RECOMMENDATIONS TO FURTHER UNDERSTANDING OF GROUNDWATER - SURFACE WATER INTERACTION

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 regional water system; 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 conditions affect limits.

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 lack substantial understanding about 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.

Questions to consider

Consider the following questions in preparation for the meeting, based on your experiences dealing with land use impacts on water supply systems and risks to source water. 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, LUAC, and Met Council staff:

Outreach, engagement, and training/technical assistance

a) Education campaign targeted for metro area regarding:
    - Potential climate change impacts to aquifer recharge, water tables, and water flows
    - Benefits and feasibility of water reuse
    - Connectedness of groundwater and surface water resources in Twin Cities metropolitan area

b) Use 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.

c) Collaborate with and support PCA and other state agencies to identify and publish best management practices for communities interested in water reuse.

Research

a) Identify data gaps and information needs, and leverage State resources and organizations to compile water quality and quantity monitoring and other data to improve accessibility and value to metro residents (example: developing new approaches to fill gaps in metro area hydrogeologic mapping).

b) Support expansion of water level monitoring programs to increase understanding of groundwater – surface water interaction, by Met Council and partners.

c) Research to better understand metro area water balances during both wet and dry periods, supported by State of Minnesota, Metropolitan Council, and partners.
    - 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.
    - 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).

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.).

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).

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.

Regulatory

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.

Regional policies and planning

- 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 wastewater and surface water; using Priority Waters List to help focus research and technical assistance).

b) Public Water Suppliers (PWSs) prioritize

    - Working group with state regulatory agencies and other PWSs to discuss changes in water demand and supply due to climate change, water reuse, and contamination.

Financial support

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.

b) 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.

c) 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.

d) 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.

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)
- *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):

- *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*