltration, water quality, and groundwater recharge?
- What water resources or ecosystems are most important for your community to protect?
- How should local decisions account for regional water impacts?

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Paying for Water Infrastructure: Balancing Affordability, Renewal, and Long-Term Sustainability

Why this matters now

Safe and reliable drinking water depends on continuous investment in treatment, infrastructure, operations, staffing, and long-term planning. Across the Twin Cities metropolitan region, many communities are facing rising water-system costs related to the renewal and replacement of aging infrastructure while also addressing treatment upgrades, climate resilience, cybersecurity, and emerging contaminants.

Most water systems are funded primarily through local water rates rather than ongoing state funding. As renewal and replacement needs grow, communities must balance affordability for households and businesses with the need to maintain infrastructure that can continue providing safe and reliable service for decades to come.

Current conditions and emerging pressures

Water systems throughout the region are facing increasing financial pressure. Many water systems are entering a period where significant portions of treatment, storage, distribution and pumping infrastructure require rehabilitation or replacement. In some communities, these needs are occurring at the same time as treatment upgrades and other emerging system requirements.

The costs of infrastructure renewal and replacement are not distributed evenly across communities. Some communities face major treatment costs or aging infrastructure needs while others do not. Smaller systems may also have higher costs spread across fewer customers.

At the same time, communities are trying to balance multiple goals through water-rate structures. Water rates must generate enough revenue to support long-term infrastructure and operations, encourage efficient water use, and remain affordable for households and businesses.

These goals can sometimes conflict. Water efficiency and conservation efforts may reduce water sales even though many infrastructure and operational costs remain fixed. Communities must also balance residential affordability concerns with the needs of businesses, institutions, and economic development.

These challenges are closely connected to infrastructure investment, water-quality protection, long-term water sustainability, and regional planning decisions.

Regional strengths

- Minnesota communities have a strong history of investing in public water systems.

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- Utilities throughout the region continue to maintain high-quality drinking water service.
- Some communities already use long-term financial planning, conservation pricing, and asset-management strategies.
- Existing state and regional funding programs help support infrastructure and treatment investments.
- Utilities, agencies, and researchers continue evaluating affordability and long-term cost management strategies.
- Many communities already use asset management practices and long-term capital planning to help anticipate infrastructure replacement needs and reduce future costs.

Emerging challenges

- Water infrastructure replacement and treatment costs continue to grow.
- Some communities face substantial costs related to PFAS, nitrate, or other treatment requirements.
- Infrastructure funding pressures may increase costs for local ratepayers.
- Affordability pressures may increase for households, businesses, and institutions.
- Smaller or lower-capacity systems may face greater financial and technical challenges.
- Existing affordability tools and metrics may not fully capture differences among communities or customer groups.

Potential risks and consequences for communities, businesses, and natural resources

When water affordability and financial sustainability challenges are not managed proactively:

- Households may struggle to afford essential water services.
- Businesses and institutions may face increasing operating costs.
- Utilities may delay needed infrastructure or treatment investments.
- Emergency repairs and infrastructure failures may increase long-term costs.
- Communities may struggle to maintain reliable service during climate or contamination events.
- Uneven infrastructure and treatment costs may create growing disparities among communities.
- Delayed investment may increase future costs for residents, businesses, and utilities.

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Long-term financial sustainability is important for maintaining safe, reliable, and resilient water systems.

Why water equity matters for this issue

Water affordability challenges do not affect all communities or households equally. Rate increases and infrastructure costs may create greater burdens for lower-income households, communities facing major treatment costs, or systems with limited financial capacity.

Water equity means all communities should have access to safe, reliable, and affordable drinking water while also supporting long-term system sustainability. Affordability planning should consider impacts on households, businesses, institutions, utilities, and future generations.

Infrastructure and treatment decisions should also consider how costs and benefits are distributed across communities and whether some communities need additional technical, financial, or planning support.

Key policy question: Are current tools strong enough for the future?

The region has a strong history of investing in public water systems and maintaining reliable service. The key policy question is whether current funding tools, rate structures, planning approaches, and assistance programs are sufficient to help communities provide safe and affordable drinking water.

How do we make sure:

- Households can continue to afford essential water services?
- Utilities can maintain infrastructure, treatment systems, and reliable operations over the long term?
- Businesses and institutions can continue accessing reliable and competitively priced water service?
- Communities facing disproportionate treatment or infrastructure costs can keep pace with future needs?
- Water-rate structures balance affordability and revenue stability?
- State, regional, and local funding tools support long-term resilience and sustainability?

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Policy options: Practical steps to reduce risk and strengthen water security

Improve affordability planning and transparency

- Improve public understanding of how infrastructure renewal and improvement costs affect water rates and long-term service reliability.
- Support long-term financial planning and affordability evaluation tools for utilities and communities.
- Encourage transparent communication about infrastructure, treatment, and operational investment needs.

Support communities facing disproportionate costs

- Improve funding flexibility and technical support for communities facing major treatment or infrastructure costs.
- Support communities with limited financial or technical capacity to address long-term water-system challenges.
- Encourage planning approaches that reduce long-term costs and improve resilience.
- Improve assistance for communities facing unusually large infrastructure replacement needs that may create affordability challenges for rate payers.

Improve long-term financial sustainability

- Support sustainable rate structures and long-term asset-management planning.
- Encourage evaluation of lifecycle costs and proactive infrastructure investment strategies.
- Improve coordination among utilities, agencies, and funding programs to support efficient long-term investment.

Balance affordability and revenue stability

- Support evaluation of rate-design approaches that balance water efficiency, affordability, and financial sustainability.
- Encourage planning approaches that account for changing water demand and impacts on utility revenue.
- Improve understanding of residential, commercial, industrial, and institutional water-use patterns and cost impacts.

Guidance for talking to constituents

When evaluating proposed legislation, regulations, investments, funding programs, or other actions that could affect water system costs and affordability, policymakers may wish to explore the following questions:

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- How should communities balance affordability with the need for long-term infrastructure investment?
- What level of state or regional support should help communities facing unusually high water costs?
- How should costs related to contamination treatment and aging infrastructure be shared?
- What role should conservation play in water-rate structures?
- How should water systems balance household affordability, business competitiveness, and long-term financial sustainability?

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