Metropolitan Area Water Supply Planning
Report to the Legislature, as part of the 2010 Minnesota State Water Plan

Introduction

Minnesota Statutes, Section 473.1565, directs the Metropolitan Council (Council) to "carry out planning activities addressing the water supply needs of the metropolitan area," including the development of a Twin Cities Metropolitan Area Master Water Supply Plan (Master Plan). The legislation directs that the plan:

- Provide guidance for water supply development.
- Emphasize conservation, interjurisdictional cooperation, and long-term sustainability.
- Address reliability, security and cost effectiveness of metro area water supplies.

The Master Plan was completed in March 2010. In addition, the law required that the Council "…***submit reports to the legislature regarding its findings, recommendations, and continuing planning activities under subdivision 1. These reports shall be included in the "Minnesota Water Plan" required in section 103B.151…".*** This report fulfills that requirement by describing efforts conducted to date, including an overview and conclusions of the Master Plan and ongoing planning efforts.

The analysis conducted as part of the planning effort to date indicates that, overall, the region's water resources are adequate to meet projected demands for the foreseeable future. However, local issues *are* predicted to continue to arise if traditional sources are developed to meet those demands. The issues include impacts to surface waters, unacceptable groundwater declines and the potential for interference with private wells.

The Master Plan sets forth a dynamic process for collecting new information, updating analytical tools, and improving guidance to address anticipated water resource issues and ensure supplies are developed sustainably. The plan adopted the following definition of water sustainability: ***"…water use is sustainable when the use does not harm ecosystems, degrade water quality, or compromise the ability of future generations to meet their own needs."*** **(Minnesota Session Law 2009 c172)**

Planning Activities

Stakeholder Input

As prescribed in Minnesota Statutes 473.1565, the Metropolitan Area Water Supply Advisory Committee – whose members represent state agencies, counties, local governments and the Council – was established to assist the Council in its planning activities. The guidance provided by this group was critical to the development of the plan and will continue to be so in the future. The advisory committee is set to sunset at the end of 2012.

From its inception, the plan development process was both inclusive and transparent. Through a series of workshops, the Council sought direction from a wide range of stakeholders whose input played an important role in shaping the plan's content and structure. The Council also sought input from technical experts including governmental scientists, private-sector consultants and representatives from academia, who provided valuable guidance and feedback. With their roles in water management, the

Minnesota Department of Natural Resources (DNR) and the Minnesota Department of Health (MDH) played an integral part in the development of this plan.

Phase I

The planning activities were organized into two phases. During the first phase, culminating in a report to the 2007 Minnesota Legislature (January 2007), the Council conducted a preliminary evaluation of water supply availability, examined the water supply decision-making and approval process, and explored the need for a regional role in water supply safety, security and reliability.

As a first step in the development of a sound regional base of technical information, the Council collected water supply system and resource monitoring location information from throughout the region. The Council also performed an initial analysis comparing regional water demand projections and water resource availability. The goal was to identify communities where water supplies might be inadequate to serve projected growth. This was the foundation for a more robust analysis in the second phase.

With guidance from the Water Supply Advisory Committee (Minnesota Statutes 473.1565) and input from stakeholders, the Council evaluated the current water supply decision-making and approval process and agency roles during Phase I. The DNR, MDH, and the Council each play a unique role in the water supply decision-making and approval process in the region. While coordination exists among these agencies, opportunities were identified for improving coordination and streamlining the process. Consequently, the MDH and DNR have been increasing the routine communication and coordination between them. The most significant change to improve the process, however, was identified to be an adequate evaluation of water supply availability as part of planning for growth. Roads, parks and sewer service capacities are evaluated as part of regional planning, but historically there has been little or no water supply availability assessment prior to growth. It is this gap that the Master Plan addresses.

The Council also evaluated a range of safety, security and reliability issues during the first phase of the planning effort. Contamination (both intentional and accidental, in both the distribution system and the source-water area), loss of power, and natural disasters were identified as the most significant short-term risks to the region's water supplies. The evaluation concluded that federal and state regulations and programs are already in place requiring communities to identify and establish protocols for protecting the safety, security and reliability of their water supplies. However, as part ongoing planning activities, the Council will evaluate potential benefits of a regional approach to aspects of water supply protection.

Phase II

Building on the work done in Phase I, the second phase of work focused on refining the water resource availability assessment. Phase II culminated in the Metropolitan Area Master Water Supply Plan (March 2010). Phase II analyses focused on the following stakeholder-identified issues, which have limited water supply availability in the past and may occur in the future:

- Impact to surface water features
- Significant aquifer drawdown
- Well interference
- Impact to trout streams or calcareous fens
- Aquifer vulnerability
- Presence of special well construction areas

The water resource availability assessment evaluated the potential for these issues to occur based on projected demands. It relied on the best available, regionally consistent data collected by the Council and by others through various programs and studies conducted over the years. These data sets included water supply system infrastructure information, geologic data, surface water flows, water well information, studies of groundwater and surface water interaction, and areas of known groundwater contamination.

Using this data and information, the Council conducted a regional analysis that compared projected water demands to available resources. Metro Model 2, a computer model of the region's groundwater flow built upon the PCA's original Metro Model, was developed to assess the ability of the region's water resources to supply projected demands without adverse consequences. The model and other analyses highlighted areas where, based on projected demands, groundwater withdrawals could cause unacceptable impacts to water resources.

Information about special well construction areas and source water protection areas developed by the MDH was also compiled and presented in the plan to inform water supply planning decisions.

In addition, work was conducted to better understand how much more water could be withdrawn from the Mississippi River for water supply during low-flow conditions, while maintaining a minimum flow necessary for existing water withdrawal infrastructure and other uses including downstream navigation channels, sustainable habitat for fisheries and wildlife, recreation, and point-source-inflow dilution. The study evaluated the probability of low flows in the Mississippi River to inform communities currently using the river as a source as well as those who are considering its use.

Stakeholder Input

From the beginning of the planning process, the Council recognized that the participation of those who are involved in water resource and supply management is critical for this to be a successful and useful effort. To gather input on the plan and its components, the Council designed and carried out stakeholder workshops. These involved a wide base of regional planners, municipal water suppliers, government officials and interested citizens.

Throughout the planning effort, meetings and public forums with the state's and region's agencies and planning partners were held to ensure that stakeholders would be actively involved in the ongoing development of the Master Plan. As the need to develop technical information and tools emerged in 2007, the Council convened a technical advisory group to ensure the accuracy of data and the usability of its analysis. As planning continues, so will the collaborative process that has been established between stakeholders and the Metropolitan Area Water Supply Advisory Committee.

The central issue that emerged from the stakeholder input was the need to link water supply to overall planning, and that evaluating resources in the context of planned growth is necessary if the region is to satisfactorily address potential limitations.

Results: Metropolitan Area Master Water Supply Plan

Five years of stakeholder input, data collection, and technical analysis culminated in the development and approval of the Master Plan in March 2010. The plan provides a framework for long-term water supply development at the local and regional level that does not harm ecosystems, degrade water

quality, or compromise the ability of future generations to meet their own needs. The plan recognizes the benefits of identifying, early in the process, issues that communities need to address.

Much of the analysis focused on evaluating the potential impacts of groundwater withdrawal, the preferred source for virtually all the growing suburbs in the region. A variety of scenarios were run, including one that assumes that the entire developable area of the region is developed at urban densities and that groundwater will be the water source used to meet all new demand in the region (ultimate development). The analysis for this scenario predicts that the magnitude of aquifer declines will vary across the metropolitan area. In the developed central cities and inner-ring suburbs, aquifer decline is expected to be minimal. In outer-ring suburbs and rural areas, particularly in the southern metropolitan area, aquifer decline on the order of 100 feet may occur.

The ramifications of this decline vary from aquifer to aquifer and from place to place. In some areas the projected decline will have little impact on natural resources, and in others could adversely affect aquifer productivity and/or surface water features. In areas where adverse impacts from use of traditional sources are predicted, communities will be able to meet projected demands through development of options including use of other aquifers, surface waters, conservation, and cooperation with neighboring communities, avoiding the adverse impact.

The plan presents results of the metropolitan area water supply availability assessment at both a regional and community scale. The region-wide water supply assessment highlights potential problem areas, so that they can be considered in the development of region-wide plans. The plan also provides enough detail on the potential local problems that water suppliers will know what needs to be addressed as part of development. This scale variability is intended to identify and coordinate water supply planning activities among utilities, local, regional and state planners and resource managers, and to reduce the likelihood that water supply problems will develop “under the radar.”

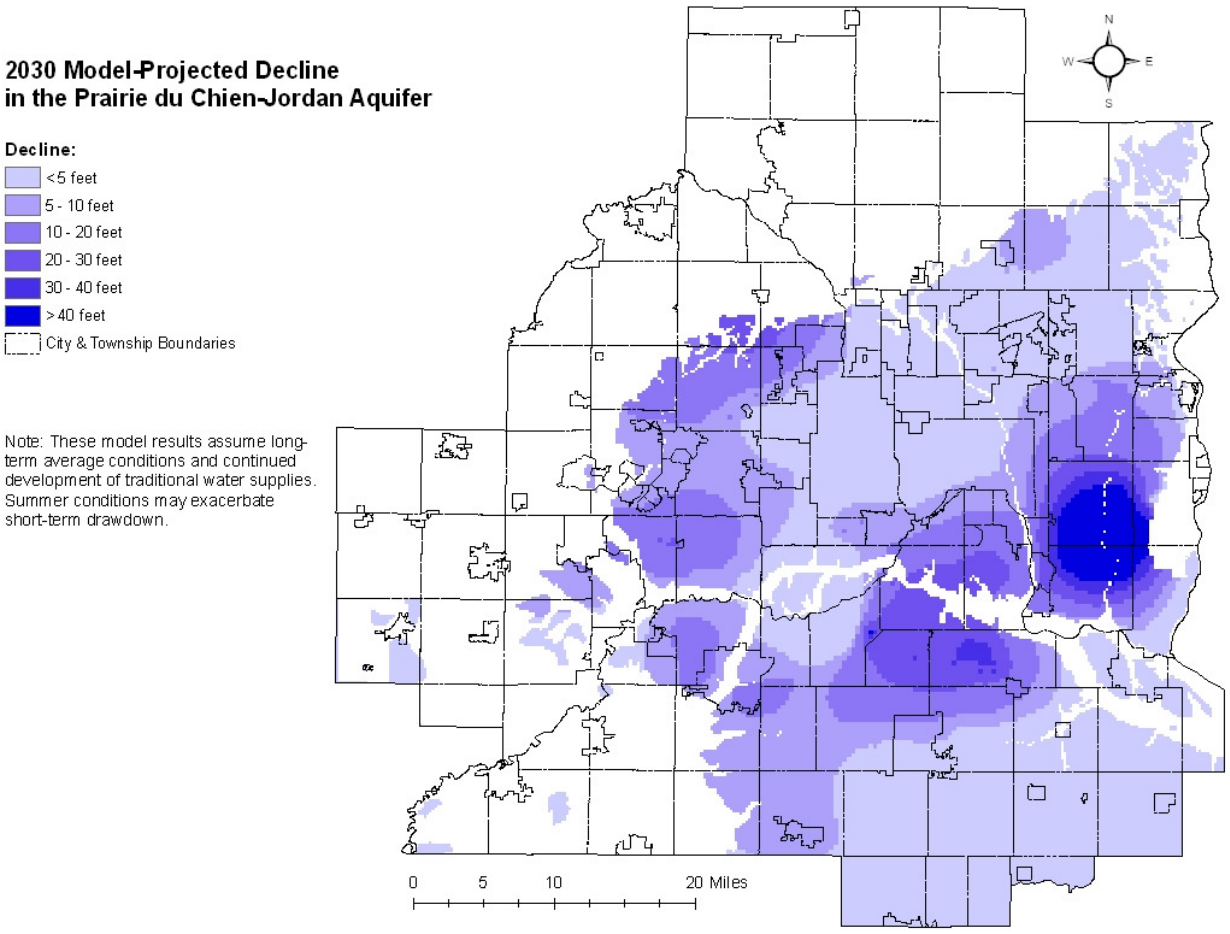

Figure 1: The analysis shows potential groundwater level drawdown primarily in outer-ring suburbs that rely heavily on groundwater. Should these communities continue to use their traditional groundwater sources, aquifer water levels are expected to decline significantly in some areas. Use of alternative water sources may neutralize predicted impacts.

The Master Plan presents local information in community-specific water supply profiles, one for each community in the region. The profiles provide information about each community's current and projected water demand, current potential supply sources, and issues identified through the technical analysis. In addition, the plan provides guidance for communities to address the issues identified in their profiles. With the information supplied in the profiles, communities will know what potential water supply issues they face and the range of appropriate solutions *before* they invest significant time and money in infrastructure planning. The information will also be used by the DNR to help ensure that potential issues are being addressed and appropriation permits can be issued with more confidence. Having this information available will help to avoid many of the costly and time-consuming delays in water supply development, as well as the challenging appropriation decisions, that have occurred in the past.

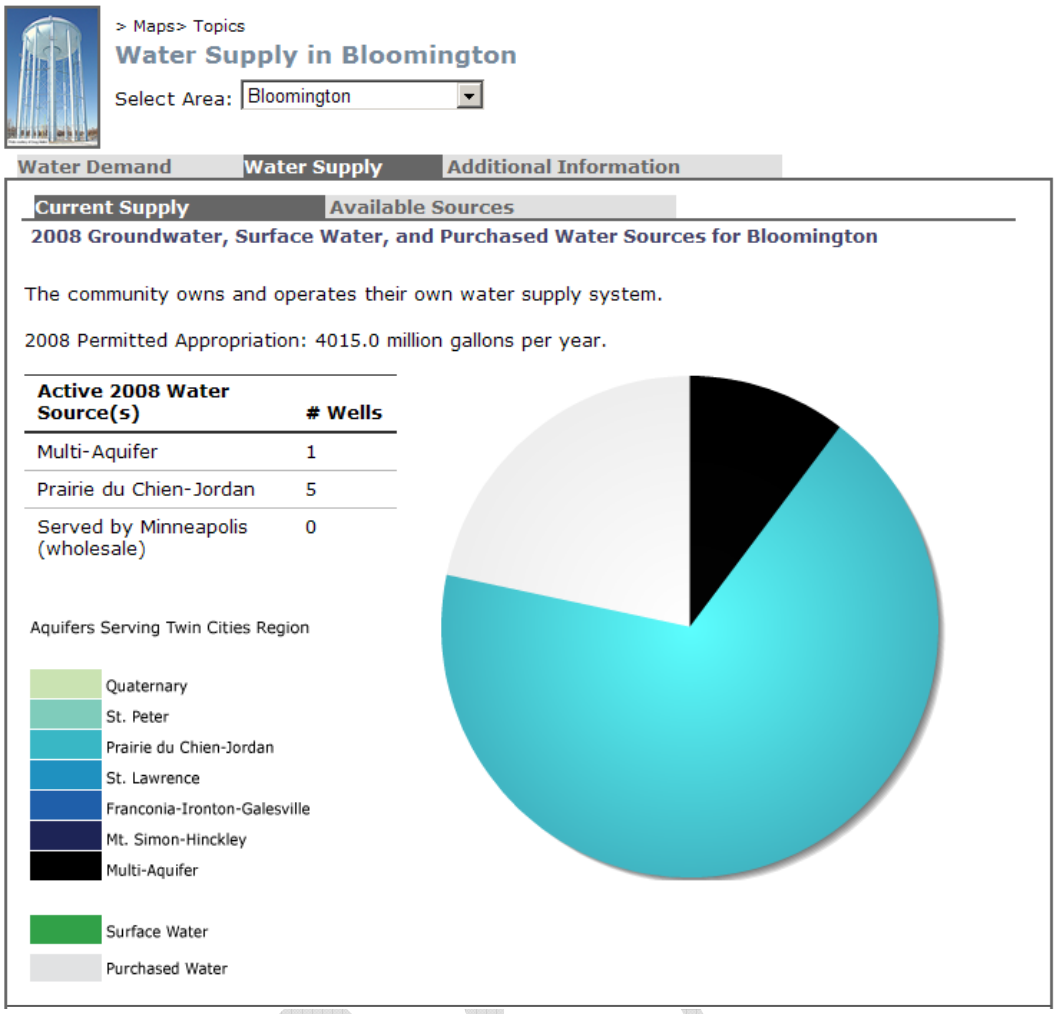

Figure 2: Community water supply profiles include information on each of the municipal water supplies in the region as well as issues that need to be addressed. They are presented in the online water supply information application as well as in paper or pdf format.

It was clear that providing public access to data and analyses was critical in the development of a useful master water supply plan. The Council created several online tools to put data and analyses in the hands of regional and local planners. Water demand, infrastructure, and groundwater model data are available as maps through the Make-A-Map application on the Metropolitan Council website. Community water use information is provided through the Council's online Topics application. An online water conservation toolbox provides water suppliers with program ideas and water customers with wise water-use tips.

As required by Minnesota Statutes 473.1565, the Metropolitan Council will consider the results of the planning effort when preparing the metropolitan development guide (Minnesota Statutes 473.145). Although water supply will not be the only factor in developing long-range growth forecasts, it will be considered alongside the other factors that shape the regional forecasts. Where other factors indicate that growth should occur and water supplies have some limitation, the Council will assist the communities in developing plans to meet projected demands sustainably. The Council will also review local comprehensive plans for consistency with the Master Plan in accordance with Minnesota Statutes 103G.291.

Ongoing Efforts

The Council's planning effort resulted in a collaborative and dynamic process for the evaluation of water supply availability, linked to long-term planning and based on a continuously improving foundation of technical information and management strategies. The plan recognizes the value of an adaptive approach to water supply management, guided by management tools developed with the best available information generated through resource monitoring, mapping and predictive analyses. The Master Plan describes the ongoing process for incorporating the information collected through efforts led by the Council, communities, watershed districts, local, county and state agencies, and others into the analyses and tools.

The primary outcome of the ongoing effort will be identification of sustainable sources to meet long-term demand for the entire Twin Cities Metropolitan Area. This will include the development of sub-regional or local plans that: identify water supply sources; establish management thresholds linked to resource monitoring networks; monitor and manage withdrawals; and identify options to address any emerging issues. In order to accomplish this, the Council intends to continue the established water supply planning process described below and illustrated in Figure 3.

- Improve the water supply availability technical analysis, including the metropolitan area groundwater model, with new data, methods and information. The updated analysis will include the evaluation of various land-use, climate and growth scenarios to identify potential local and regional water supply limitations as well as options to meet projected demands.
- Update water supply planning tools and guidance, including the water conservation toolbox, water supply development guidance and online water supply mapping. The tools are used by cities and regulators to identify actions to take and sources to develop to meet future demands without adverse impacts to natural resources.
- Collect data and information on: water levels, hydrogeologic properties, water chemistry, recharge rates, geology, water use, wells, water supply systems, water conservation, groundwater contamination and groundwater/surface water interactions. This information may be collected by the Council or others through regular programs or special studies, and will be used to improve the water supply availability analysis and planning tools.

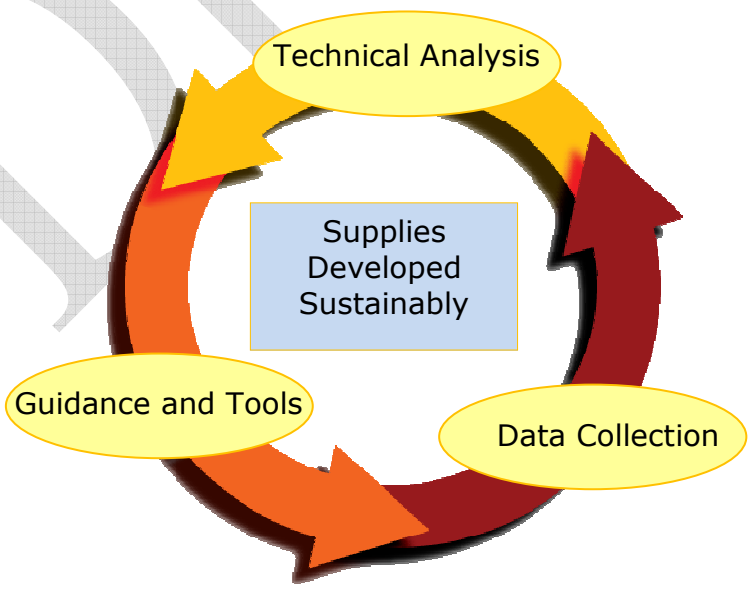

Figure 3. The ongoing and dynamic planning process.

Examples of specific efforts under way or on the horizon include:

- Developing a map of known groundwater contaminant plumes in the region.
- Convening a stakeholder group to develop a protection plan for the Seminary Fen and for a Valley Branch trout stream.
- Characterizing glacial aquifers in the region.
- Developing tools for communities to use to evaluate the feasibility of stormwater reuse.

These are example of the types of information collection, analysis and tool development that will continue as part of the ongoing planning process.

Inclusion and transparency, informed by robust data collection and analysis, create the organizational basis that inspires better decision-making. In order to continue the collaborative process established in development of the plan, stakeholders will be engaged through a variety of collaborative venues. For example, the Council will continue to utilize technical work groups to gather input and provide review of the Council's technical analyses.

The Council's water supply planning effort balances regional growth against local resource vulnerability, recognizing that supplies appear to be regionally sufficient to meet foreseeable demands. However, supplies may be locally limited due to a number of factors that require active management. This dichotomy provides challenges for resource protection and opportunities for interjurisdictional cooperation. Cooperation could occur on many levels and include information sharing, shared monitoring points, coordinated source-water protection, co-development of supplies, and wholesale or retail purchase of supplies. Regardless, an iterative management process is necessary so that as new withdrawals are made, information is collected, impact predictions are improved and cost-effective supply development decisions are made. Integrating local data collection and resource management strategies with regional networks will allow managers at all levels to have the best possible sense of the long-term regional availability of water and to provide the framework for local withdrawal decisions.

Recommendations

Two specific recommendations were made by the Metropolitan Area Water Supply Advisory Committee/Metropolitan Council in the 2007 Report to the Legislature: 1) Consolidate and clarify the requirements for local water supply plans, and 2) Provide funding for capital projects that have a regional or state benefit, specifically to provide funding for the interconnection between the Minneapolis and St. Paul water supply systems. Other less formal recommendations in that report included conducting additional data collection, analysis and sharing, as well as improving coordination between agencies in the water supply permitting process.

The 2010 Master Water Supply Plan expands upon recommendations identified in the 2007 report, particularly those that support an adaptive management framework. The plan stresses ongoing data collection, analysis and update of tools for water supply decisions. As the regional planning process continues, these tools will support the development and implementation of long-term sustainable water system decisions. Lessons learned through this process are expected to result in future recommendations to ensure that water supplies are developed sustainably.