WATER SUPPLY PLANNING IN THE TWIN CITIES METROPOLITAN AREA (2005-2020)

Metropolitan Council report on findings, recommendations and continuing planning activities completed under Minnesota Statutes 473.1565

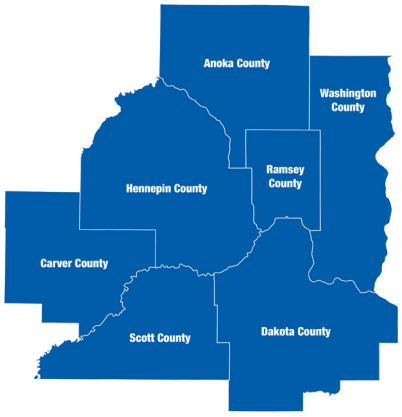
METROPOLITAN COUNCIL

September 2020

The Council's mission is to foster efficient and economic growth for a prosperous metropolitan region

Metropolitan Council Members

Charles Zelle	Chair	Raymond Zeran	District 9
Judy Johnson	District 1	Peter Lindstrom	District 10
Reva Chamblis	District 2	Susan Vento	District 11
Christopher Ferguson	District 3	Francisco J. Gonzalez	District 12
Deb Barber	District 4	Chai Lee	District 13
Molly Cummings	District 5	Kris Fredson	District 14
Lynnea Atlas-Ingebretson	District 6	Phillip Sterner	District 15
Robert Lilligren	District 7	Wendy Wulff	District 16
Abdirahman Muse	District 8		



The Metropolitan Council is the regional planning organization for the seven-county Twin Cities area. The Council operates the regional bus and rail system, collects and treats wastewater, coordinates regional water resources, plans and helps fund regional parks, and administers federal funds that provide housing opportunities for low- and moderate-income individuals and families. The 17-member Council board is appointed by and serves at the pleasure of the governor.

On request, this publication will be made available in alternative formats to people with disabilities. Call Metropolitan Council information at 651-602-1140 or TTY 651-291-0904.

Table of contents

About this report

The Twin Cities seven-county metropolitan area is home to three million people, over half of Minnesota's population. Securing residents' safe and plentiful water – while protecting the region's diverse water resources – requires coordinated, interdisciplinary and ongoing effort.

Although the seven-county region is relatively water-rich, the region's steady population growth, increased groundwater pumping, changing land use, and variable weather and climate is challenging some communities' ability to meet current and future water demand.

This report summarizes findings, recommendations, and continuing planning activities that address the water supply needs of the metropolitan area. It also documents work done since 2005 by Metropolitan Council (Council), with the Metropolitan Area Water Supply Policy (MAWSAC) and Technical Advisory Committees (TAC), and other partners, to fulfill the requirement of Minnesota Statute 473.1565.

Activities include:

1) Support for **collaboration**

2) Development and maintenance of a **base of technical information** including:
   a) Surface and groundwater availability analyses
   b) Water demand projections
   c) Water withdrawal and use impact analyses
   d) Modeling
   e) Similar studies

3) Development and periodic update of a **Metropolitan Area Master Water Supply Plan (Master Plan)** that:
   a) Provides guidance for local water supply systems and future regional investments
   b) Emphasizes conservation, interjurisdictional cooperation, and long-term sustainability
   c) Addresses the reliability, security, and cost-effectiveness of the metropolitan area water supply and its local and subregional components

4) **Recommendations**:
   a) Clarify the appropriate roles and responsibilities of local, regional, and state government in metropolitan area water supply
   b) Streamline and consolidate metropolitan area water supply decision-making and approval processes
   c) Fund ongoing and long-term metropolitan area water supply planning activities and capital investments

The Council considers the work and recommendations of the policy and technical advisory committees as the Council prepares regional development framework updates.

Minnesota's Clean Water Fund supports two Metropolitan Council programs that increase communities' implementation of projects to help achieve sustainable water supplies.

Twin Cities metropolitan area water supply at a glance

Water supply sources, demand, and infrastructure

Twin Cities metropolitan area water supply sources include four extensive underground layers of rock, gravel and sand (aquifers) which hold and transport billions of gallons of water for over two million people; the Mississippi River which supplies huge volumes of water for commercial, industrial and residential uses; and treated stormwater and wastewater which could potentially provide water for non-drinkable uses such as cooling or irrigation. A variety of factors must be considered when using any of these sources.

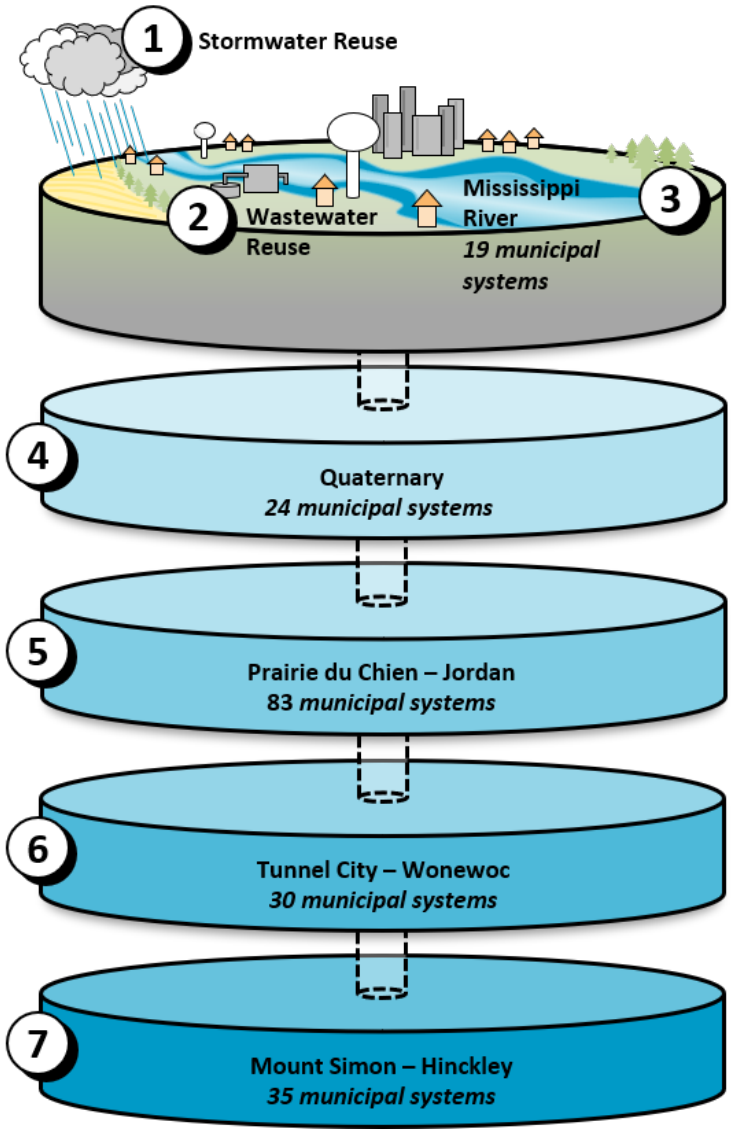


Figure 1. Water supply sources of the Twin Cities metropolitan area.

Water supply source considerations include:

- Access to the source – not all sources are equally available or productive across the region
- Seasonal variability of the supply – stormwater is not available in the winter
- Recharge rates – some aquifers replenish more quickly than others
- Nearby competing demands
- Vulnerability to contamination and/or existing natural or manmade contamination (examples: nitrate, PFAS, TCE, arsenic, radium, chloride)
- Regulated withdrawal limits and treatment requirements to protect public and environmental health
- Funding challenges

The Twin Cities metropolitan area water supply environment is large and complex. Figure 2 highlights some of the key factors shaping the Council's and partners' approach to water supply planning.

more than
50%
of Minnesota's population lives in the Twin Cities metro area

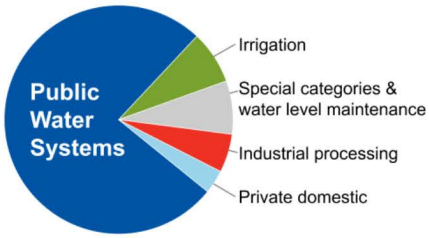
186 communities
84 suburban
61 rural & agricultural
27 urban
14 rural towns

3 million people in 2020
1.7 million jobs in 2020
100 gallons per person per day

3 of 4 people use groundwater (the rest use Mississippi River)

105 municipal systems
2 Mississippi River intakes
800 groundwater wells
10,000 miles distribution pipe

Metro Water Uses

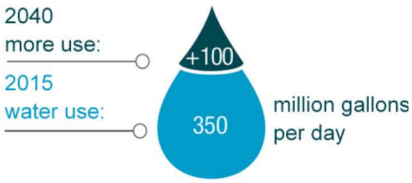


Private Wells
60,000 provide residential drinking water
5,000 support businesses and organizations

Over 2x more water used in summer than winter

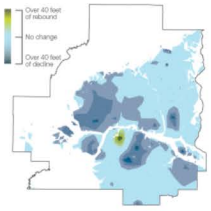
1,500
square miles designated for source water protection

Projected Water



Projected 2040 Growth
500,000 more people
200,000 more households
200,000 more jobs

Metro Model projects aquifer decline from more pumping



environmental permits, registrations & potential contaminated sites
57,600
recorded in MPCA's What's in My Neighborhood

Climate Challenges
drought
groundwater recharge
flooding

Emerging Issues
economic shifts
new contaminants
COVID-19 pandemic

Figure 2. Selected information about water supply conditions in the Twin Cities metropolitan area.

Metropolitan Council has a unique role as a planning agency, not a regulator or utility

Bringing together the many different and changing facets of water supply into a regional picture is outside the scope of any one community, yet it is necessary to adequately plan for the region's growth and economic development. The Metropolitan Council, as the regional planning agency for the seven-county Twin Cities metropolitan area, provides this role in collaboration with communities and state agencies under the advisement of several committees.

The Council has a unique role regarding water supply planning; it is not a regulator nor a water supplier. The Council's regional water supply work has been designed and applied to ensure local water suppliers have control of and responsibility for their water supply systems, while at the same time assuring state agency oversight is effective and efficient. This program supports municipality and industry efforts to address threats to drinking water supplies, provides cost-effective regional solutions, boosts inter-jurisdictional coordination, supports local implementation of water supply reliability and water quality protection projects, and protects groundwater for current and future use. Through its work, the Council helps to bolster the livability of the region, foster economic growth and prosperity, and alleviate competition and conflict over water supply. No other agency or unit of government provides this.

The Council's role is authorized in Minnesota Statutes (Minn. Stat. 473.1565) and supported by Council policies. Specifically, the Council:

1) Maintains a database of technical information, based on analysis of regional and local issues
2) Identifies approaches for addressing emerging issues
3) Develops and updates a metropolitan area Master Water Supply Plan (Master Plan) with partners
4) Assists communities with developing their local water supply plans and other local plans
5) Facilitates cooperation between communities and supports local and subregional efforts

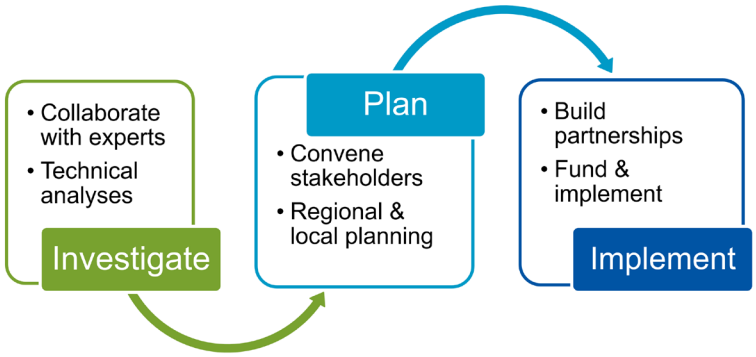


Figure 3. In collaboration with partners, the Council investigates, plans, and implements water supply projects and programs.

LOCAL PERSPECTIVES SHAPE REGIONAL PLANNING

"Water Supply Planning since 2005 reflects a partnered approach between the Council, local governments as well as other water-specific agencies/ entities. To me, the greatest value in this partnered approach is that documents like the Master Water Supply Plan (2015) are informed by the real experiences and expertise of the local water suppliers that the public has come to trust for safe and sustainable delivery of drinking water. The incorporation of those local government assets in MAWSAC, TAC, and water supply workgroups have added value and credibility to the necessary water supply planning efforts of the Metropolitan Council."

Mark Maloney, Public Utilities Director, City of Shoreview

Metro Area Water Supply Advisory Committee and Technical Advisory Committees shape the work

The Metropolitan Area Water Supply Advisory Committee (MAWSAC) and the Technical Advisory Committee (TAC), policy and technical committees established by Minn. Stat. 473.1565, are responsible for assisting the Metropolitan Council with its water supply planning activities.

MAWSAC responsibilities and membership

MAWSAC is responsible for:

1) Assisting the Council in its planning activities identified in Minn. Stat. 473.1565
2) Approving the Master Plan developed in cooperation with the Council
3) Appointing and consulting with the Technical Advisory Committee (see below), established to inform MAWSAC's work
4) Reporting to the Council, the Legislative Water Commission, and the chairs and ranking minority members of the Minnesota House of Representatives and Senate committees' divisions with jurisdiction over environment and natural resources, and providing the information required under this statutory section; MAWSAC's report and recommendations must include information provided by the TAC

The membership of MAWSAC is specified by Minn. Stat. 473.1565. The committee includes representatives of the Metropolitan Council, state water agencies, water utilities, and local and/or county governments from each county in the 11-county metropolitan area. Members are appointed in consultation with the Association of Minnesota Counties, Association of Metropolitan Municipalities (Metro Cities), and the League of Minnesota Cities, as appropriate.

Since 2005, more than 50 people have served on MAWSAC, bringing perspectives from more than a dozen different communities in all 11 metro counties.

TAC responsibilities and membership

TAC is responsible for informing MAWSAC's work by providing scientific and engineering expertise.

Most of the 15 committee members represent single-city and multicity public water supply systems in the metropolitan area and include experts in water resources analysis and modeling; hydrology; and the engineering, planning, design, and construction of water systems or water systems finance. Members are appointed by MAWSAC with input from the Association of Metropolitan Municipalities (Metro Cities), as appropriate.

Since its creation in 2015, 17 people have served on TAC, bringing perspectives from communities and utilities in the seven-county metro area.

See Tables 1 and 2 in the appendix for MAWSAC and TAC membership history.

Regional water supply work is based on shared principles

Although attention often focuses on "what" water supply planning activities the Metropolitan Council has done under Minn. Stat. 473.1565, equally important is "how" that work is done. Guided by stakeholders during the development of *Thrive MSP 2040* – the Council's long-range vision and plan for the region over the next 30 years – the Council identified three principles to carry out all its work, including water supply planning:

Collaboration recognizes that shared efforts advance our region most effectively toward shared outcomes. Addressing the region's issues—particularly the emerging challenges of climate change, economic competitiveness, racial disparities, and water sustainability—requires collaboration because no single entity has the capacity or the authority to do the work alone.

Integration is the intentional combining of related activities to achieve more effective results, leveraging multiple policy tools to address complex regional challenges and opportunities.

Accountability includes a commitment to monitor and evaluate the effectiveness of our policies and practices toward achieving shared outcomes and a willingness to adjust course to improve performance.

Collaboration sets direction and drives results

Metropolitan Council's water supply planning activities support both local stakeholder goals and progress toward the regional outcomes put forth in *Thrive MSP 2040,* shown in Figure 4.

Figure 4. Regional outcomes put forth in Thrive MSP 2040 include stewardship, prosperity, equity, livability, and sustainability.

Since 2005, the Council has connected with hundreds of water supply leaders in the State government's water agencies, local governments, public water utilities, academic institutions, environmental advocacy groups, businesses, and neighborhoods (Table 3 of the appendix). Working together to tackle challenges has better equipped communities to meet current and future needs:

- Scoping and contributing to technical projects at subregional water supply work groups, MAWSAC and TAC meetings, inter-agency coordination team meetings and focus groups
- Shaping regional plans and related local plan requirements through input to and approval of Master Plan and development of local water supply and comprehensive plans
- Demonstrating new approaches through projects such as rainwater harvesting and stormwater reuse at CHS field in Saint Paul and turfgrass demonstration site at the Minnesota Landscape Arboretum
- Building capacity through new programs such as industrial water efficiency audits through Minnesota Technical Assistance Program (MnTAP) intern program, community grants for water efficiency rebates, and the water conservation efforts of the Freshwater Society Water Stewards program

Collaboration milestones

2005 and 2015 Convened metropolitan area water supply policy and technical advisory committees (MAWSAC and TAC), which guide the Council's water supply work and approve the Master Plan.

2006-2015 Engaged stakeholders in water supply-related plan and policy updates including scoping workshops, technical forums, and formal public review processes.

2009-2017 Convened subregional water supply work groups, which serve as a cornerstone for collaboration. More than 70 communities have received technical and financial support from the Council through their work in these groups.

2013-2020 With partners, hosted several engagement events such as: the 2013 Our Water, Our Future workshops, 2014 forums and technical workshops to guide policy and plan updates, 2017 and 2018 tours of the University of Minnesota turfgrass research site, Water Bar on opening day of the 2019 Minnesota State Fair, and a 2020 webinar series for water efficient landscapes.

LOCAL SUPPORT FOR WORKING TOGETHER

"Groundwater doesn't know community boundaries. We can have a greater impact if we work together on water supply sustainability."

Russ Matthys, Public Work Director, Eagan

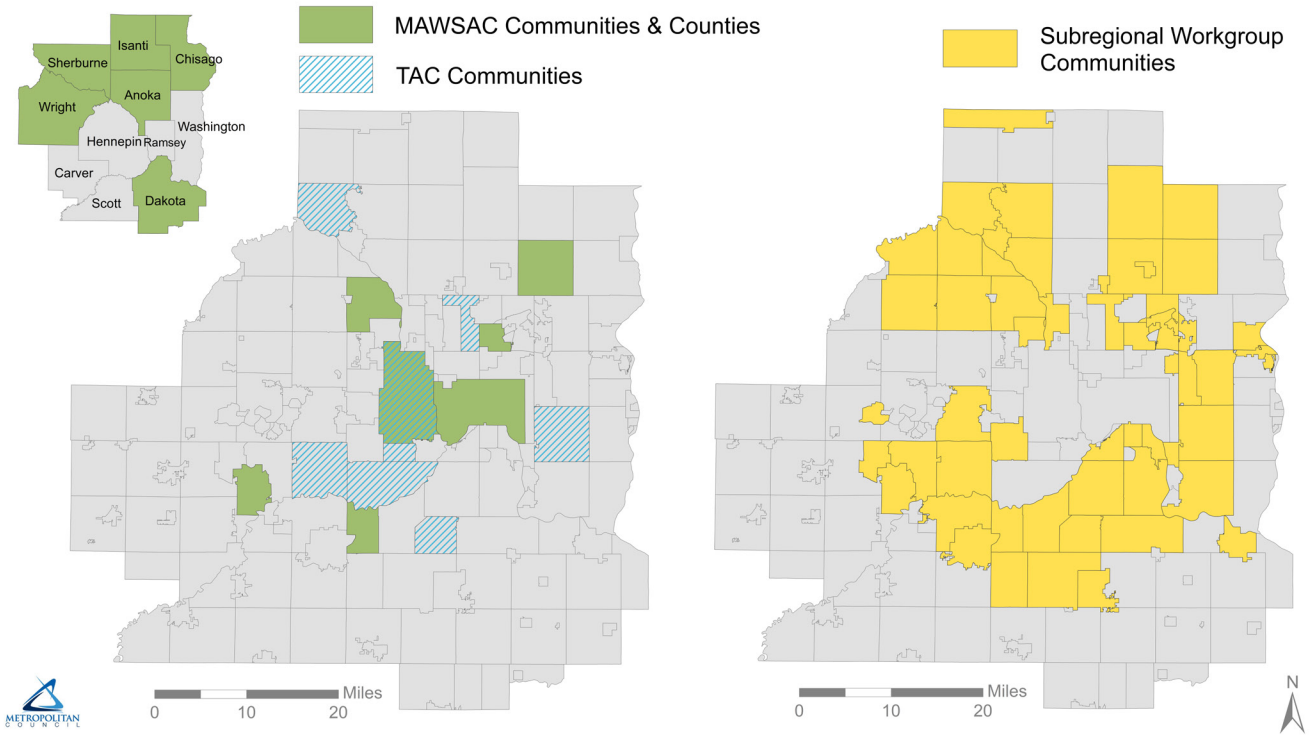


Figure 5. Communities represented in MAWSAC, TAC and subregional water supply work groups.

Technical investigations provide a foundation for planning and implementation

Since 2005, the Council has worked with its partners to develop and maintain a base of technical information including analyses of surface and groundwater availability, water demand projections, water withdrawal and use impact analyses, modeling, and similar studies.

In its technical work, the Council taps into extensive scientific and engineering expertise available in the region through contracts with engineering consultants, partnerships with academic institutions and the research branches of water agencies, and engineering and research support from across all divisions of the Council itself. The work – guided by MAWSAC, TAC, subregional water supply work groups, and others as appropriate – shapes regional policy plans, the Master Plan, and local programs and projects.

WORKING TOGETHER FOR SHARED RESOURCES

"Council funding of studies and projects was important because it isn't always easy to get local city councils to commit funds to something that reaches beyond their borders."

Steve Albrecht, Former Burnsville Public Works Director

Technical investigation milestones

2005-2020 Projects to collect and analyze new geologic, water level, and water chemistry information improve the conceptual understanding of groundwater and surface water sources. Examples: 2007 mapping of metro surficial geology and geochemistry; 2009 synoptic groundwater measurement of the metro area; 2015 analysis of enhanced recharge potential.

2009-2017 Developed and updated a regional groundwater flow model (Metro Model 2 and 3) to understand the cumulative and long-term implications of planned growth and related water demand.

2010 and 2020 Evaluations of groundwater and surface water interaction to better understand potential water supply impacts of regional growth, land use changes, and climate change.

2015-2020 Guided by water supply work groups and partners, completed subregional analyses of alternative water supply approaches, to inform future planning and project scoping. For example, in 2016 the Council and partners completed evaluations of recharge and stormwater reuse in the northeast, northwest, and southeast metro areas.

2013-2020 Water demand management analyses, including 2014 assessment of industrial water conservation barriers and opportunities, 2016 water billing analysis, 2018 study of efficient water use on Twin Cities metro area lawns). This work supports new programs such as Freshwater Society's Master Water Stewards Water Conservation Advisors, University of Minnesota Extension Turfgrass research and education.

For a more detailed list of technical investigation activities, see Table 4 in the appendix.

Key findings: challenges, opportunities and changing conditions

With partners, the Council's water supply collaboration and technical investigations have highlighted challenges in several areas, summarized below. For more information, refer to the Master Plan and technical studies included in the bibliography.

Socio-economic conditions

By 2040, the region is projected to grow by 500,000 people; 200,000 households; and 200,000 jobs compared to 2010. Understanding changing water supply needs and securing a sustainable supply of plentiful, clean water for these growing communities is the primary goal of the Council's water supply planning work.

Funding and finance

High-quality drinking water, wastewater treatment, and stormwater systems are a critical, and costly, component of community planning. Costs include planning and design, capital costs, operation and maintenance costs, and costs to monitor and report compliance with regulatory requirements. Public water suppliers, wastewater utilities, community planners, and elected officials stress the need for financial support for infrastructure changes to achieve sustainable solutions. Examples of challenges:

- Balancing short- versus long-term needs and costs when planning to rebuild or build new infrastructure
- Equitably balancing utility revenue versus affordability, particularly if decreased water demand impacts revenue while water supply system maintenance costs go up
- Addressing the need for more intense monitoring and treatment in water supply systems with mixed water sources
- Lacking reliable and adequate funding sources for implementing many stormwater reuse opportunities

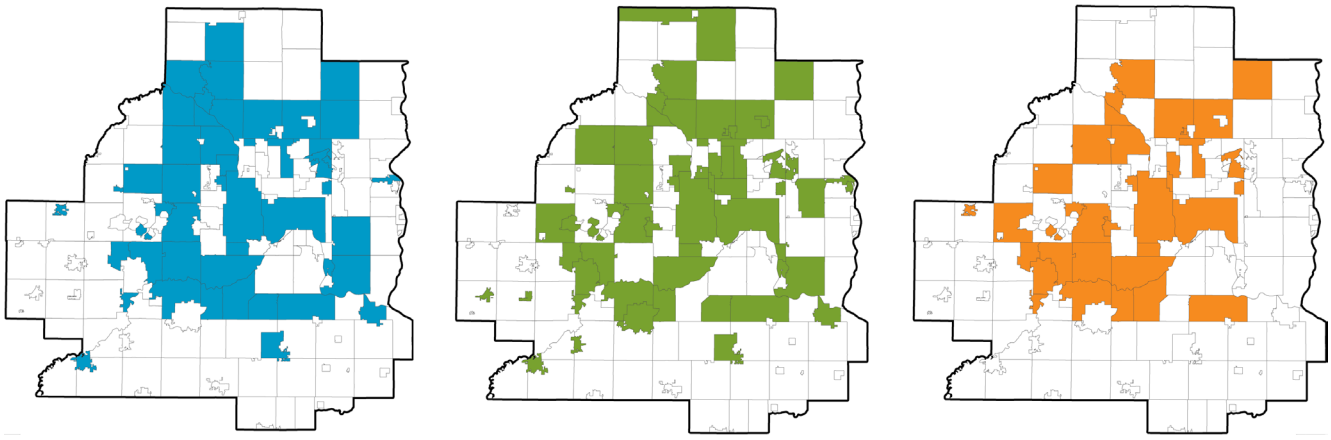


Figure 6. Based on information submitted to the Council in local comprehensive plan updates, by 2040 more than 50 communities plan to drill new municipal wells (left), more than 60 communities plan to improve and/or expand their distribution systems (middle), and more than 35 communities plan to enhance their water supply treatment processes (right). Note: Not all local plan updates have been submitted to the Council as of August 31, 2020 and this information will be revised as plans are received.

Water quality

Contamination issues vary throughout the region, primarily driven by differences in hydrogeologic setting and in level of development. The most cost-effective way to address contamination is usually to prevent it through protection of source waters. However, such protection in the metro area is complicated when drinking water management areas extend outside communities' jurisdictions or overlap with one another. Opportunities exist for more coordinated plans and implementation.

Aquifer water levels and groundwater-surface water relationships

Aquifer levels are useful for providing information about groundwater flow directions, relationships between groundwater and surface water systems, and water levels near wells. Aquifer water level issues are closely related to issues like water quality, relationships between surface water and groundwater, and well interference. A regional evaluation of hydrogeologic conditions suggests that about half of the surface water features in the metropolitan area are likely to be directly connected to the regional groundwater flow system, highlighting opportunities for more integrated surface water and groundwater planning.

Land use

Land use is expected to change to reflect the changing population, economy, and community needs. Changes on the landscape, particularly in Drinking Water Supply Management Areas, can affect downstream drinking water sources and lead to increased treatment needs and public health risks.

Regulatory considerations

The regulatory complexity of water management in Minnesota has been identified as a key challenge by public water suppliers, communities and watersheds for decades. Examples include:

- Missed opportunities to coordinate water-related plans to more efficiently use resources and achieve multiple benefits
- Supplying, treating and distributing water to consumers in compliance with Safe Drinking Water Act standards, water appropriation permits and the well code
- Agency codes and permit requirements that may contradict one another such as source water protection guidance limiting stormwater infiltration or plumbing code that confuses reuse options
- Minnesota rules preventing use of wells for injection to enhance recharge

Reliability

Approximately 50 communities in the metropolitan area use only one source (either groundwater or surface water) to supply all their water demands. Communities already use federal and state regulations and programs to identify and establish protocols for protecting the safety, security and reliability of their water supplies. However, there are still opportunities in some areas to improve the protection of water supplies as a priority for ensuring the reliability of water supply in the region.

Managing water demand

Water demand is the driving factor for water resource planning. Water demand is shaped by various socioeconomic and climate factors but planning and maintaining efficient systems are common goals. Analysis of historical and projected data on water use and population shows that decreasing the regional average total municipal water use to 90 gallons per person per day would accommodate 2040 population growth, with no regional increase in water use by municipal public water supply systems.

Uncertainty

Uncertainty is a constant factor. Several current questions remain unanswered, and other questions will inevitably emerge. Water supply planning must be done so that plans can adapt to factors such as climate changes, technology and emerging contaminants, and changing cultural priorities and attitudes.

Climate change

Mounting evidence shows that Minnesota's climate is changing, including in the metro area, and stakeholders have raised the following question: How might changes in precipitation patterns, longer growing seasons and increased risk of drought change the region's water demand, sustainable limits and quality of surface and groundwater supply sources, and the priorities set by decision-makers?

Regional planning and local planning assistance provide a framework for coordinated work

Developed and updated in collaboration with hundreds of stakeholders across the region, the Twin Cities Metropolitan Area Master Water Supply Plan (Master Plan) provides the framework for the Council's water supply activities and guides local plan updates.

First adopted in 2010, the plan and supporting technical information shaped the 2040 metropolitan development guide (Thrive MSP 2040) and regional policy and system plans. The Master Plan was then updated in 2015 to support implementation of the new regional policies – providing guidance so that communities can take the most proactive, cost-effective approach to long-term planning and permitting to ensure plentiful, safe, and affordable water that supports the prosperity and livability of the region for future generations.

Both local water supply plans and local comprehensive plans are informed by the Master Plan.

Planning milestones

2010 Adopted first Master Plan, shaped by information gathered and reviewed by staff and in partnership with stakeholders.

2014 & 2015 Adopted *Thrive MSP 2040* and Water Resources Policy Plan; their content reflects information developed in the 2010 Master Plan.

2015 Updated Master Plan to reflect new information and stakeholder priorities and to support implementation of *Thrive* and the Water Resources Policy Plan.

2015-2020 Provided local planning assistance to help communities update local plans. Examples: "PlanIt" conference, tutorials and webinars.

2016-2018 Communities updated local comprehensive plans, including local water supply plans, to align with regional policy and system plans.

For a more detailed list of planning activities, see Table 5 in the appendix.

LOCAL SUPPORT FOR REGIONAL WATER SUPPLY PLANNING

"The County is supportive of the Met Council's role in coordination and the provision of technical assistance, financial assistance, and regional facilitation. The Board and County Staff look forward to continuing discussions as we continue to define our regional vision and implement Thrive MSP 2040."

Randy Maluchnik, Chair, Board of Commissioners, Carver County

Implementation is guided by a shared vision of sustainability

The Master Plan has a single goal: a sustainable water supply now and in the future. Together, the Council and stakeholders who contributed to the Master Plan said that the region's water supplies will be considered sustainable when:

1. The use of existing water supply infrastructure and investments is maximized (within sustainable limits of available sources)
2. Use of surface water is planned and implemented in a way that maintains protected flows (Minnesota Rule 6115.0630)
3. Use of groundwater is planned and implemented in a way that:
    a. Maintains aquifer levels consistent with safe-yield conditions (Minnesota Rule 6115.0630) and protected surface water flows and water levels
    b. Minimizes impacts to groundwater-flow directions in areas where groundwater contamination has, or may, result in risks to the public health
4. Water demand that exceeds sustainable groundwater withdrawal rates is supplied by the most feasible combination of efficiency and conservation, surface water, and/or wastewater and stormwater reuse
5. Legislative changes are made that align agency directions on all aspects of water supply
6. Water users and suppliers recognize uncertainty and seek to minimize risk

Implementation milestones

2007	Changes made to Minn. Stat. 473.859, Subd. 3 and to Minn. Stat. 103G.291 to clarify and consolidate water supply planning requirements.
2009-2020	Leveraged outside funding for implementation of projects and programs identified in the Master Plan with guidance from MAWSAC, TAC, and subregional water supply work groups. Examples: Clean Water Fund; interagency cost-sharing agreements; and local matching funds for Council water efficiency grants.
2014	Initiated industrial water efficiency intern program with MnTAP to promote water efficiency in metro area industries and organizations.

COUNCIL PROGRAMS ARE SUPPORTING LOCAL RESULTS

"The City of Hugo has allocated all [water efficiency grant] funds. We are still having residents call and ask if our program is still available and we are looking forward to the time that we have more funds to allocate. We believe it has really made a significant impact on the amount of groundwater being used in Hugo."

City of Hugo Community Development

"Metro Cities' policies recognize the importance of an adequate and sustainable water supply for the metropolitan region. Many communities have benefited from these programs as they strive to use water more efficiently, and stand to further benefit in important ways from continued support of these programs."

Patricia Nauman, Director, Metro Cities

2015 Created water efficiency grants to support municipal rebate programs, funded with Clean Water Fund appropriation; began awarding grants to promote innovative stormwater reuse, funded by the Council general fund (also grants in 2016, 2017, and 2019).

2018 Developed water conservation advisory training with Freshwater Society to empower residents to be leaders in their own neighborhoods.

2020 Added water supply content to the Council's Climate Vulnerability Assessment, a tool that assists the Council and communities to prepare and adapt to climate change.

For a more detailed list of implementation activities, see Table 6 in the appendix.

Outcomes: the water supply picture in 2005 versus 2020

Through the Council's work in partnership with stakeholders across the region, we have achieved:

1. Better understanding of shared water resource conditions and challenges
2. Subregional collaborative platform to advance water sustainability goals
3. Better management and long-term resiliency of shared resources
4. More technical and financial resources focused on regional water supply challenges
5. Better equipped to pursue next steps

The following pages highlight examples of the work that has generated the achievements above.

Future work

In addition to the ongoing implementation of the Master Plan, the Council and its partners have identified some topics for further study and policy exploration. These topics arose out of the shared experience accrued through the regional and local water supply work done so far (summarized in part on pages 12-13).

At recent meetings of the Council's Environment Committee, MAWSAC and TAC, and the Land Use Advisory Committee (LUAC), these questions were raised:

- How could equity be implemented in water supply activities?
- What is the impact of climate change on our resources and operations in the water supply sector?
- How can we strengthen land use and water supply planning connections?
- What can we do to prevent contamination of our water supply sources and respond more effectively to emerging contamination (recent examples: PFAS, chloride)?

By supporting local leadership and collaboration, our shared water supplies will sustain us through the challenges ahead.

Highlights: What success looks like

The Twin Cities metropolitan area Master Water Supply Plan lays out the following strategies to achieve sustainable water supplies:

Figure 7. Master Plan strategies: funding; collaboration; technical investigations; planning; and water efficiency and reuse.

The Council was given new water supply planning responsibility in 2005 (Minn. Stat. 473.1565) but was not given dedicated funding to support that work. Instead the Council uses several sources to fund its various water supply activities.

The primary source of funding for the past 10 years has been the Clean Water Fund (CWF), which supports two Metropolitan Council programs that increase communities' implementation of projects to help achieve sustainable water supplies:

1. **Water demand reduction grant program:** Providing grants for communities to implement water demand reduction measures to ensure the reliability and protecting of drinking water supplies (Figure 9).

2. **Metropolitan area water supply sustainability support:** Implementing projects that address emerging drinking water supply threats, provide cost-effective regional solutions, leverage inter-jurisdictional coordination, support local implementation of water supply reliability projects, and prevent degradation of groundwater.

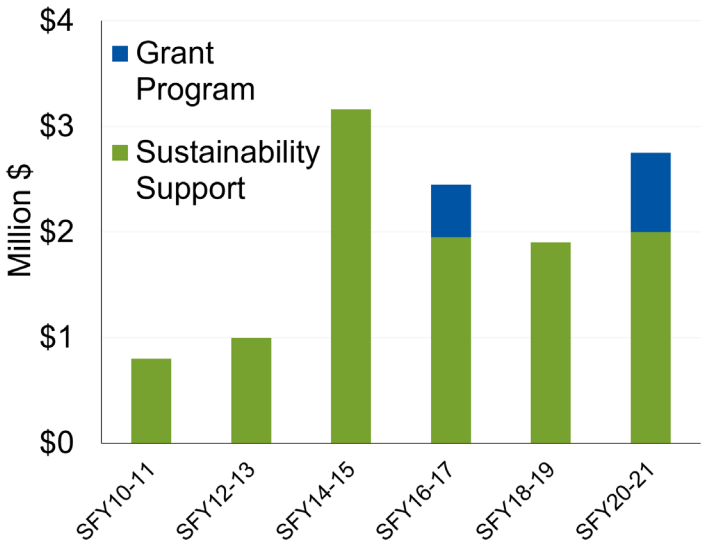


Figure 8. Council Clean Water Fund appropriation history.

CWF, however, cannot be used for the following water supply-related planning activities:

- Review of local water supply plans, comprehensive plan updates and amendments, or wellhead protection plans
- Technical support for communities in developing local plans
- Coordination and support for MAWSAC, TAC, or subregional water supply work groups
- Coordination and development of the Master Plan

Therefore, planning work has been funded through limited Council funds. For a brief time (2015-2016), the state general fund supported plan development and stakeholder engagement for the 2015 Master Plan and related Water Resources Policy Plan updates.

While wastewater rates revenue is not used for water supply *planning* activities – this source is restricted for use on activities directly tied to wastewater utility operation – this source does support work such as reuse investigations, which indirectly support the water supply sustainability of the region.

Water Efficiency Grant Program, 2019

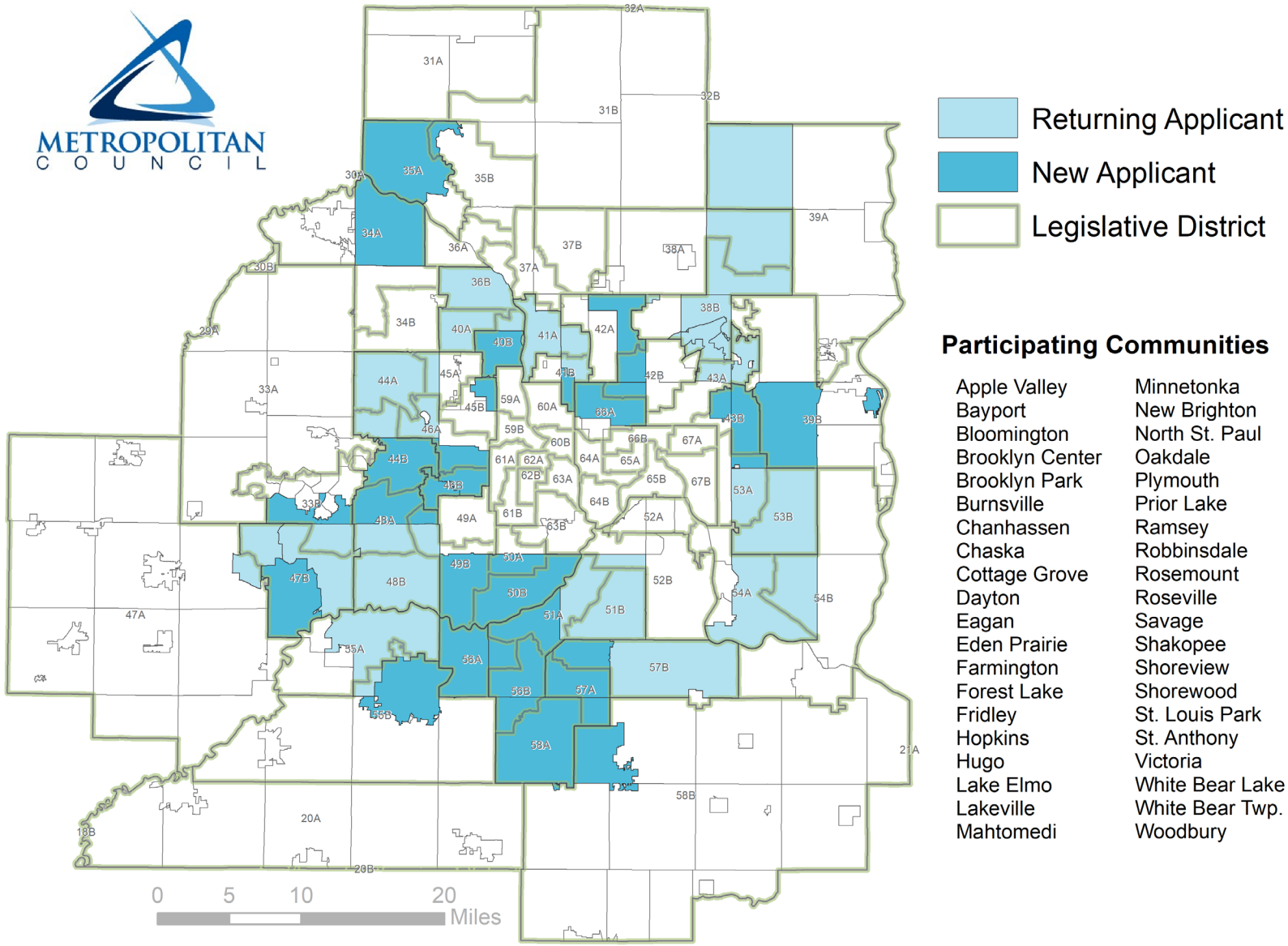


Figure 9. Communities participating in the Council's Clean Water Fund-supported water efficiency grant program, by Minnesota Legislative district.

Funding Highlight: Metropolitan Council Water Efficiency Grant Program

Through the Council's water supply planning activities since 2005, the Council and its stakeholders have worked to promote water conservation and efficiency so that communities, businesses, and residents are more equipped to support better management for long-term resiliency of shared water supply resources.

One program that highlights this work is the Council's Water Efficiency Grant Program. Begun as a pilot in 2015, this Clean Water Fund-supported program has been very successful and was reestablished with Clean Water Fund support for 2019-2022.

The Council covers 75% of the program cost; the municipality must provide the remaining 25%. Municipalities use the combined Council and municipality funds to run their own grant or rebate programs.

Objective

Support technical and behavioral changes that improve municipal water use efficiency through local water efficiency rebate programs for WaterSense-labeled fixtures:

- Irrigation controllers, spray sprinkler bodies, and system audits
- Toilets
- Clothes washers

Participants

Apple Valley, Bayport, Bloomington, Brooklyn Park, Brooklyn Center, Burnsville, Chanhassen, Chaska, Circle Pines, Cottage Grove, Dayton, Eagan, Eden Prairie, Farmington, Forest Lake, Fridley, Hopkins, Hugo, Lake Elmo, Lakeville, Mahtomedi, Minnetonka, New Brighton, Newport, North St. Paul, Oakdale, Plymouth, Prior Lake, Ramsey, Robbinsdale, Rosemount, Roseville, Savage, Shakopee, Shoreview, Shorewood, St. Anthony, St. Louis Park, Victoria, White Bear Lake, White Bear Township, Woodbury

2015-2017:

- 19 communities established local water efficiency programs
- **Estimated water saved:** 52 million gallons/year

2019-2022:

- 17 returning communities enhanced local water efficiency programs
- 23 new communities established local water efficiency programs

LOCAL SUPPORT FOR THE COUNCIL'S WATER EFFICIENCY GRANT PROGRAM

"Many communities, including Hugo, have benefited from these programs and will continue to benefit from the expansion of these programs."

Tom Weidt, Mayor of Hugo

"The Program is valuable for several reasons beyond the obvious water conservation benefits. The public awareness the Program creates is important … As more residents become aware of the Program, we believe it will be important to continue it into the future."

Mark Burch, Former White Bear Lake Public Works Director

Funding Highlight: Twin Cities Regional Water Billing Analysis

Through the Council's water supply planning activities since 2005, the Council and its stakeholders have worked to support better understanding of shared challenges and better management for long-term resiliency of shared water supply resources. Public water suppliers, wastewater utilities, community planners, and elected officials stress the need to consider the local financial aspects of this work.

One project that highlights this is the 2015 Twin Cities Regional Water Billing Analysis.

Partners

126 metro municipal utilities, Minnesota Department of Natural Resources, Metropolitan Council

Objective

Determine if the rates and rate structures used by water utilities in the Twin Cities metropolitan area to bill their customers have any affect on water consumption. Socioeconomic and land use factors also were considered in this analysis.

Findings and next steps

- Water is relatively inexpensive
- Wealthier households use more water
- Lower prices are associated with greater summer water use
- Inclined block rate structures are not necessarily water conservation rate structures
- Significant room for improvement in rate structures across the metro area
- Water savings realized could be substantial
- Continue to track and share *metro area water rate information* and work with communities to create resources to understand the relationships between rates, water conservation, and long-term utility budgets

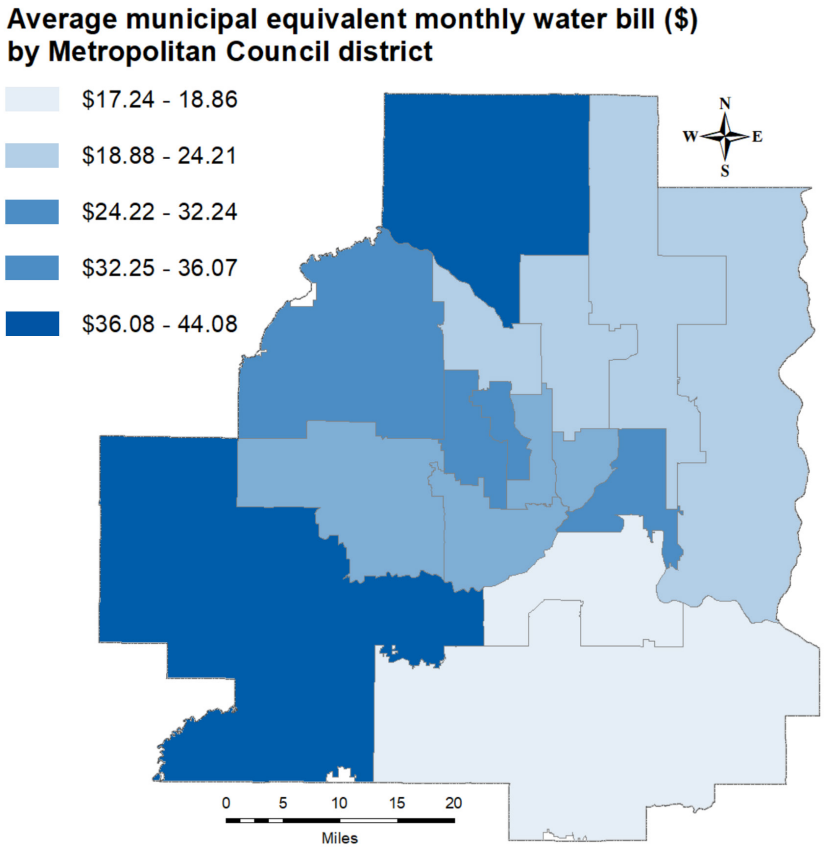


Figure 10. The 2015 Twin Cities Regional Water Billing Analysis includes a range of information about municipal water rates and other factors for 126 communities in the metro area. This information improved understanding of the impacts of rates on water consumption and supported subsequent projects. This figure is an example of the report content.

Collaboration Highlight: Northwest Metro Area Water Supply System Study

Through the Council's water supply planning activities since 2005, a successful subregional collaborative platform has been established to advance regional and local water sustainability goals. For example, participation in subregional water supply work groups has increased from 20 communities in 2005 to more than 70 communities in 2020.

One project that highlights the collaborative and long-range work being done by these groups is the 2020 Northwest Metro Area Water Supply System Study.

Partners

Corcoran, Dayton, Ramsey, Rogers, Metropolitan Council

Objective

Understand the relative costs and implementation considerations of different approaches to a multi-community water supply in the northwest metro area.

The study evaluates four approaches to water supply:

1. Multi-community surface water treatment plant
2. Multi-community groundwater treatment plant
3. Multi-community conjunctive use system (surface water augmented with groundwater)
4. Status quo

The study does not provide "shovel-ready" projects for implementation. Rather, the project defined by each approach are at a concept-level with the intent to compare relative differences in costs between approaches and, more importantly, to explore the implementation issues associated with each approach.

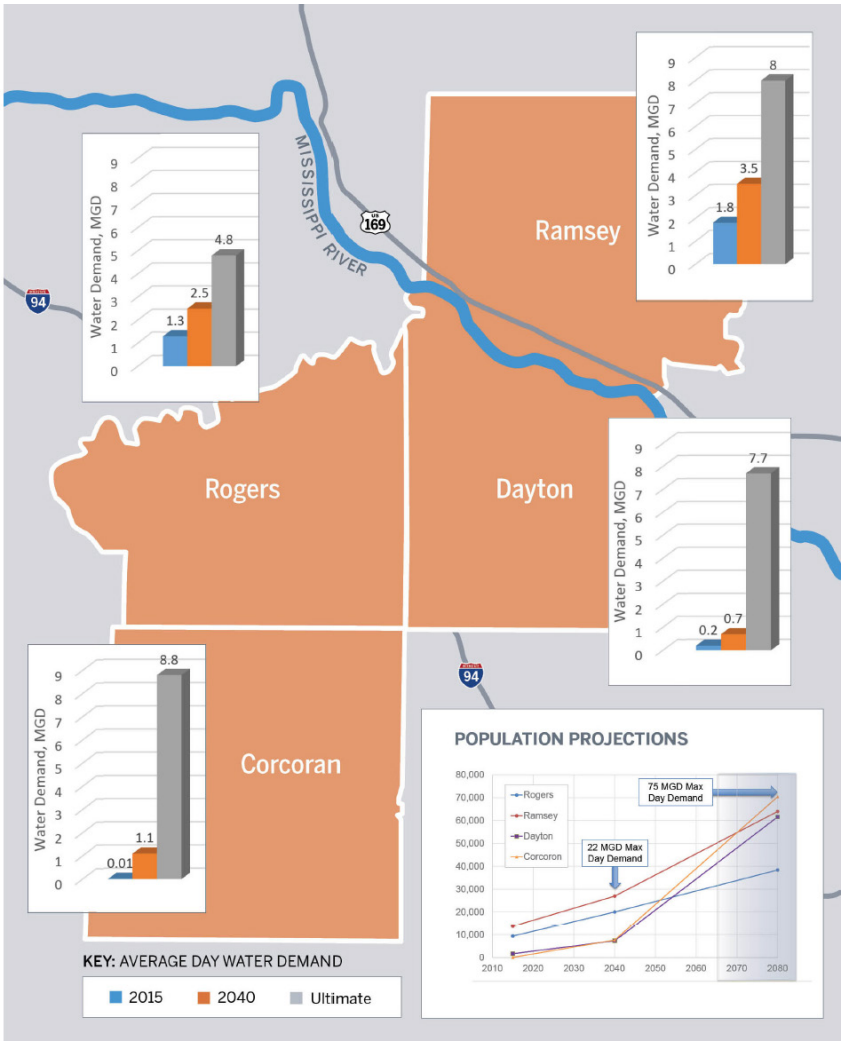


Figure 11. The 2020 Northwest Metro Area Water Supply System Study includes a range of information about projected population water demand and other water supply system components for the cities of Corcoran, Dayton, Ramsey and Rogers. This information is used to explore the costs and implementation considerations for four different water supply approaches. This figure provides an example of the report content.

Technical Investigations Highlight: Metro Model

Through the Council's water supply planning activities since 2005, the Council and its stakeholders have a better understanding of shared resources and challenges.

One project that highlights cumulative and long-term changes to aquifers (the water supply source for 75% of the metro area population) is the regional groundwater flow model – Metro Model (versions 2 and 3).

Partners

The technical advisory group providing guidance during this project included representatives of the University of Minnesota, University of Wisconsin, MN Department of Health, MN Department of Natural Resources, MN Department of Agriculture, MN Pollution Control Agency, MN Geological Survey, U.S. Geological Survey, City of Woodbury, Dakota County, Shakopee Mdewakanton Sioux Community, and the consulting firms Antea Group, Braun Intertec, HDR, and LGB.

Objective

Help address a broad range of regional planning questions and to be as flexible as practical to accommodate new questions or scenarios, while still incorporating the best available data. Some examples of questions the model is intended to help address include:

- Given projected water demands, what impacts may be expected on groundwater levels and groundwater-dependent surface-water features?
- What combinations of source aquifers, well locations, and withdrawal rates can be used to achieve sustainable water consumption?

Metro Model is a fundamental part of the Council's water supply planning efforts. It has also served as a starting point for other local and subregional modeling efforts such as local wellhead protection planning and groundwater modeling in the northeast metro groundwater management area.

LOCAL SUPPORT FOR COUNCIL GROUNDWATER MODELING

"Encourage the continued development of a metropolitan groundwater model, as a tool to define aquifers and aquifer recharge areas and as a basis for aquifer protection and management."

Bloomington 2040 Comprehensive Plan Update

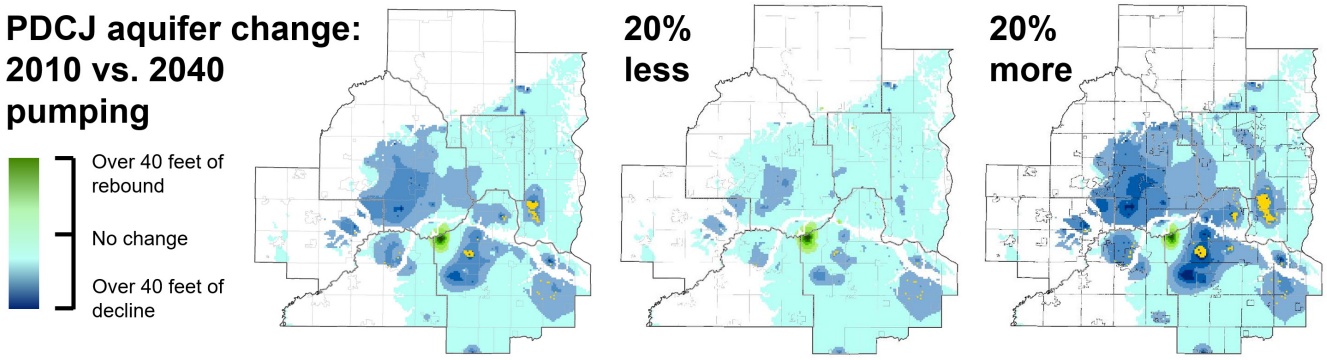


Figure 12. Model-projected water level change in the Prairie du Chien-Jordan (PDCJ) aquifer – which is used by most communities in the Twin Cities metro area – based on estimated 2040 groundwater pumping rates (left), 20% less than the 2040 estimate (middle), and 20% more than the 2040 estimate (right).

Planning Highlight: Climate Vulnerability Assessment – Water Supply

Through the Council's water supply planning activities since 2005, the Council and its stakeholders have worked to improve the water supply process and planning tools for better management for long-term resiliency of shared water supply resources.

One project that highlights this work, led and funded by the Council's Local Planning Assistance group is the addition of water supply content to the Council's *Climate Vulnerability Assessment* (CVA).

Evidence is mounting that Minnesota's climate is changing, including in the Twin Cities metro area and Minnesota Governor Tim Walz is urging bold action across the state to address climate change. The CVA is a tool that can assist in Council and community planning efforts in preparing and adapting to climate change because the CVA can reveal system vulnerabilities to currently occurring and, to some extent, expected climatic changes. The CVA project consists of Council-related analysis and recommendations as well as tools for communities and other stakeholders.

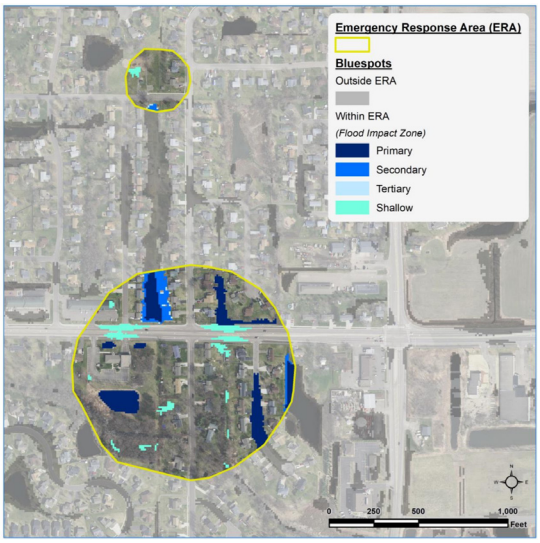
Objective

Include water supply content in the Climate Vulnerability Assessment, specifically the identification of areas around wells that are most at risk of flooding and potential strategies to improve management in these areas.

Findings

Private and public wells across the region are at risk of being overtopped by flooding during extreme events. This analysis provides information about where that risk may be most likely.

Local communities and other stakeholders may conduct similar analyses to assess conditions and vulnerabilities that may inform adaptive strategies for local system assets.



Analysis Layer	Total (Acres)	Total Analysis Layer in FIZ*	Flood Impact Zone % for Analysis Layers in a FIZ			
			Primary	Secondary	Tertiary	Shallow
Domestic Wells (50ft Buffer)	12,054	7.6%	37.2%	19.2%	29.4%	14.2%
Inner Wellhead Management Zone (200ft Buffer Around Public Well)	2,539	13.1%	40.8%	19.5%	25.4%	14.3%
Emergency Response Areas (1-year Time-of-Travel to Public Well)	39,562	16.3%	46.2%	18.5%	22.6%	12.7%

Figure 13. Results of the Climate Vulnerability Assessment analysis of potential localized flood impacts to private domestic and public (municipal and nonmunicipal) water supply wells, based on a calculation of the acres around wells that overlap a Flood Impact Zone (FIZ).

Implementation Highlight: MnTAP Water Efficiency Intern Program

Through the Council's water supply planning activities since 2005, the Council and its stakeholders have worked to promote water conservation and efficiency so that communities, businesses, and residents are more equipped to support better management for long-term resiliency of shared water supply resources.

One program that highlights this work is the Council's partnership with the University of Minnesota's Minnesota Technical Assistance Program (MnTAP) to support an industry-focused intern program focused on water efficiency.

Objective

This program, launched in 2012, places student interns in metro area industries and other organizations. The students get hands-on experience and the organizations benefit as opportunities to operate more efficiently are identified.

Participants

Aqseptence, Anoka-Hennepin ISD11, Aveda Inc., Bailey Nurseries, Ball Corporation, Boston Scientific, Cemstone, CertainTeed Roofing, City of Plymouth, City of Woodbury, Electric Machinery, Federal Cartridge Company, Fulton Beer, Gedney Foods Company, GE Water & Process Technologies, HCMC, Health Systems Cooperative Laundries, Kapstone Containers, Lloyd's BBQ, Minnesota Zoo, Northern Star Co., North Memorial Health, R&D Systems, Sanimax, Science Museum of Minnesota, TEL FSI Inc., Thomson Reuters, TreeHouse Foods, Xcel Energy

2013-2017:

- 20 projects making 159 recommendations
- **Total intern recommendations implemented as of 2018:** 87 million gallons/year
- **Realized cost savings:** $486,000/year

Learn more! Information about *intern projects* and *industrial water conservation research in the metro area* is on the MnTAP website.

Figure 14. MnTAP water efficiency interns working in local businesses.

Implementation Highlight: Rainwater Harvesting and Reuse Demonstration Project at CHS Field

Through the Council's water supply planning activities since 2005, the Council and its stakeholders have built strong partnerships that allow for new approaches to water supply and shared learning.

One project that highlights this work is a rainwater harvesting and reuse demonstration project in downtown Saint Paul. The construction of CHS Field, home of the Saint Paul Saints, immediately next to Metro Transit's Green Line Operations and Maintenance Facility (OMF) in downtown Saint Paul created a unique opportunity to capture rainwater from a portion of OMF roof and convey it to CHS Field for ball field irrigation and toilet flushing.

Partners

Capital Region Watershed District, City of Saint Paul, Saint Paul Saints, Metropolitan Council/Metro Transit

Objective

Reduce potable water use as well as pollution runoff flowing to the river from CHS Field, home of the Saint Paul Saints

Results

- Approximately 450,000 gallons/year of municipal water saved
- Value of water conservation and reuse is promoted
- Freshwater Society 2015 Clean Water Champion

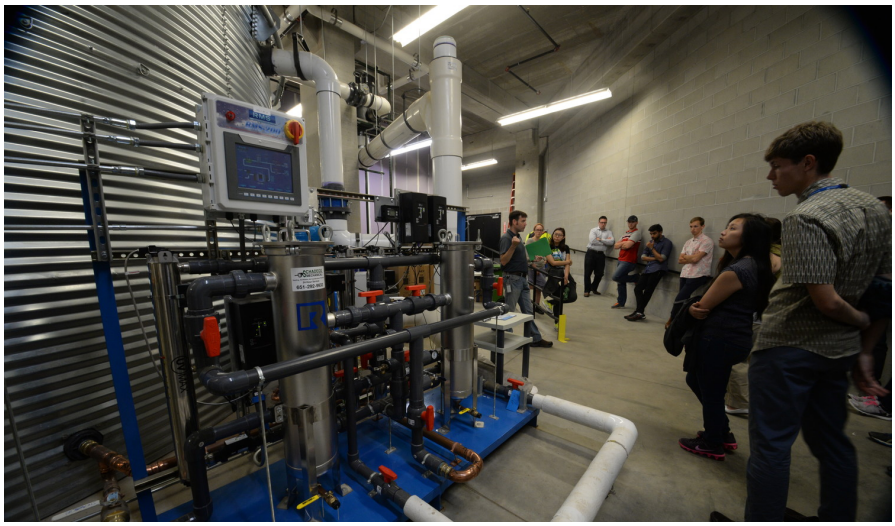


Figure 15. Stormwater reuse is showcased on tours of the cistern that holds rainwater captured from the roof of Metro Transit's Green Line Operations and Maintenance Facility, for use at CHS Field.

STRONG PARTNERSHIPS LEAD TO SUCCESS

"There were so many challenges to incorporating stormwater management into CHS Field, it couldn't have happened without the strong partnerships between CRWD, the City, Met Council, and the Saints. The ballpark demonstrates how water conservation can be achieved when people make it a priority, and are willing to think creatively."

Nate Zwonitzer, Project Manager

Implementation Highlight: Exploring Impacts of Infiltrating Reclaimed Water on Groundwater and Surface Water in the Southeast Metro

The Twin Cities metropolitan area Master Water Supply Plan identifies investigating the reuse of wastewater as a strategy for achieving sustainable water supplies and supporting the Water Resources Policy Plan policy on conservation and reuse.

One project that highlights this work, led and funded by the Metropolitan Council Environmental Services Technical Services group, was an analysis exploring the impacts of infiltrating reclaimed water on groundwater and surface water in the Southeast Metro.

STEP 1
Build on previous study and tools

STEP 2
Identify potential infiltration sites

STEP 3
Assess impacts of infiltration

STEP 4
Explore results in Dakota County

Objective

Answer Metropolitan Council Environmental Services' Southeast Metro customers' question: can infiltrating water lessen projected future groundwater level drawdown and surface water level impacts?

Southeast Metro communities depend on groundwater for drinking water. They have sought ways to avoid or lessen potential future issues such as groundwater level drawdown. Infiltrating highly treated wastewater (reclaimed water) may be one method that helps avoid or lessens potential future groundwater level drawdown and surface water impacts due to pumping.

Model results were mapped and stored in a map library. Maps can be filtered/ searched to identify impacts of infiltration at any given site.

THE MAPS SHOW:

- **Infiltration can reduce the negative impacts of groundwater pumping on aquifer and surface water levels**
- **There are some areas where infiltration could be beneficial to both aquifers and surface water levels**
- **Infiltration's impact depends on the rate of infiltration. Rate of 1 MGD had little benefit, 10 MGD had greater benefit but mounding occured.**

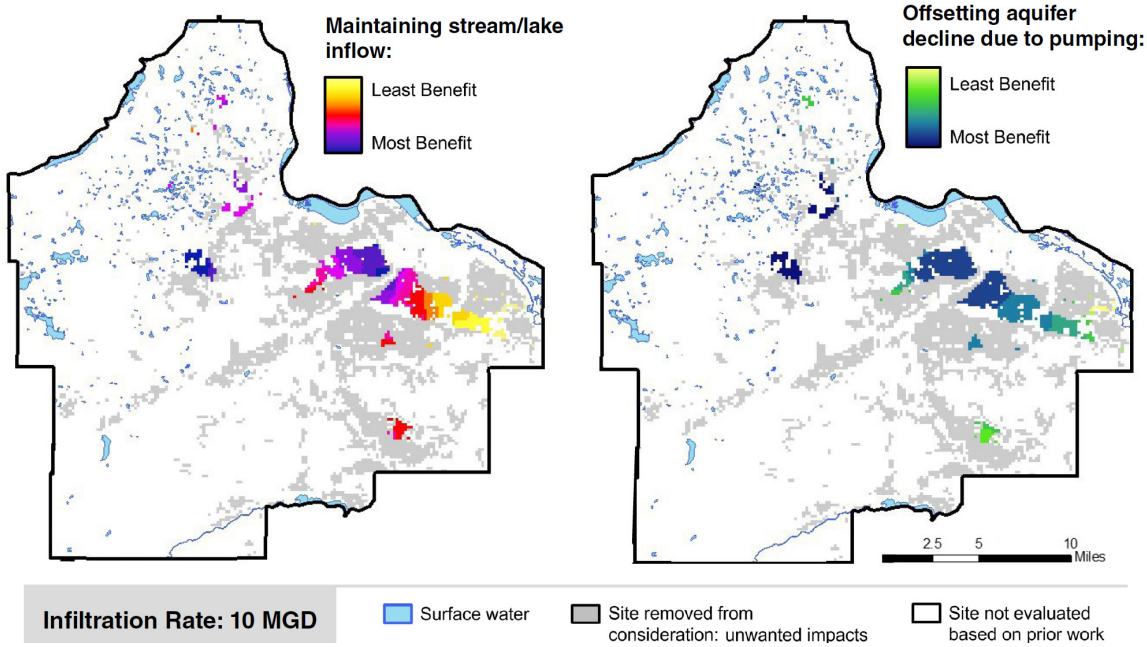


Figure 16. Process steps (above) and examples of maps generated by this project (left).

Appendix

Commonly used acronyms & abbreviations

CVA – Metropolitan Council Climate Vulnerability Assessment

CWF – Clean Water Fund

DNR – Minnesota Department of Natural Resources

DWSMA – Drinking Water Supply Management Area

GWMA – Groundwater Management Area, as designated by the DNR

LUAC – Land Use Advisory Committee

Master Plan – Twin Cities metropolitan area Master Water Supply Plan

MAWSAC – Metropolitan Area Water Supply Policy Advisory Committee

MDA – Minnesota Department of Agriculture

MDH – Minnesota Department of health

MM3 – Metro Model 3, the regional groundwater flow model

MnTAP – Minnesota Technical Assistance Program at University of Minnesota

MPCA – Minnesota Pollution Control Agency

MWSP – Twin Cities metropolitan area Master Water Supply Plan

PFAS – Broad group of perfluoroalkyl and polyfluoroalkyl substances

TCE – Trichloroethylene, a volatile organic compound

TAC – Metropolitan Area Water Supply Policy Advisory Committee

WRPP – Water Resources Policy Plan

U of M – University of Minnesota

History of Metro Area Water Supply Policy and Technical Advisory Committee membership

Table 1. History of Metro Area Water Supply Policy Advisory Committee membership (MAWSAC).

Statutorily required MAWSAC representative	Current and past MAWSAC representatives
Commissioner of Agriculture or Designee	**Jeff Berg (current)** Dan Stoddard Bob Patton Quinn Cheney Greg Buzicky Gene Hugoson
Commissioner of Health or Designee	**Sandeep Burman (current)** Karla Peterson Randy Ellingboe Chris Elvrum Diane Mandernach John Stine Doug Mandy
Commissioner of Natural Resources or Designee	**Jack Gleason (current)** Jeanne Daniels Julie Eckman Terrie Yearwood Dale Holmuth James Japs Gene Merriam
Commissioner of Pollution Control Agency or Designee	**Catherine Neuschler (current)** Katrina Kessler Sheryl Corrigan Faye Sleeper Galen Reetz Brad Moore Sherri Kroening
Metro area county official #1	**Valerie Grover, Dakota County (current)** **Georg Fischer, Dakota County (2013-2020)** Joseph Harris, Dakota County (2005-2013)
Metro area county official #2	**Jamie Schurbon, Anoka County (current)** Beverly Aplikowsky, Ramsey County (2005-2007) Dennis Berg Anoka Co/Ramsey (2005-2012)

Statutorily required MAWSAC representative	Current and past MAWSAC representatives
Metro area noncounty LGU #1	**Phillip Klein, Hugo (current)** Chuck Haas, Hugo (2005-2016)
Metro area noncounty LGU #2	**Tonja West-Hafner, Brooklyn Park (current)** Dean Lotter, New Brighton (2015-2019) Sandy Colvin Roy, Minneapolis (2012-2014) Linda Loomis, Golden Valley (2005-2012)
Metro area noncounty LGU #3	**Mike Huang, Chaska (current)** Todd Gerhardt, Chanhassen (2015-2019) Tom Furlong, Chanhassen (2005-2015)
Metro area noncounty LGU #4	**Brad Larson, Savage (2020-Present)** Barry Stock, Savage (2005-2018)
Metro area noncounty LGU #5	**Kevin Watson, Vadnais Heights (2020-Present)** Patty Acomb, Minnetonka (2015-2018)
Chair of the Metropolitan Council or Designee	**Wendy Wulff (2019-Present)** Sandy Rummel (2012-2019) Peggy Leppick (2010-2011) Peter Bell (2005-2010)
Chisago County official	**Michael Robinson (current)**
Isanti County official	**Susan Morris (current)** Greg Anderson (2014-2015)
Sherburne County official	**Lisa Volbrecht (current)**
Wright County official	**Mark Daleiden (current)** Elmer Eichelberg (2012-2013)
Representative of St. Paul Regional Water Services	**Steve Schneider (current)**
Representative of Minneapolis Water Department	**Glen Gerads (current)**

Table 2. History of Metro Area Water Supply Technical Advisory Committee membership (TAC).

TAC member organization	Representative (tenure)
Single-city public water supply system	Jim Westerman, Woodbury (2017-Present) Klayton Eckles, Woodbury (2016-2017) Jessica Levitt, Cottage Grove (2016-2018) Matt Saam, Apple Valley (2017-Present) Scott Anderson, Bloomington (2017-Present) Robert Ellis, Eden Prairie (2017-Present) Bruce Westby, Ramsey (2016-Present) Kristin Asher, Richfield (2016-Present) Mark Maloney, Shoreview (2016-Present) Lon Schemel, Shakopee (2016-2017)
Multicity public water supply system	Dale Folen, Minneapolis Water Works (2016-Present)
Not public water supply system	Ray Wuolo, Barr Engineering (2016-Present) John Dustman, Summit Envirosolutions (2016-Present) Crystal Ng, U of M (2016-Present) Jamie Wallerstedt MPCA (2016-Present) Lih-in Rezania, MDH (2016-Present) Jim Stark, Legislative Water Commission/USGS (2016-Present)

History of collaboration

Table 3. History of collaboration in Metropolitan Council's water supply work.

YEAR	Metropolitan Council Water Supply Collaboration Activity
2006	Convened Metropolitan Area Water Supply Advisory Committee (MAWSAC)
2008	Convened stakeholders to shape/draft scope of master water supply plan
2009	Convened East Metro water supply work group Coordinated with DNR to streamline water use data sharing Joined Clean Water Fund Interagency Coordination Team, to ensure funding requests to support water supply planning are aligned with other water agencies' work
2010	Convened Seminary Fen work group
2011	Convened South Washington Co. water supply work group
2012	Received Governor's Continuous Improvement Award as part of Clean Water Fund Performance and Outcomes team
2013	Collaboration between Council and DNR water supply leadership on shared projects, water supply plan requirements Hosted Our Water Our Future workshop series in the northeast metro Hosted stormwater reuse guide tour and workshops
2014	Hosted forums and technical workshops for water supply stakeholders to provide guidance and share information shaping the update of regional water supply policies and the MWSP Convened Southeast Metro water supply work group
2015	Convened Metropolitan Council Water Supply Technical Advisory Committee (TAC)
2016	Reconvened West Metro water supply work group after a hiatus of several years Convened West Metro water supply work group
2017	Completed workshop series with southeast metro stakeholders to draft a water conservation and efficiency assessment tool Convened a forum of all the subregional water supply work groups to share experiences and water supply planning priorities Hosted tours of U of M Turfgrass research site Published online tutorials to guide local water supply plan updates as part of the Council's PlanIt program Convened Council's land use and water supply advsiory committees to begin collaboration on overlapping land use-water supply issues

YEAR	**Metropolitan Council Water Supply Collaboration Activity**
2018	Hosted tours of U of M Turfgrass research site Council Co-hosted the 2018 One Water Summit with local and national partners and supported MAWSAC and TAC member participation
2019	Completed education and outreach to reduce lawn water use Hosted a Water Bar on the first day of the MN State Fair, with city and agency partners
2020	Hosted webinar series for water efficient landscapes

History of technical investigations

Table 4. History of technical investigations in Metropolitan Council's water supply work.

YEAR	Metropolitan Council Water Supply Planning Activity
2007	Completed mapping of metro area surficial geology and geochemistry
2008	Piloted project with Dakota County to map groundwater contamination
2009	Completed synoptic groundwater measurement of the metro area Completed Metro Model 2, the regional groundwater flow model
2010	Completed analysis of Mississippi River low-flow characteristics Filled gaps in metro area hydrostratigraphic and hydrogeochemical data Completed evaluation of groundwater-surface water interaction Completed East Bethel groundwater analysis
2011	Completed mapping bedrock recharge and Platteville Formation hydrostratigraphy
2013	Updated Soil Water Balance (SWB) model to estimate recharge Surveyed private industrial water users regarding conservation barriers and opportunities
2014	Completed assessment of stormwater infiltration impacts on groundwater Updated the regional groundwater flow model to Metro Model 3 Completed assessment of industrial water conservation barriers and opportunities
2015	Drafted study of Turtle Lake augmentation (Shoreview, MN) Completed groundwater modeling to explore sustainable groundwater limits Completed joint water utility feasibility study for six northwest metro communities Completed regional enhanced recharge study
2016	Completed water billing analysis Oversaw completion of USGS Scientific Investigations Report Completed recharge and stormwater reuse study in the northeast, northwest, & southeast metro areas Completed water supply feasibility assessment for Washington County Water Coalition Completed research on industrial water conservation in the north and east GWMA
2017	Contributed technical assistance to screening level evaluation of the impacts of infiltrating reclaimed water on groundwater and surface water in the southeast metro

YEAR	**Metropolitan Council Water Supply Planning Activity**
	Updated transient regional groundwater flow model
2018	Completed study of efficient water use on Twin Cities lawns Completed water efficiency study for Washington County Municipal Water Coalition
2019	Completed assessment of economic benefits of residential-focused water efficiency programs Installed turfgrass irrigation research and demonstration plots at MN Landscape Arboretum
2020	Updated evaluation of groundwater and surface water interactions Completed preliminary assessment of metro area municipal water supplier data reporting

History of planning

Table 5. History of Metropolitan Council water supply-related planning activities.

YEAR	Metropolitan Council Water Supply Planning Activity
2005	Minnesota Statutes 473.1565 enacted
2007	Council supported changes to MS 473.859, Subd. 3 and 103G.291 to clarify and consolidate water supply planning requirements
2010	Council adopted Master Water Supply Plan (Master Plan), shaped by information gathered and reviewed by staff and in partnership with stakeholders
2014	Council adopted Thrive MSP 2040, the updated metropolitan development guide
2015	Adopted Water Resources Policy Plan Supported guidance, webinars, and workshops for planners working on water supply information for local comprehensive plans, included in the Local Planning Handbook and PlanIt program Updated Master Water Supply Plan based on Metro Model 3, conservation and reuse projects, and feasibility assessments
2016	Technical assistance to communities updating local water supply plans
2018	Council amended the 2040 Water Resources Policy Plan to clarify wastewater reuse policy
2020	Council launched development of Met Council Climate Action and Resilience Plan

History of implementation

Table 6. History of Metropolitan Council water supply-related implementation activities.

YEAR	Metropolitan Council Water Supply Planning Activity
2007	Reported to MN Legislature on progress: water supply planning in the Twin Cities metro area, including technical findings
2009	One-time funding for Master Water Supply Plan implementation from Clean Water Fund ($400K)
2010	Awarded Clean Water Fund appropriation for specific water supply projects ($400K)
2011	Awarded Clean Water Fund appropriation for Master Water Supply Plan implementation ($1M)
2012	Award from American Society of Landscape Architects for Stormwater Reuse Guide
2013	Awarded Clean Water Fund appropriation for regional groundwater planning ($2M) + agreement with USGS to investigate White Bear Lake ($537K)
2014	Awarded appropriation for grant to Shoreview to study Turtle Lake ($75K) + Plan for the North and East Metro GWMA ($400K) + Investigation to treat stormwater in NE metro ($100K)+ Partnership with MnTAP ($50K)
2014 *2014*	Initiated industrial water efficiency intern program with MnTAP Reported to Minnesota Legislature: Metropolitan Council water supply activities supported by CWF
2015	Created water efficiency grant program to support community programs Awarded Clean Water Fund appropriation to implement projects ($1.95M) + water demand reduction grant program ($500K) Council awarded grants for innovative stormwater reuse Fresh Water Society's Clean Water Champion Award for Council and partners' work to help communities reduce demands on groundwater by harvesting and reusing rainwater at CHS Field, home of the St. Paul Saints baseball team in St. Paul
2016	Updated Water Conservation Toolbox
2017	Awarded Clean Water Fund appropriation to implement projects ($1.9M)
2017	Supported MAWSAC report to Legislature: summary of water sources, challenges, goal, and planned activities
2018	Developed water conservation advisory training with Freshwater Society Released Climate Vulnerability Assessment, a planning tool to help Twin Cities prepare for climate change
2019	Awarded Clean Water Fund appropriation to implement projects ($2M) + water demand reduction grant program ($750K) Council awarded grants to communities for stormwater management, including reuse

History of legislative recommendations

Table 7. History and status of Metropolitan Council-supported water supply recommendations to the Minnesota Legislature.

Recommendation to the Legislature		Status
2007:	Approve statutory changes clarifying agency roles in water supply plan review and consolidate into one statute the requirements of community water supply plans in the metropolitan area.	Completed MS 473.859, Subd. 3 and 103G.291, subdivision 3 were revised so that DNR local water supply plan now fulfills MC comp plan requirements for water supply content and WHP no longer required part of comp plan
2007:	Support an appropriate level of state funding, upon the request of local governmental units, for interconnections and other physical water system improvements to ensure water supply reliability, natural resource protection, and/or safety and security, including economic security, of the region and state. Consistent with this recommendation, support an appropriate level of state funding for the proposed Minneapolis and St. Paul water supply systems interconnection.	Partially completed Burnsville-Savage interconnection funded
2008:	Provide funding for implementation of the metropolitan area Master Water Supply Plan	Completed Received $400K for one year from CWF
2009:	Provide funding for implementation of the metropolitan area master water supply plan	Partial – received $400K for one year, with additional stipulations to include protection of Seminary Fen and Valley Branch Trout Stream and other work from CWF
2010:	Provide funding for implementation of the metropolitan area Master Water Supply Plan	Completed Received $1M over two years from CWF
2010:	Eliminate the sunset date for the Metropolitan Area Water Supply Advisory Committee, because it provides valuable guidance to the Council in its water supply planning efforts	Partially completed (extended)
2012:	Recommended, with CWF Interagency Coordination Team, the legislature provide funding for groundwater planning to achieve water supply reliability and sustainability	Completed – received $2M over two years
2013:	Extend the sunset date for the Metropolitan Area Water Supply Advisory Committee from 12/31/12 to 12/31/16	Completed

Recommendation to the Legislature		Status
2014:	Provide funding to implement projects that address emerging drinking water supply threats, provide cost-effective regional solutions, leverage interjurisdictional coordination, support local implementation of water supply reliability projects, and prevent degradation of groundwater resources in the metro area. (Co-recommended by CWF Interagency Coordination Team)	Completed Received $1.95M over two years
2016:	Provide funding to continue implementing projects that address emerging drinking water supply threats, provide cost-effective regional solutions, leverage interjurisdictional coordination, support local implementation of water supply reliability projects, and prevent degradation of groundwater resources in the metro area. (Co-recommended by CWF Interagency Coordination Team)	Completed Received $1.9M over two years
2017:	Provide necessary funds to plan and collaborate, for conserving, protecting our water supply (stakeholder-identified projects that provide regional benefit, increased collaboration, improved local assistance, source water protection). (Co-recommended by MAWSAC)	Ongoing
2017:	Support boosting efficiency and wise use of water so the region can grow (region-wide messaging, grants and tools to reduce regional per capita water use). (Co-recommended by MAWSAC)	Ongoing
2017:	Support work that leads to solutions (multi-community water supply analyses, feasibility assessments of innovative approaches) (Co-recommended by MAWSAC)	Ongoing
2018:	Provide funding to continue implementing projects that address emerging drinking water supply threats, provide cost-effective regional solutions, leverage interjurisdictional coordination, support local implementation of water supply reliability projects, and prevent degradation of groundwater resources in the metro area.	Completed Received $1.9M over two years

Bibliography of Metropolitan Council Water Supply Projects 2005-2020

Resources are listed in alphabetical order by Author/Owner, then by year produced.

Technical Projects

Barr Engineering Company. *Evaluation of Groundwater and Surface-Water Interaction: Guidance for Resource Assessment in the Twin Cities Metropolitan Area, Minnesota (Prepared for Metropolitan Council)*. Metropolitan Council, 2010.

Barr Engineering Company. *East Bethel Groundwater Analysis (Prepared for Metropolitan Council)*. Metropolitan Council, 2010.

Barr Engineering Company. *Technical Memo: Metro Pumping Optimization (Prepared for Metropolitan Council)*. 15 August 2014.

Barr Engineering Company. *Technical Memo: Metro Pumping Optimization 2 (Prepared for Metropolitan Council)*. 13 October 2014.

Barr Engineering Company. *Technical Memo: Metro Pumping Optimization 3 (Prepared for Metropolitan Council)*. 2 April 2015.

Barr Engineering Company. *Technical Memo: Metro Model 3 Transient Model Update (Prepared for Metropolitan Council)*. Metropolitan Council, 2017.

CDM Smith. *Twin Cities Regional Water Billing Analysis (Prepared for the Metropolitan Council)*. Metropolitan Council, 2015.

Davis, Bill and Jodi Polzin. *Technical Memo: Water Efficiency Project – Maximizing Benefits from Community Water Efficiency Programs (Prepared for Metropolitan Council)*. April 2019.

Dakota County Water Resources Department. *Mapping Groundwater Contaminant Investigations: Project Summary Report to Metropolitan Council*. Dakota County, 2008.

Freshwater Society. *Water Conservation Advisor Training Program: Program Status Report and Sustainability Plan Phases 1-4 (Prepared with Metropolitan Council)*. Freshwater Society, 25 February 2019.

Kessler, Erich, and Lorenz, D.L. *Low-flow characteristics of the Mississippi River upstream from the Twin Cities Metropolitan Area, Minnesota, 1932–2007*. U.S. Geological Survey Scientific Investigations Report 2010–5163, 2010.

Metropolitan Council. *Water Supply Planning in the Twin Cities Metropolitan Area: Report to the 2007 Minnesota State Legislature – Technical Report*. Metropolitan Council, January 2007.

Metropolitan Council. *Twin Cities Metropolitan Area Regional Groundwater Flow Model Version 2.00: Technical Report in Support of the Metropolitan Area Master Water Supply Plan*. Metropolitan Council, 2009.

Metropolitan Council. *Assessing the Opportunity and Barriers for Water Conservation by Private Industrial Water Users: For the Twin Cities Metropolitan Area – A Report Detailing the Development and Execution of the Electronic Survey Strategy Conducted Beginning March 2012 (Prepared by Minnesota Technical Assistance Program)*. Metropolitan Council, 2013.

Metropolitan Council. *Using a Soil Water Balance Model to Estimate Recharge for Version 3 of the Twin Cities Metropolitan Area Groundwater Model (Prepared by Barr Engineering Company)*. Metropolitan Council, 2013.

Metropolitan Council. *Assessing the Opportunity and Barriers for Water Conservation by Private Industrial Water Users: For the Twin Cities Metropolitan Area – A Final Report Detailing the Development and Execution of all the Project Assistance Deliverables from December 9, 2011 to December 31, 2013 (Prepared by Minnesota Technical Assistance Program)*. Metropolitan Council, 2014.

Metropolitan Council. *Twin Cities Metropolitan Area Groundwater Flow Model Version 3.0 (Prepared by Barr Engineering Company)*. Metropolitan Council, 2014.

Metropolitan Council. *Feasibility Assessment of Approaches to Water Sustainability in the Northeast Metro (Prepared by Short Elliott Hendrickson Inc.)*. Metropolitan Council, 2014.

Metropolitan Council. *Industrial Water Conservation in the North and East Metro Groundwater Management Area: Data Research Report (Prepared by MnTAP)*. Metropolitan Council, 2015.

Metropolitan Council. *Industrial Water Conservation in the North and East Metro Groundwater Management Area: Project Final Report (Prepared by MnTAP)*. Metropolitan Council, 2016.

Metropolitan Council. *Joint Water Utility Feasibility Study (Prepared by Barr Engineering Co.)*. Metropolitan Council, 2015.

Metropolitan Council. *Washington County Municipal Water Coalition: Water Supply Feasibility Assessment (Prepared by Short Elliott Hendrickson Inc.)*. Metropolitan Council, 2016.

Metropolitan Council. *Twin Cities Regional Water Billing Analysis 2016 (Prepared by CDM Smith)*. Metropolitan Council, 2016.

Metropolitan Council. *Twin Cities Area Enhanced Groundwater Recharge Study (Prepared by HDR)*. Metropolitan Council, 2016.

Metropolitan Council. *Regional Groundwater Recharge and Stormwater Capture and Reuse Study: North and East Metro Study Area (Prepared by HDR)*. Metropolitan Council, 2016.

Metropolitan Council. *Regional Water Supply, Enhanced Groundwater Recharge, and Stormwater Capture and Reuse Study: Northwest Metro Study Area (Prepared by HDR)*. Metropolitan Council, 2016.

Metropolitan Council. *Regional Drinking Water Supply, Groundwater Recharge, and Stormwater Capture and Reuse Study: Southeast Metro Study Area (Prepared by HDR)*. Metropolitan Council, 2016.

Metropolitan Council. *Efficient Water Use on Twin Cities Lawns through Assessment, Research, and Demonstration: Objective 1 Report (Prepared by University of Minnesota Extension Turfgrass Science)*. Metropolitan Council, 2016.

Metropolitan Council. *Efficient Water Use on Twin Cities Lawns through Assessment, Research, and Demonstration: Final Report (Prepared by University of Minnesota Extension Turfgrass Science)*. Metropolitan Council, 2018.

Metropolitan Council. *Industrial Water Conservation Motivations Report: A Summary Report Outlining Industry Reasons for Success of, or Barriers to, Water Conservation Recommendations and Findings Developed by the Minnesota Technical Assistance Program for Assistance Clients and Intern Host*

Companies in the Eleven-County Metropolitan Area from 2012-2017 (Prepared by MnTAP). Metropolitan Council, 2018.

Metropolitan Council. *Water Conservation and Efficiency Assessment Tool: Summary of Results – Southeast Metro Groundwater Work Group (Prepared by HDR Engineering)*. Metropolitan Council, 2018.

Metropolitan Council. *Reducing Water Use on Twin Cities Lawns Through Research, Education and Outreach (Prepared by University of Minnesota Extension)*. Metropolitan Council, 2019.

Metropolitan Council. *Municipal Water Supplier Data Reporting in the Twin Cities Metropolitan Area: Phase 1 – Background and Discovery (Prepared by CDM Smith)*. Metropolitan Council, 2020.

Metropolitan Council. *Interactions of Groundwater and Surface Water Resources: Phase 1 – Potential Hydraulic Connections between Bedrock Aquifers and Surface Water in the Twin Cities Metropolitan Region (Prepared by HDR)*. Metropolitan Council, 2020.

Metropolitan Council. *Interactions of Groundwater and Surface Water Resources: Phase 1 – Potential Hydraulic Connections between Bedrock Aquifers and Surface Water in the Twin Cities Metropolitan Region (Prepared by HDR)*. Metropolitan Council, 2020.

Minnesota Geological Survey. *Surficial Geologic Mapping and Groundwater Geochemistry Assessment (Prepared for Metropolitan Council).* Metropolitan Council, 2007.

J L Nieber, C N Arika, L. Lahti. *The Impact of Stormwater Infiltration Practices on Groundwater Quality (Prepared for Metropolitan Council)*. University of Minnesota Departments of Civil Engineering and Bioproducts and Biosystems Engineering, 2014.

Tipping, Robert G. *Distribution of Vertical Recharge to Upper Bedrock Aquifers: Twin Cities Metropolitan Area (Prepared for Metropolitan Council)*. Minnesota Geological Survey, 2011.

Anthony C. Runkel, Julia R. Steenberg, Robert G. Tipping. *Hydraulic Conductivity and Hydrostratigraphy of the Platteville Formation, Twin Cities Metropolitan Area, Minnesota (Prepared for Metropolitan Council)*. Minnesota Geological Survey, 2011.

Sanocki, C.A., Langer, S.K., and Menard, J.C. *Potentiometric surfaces and changes in groundwater levels in selected bedrock aquifers in the Twin Cities Metropolitan Area, March–August 2008 and 1988–2008*. U.S. Geological Survey Scientific Investigations Report 2009–5226, 2009.

SEH. *Turtle Lake Augmentation Study: City of Shoreview, Minnesota (Prepared for the City of Shoreview)*

SEH. *Water Efficiency Study: Washington County Municipal Water Coalition (Prepared for Metropolitan Council).* Metropolitan Council, 2018.

Planning & Progress Report Documents

Metropolitan Council. *Water Supply Planning in the Twin Cities Metropolitan Area: Report to the 2007 Minnesota State Legislature*. Metropolitan Council, January 2007.

Metropolitan Council. *Metropolitan Area Master Water Supply Plan: Twin Cities Metropolitan Area, Minnesota*. Metropolitan Council, 2010.

Metropolitan Council. *Stormwater Reuse Guide: A Guide for city planners, engineers, homeowners and green thinkers (Prepare by CDM Smith)*. Metropolitan Council, 2011

Metropolitan Council. *Progress Report on Water Supply Planning*. Metropolitan Council, 2014.

Metropolitan Council. *Thrive MSP 2040: One Vision, One Metropolitan Region*. Metropolitan Council, 2014.

Metropolitan Council. *2040 Water Resources Policy Plan*. Metropolitan Council, 2015.

Metropolitan Council. *Metropolitan Area Master Water Supply Plan: Twin Cities Metropolitan Area, Minnesota (Update)*. Metropolitan Council, 2015.

Metropolitan Area Water Supply Advisory Committee. *Water Supply Now and for the Future: Steps Toward Sustainable Water Supplies*. Metropolitan Council, 2017.

Training, Education & Outreach

Metropolitan Council. *2017 PlanIt "Beyond the Basics" Webinar Series: Water Resources Planning*. Metropolitan Council, July 21, 2016. *https://metrocouncil.org/Handbook/PlanIt/Webinars.aspx*

Metropolitan Council. *2017 PlanIt Tutorial: Reporting Water Use by Major Categories*. Metropolitan Council, 2016. *https://youtu.be/s4QqjAKYVJ0*

Metropolitan Council. *2017 PlanIt Tutorial: Working with the Local Water Supply Plan Template*. Metropolitan Council, 2016. *https://youtu.be/MYbEwTOe6Z4*

Metropolitan Council. *2017 PlanIt Tutorial: Considering Source Water Protection in Your Plan*. Metropolitan Council, 2016. *https://youtu.be/42a1BjPjTTI*

Metropolitan Council. *2017 PlanIt Tutorial: Tools and Resources to Complete Your Local Water Supply Template*. Metropolitan Council, 2016. *https://youtu.be/0IMZMOFpT84*

University of Minnesota Extension and Metropolitan Council. *Video: Green Grass with Less Blue*. University of Minnesota, 2017. *https://turf.umn.edu/news/green-grass-less-blue-new-video*

Metropolitan Council. *Video: Too Much of a Good Thing*. Metropolitan Council, 2017. *https://www.youtube.com/watch?v=zO_I7USYE6s&feature=emb_logo*

University of Minnesota. *Education Signs: Mow High, Give Your Lawn a Brain, Cement Won't Grow, Grow Easy Peasy Lawns, and Green Grass with Less Blue*. Metropolitan Council, 2017. *https://turf.umn.edu/lawn-info/irrigation-resources*

University of Minnesota Extension Turfgrass Science. *Watering Wisdom Webinar Series: Outdoor Water Use in the Twin Cities – Am I Using Too Much?. https://turf.umn.edu/video-outdoor-water-use-twin-cities-am-i-using-too-much*

Metropolitan Council. Climate Vulnerability Assessment: Localized Flood Risk. Metropolitan Council 2018. *https://metrocouncil.org/Communities/Planning/Local-Planning-Assistance/CVA/Localized-Flood-Risk.aspx*

390 Robert Street North
Saint Paul, MN 55101-1805

651.602.1000
TTY 651.291.0904
public.info@metc.state.mn.us
metrocouncil.org

Follow us on:
twitter.com/metcouncilnews
facebook.com/MetropolitanCouncil
youtube.com/MetropolitanCouncil