

**DATE:** September 21, 2021  
**TO:** Wendy Wulff, MAWSAC Chair  
**FROM:** Mark Maloney, TAC Chair  
**SUBJECT:** Recommendations around groundwater and surface water interaction

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This memo includes information for the Metropolitan Area Water Supply Advisory Committee (MAWSAC) to consider as the committee develops recommendations around groundwater and surface water interaction. It reflects past MAWSAC and Technical Advisory Committee (TAC) committee meeting discussions, recent interviews with a limited number of TAC and MAWSAC members, and internal MCES conversations.

## **Request to MAWSAC**

Share your thoughts on what recommendations to make as a committee around groundwater and surface water interaction.

## **Background**

The Metropolitan Area Water Supply Policy Advisory Committee (MAWSAC) is responsible to assist the Council in its water supply planning work. One of the committee's responsibilities is to produce, by 2022, a set of recommendations and supporting information around high-priority water supply topics to support the update of the regional development guide and related policy plans. The Metropolitan Area Water Supply Technical Advisory Committee (TAC) informs MAWSAC's work by providing scientific and engineering expertise. Recommendations to the Metropolitan Council (Council) and Minnesota Legislature (Legislature) may address technical studies, policy updates, collaboration, and/or funding.

In March 2021, MAWSAC and TAC adopted a work plan to develop recommendations in the areas of:

1. Contamination and water quality
2. Intersection between land use and water supply
3. Groundwater and surface water interaction
4. Infrastructure

## **TAC Meeting Highlights**

At their meeting on August 17, 2021, TAC was asked to share information with MAWSAC to consider related to potential recommendations around groundwater and surface water interaction. This reflects MAWSAC's intention to approach the development of recommendations by working directly with local technical and scientific experts throughout the process to ensure their concerns are consistently understood and considered.

TAC provided input and suggestions to revising the draft problem statement, goal, and proposed actions on pages 3-6 below. They also shared the following high-level considerations:

- More data is needed to better understand interactions and problem solve.
- Collaboration is necessary to treat water as one resource.
- Acknowledge the challenge of bringing different management organizations together and the need to be sensitive to power/authority dynamics where responsibilities overlap.
- It is important that proposed approaches and recommendations be more specific.

# RECOMMENDATIONS RELATED TO GROUNDWATER AND SURFACE WATER INTERACTION

## Goal

The TAC, serving at the pleasure of the MAWSAC, recommends that the MAWSAC, with the Metropolitan Council and the State of Minnesota, promote actions to further understand how ground water and surface water interact and how those interactions impact the sustainability of water supply systems and resources. Ongoing support for collaborative management strategies, research, and monitoring is needed to better understand these interactions and impacts.

## Problem

Planning for water supply sustainability comes down to understanding water budgets: the amount of water moving through the different parts of the regional water cycle; how water flow affects contaminant migration, including between ground and surface waters; how water can be used or reused without doing damage to connected resources; and how different environmental and use conditions affect water availability.

Because water systems extend beyond jurisdictional boundaries, approaches that support a subregional perspective will improve understanding of the challenges and opportunities and allow the potential impacts of interacting groundwater and surface water to be prioritized when making decisions.

*As committees form recommendations around this challenge, look for opportunities to:*

- Increase support for research and technical analysis. While research exists for different components of the water budget, we still benefit from further research to better understand the connections between those components. Changes in climate and management practices are also increasing our uncertainty about how ground- and surface waters interact.
- Increase support for inter-organizational coordination, particularly around stormwater and groundwater management, resource monitoring, permitting, and planning so that local needs are met while adding value on challenges that extend beyond jurisdictional boundaries.

## Questions to consider

Consider the following questions in preparation for the meeting, based on your experiences dealing with groundwater and surface water interaction. The [Master Water Supply Plan](#) and [Thrive MSP 2040](#) outcomes, principles, and goals are a resource to draw on.

- 1) **What trade-offs or tensions do you perceive might shape public support for furthering our understanding of ground- and surface water interaction?** What political or regulatory pressures are you trying to balance?
- 2) **What resources would help most?** What financial resources, information, plans, permits, or technical assistance set us up to do better? Anything missing from current local, regional, or state agencies?
- 3) **Who in your community is most impacted by changes in groundwater or surface waters?** What outreach approaches or collaborations have been most effective? Are there any gaps in resources?
- 4) **How could the Council and/or organizations represented on TAC help?** How could the region build a better understanding of the interactions between ground- and surface water and how that impacts water supply sustainability?

## Potential solutions or approaches

The following proposed solutions or approaches come from conversations had by MAWSAC, TAC, and Council staff. At their meeting on August 17, 2021, TAC spent some time reviewing, revising, and doing some preliminary sorting of these proposed solutions according to ease of implementation and impact.

TAC also highlighted the following possible leaders and critical partners for work in this area: Minnesota Geological Survey, Department of Natural Resources, U.S. Geological Survey, Department of Health (Source Water Protection), Counties, Soil and Water Conservation Districts, water providers, watershed management organizations and watersheds.

## Research

Proposed action	Ease of implementation versus impact
<p>a) Identify data gaps and information needs, and leverage State resources and organizations to compile common/shared water quality and quantity monitoring and other data to improve accessibility and value to water resource managers and metro residents (example: developing new approaches to fill gaps in metro area hydrogeologic mapping).</p> <ul style="list-style-type: none"> <li>○ Consider community sharing of SCADA well pumping data for regional mapping of aquifer levels</li> <li>○ Combine groundwater level data from USGS, state water agencies, and Met Council to evaluate interactions.</li> </ul>	<p>Relatively hard to implement with longer-term or bigger impact</p>
<p>b) Support expansion of water level monitoring programs to increase local and regional understanding of groundwater – surface water interaction, by Met Council and partners.</p>	<p>Relatively hard to implement with longer-term or bigger impact</p>
<p>c) Research to better understand metro area water balances during both wet and dry periods, supported by State of Minnesota, Metropolitan Council, and partners.</p> <ul style="list-style-type: none"> <li>○ Analyses to better understand water routing, the impact of land use changes and development on water routing, and how groundwater recharge, shallow groundwater, and surface flows are impacted.</li> <li>○ Updated models of metro area’s water cycle and budget to support better understanding of quantity and quality interactions between climate, water users and utilities, surface waters, and groundwater (examples: nitrate movement in Dakota County, impacts of artificial recharge on aquifers, projections of climate change).</li> </ul>	<p>Relatively hard to implement with longer-term or bigger impact</p>
<p>d) Research efforts to understand how contamination moves between and impacts groundwater and surface water, supported by State of Minnesota (example: research stations in areas of high groundwater-surface water interaction to study quality and quantity impacts of large-scale infiltration projects, pumping centers near sensitive groundwater-supported surface waters, etc.).</p>	<p>Relatively hard to implement with longer-term or bigger impact</p>

Proposed action	Ease of implementation versus impact
e) Prioritize continued inter-agency collaboration to understand the effectiveness of infiltration as a stormwater management practice, particularly under a range of potential climate futures (high and low water tables).	Relatively hard to implement with longer-term or bigger impact
f) Research efforts to learn if past actions on water conservation and reuse have been beneficial to groundwater and surface waters, supported by Metropolitan Council and partners.	Relatively hard to implement with longer-term or bigger impact
g) Identify possible costs and benefits/trade-offs in combined management of groundwater and surface water resources (example: costs to rebuild trail if infiltration causes high water tables and lake flooding or costs to run water conservation campaign if pumping has to stop in order to not damage valued lake).	Relatively hard to implement with longer-term or bigger impact
h) Identify possible costs to better understand the State's water budget.	<i>Topic raised in TAC discussion on 8/17/21 but not ranked.</i>

### Outreach, engagement, and training

Proposed action	Ease of implementation versus impact
a) Learn about and promote the MDH/University of Minnesota report 'The Future of Drinking Water: A Framework for Managing Risk'	Relatively easy to implement with long-term or bigger impact
b) Education campaign targeted for metro area regarding: <ul style="list-style-type: none"> <li>o Current understanding of potential climate change impacts to aquifer recharge, water tables, and water flows and need for additional work</li> <li>o Benefits and feasibility of water reuse</li> <li>o Connectedness of groundwater and surface water resources in Twin Cities metropolitan area</li> <li>o Regional and sub-regional/local water budgets with a visual tool</li> <li>o Unified message around contaminants with potential to impact public water supplies (example: DWSMAs)</li> </ul>	Relatively easy to implement with short-term/immediate or smaller impact
c) Collaborate with and support PCA and other state agencies to identify and publish best management practices for communities interested in water reuse.	Moderately hard to implement with short-term/immediate or smaller impact
d) Continue to support using the latest research to improve and update stormwater infiltration requirements and recommendations around practices, particularly in vulnerable drinking water supply management areas. State of Minnesota, Pollution Control Agency, Metropolitan Council, developers, and other partners collaborate as needed.	Relatively hard to implement with short-term/immediate or smaller impact

<b>Proposed action</b>	<b>Ease of implementation versus impact</b>
e) Build and support relationships among wellhead managers, land use planners and developers, and watershed management organizations to address contaminants outside their jurisdictions.	<i>Topic raised in TAC discussion on 8/17/21 but not ranked.</i>

### Financial support

<b>Proposed action</b>	<b>Ease of implementation versus impact</b>
a) Grants for communities to support water reuse projects, particularly those that help respond to emerging contamination and/or reduce the amount of treated drinking water used for non-potable demands, with funding from State of Minnesota.	Relatively easy to implement with longer-term or bigger impact
b) Support for developers seeking to use innovative water reuse and capture in areas that are less suitable for infiltration as a stormwater management practice, with funding from State of Minnesota.	Relatively easy implement with short-term/immediate or smaller impact
c) Sub regional projects that extend beyond political boundaries of one community that support groundwater and surface water health and sustainability, with funding provided by State of Minnesota.	Relatively hard to implement with short-term/immediate or smaller impact
d) Augmented sources of funding to implement water supply system plans, when rapid response is needed after low probability or unlikely events (significantly changing water tables, water quality), provided by State of Minnesota.	Relatively hard to implement with short-term/immediate or smaller impact
e) Continue to support PWSs to work with neighbors to work together on water issues that extend beyond municipal boundaries.	<i>Topic raised in TAC discussion on 8/17/21 but not ranked.</i>

### Regulatory

<b>Proposed action</b>	<b>Ease of implementation versus impact</b>
a) Prioritize continued inter-agency collaboration to develop streamlined regulatory direction to communities regarding potential for storm or wastewater reuse, particularly for infiltration or enhanced aquifer recharge.	Relatively easy to implement with longer-term or bigger impact

### Regional policies and planning (Council and partners)

<b>Proposed action</b>	<b>Ease of implementation versus impact</b>
a) Metropolitan Council regional policies acknowledge areas with high degree of groundwater and surface water interaction and includes strategies in relevant areas of the Council's work (examples: prioritizing obtaining regional park land that directly impacts areas of high surface and groundwater connection; supporting opportunities to work with partners to explore feasibility of reusing reclaimed	Relatively easy to implement with longer-term or bigger impact

Proposed action	Ease of implementation versus impact
wastewater and surface water; using Priority Waters List to help focus research and technical assistance).	
b) Support collaboration among Public Water Suppliers (PWSs), state regulatory agencies, watershed management organizations, and other PWSs to prioritize discussion of changes in water demand and supply due to climate change, water reuse, and contamination.	Relatively easy implement with short-term/immediate or smaller impact
c) Incorporate water safety planning (as described in University of Minnesota Future of Drinking Water report) into regional policy and planning approaches.	<i>Topic raised in TAC discussion on 8/17/21 but not ranked.</i>

### Potential leaders and critical partners

TAC highlighted the following possible leaders and critical partners for work in this area: Minnesota Geological Survey, Department of Natural Resources, U.S. Geological Survey, Department of Health (Source Water Protection), Counties, Soil and Water Conservation Districts, water providers, watershed management organizations and watersheds.

### Resources related to groundwater and surface water interaction

The following resources were shared or referred to during conversations with committee members or highlighted by staff as this document was developed. They may be useful to review related to committee conversations around groundwater and surface water interaction. This is not intended to be a complete list of resources.

#### Examples of local work:

- [2018 Nokomis Area Groundwater & Surface Water Evaluations FAQs \(fact sheet\)](#)
- [2020 Hennepin County Interactive Landslide Map and Hazard Atlas \(interactive map and reports\)](#)
- [Washington County educational video ‘Our Groundwater Connection’](#) (5 min video)
- [Dakota County Land Conservation Plan](#) (page 28 includes map of significant recharge areas)
- [Metropolitan Council East Bethel Water Reclamation Facility](#) (fact sheet)
- [Pioneer Press article ‘Ramsey County to address water damage to park due to flooding of Shoreview’s Snail and Grass lakes’](#) (4/12/21 newspaper article)

#### Research examples: understanding groundwater-surface water interactions

- [Metropolitan Council Updated Daily Soil Water Balance \(SWB\) Model](#) (report)
- [USGS report on groundwater and surface water interactions near White Bear Lake, Minnesota, though 2011](#)
- [Evaluation of Groundwater and Surface Water Interaction within the Nine Mile Creek Watershed](#) (2019 report)
- [2018 report of the Interagency Workgroup on Water Reuse: Advancing Safe and Sustainable Water Reuse in Minnesota](#)

#### Examples of existing groundwater-surface water data:

- [Key water information catalog, hosted by Metropolitan Council](#)
- [Metropolitan Council Environmental Information Management Systems \(EIMS\)](#)
- [DNR Minnesota State Climatology Office](#) and [Minnesota Climate Trends Tool](#)

- [MPCA Water quality data](#)
- [DNR Groundwater level data](#)
- [DNR Cooperative Stream Gaging \(CSG\)](#)
- [DNR Springs, Springsheds, and Karst](#)
- [DNR Watershed Health Assessment Framework](#)
- [DNR Minnesota Hydrogeology Atlas: Water-Table Elevation and Depth to Water Table](#) and [Pollution Sensitivity of Near-surface Materials](#)

**Examples of guidance (technical assistance, best practices, planning, funding):**

- MDH and University of Minnesota report: [Future of Drinking Water: A Framework for Managing Risk](#) (PDF report)
- University of Minnesota [Minnesota Water Sustainability Framework](#) (PDF report)
- [MPCA Minnesota Stormwater Manual](#) including [information on soils with low infiltration capacity](#) (website)
- [Metropolitan Council Priority Waters List](#) (2/9/21 presentation of work in progress)
- [DNR mapping for Bonanza Valley landowners to support groundwater recharge through restorable wetlands](#)
- [Stillwater Engineering Design Guidelines for Stormwater Management](#) (see page 27 for discussion of infiltration practices)
- [Board of Water and Soil Resources support for Groundwater Protection](#) including a [summary of available funding](#) (website)

**Community data**

- [Metropolitan Council Long-range Forecasts](#)
- [Metropolitan Council Community Profiles interactive datasets](#)
- [MC Equity Considerations for Place-based Advocacy and Decision Dataset](#) ([website](#))
- [MPCA Understanding environmental justice](#)