Proposed Approach for Regional Groundwater Modeling

Why does the Council do groundwater modeling?

MN Statutes 473.1565 direct the Metropolitan Council to develop and maintain a base of technical information for sound water supply decisions, including groundwater availability analyses and modeling. Unlike modeling done for regulatory purposes, the Council's regional groundwater modeling is not intended to provide specific solutions to any given problem. Rather, it is intended to support stakeholder efforts to identify and evaluate different approaches and as a starting point for more localized groundwater modeling efforts. For example, the Council uses regional modeling to inform regional policies and subregional analyses of potential water supply approaches and to make recommendations for monitoring and funding priority areas.

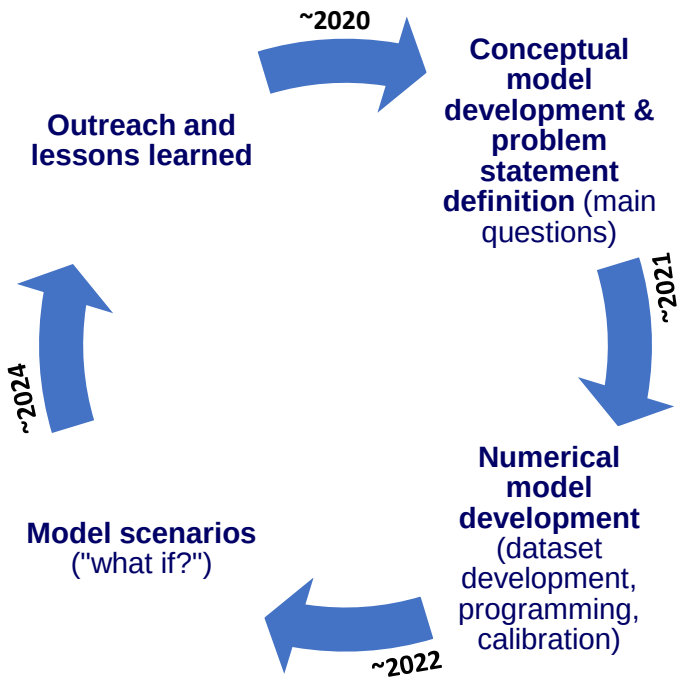
Council approach to modeling efforts

Metropolitan Council supports groundwater modeling efforts that demonstrate the following principles, which are grounded in MCES' values of excellence, inclusiveness, integrity, respect, and commitment:

- **Recognize that water resources are not limitless** and require careful analyses and long-term planning to ensure their sustainability for future generations.
- **Build a shared regional perspective** by seeking-out and listening to local and subregional partners to better understand their needs and questions.
- **Forge partnerships with diverse stakeholders** to ensure multiple perspectives inform technical approaches and applications of model results (political, planning, management, outreach/engagement). For example, technical advisory groups will be supported.
- **Adapt to changing stakeholder questions and issues** by fostering a culture of inquiry and supporting the exploration of "what-if".
- **Explore alternative approaches**, such as new modeling techniques and new datasets. For example, updated versions of MODFLOW, new geologic maps, new surface water models, etc.
- **Use appropriate conceptual models** to build models for the questions and issues being addressed.
- **Apply models responsibly,** in ways that are consistent with the conceptual model they are based on.
- **Include sufficient time and resources in a continuous effort** to explore new questions raised by modeling efforts, to promote learning from each model iteration, and to improve work going forward.

Lessons Learned

- Clarify and communicate purpose, roles, assumptions, and results
- Incorporate local expertise and data early on
- Better process to support and to incorporate more local modeling efforts



Examples of Stakeholder Questions

- How much groundwater can be sustainably pumped from aquifers under different conditions?
- What is the effect of future climate?
- How vulnerable are aquifers to changes in recharge?
- How does reuse change the limits on the amount of water available?
- How do land use/BMPs in source water areas groundwater?
- How does development impact groundwater?
- How do groundwater model results inform development?
- What are the effects of policy or water use initiatives?
- What are the accuracy and uncertainty of calculated model results?

Examples of New Data and Software

- Local water supply plan water demand projections and planned infrastructure
- Updated geologic atlases (Anoka, Dakota, Hennepin, Isanti, Sherburne, Wright)
- Additional monitoring (observation wells, stream flow, water chemistry, aquifer tests)
- Climate modeling
- MODFLOW 6