2020 Anoka County Water Resources Report

Anoka County
HUMAN SERVICES DIVISION
Public Health & Environmental Services

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EXECUTIVE SUMMARY

Water plays an important role in public health. The mission of The Anoka County Public Health and Environmental Services (PHES) Department is: “To improve health through education, prevention, service, regulation and advocacy in Anoka County”. The vision of PHES is “Optimal health for all people, communities and environments in Anoka County”.

Local water resources are key to Anoka County’s (the County) future. The quality and sustainability of the County’s water resources impacts the health of its residents and its economic future. A sustained and adequate supply of safe water is critical to support the County’s growing communities. In all respects, local agencies support the County’s goal of maintaining an environment that benefits public health, safety, and welfare. Determining the adequacy of water management programs to support public health is an oversight function of the County. The Water Resources Report serves to achieve the mutual goals of State and local agencies and is updated every five years by PHES staff and the Anoka County Water Resources Management Task Force (Task Force).

Issues and New Developments

The Task Force has identified several emerging issues and new developments relating to water resources in the County. These include:

- Concerns about water quantity due to increasing development, which has the potential to increase the amount of water that is used in the County;
- Non-point source pollution, such as runoff, affecting the quality of water resources;
- Major updates to the 5-year National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit;
- Developments in water reuse;
- Contaminants of emerging concern;
- Conservation practices and the effects these practices have on the cost of water utilities;
- Changes in precipitation patterns resulting in a higher risk of localized flooding and drought.

More information on these issues and developments can be found in Chapter 6 and throughout the report.

Development of the Report

To ensure that a comprehensive assessment of the County’s water resources was performed, the PHES Department established the Anoka County Water Resources Management Task Force. Members of the Task Force include representatives from municipalities, watershed management organizations, State and County agencies, industry, and groups like League of Women Voters, as well as private citizens. The Task Force provides community participation in the preparation of this report. Development of this report has been reviewed by the Task Force, who has contributed many valuable comments and recommendations.

Recommendations

The Task Force has identified four primary recommendation categories and specific subsequent recommendations for the continued management of water resources within Anoka County:

1. Continue coordinated water management programs
    a. Continue updating the Water Resources Report every five years.
    b. Maintain the Task Force that meets a minimum of twice yearly to review, update, and coordinate efforts and information of organizations and their agencies to manage local water resources.
    c. The Task Force will monitor current and emerging water resource issues to identify opportunities for collaboration in implementing programs that enhance the management of local water resources and protection of human health and ecosystems. The Task Force should also identify and assess gaps in the management of water resources, finding opportunities or making recommendations to address significant gaps.
    d. Through multi-agency collaboration, many water management goals can be accomplished more efficiently and effectively than what a single partner could do alone. Partnerships like the Anoka County Water Resource Outreach Collaborative that are organized in this way result in more consistent messaging for residents and reduced duplication of effort.
    e. Participate in One Watershed, One Plans that seek to focus the combined resources of local entities and State dollars onto the regionally most important water projects.
    f. The Anoka County PHES Department supports the above activities as part of the Department's assessment and planning activities.

2. Continue county-wide water education programs
    a. Facilitate the development of partnerships to coordinate and enhance the numerous community-based natural resources and environmental programs. The Anoka County Water Resource Outreach Collaborative is a crucial partnership in this regard. The PHES Department and the Task Force will continue to participate in and support the collaborative. This includes supporting the investigation of funding for the WROC coordinator position.
    b. Utilize work groups of technical and education professionals to develop and deliver informational messages.
    c. Maintain the *Know the Flow* website (www.KnowtheFlow.us) to provide a water resources information and outreach project. This website supports County agencies, cities, WMOs, lake improvement districts, and other organizations that promote protection and sustainable management of water resources.
    d. Continue participating on the Metro Area Children's Water Festival planning team and continue to send at least two PHES employees to volunteer at the festival each year.
    e. The PHES Department may consider action to secure grant funding for facilitation of a coordinated approach to conservation and environmental education outreach.

3. Source Water Protection
    a. Monitor and promote best practices and other sustainability and conservation efforts recommended by partners to be in tune with current trends in sustainability.
    b. Support other groups that are working on the issues of sustainability and conservation.
    c. Continue to monitor the North and East Metro Groundwater Management Area planning and evaluation process.
    d. Identify opportunities to cooperate with the DNR in locating and educating unpermitted water appropriators through local land use and environmental programs.
    e. Identify opportunities to encourage County residents and property owners to locate and seal abandoned wells through education, citizen engagement, and financial assistance.

4. Drinking water protection
    a. PHES will continue to support and facilitate the cooperative wellhead protection efforts of the Anoka County Municipal Wellhead Protection Group and encourage communities not part of the group to participate.
    b. PHES will continue the inspection and testing of public water supplies serving County-licensed food and lodging establishments.

GLOSSARY

- **Aquifer** = Water-bearing rock or sediment in a formation, group of formations, or part of a formation that is capable of yielding groundwater in sufficient quantities that it can be extracted.
    - **Confined Aquifer** = An aquifer lying below an aquitard, resulting in the groundwater being under pressure.
    - **Unconfined Aquifer** = An aquifer without a confining layer at the top, whose upper boundary is the water table. There is a lack of pressure in an unconfined aquifer, allowing the water level to rise and fall.
- **Aquitard (or Confining Layer)** = A saturated body of rock of low permeability (ability of an aquifer to transmit water through interconnected pore spaces) that impedes the movement of groundwater.
- **Bedrock** = Relatively hard, solid rock that underlies soil or other unconsolidated material.
- **Groundwater** = Subsurface water located in interconnected pore spaces of rock or sediment.
- **Groundwater Management Area** = Areas where groundwater supplies are under increasing demands for irrigation, industry, and domestic needs, which puts them at risk of overuse and degradation. Trends suggest that groundwater use might be unsustainable in these areas.
- **Impaired Water** = A body of water that fails to meet one or more water quality standards. Water quality standards are set by the State to ensure the water fulfills its designated use such as drinkable, swimmable, fishable, or useable in other, designated ways.
- **Metropolitan County** = any one of the following seven counties: Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, or Washington.
- **Non-Point Source Pollution** = Pollution originating from many diffuse sources and having no single, defined source. Examples include excess fertilizers, urban runoff pollutants, and sediment.
- **Obwell** = A water-level observation well in the DNR network that monitors static water levels of an aquifer over time.
- **Point Source Pollution** = Pollution originating from a single, identifiable source. Examples include waste disposal sites and sewage treatment plants, leaking storage tanks, chemical spills, ruptured pipelines, and industrial factories.

- **Special Well and Boring Construction Area (SWBCA)** = An area designated by the Minnesota Department of Health where groundwater contamination has or may result in risks to public health. In these areas, various controls are put in place to provide for the safe construction of safe water supplies and to prevent the spread of contamination. These controls are more stringent than the minimum requirements specified in the Minnesota Well Code (MN Rules Chapter 4725). A SWBCA is sometimes also called a well advisory.

- **Subsurface Sewage Treatment System (or On-site Septic System)** = A sewage treatment system connected to a home or establishment, consisting of septic tanks and a soil absorption system or other system allowed by the State and municipality.

- **Superfund** = The Federal program established by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended in 1986, authorizing the U.S. Environmental Protection Agency to investigate and clean up sites nominated to the National Priorities List. Sites on the National Priorities List are called Superfund sites.

- **Total Maximum Daily Load (TMDL)** = The maximum amount of a pollutant a body of water can receive without violating water quality standards, and an allocation of that amount to the pollutant's sources.

- **Water Table** = The elevation at which the pressure in the pores of a water-bearing body of rock or sediment is at atmospheric pressure. Rock and sediment are saturated with water below this elevation.

- **Watershed** = An area in which all of the land drains into a common water body such as a creek, river, or lake.

- **Watershed District** = Local units of government, operating under Minnesota Statutes Chapter 103B and 103D, that work to solve and prevent water-related problems. They are drainage authorities and are funded by their own levy authority. The boundary of the district usually follows that of the natural watershed. A watershed district is a type of watershed management organization (WMO).

- **Watershed Management Organization (WMO)** = Organizations based on watershed boundaries that can be organized as a Joint Powers Agreement (JPA) between the cities and townships within the watershed, as a watershed district, or as a function of county government. All WMOs within Anoka County are Joint Powers Organizations with JPAs.

For descriptions of various Federal, State, and local agencies and their responsibilities related to water resources, see Appendix A.

ACRONYM KEY

ACD = Anoka Conservation District

ACMWPG = Anoka County Municipal Wellhead Protection Group

AIS = Aquatic Invasive Species

APO = Administrative Penalty Order

BMP = Best Management Practice

BWSR = Minnesota Board of Water & Soil Resources

CEC = Contaminant of Emerging Concern

CWA = Clean Water Act

CWF = Clean Water Fund

CWLA = Clean Water Legacy Act

DNR = Minnesota Department of Natural Resources

DWSMA = Drinking Water Supply Management Area

EPA – U.S. Environmental Protection Agency

EQB = Minnesota Environmental Quality Board

FEMA = Federal Emergency Management Agency

JPA = Joint Powers Agreement

MCM = Minimum Control Measure

MDA = Minnesota Department of Agriculture

MDH = Minnesota Department of Health

MGS = Minnesota Geological Survey

MPARS = Minnesota Permitting and Reporting System

MPCA = Minnesota Pollution Control Agency

MS4 = Municipal Separate Storm Sewer System

MWW = Minneapolis Water Works

NEM-GWMA = North and East Metro Groundwater Management Area

NPDES = National Pollutant Discharge Elimination System

PHES = Anoka County Public Health and Environmental Services Department

PWS = Public Water Supply

SPRWS = St. Paul Regional Water Services

SWA = Source Water Assessment

SWBCA = Special Well and Boring Construction Area

SWPP = Source Water Protection Plan

SWPPP = Stormwater Pollution Prevention Program

TMDL = Total Maximum Daily Load

UMRSWPP = Upper Mississippi River Source Water Protection Project

USGS = U.S. Geological Survey

WMO = Watershed Management Organization

WROC = Anoka County Water Resource Outreach Collaborative

WRAPS = Watershed Restoration and Protection Strategy

1W1P = One Watershed, One Plan

For descriptions of various Federal, State, and local agencies and their responsibilities related to water resources, see Appendix A.

CHAPTER 1 – INTRODUCTION

Water plays an important role in public health. Since recorded time, people have been concerned with sanitation and their environment. The Greek philosopher Hippocrates first made the connection between environment (impure water) and illness. Today we refer to this connection as environmental health.

The Anoka County Public Health and Environmental Services Department (PHES), along with other countywide and local agencies, seeks to maintain an environment that benefits the public's health, safety, and welfare. Local water resources are key to Anoka County's (the County) future. The quality and sustainability of the County's water resources impacts the health of our residents and our economic future. A sustained and adequate supply of safe water is critical to support our growing communities.

Oversight is key in maintaining local water resources that are adequate to support a health community and strong economy. The County's oversight is achieved by monitoring water resources and maintaining a collaborative approach to management with State and local agencies. State programs establish water management priorities and goals. Local agencies play a significant role in achieving local water management goals by managing development, land use, environmental protection, and natural resources.

Countywide agencies such as PHES, the Highway Department, the Parks Department, University of Minnesota Extension-Anoka County, and the Anoka Conservation District address specific environmental and water protection issues through regulatory, service, and educational programs. Cities, townships, and watershed management organizations address land use and surface water management that protects and sustains local water resources.

The United States Congress and Minnesota Legislature have determined roles that different levels of government play in the protection and management of water resources through mandated and permissive authority. In Minnesota, the management of water has been carried out through a number of programs housed in multiple agencies that have either a direct or indirect impact without establishing a goal of comprehensive water management.

Federal and State water protection and management is limited to specific programs and activities. They have defined their participation in comprehensive water management through establishment of minimum standards and providing technical assistance, model ordinances, guidance, grants, and funds to local governmental units.

Local governments, such as counties, municipalities, and watershed management organizations, are required to provide protection activities through education, zoning, land development planning, water planning, licensing, and monitoring of activities potentially harmful to water resources. Where water problems are found (e.g. contamination,

unsustainable use, or drought), response activities rest primarily with State and Federal agencies.

Municipalities acknowledge the need to protect their water resources but may not have the specific expertise, structure, and staff to develop and implement protection activities. Grants and funds for water resources protection programs are usually designated for counties. However, municipalities must play a key role in all phases of local water resources protection for a program to be successful.

Overall, many of the responsibilities for comprehensive water management are left to counties, municipalities, and watershed districts that manage land use. In short, Anoka County's part in comprehensive water management is to:

1. Monitor existing Federal and State water resource management programs
2. Identify County and community needs; and
3. Address concerns through existing local planning, program, and authorities.

Recent Developments

A variety of major reports, plans, and other projects and changes have taken place since the publication of the 2014 Water Resources Management Report. Some of these include:

- Anoka County Geologic Atlas Part B (2016) – The Minnesota Department of Natural Resources (DNR) published Part B, Hydrogeology, of the Geologic Atlas of Anoka County, Minnesota in 2016. This publication is discussed further in Chapter 3.
- North and East Metro Groundwater Management Area Plan (November 2015) – The North and East Metro Groundwater Management Area (GWMA) was a pilot project when established in 2013. The GWMA now has a plan, published by the DNR in 2015, and continues to have meetings and work on various projects. The GWMA is discussed further in Chapter 3.
- DNR Water Conservation Reporting (2018) – The DNR began the Water Conservation Reporting System in 2018, which supplements the annual water use report. In 2018, the DNR published their first Minnesota Water Conservation Report, using water use information from 2017. This is discussed further in Chapter 5.
- One Watershed, One Plan – The One Watershed, One Plan (1W1P) program was initiated in 2011 by the Local Government Water Roundtable and continues to grow, with more and more watersheds participating in the program. 1W1P is further discussed later on in this chapter. The 1W1Ps currently in the works within the Anoka County boundaries are for the Rum River and Lower St. Croix Watersheds.
    - Rum River – Planning for the Rum River Watershed's 1W1P began in 2018.
    - Lower St. Croix – Planning for the Lower St. Croix Watershed's 1W1P began in 2017.
- Water Supply Workgroups – Workgroups are facilitated by the Metropolitan Council to help communities, industries, and other community groups work together to address potential or on-going water supply issues. There are two water supply workgroups within Anoka County: The Northeast Metro and Northwest Metro groups. These groups

are discussed further throughout this report. The groups have published the following studies:

  - Regional Water Supply, Enhanced Groundwater Recharge, Stormwater Capture and Reuse Study (December 2016) – Northwest Metro Study Area
  - Regional Groundwater Recharge and Stormwater Capture and Reuse Study (May 2016) – North and East Metro Study Area
  - Industrial Water Conservation in the North and East Groundwater Management Area – Project Final Report (December 2015)
  - Feasibility Study of Joint Water Utility – Cities of Centerville, Circle Pines, Columbus, Hugo, Lexington, and Lino Lakes (December 2015)
  - Feasibility Assessment of Approaches to Water Sustainability in the Northeast Metro (December 2014)

- Metro Model 3 (May 2014) and updated Master Water Supply Plan (September 2015) – The Metropolitan Council published an update to the Twin Cities Metropolitan Area Groundwater Flow Model ("Metro Model") in May 2014 and subsequently updated the Twin Cities Metropolitan Area Master Water Supply Plan in September 2015. Metro Model 3 and the updated Master Water Supply Plan are discussed further in Chapters 3 and 5, respectively.
- Governor's Water Summit, including report (2016) – Governor Mark Dayton convened a forum on February 26, 2016 to discuss and consider a variety of important questions related to ensuring adequate and clean water for future generations throughout the State of Minnesota. A report on the summit was published in November 2016.
- Interagency Workgroup on Water Reuse and 2018 Report – In response to interest in water reuse, a legislative directive, and funding support, an interagency workgroup on water reuse formed in 2015. A report was developed by the workgroup, consisting of State agencies, Metropolitan Council, and the University of Minnesota, with input from stakeholders in the water reuse community. The report was published in 2018 and includes a variety of recommendations for water reuse in Minnesota. The workgroup and report are discussed further in Chapter 4.
- Beyond the Status Quo: 2015 EQB Water Policy Report – The Minnesota Environmental Quality Board (EQB) published a water policy report entitled "Beyond the Status Quo" in 2015, as a result of collaboration across State agencies to move beyond the status quo on water challenges. Key findings of the report include: "Minnesota is a global leader in water", "We need to protect our waters", and "we need to identify our vulnerabilities and increase the resilience of all our communities". The following were included in the Appendix of the report:
  - Five-year Assessment of Water Quality Trends and Prevention Efforts (Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Agriculture (MDA))
  - 2015 Groundwater Monitoring Status Report (MPCA and MDA)
  - Water Availability Assessment Report (DNR)
- Water Levels and Groundwater and Surface-Water Exchanges in Lakes of the Northeast Twin Cities Metropolitan Area, Minnesota 2002 through 2015 (2016) The U.S. Geological Survey (USGS), in cooperation with the Metropolitan Council and the

Minnesota Department of Health (MDH), published this study characterizing groundwater and surface-water interactions. The study area included all of Anoka County, as well as part or all of multiple other metro counties, and the study itself was published in two chapters, listed below.

  - Chapter A: Statistical Analysis of Lake Levels and Field Study of Groundwater and Surface-Water Exchanges in the Northeast Twin Cities Metropolitan Area, Minnesota, 2002 through 2015
  - Chapter B: Simulation and Assessment of Groundwater Flow and Groundwater and Surface-Water Exchanges in Lakes in the Northeast Twin Cities Metropolitan Area, Minnesota, 2003 through 2013

- Renewal of NPDES MS4 Permit - Major updates to the 5-year National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater (MS4) Permit are currently in progress. The draft MS4 General Permit was available for public comments through January 11, 2020. The comments have been posted by the MPCA and are now under review by the agency. Increased fees, regulation, and reporting were of concern to local MS4 agencies. More information on MS4s can be found in Chapter 4.
- Local TMDL and WRAPS Reports – The WRAPS (Watershed Restoration and Protection Strategy) process was developed by the MPCA to identify and address threats to water quality in each of the 80 major watersheds in Minnesota. The WRAPS process is on a 10-year cycle and has four major steps or phases: 1) Monitor water bodies and collect data; 2) Assess the data; 3) Develop strategies to restore and protect the watershed's water bodies; 4) Conduct restoration and protection projects in the watershed. The WRAPS and TMDL (Total Maximum Daily Load) reports are completed during step 3 and provide details on water quality issues and identify what needs to be done in the watershed. More information on TMDLs can be found in Chapter 4. There are three major watersheds within the County (discussed further in Chapter 1), each with a different monitoring year that begins the 10-year cycle. The following are the most recent reports for each major watershed:
  - Lower St. Croix River: Sunrise River TMDL (2013) and WRAPS (2014)
  - Mississippi River – Twin Cities: Coon Creek Watershed District TMDL and WRAPS (2016), Rice Creek Watershed District SW Urban Lakes TMDL (2014), Vadnais Lake Area TMDL and Protection Study (2014), Twin Cites Metro Area Chloride TMDL (2016), Mississippi River-Twin Cities Watershed Monitoring and Assessment Report (2013)
  - Rum River: Rum River TMDL and WRAPS (2017)
- Ramsey – Due to encountering limits to its use of local groundwater, the City of Ramsey has investigated the potential to draw and process drinking water from the Mississippi River in coordination with the neighboring communities of Corcoran, Dayton, and Rogers (Hennepin County). Additional information can be found throughout this report. At the time of the development of this report, the city was still awaiting the results of a feasibility study conducted with the Met Council.

County Groundwater Planning

The Minnesota Groundwater Protection Act of 1989 (the Act) was a significant piece of environmental legislation. The Act emphasized State agency actions to address specific groundwater issues and local groundwater protection planning and plan implementation. The Act emphasized the connection between land use, regulated by local government, and the quality and sustainability of local groundwater resources. The Act also emphasized the need for groundwater management planning and implementation by local government having land use management authority.

Following passage of the Act, management and protection of groundwater became a permissive activity of each metropolitan county. Metropolitan counties were encouraged to develop groundwater protection plans through legislation (MN Statute 103B.255) and planning grants. As land use planning and zoning within Anoka County is a function of its municipalities, the County originally chose to write a groundwater report instead of a groundwater plan. This report has since evolved to encompass all water resources. In 1995, PHES prepared a Groundwater Protection Assessment. In 2009, PHES completed the Water Resources Management Report that was made part of the Anoka County Community Health Improvement Plan. The 2014 Water Resources Management Report was also incorporated into the Community Health Improvement Plan. However, no issues related to water resources were identified as top health priorities in the 2019 Community Health Assessment, and thus the 2020 Water Resources Management Report will not be incorporated into the new Community Health Improvement Plan.

Anoka County has formed a Water Resources Management Task Force to monitor water issues and coordinate water management activities within the County. Local agencies have cooperated in water management planning and protection through programs including promoting the County's private well water testing program and forming the Anoka County Municipal Wellhead Protection Group (ACMWPG) protecting municipal drinking water supplies and collaborating to fund the Geologic Atlas of Anoka County. The County and its partners participate in the annual Metropolitan Area Children's Water Festival, which is a metro-county cooperative education program established in 1998, and the newly established Anoka County Water Resource Outreach Collaborative. The Know the Flow Website (www.KnowtheFlow.us) is a collaboration of local agencies to provide information for the wise use and protection of local water resources. The ACMWPG initiated this website and funded its initial design. Over time, the site has evolved into a water resources management initiative to provide public information and coordination among Anoka County agencies, communities, and water management organizations. The site serves as a resource for these entities, as well as the general public, for a "one stop shop" for all things water resources in and around the County.

Local Water Resource Partners

Coordination and collaboration are fundamental to Anoka County's monitoring and management of water resources. Anoka County strives for coordinated water management

plans, coordinated water education programs, to promote local water sustainability, to continue drinking water protection initiatives, and to identify opportunities in local water management. This is done through and with a variety of local water resources partners.

Anoka County Departments

The County is engaged in water resources protection through provisions of its Hazardous Waste (#2018-7), Solid Waste (#2018-2), Sewage Treatment (#2018-5), Shoreland Management (#2019-6), Buffer (#2017-1), and Water Surface Use of Coon Lake (#2003-1) ordinances. County-licensed daycare and foster care establishments must be in compliance with the State, County, and municipal standards to protect and monitor their water supply wells and sewage treatment systems.

Individual well water supply systems serving food and beverage and lodging establishments licensed by the County are monitored by PHES. MDH has delegated the administration of the public water supply protection program of these transient noncommunity public water supply systems to PHES. These systems are defined and discussed further in Chapter 5. In summary, PHES performs routine water quality sampling, complaint investigation, wellhead protection, and routine well/plumbing sanitary surveys of these water supply systems.

PHES also provides private well water testing and technical assistance to residents, businesses, and community officials concerning wells, water supply, and water resources and supply protection issues. PHES has developed a database for tracking water well quality results of tests performed for homeowners, County-licensed facilities, some State-licensed facilities, and some water supply reconnaissance and investigation projects throughout the County.

The Anoka County Division of Property Records and Taxation is responsible for collecting “well disclosure certificates” from the seller of a property at the time of transfer (MN Statute 103I.235). The certificate identifies all wells on the property, including abandoned wells. These certificates are forwarded on to MDH, who will notify the property owner of the requirement to seal identified abandoned wells.

The Anoka County Highway Department is an MS4-permitted agency. A municipal storm sewer system, or MS4, is a conveyance or system of conveyances that is owned or operated by a public entity (such as Anoka County), designed or used for collecting or conveying stormwater, not a combined sewer, and not part of a publicly owner treatment works. Since the population of Anoka County is greater than 10,000, the Highway Department must satisfy the requirements of the MS4 general permit. These requirements are addressed in a Stormwater Pollution Prevention Program (SWPPP) developed by the MS4 agency. Effective SWPPs have six components: public education and outreach, public participation/involvement, illicit discharge detection and elimination, construction site stormwater control, post-construction stormwater management, and pollution prevention/good housekeeping. MS4s and SWPPPs are discussed further in Chapter 4. The Highway Department is also responsible for the enforcement of the State buffer law, which is enforced

with the Anoka County Buffer Ordinance to Provide for Riparian Vegetated Buffers and Water Quality Protection for State Water Resources Under the County's Jurisdiction (#2017-1) in partnership with the Anoka Conservation District.

Lastly, the Anoka County Parks Department vision statement includes the department's duty to "provide stewardship of the land and water resources to continue to preserve, restore, and protect the natural resource-based park system". The department has been focusing on establishing and growing a Natural Resources Management Unit that has resulted in inventorying and mapping, corridor protection, water quality enhancement, riverbank stabilization, and inter-agency cooperation, amongst other natural resources activities. As a top-three priority, the department will continue to focus on natural resource restoration and protection for the next 10 years, especially the protection of surface water resources. The Parks Department also manages the County's Aquatic Invasive Species (AIS) Prevention Aid Program. The AIS program focuses on education, early detection, monitoring, and preventing the spread of aquatic invasive species in surface water throughout the County. See Chapter 4 for more information on the program and AIS in the County.

Anoka County Water Resources Management Task Force

The Anoka County Water Resources Management Task Force (Task Force) was previously charged with advising, consulting with, and making recommendations to the Anoka County Community Health Advisory Committee in the preparation of its Water Resources Management Report. The report was used to address environmental health issues confronting Anoka County through the Community Health Improvement Plan (CHIP). However, as of 2019, issues related to water resources are no longer listed as a priority concern for the County in the CHIP. PHES and the Task Force still believe in the value of the report and are continuing to update it on the 5-year cycle.

In addition to collaborating with PHES to produce the report, the Task Force is an information-sharing group with educational opportunities. This is achieved through hosting speakers and presentations, updating each other on projects, and other regular collaboration. The Task Force includes members from various State and County agencies, watershed management organizations, municipalities, industry, and groups like League of Women Voters, along with private citizens. A current list of the agencies and organizations that Task Force members represent can be found in Appendix B.

Cities and Township

The cities and township of the County completed comprehensive land use plans in the late 1970s and early 1980s. Minimum standards for the plans were established and monitored by the Metropolitan Council. Items related to water resources protection required in the plans are sanitary sewers and the natural environment. The Met Council also requires a water supply plan as part of local comprehensive plans for all communities that have public water supplies in the metropolitan area (see Chapter 5).

Prior to 1974, municipalities were able to regulate well construction by requiring construction permits. Municipal requirements varied from a required minimum well depth of 75 feet to not allowing any private well construction. In 1973, Minnesota Statutes 103I.101 was enacted and on July 1, 1974, the Commissioner of Health adopted the rules regulating well construction (MN Rules 4725) and preempting local control as prescribed in the Statute. As a result, the State water well construction code is the standard for the entire state and only MDH may require well construction permits unless such authority is delegated to a local community health services agency.

Quality degradation of water resources is generally the result of land use activities. Land use in Anoka County is controlled through municipal planning and zoning (MN Statute 462.351). This can address water resources protection by controlling or even limiting specific threats that land use activity poses from its operation, location, or sensitivity of the resource.

Through the Wetlands Conservation Act of 1991, the responsibility for ensuring the no net loss of wetlands mandate must be assumed by a city council, town board, or watershed management organization in Anoka County (Table 1.1). Decisions made by local units of government may be appealed to the Minnesota Board of Water and Soil Resources (BWSR).

Table 1.1 – Wetland Management Authority

Municipality	Contact*
Andover (West)	LRRWMO
Andover (East)	CCWD
Anoka	LRRWMO
Bethel	City
Blaine (West)	CCWD
Blaine (East)	RCWD
Centerville	RCWD
Circle Pines	RCWD
Columbia Heights (West) and Hilltop	MWMO
Columbia Heights (East)	RCWD
Columbus (North)	City
Columbus (SW)	CCWD
Columbus (SE)	RCWD
Coon Rapids	CCWD
East Bethel	City

Municipality	Contact*
Fridley (NW)	CCWD
Fridley (East)	RCWD
Fridley (SW)	MWMO
Ham Lake (North)	City
Ham Lake (South)	CCWD
Lexington	RCWD
Lino Lakes (N, SW)	RCWD
Lino Lakes (SE)	VLAWMO
Linwood Township	Township
Nowthen	City
Oak Grove	City
Ramsey	LRRWMO
St. Francis	City
Spring Lake Park (West)	CCWD
Spring Lake Park (East)	RCWD

*Acronym key: CCWD – Coon Creek Watershed District; LRRWMO – Lower Rum River Watershed Management Organization; MWMO – Mississippi Watershed Management Organization; RCWD – Rice Creek Watershed District; VLAWMO – Vadnais Lake Watershed Management Organization.

Municipalities can address water resource protection through construction and operation requirements of facilities that have the potential to release contaminants into the environment. Municipalities require construction standards and perform inspections as a matter of routine to assure that a facility meets building codes. By expanding construction and operation requirements to include water resource protection, a municipality can prevent degradation of its water resources.

Some municipalities within the County have come together to form the Anoka County Municipal Wellhead Protection Group (ACMWPG). This group, along with the County, has entered into a joint powers agreement to work together on implementing common measures in the cities' wellhead protection plans. These plans and the ACMWPG are discussed further in Chapter 3.

Watershed Management Organizations

A watershed encompasses all of the land that drains into a common water body such as a creek, river, or lake. There are two watershed districts and five watershed management organizations (WMOs) within the County boundary (Figure 1.1). Watershed districts are a type of WMO, so they may be collectively referred to as WMOs.

Watershed districts are local units of government, operating under MN Statutes 103B and 103D, that work to solve and prevent water resource-related problems, are drainage authorities, and are funded by their own levy authority. The watershed districts located within the County boundary are the Coon Creek Watershed District (CCWD) and the Rice

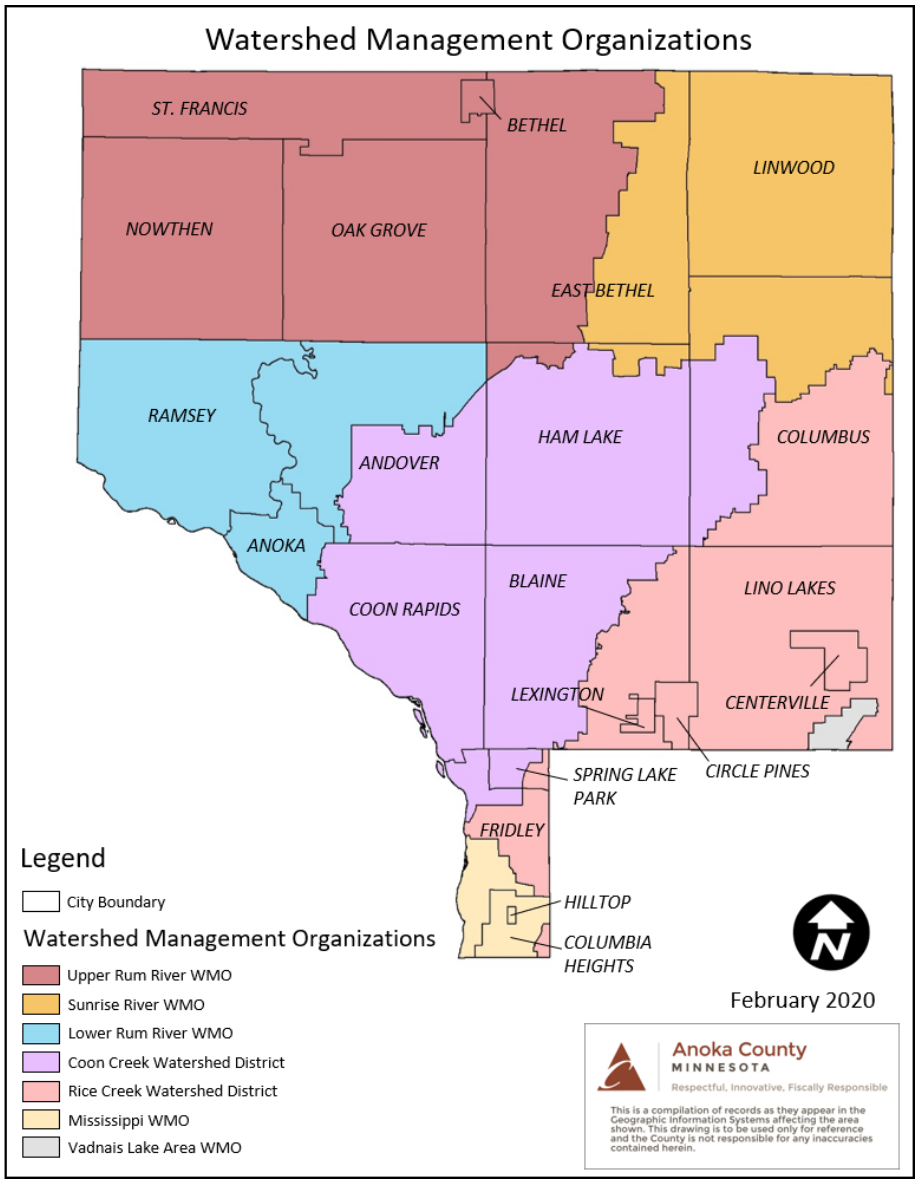

Figure 1.1: Map of the watershed management organizations (WMOs) in Anoka County.

Creek Watershed District (RCWD). The CCWD encompasses all or part of the communities of Andover, Blaine, Columbus, Coon Rapids, Fridley, Ham Lake, and Spring Lake Park. The RCWD encompasses all of part of the communities of Blaine, Centerville, Circle Pines, Columbia Heights, Columbus, Fridley, Lexington, Lino Lakes, and Spring Lake Park. The RCWD also includes land in Hennepin, Ramsey, and Washington counties.

WMOs are required under the Metropolitan Surface Water Management Act and can be organized in one of three ways:

- As a Joint Powers Agreement (JPA) between the municipalities within the watershed that is funded by the members of the JPA,
- As a watershed district as previously defined, or
- As a function of county government

All WMOs within the County are Joint Powers Organizations with JPAs.

The WMO's located within the County boundary are the Lower and Upper Rum River WMOs (LRRWMO and URRWMO), the Mississippi River WMO (MWMO), the Sunrise River WMO (SRWMO), and the Vadnais Lake Area WMO (VLAWMO). The LRRWMO includes Ramsey, Anoka, and parts of Andover. Bethel, Nowthen, Oak Grove, and St. Francis, along with portions of East Bethel and Ham Lake, are in the URRWMO. Hilltop and parts of Columbia Heights and Fridley are in the MWMO, along with parts of Hennepin and Ramsey counties. The SRWMO includes Linwood Township and parts of Columbus, East Bethel, and Ham Lake. The majority of the VLAWMO is in Ramsey County, but a small portion of Lino Lakes is also included in the WMO.

Anoka Conservation District

The Anoka Conservation District (ACD) is a non-regulatory county-level subdivision of State government. ACD provides technical and financial assistance to private landowners to manage natural resources in a way that conserves and improves soil and water resources. When established in 1946 under Minnesota Statute Chapter 103C, ACD largely worked with agricultural producers, but has since evolved to serve the changing demographics of the County. With little agriculture remaining in the County, ACD provides assistance to landowners on all sized properties and helps other local governments plan and implement wise resource management strategies.

ACD's mission is "to conserve and enhance the natural resources of Anoka County. We do this by conducting monitoring and analysis, informing landowners and local government in natural resource management, and leveraging technical and financial resources to promote natural resource stewardship practices". ACD can administrate official controls under a Joint Powers Agreement (MN Statute 471.59) with the County or a municipality to conduct soil and water activities under the comprehensive local water management act (MN Statute 103B.311). ACD can, if delegated by the County, prepare and adopt a county groundwater protection plan (MN Statute 103B.255, Subd. 2).

ACD and WMOs in the County engage in local water resources protection activities and land restoration projects such as the Pleasure Creek *E. coli* Bacteria Monitoring project, the Ditch 66 Pollution Source Inventory report, and the Lakeshore Restoration of the Anoka County Park at Martin Lake. The projects have ranged widely, including diagnostic studies, construction of water quality improvement projects, and public outreach.

Anoka County Water Resource Outreach Collaborative

The Anoka County Water Resource Outreach Collaborative (WROC) is a partnership formed in 2018 to implement a comprehensive water outreach and engagement program for watershed and city partners in Anoka County. The purpose of this shared outreach and engagement program is to inform community residents, businesses, staff, and decision-makers about issues affecting local waterbodies and groundwater resources and to engage people in activities and individual behavior changes that will help protect and improve the health of these resources. WROC's guiding principles are to ensure added value for all partners; to prioritize activities that will result in measurable impacts to natural resources; to create shareable, durable, and broadly applicable work products; and to tackle activities of scale beyond the scope of individual partners. The current WROC Outreach and Engagement Coordinator is housed at the Anoka Conservation District office in Ham Lake.

Since January 2019, WROC has created new resources including a Conservation Resources Library and a brochure, display, and animated video on groundwater. In addition, WROC has had a presence at 40 community outreach events throughout Anoka County and facilitated or collaborated with partners to host 42 workshops, presentations, and trainings. In total, 6,927 people were directly engaged at outreach events in 2019. WROC will continue partnering to reach new and diverse audiences with messages on water health and conservation. WROC believes that prioritizing public education is critical to empowering everyone to act as water stewards and to create a healthier world for future generations.

University of Minnesota Extension-Anoka County

The University of Minnesota Extension (UMN Extension) is a statewide educational outreach branch of the University of Minnesota. Through the Anoka County office, UMN Extension conducts programs to educate the public in making changes in their behavior to better manager and protect their health and the environment. UMN Extension administers the Agricultural Land Preservation and Conservation Program (MN Statute 40A.15). This program provides technical and financial assistance for agricultural land preservation and conservation activities. Activities funded through the County program vary from year to year, but have included a pilot abandoned well inventory project, a natural resources field trip, "think earth" education program, and a series of environmental health surveys and assessments related to natural resources and impacts on human health.

North and East Metro Groundwater Management Area

In 2011, the Minnesota Legislature authorized the Commissioner of the Department of Natural Resources (DNR) to designate groundwater management areas (GWMAs) to address difficult groundwater-related resources issues (MN Statute 103G.287, Subd. 4). In June 2013,

the Commissioner of the DNR established the North and East Metro Groundwater Management Area (NEM-GWMA). The NEM-GWMA includes 10 communities in southeast Anoka County (Blaine, Centerville, Circle Pines, Columbia Heights, Columbus, Fridley, Hilltop, Lexington, Lino Lakes, and Spring Lake Park), along with Ramsey County, Washington County, and a portion of Minneapolis (Figure 1.2).

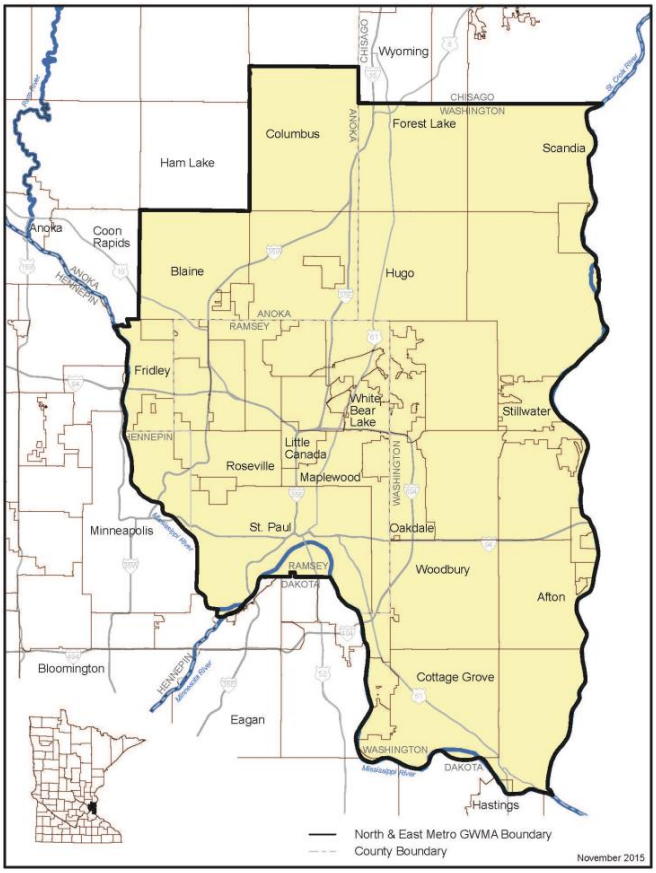

Figure 1.2: Map of the North and East Metro Groundwater Management Area. Source: Minnesota Department of Natural Resources.

The designation as a GWMA allows a more comprehensive and focused approach to ensuring that groundwater supplies remain adequate to meet human needs, while protecting lakes, streams, and wetlands. Additional information regarding the NEW-GWMA and its current work is discussed in Chapter 3.

Metropolitan Council's Metro Water Supply Workgroups

Water supply workgroups help address water supply issues in the metropolitan region. Workgroups are facilitated by the Metropolitan Council (Met Council) to help communities, industries, and other community groups work together to address potential or on-going water supply issues. There are two water supply workgroups within Anoka County: The Northeast Metro and Northwest Metro workgroups (Figure 1.3).

The Met Council was directed by the 2005 Minnesota Legislature to "carry out planning activities addressing the water supply needs of the metropolitan area", which included the

development of the Twin Cities Metropolitan Area Master Water Supply Plan (see Chapter 5 for more information) (MN Statute 473.1565). The development of the water supply workgroups and subsequent studies and projects were a result of completing the plan, with the goal of strengthening local and regional water supply planning efforts. Additional information regarding the two water supply workgroups in the County and their projects and studies is discussed in Chapters 3, 4 and 5.

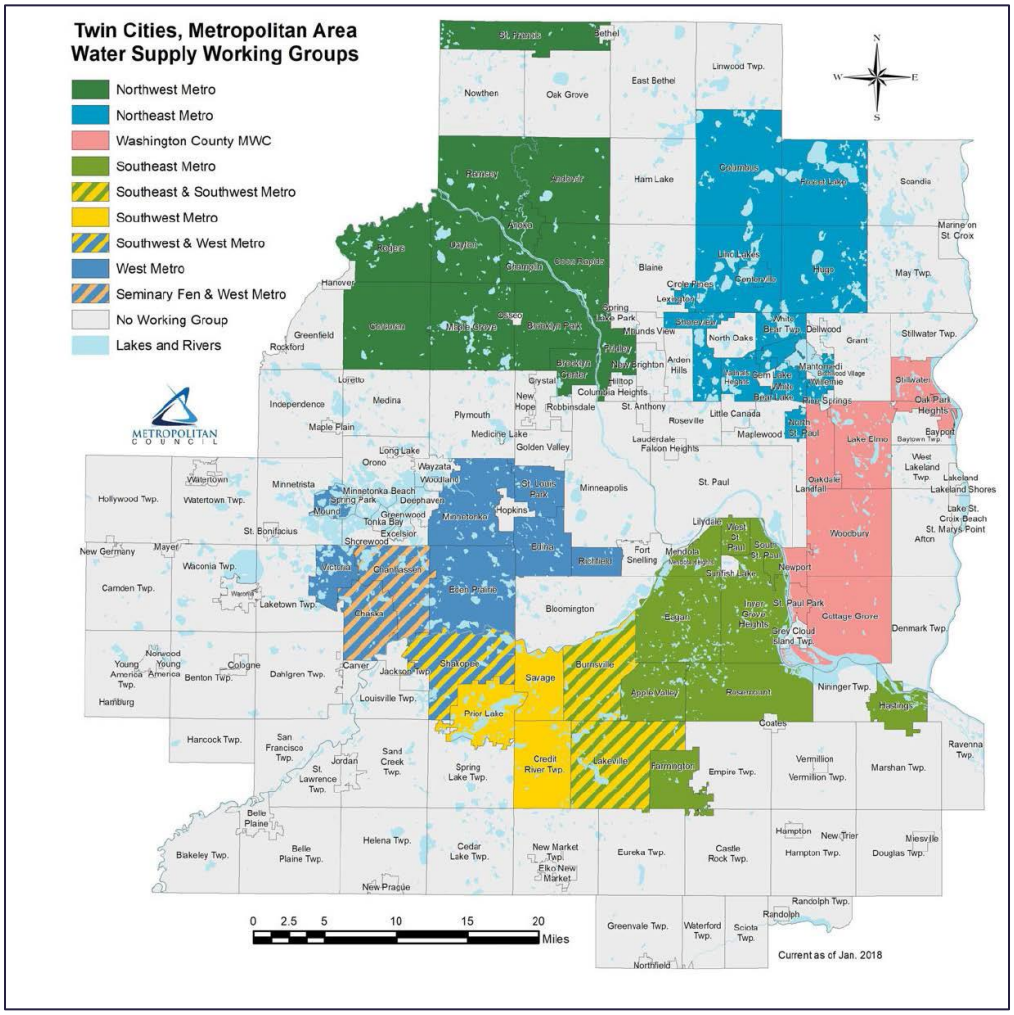

Figure 1.3: Map showing the Twin Cities, Metropolitan Area Water Supply Working Groups. The Northwest Metro workgroup is in dark green and the Northeast Metro workgroup is in dark blue. Source: Metropolitan Council.

One Watershed, One Plan

Water management within areas has been implemented through numerous plans and programs. Plans to implement water management strategies have typically been developed by local governments (e.g. counties, municipalities, watershed management organizations, and soil and water conservation districts).

The One Watershed, One Plan (1W1P) concept was initiated in 2011 by the Local Government Water Roundtable, which included the Association of Minnesota Counties, the

Minnesota Association of Watershed Districts, and Soil and Water Conservation Districts, to explore aligning the various local water plans and programs into a single plan based on a major watershed. A major watershed would encompass the area of many WMOs or counties. Such comprehensive watershed-based planning is considered the next logical step in local water planning.

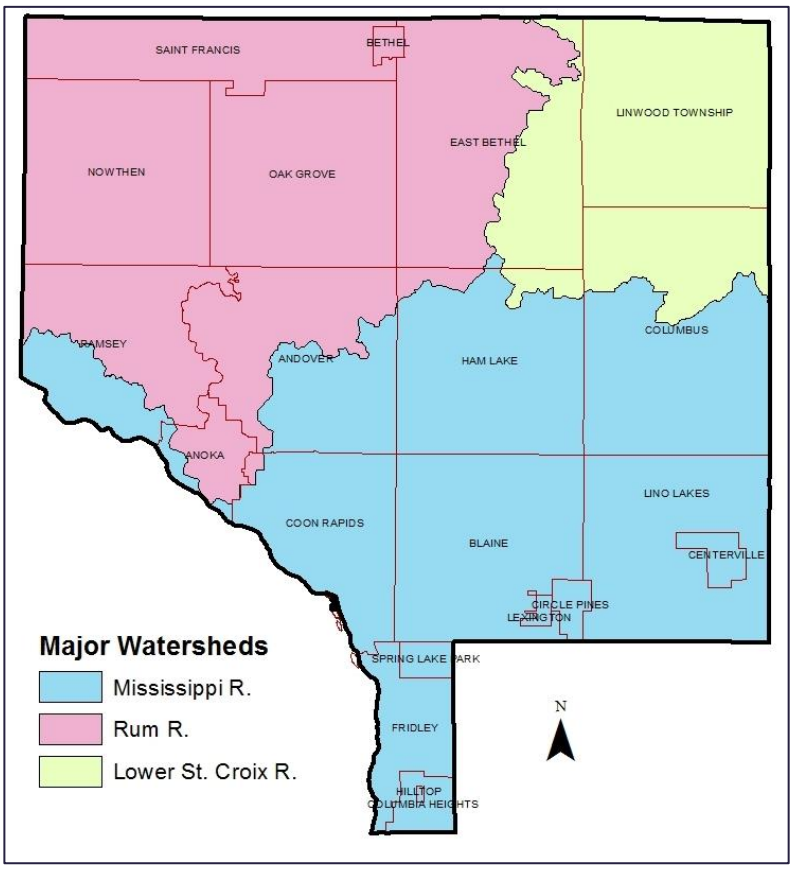

Figure 1.4: Map of the major watersheds in Anoka County.

There are three major watersheds that cover large portions of the metropolitan area, including Anoka County. There are the Mississippi River, the Rum River, and the Lower St. Croix watersheds (Figure 1.4). Local water management planning for major watersheds requires coordination among counties, county soil and water conservation districts, municipalities, watershed districts, WMOs, lake improvement districts, and non-governmental organizations.

In 2013, the Minnesota Legislature authorized Clean Water Fund (CWF) appropriations by the Minnesota Board of Water and Soil Resources (BWSR) for a pilot project by local governments within a major watershed area to transition to a comprehensive water management approach through a single plan. Since then, 10 plans have been approved by BWSR and approximately 20 more are in review or in the planning process. In 2016, BWSR published the One Watershed, One Plan Transition Plan. The purpose of the plan is to "outline expectations and identify incentives for local governments to participate in development and implementation of comprehensive watershed management plans in order to achieve statewide transition by 2025". Since watershed management is already required for the metropolitan area under MN Statute 103B.201, the metropolitan area was delegated funding by county in 2018. Once 1W1P comprehensive watershed management plans are completed, the entire watershed will be delegated funding as well.

Within Anoka County, the Rum River and Lower St. Croix River Watersheds are currently in the planning process. Planning for the Lower St. Croix 1W1P began in 2017 and planning for the Rum River 1W1P began in 2018. PHES is involved in the Lower St. Croix 1W1P via oversight and monitoring of plan progress and in the Rum River 1W1P by serving on the Technical Advisory Committee. Other local entities involved in the process include the Anoka Conservation District and WMOs.

CHAPTER 2 – DEMOGRAPHICS AND DEVELOPMENT

Anoka County (the County) is part of a rapidly growing metropolitan region in which residential and economic opportunities continue to expand. The County encompasses a 446 square mile area with a population of approximately 357,851 (Metropolitan Council, 2018), making it the fourth most populated county in Minnesota. The County's population growth is expected to maintain its pace of approximately 3,000 and 3,500 per year with a majority taking place in communities making the transition from rural to developed municipalities.

The municipalities of Columbus and East Bethel are the most recent communities to initiate the development of a community water supply system. The Columbus municipal system consists of three wells of varying depths and serves 150 people via 25 service connections. The East Bethel municipal system consists of four deep wells (three primary and one emergency) and serves 190 people via 100 service connections.

East Bethel, in a cooperative project with the Met Council, has also initiated the construction of a wastewater treatment facility located within the City. Sewage collected through a new East Bethel sanitary sewer system will deliver the wastewater to the Met Council's new East Bethel treatment facility. The wastewater will be treated to remove potential pollutants then returned to natural waters through rapid infiltration basins that recharge groundwater locally. A unique feature of the system is that it is designed for the potential reuse of treated wastewater for non-potable uses such as lawn and agricultural irrigation, surface water augmentation, industrial cooling water, fountains, and possible toilet flushing. The benefits of recycled wastewater include:

- Reduced withdrawal of groundwater;
- Preservation of groundwater resources for a sustainable supply;
- Reliable, and potentially lower cost, water supply for industrial use.

See Chapter 4 and 5 for more information on water reuse.

Development and Water Supply

Community water supply and wastewater treatment services play an integral part in the development and sustainability of the County communities. As a community grows, so does its need for a community water system to supply increasing water demand. A community's water demand typically stabilizes within a predicable annual range as the community reaches full development.

Table 2.1 – Community Development Based on Water System Development

Rural	Transitional	Developed
Columbus	Andover	Anoka
Ham Lake	Blaine	Bethel
Linwood Township	East Bethel	Centerville
Nowthen	Lino Lakes	Circle Pines
Oak Grove	Ramsey	Columbia Heights
	St. Francis	Coon Rapids
		Fridley
		Hilltop
		Lexington
		Spring Lake Park

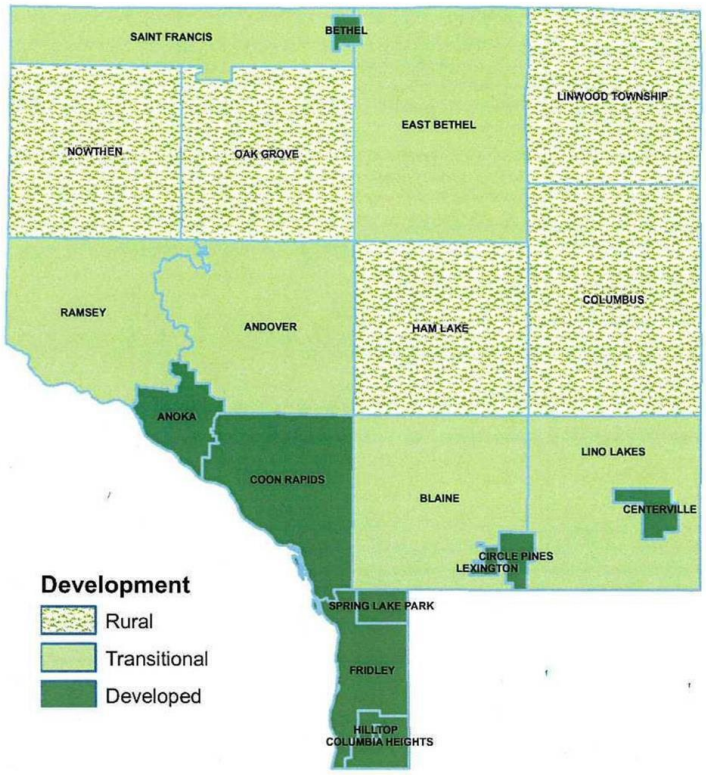

Figure 2.1: Map showing the developmental stage of Anoka County communities.

The rural communities of Columbus, Ham Lake, Linwood Township, Nowthen, and Oak Grove have not initiated a significant water supply system and wastewater collection/treatment system to serve its population. However, some limited subdivision-based community water systems have been established, including in the Columbus and Oak Grove. As population within the metropolitan area increases, it is expected that these communities will experience increased demand for residential development of water supply and sewer services.

The communities of Andover, Blaine, East Bethel, Lino Lakes, Ramsey, and St. Francis are experiencing a transition from rural to suburban land use with increasing demand for commercial, transportation, waste management, sewer, and water supply services. The City of Blaine is among the leaders in population growth in the metropolitan area. Water supply systems serving these communities are expanding to meet the increased demand of growing populations and industries.

The developed communities of Anoka, Bethel, Centerville, Circle Pines, Columbia Heights, Coon Rapids, Fridley, Hilltop, Lexington, and Spring Lake Park make municipal water supply available to essentially all properties and residents. These communities face the challenge of managing their established development and infrastructure. With the exception of the City of Bethel, these developed communities are also part of regional assessments of water sustainability and feasibility studies for regional water service.

Water Supply Challenges for Communities

In Anoka County, groundwater is readily available, supplying public and private water systems throughout the County, with the exception of Columbia Heights and Hilltop, whose municipal systems obtain their water from the Mississippi River through their connection to Minneapolis Water Works. Increasing water demand may potentially exceed the sustainability of locally available groundwater supplies in some areas of the County.

The Minnesota Geological Survey (MGS) has determined that the County's central and northern communities lack a major groundwater aquifer, the Prairie du Chien-Jordan, that supplies much of the developed metropolitan region's municipal water supply systems. The DNR has expressed concern that local groundwater resources in transitional communities may not be sufficient to support water demand typically associated with full development. More information on groundwater and water supply is included in Chapters 3 and 5.

CHAPTER 3 - GROUNDWATER

Management of water resources may be divided into surface water, such as wetlands, lakes, and streams, and groundwater, but the two are connected and dependent upon one another. This is especially the case in Anoka County, where surface water exists on sandy soils that readily permit water movement below the surface and into the water table.

The County relies on groundwater for domestic, municipal, commercial, industrial, and agriculture water supply. 94% of Anoka County residents rely on groundwater for their drinking water. The Mississippi River has the potential to supply many communities, especially those that border the river, but groundwater is the only readily available water source to supply growth and development in central and northern areas of the County.

In 2018, groundwater withdrawal by public and private wells amounted to over 11.8 billion gallons annually. By 2050, groundwater withdrawal is estimated to increase to over 19 billion gallons (Metropolitan Council, 2007). Increased withdrawal is projected to take place in the transitional communities experiencing increased development, including Andover, Blaine, Lino Lakes, Ramsey, and St. Francis.

Deeper groundwater, located in bedrock formations below the surface and deeper layers of sand and gravel, has less of a direct connection with surface water features. However, the geologic formations containing groundwater are not evenly distributed across the County.

To gain a better understanding of groundwater, ACD, WMOs, municipalities, and the Minnesota Environmental Trust Fund funded the development of the Geologic Atlas of Anoka County.

Geologic Atlas of Anoka County

In 2013, the Minnesota Geological Survey released Part A of the Geologic Atlas of Anoka County. Part A consists of six geologic map plates:

1. Data-Base Map
2. Bedrock Geology
3. Surficial Geology
4. Quaternary Stratigraphy
5. Sand Distribution Model
6. Bedrock Topography and Depth to Bedrock

"The public health and economic development of Anoka County are directly dependent on the wise use and management of its land and water resources. Geologic and hydrologic information are essential before decisions are made that affect natural resources. Although the amount of geologic information required for making specific decisions can vary, the

information will not be used if it is not available when needed, or it is available only in a highly technical form or scattered in many different maps and reports" (Bauer, Emily J., MGS. Geologic Atlas of Anoka County, Part A, 2013).

Anoka County agencies, residents, communities, and WMOs have access to detailed information about their geologic environment. The presence and thickness of water-producing formations are mapped in the Geologic Atlas.

Part A of the Geologic Atlas has defined the presence of a significant bedrock formation – the Prairie du Chien-Jordan aquifer – in 20% of the County (Figure 3.1).This aquifer contains great volumes of groundwater preferred by community public water supply systems because it readily yields high volumes of water to public water wells. Other aquifers that extend throughout most of the County provide water to community wells where this aquifer is absent. Figure 3.2 shows the County's bedrock geology.

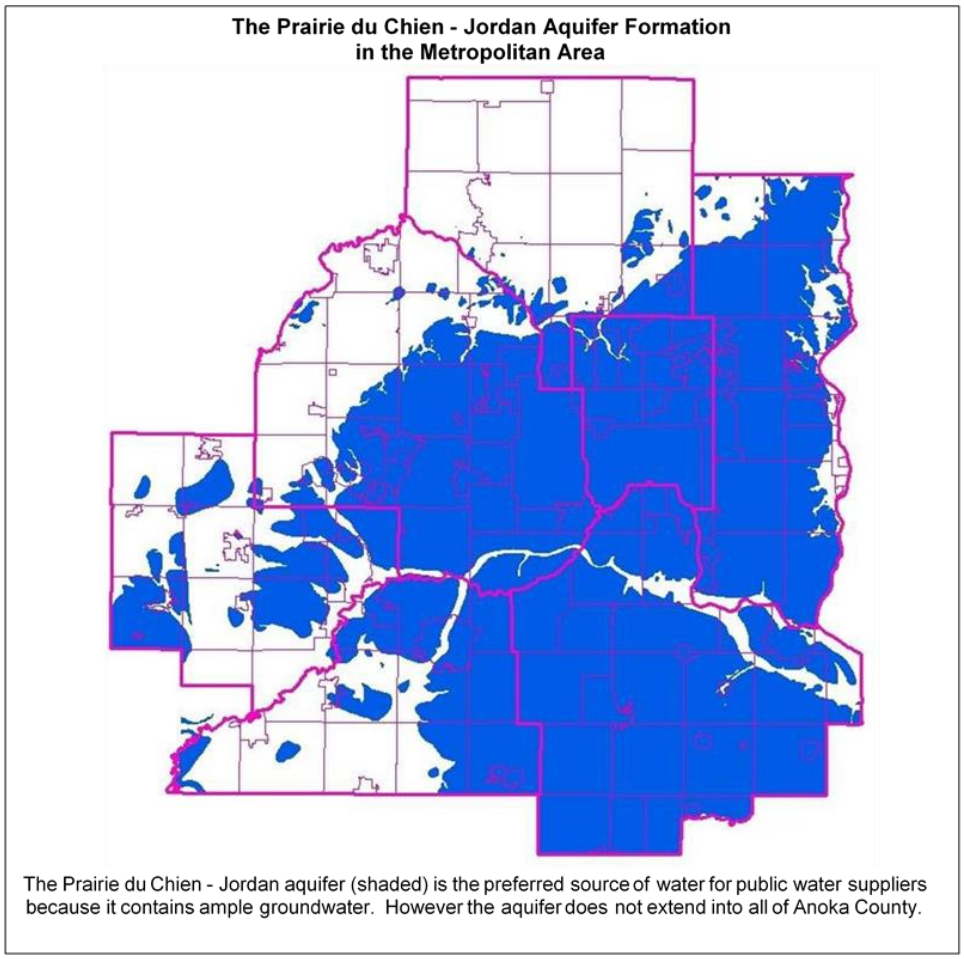

Figure 3.1: Map of the Twin Cities area showing the extent of the Prairie du Chien-Jordan Aquifer formation.

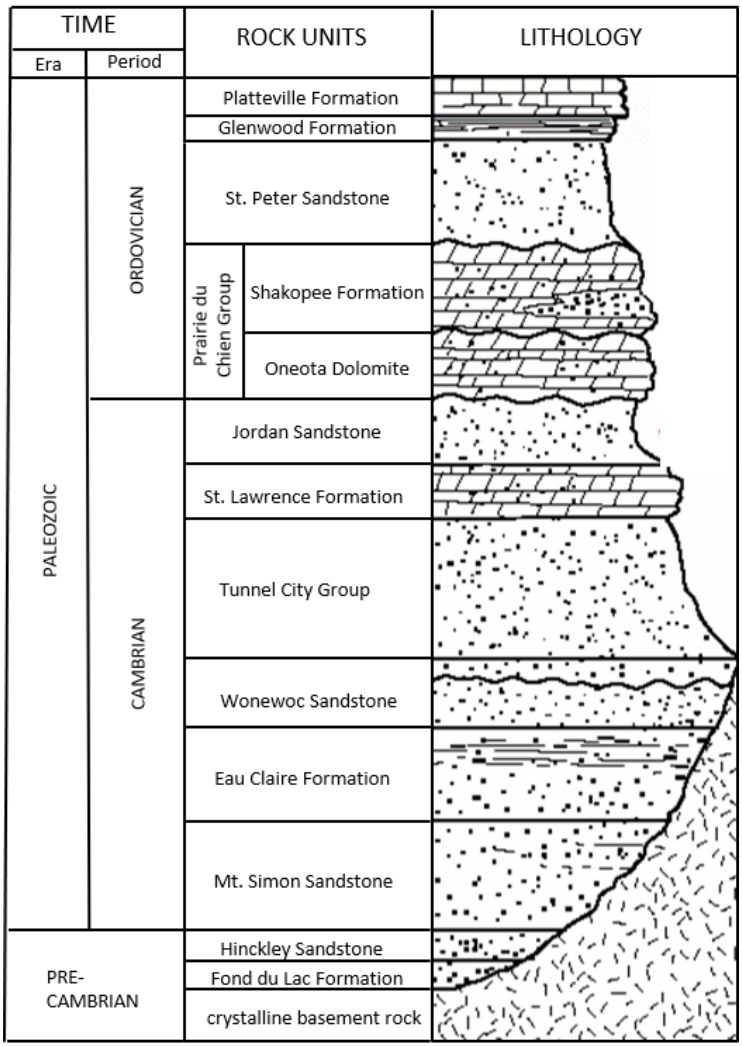

Figure 3.2: Regional stratigraphic column showing bedrock units in the region. Modified from Ojakangas (2009).

A notable geologic feature in the County is the Anoka Sand Plain, which is a collection of sporadic glacial deposits due to uneven deposition and erosion associated with glacial advance and retreat. Glacial meltwater streams and rivers have eroded tills and cut deep bedrock valleys in the County, creating a buried landscape and leaving a ribbon-like pattern to the County's bedrock. These valleys were subsequently filled with outwash and till by following glaciers and are referred to as buried bedrock valleys. The relatively thick and widespread surficial sand and gravel of the Anoka Sand Plain is one of the most important geologic features controlling groundwater availability and the pollution sensitivity of underlying aquifers.

Part B of the Geologic Atlas, Hydrogeology, was prepared by the DNR and was released in 2016. Part B builds on the geologic information presented in Part A and describes the hydrogeologic setting, water levels, groundwater chemistry, pollution sensitivity, and aquifer use within the County are located in the Part B report. The report is accompanied by three plates that display water chemistry and hydrogeologic cross sections.

The recent completion of Part B of the Geologic Atlas provides information helpful for sustainable management of groundwater resources for monitoring, well construction, water allocation, permitting, and pollution remediation, as well as for preferred locations for the storage and processing of solid and hazardous wastes.

Available Aquifers in Anoka County

When water enters the ground, it infiltrates down until it reaches a geologic formation that will not allow the water to easily pass through, such as clay or shale. This formation is known as a confining layer. Above this layer, water collects and fills up empty pores, creating a saturated zone. The upper surface of this saturated zone is called the water table. In general, the surface of the water table is a subdued reflection of the land surface.

There are four primary aquifers found throughout the County. These are, from shallowest to deepest, the glacial drift, Upper Tunnel City, Wonewoc, and Mt. Simon-Hinckley aquifers. Three additional aquifers, the St. Peter, Prairie du Chien-Jordan, and St. Lawrence aquifers, are present in the southern and southeastern areas of the County in between the glacial drift and the described county-wide bedrock layers.

The glacial drift aquifer, also referred to as a buried sand and gravel aquifer, is composed of variable and discontinuous layers of outwash and till. Wells in the upper portion of this aquifer are referred to as being in a water table, unconfined aquifer, due to the lack of overlying water-confining material. The top of the aquifer, defined by the water table, is commonly 3 to 20 feet below the land surface. During a wet season, the water table can rise above lowlands, resulting in flooding. Wells in this portion of the aquifer are usually 20 to 50 feet deep with typical yields of 20 gallons per minute (gpm) or less (Helgesen and Lindholm, 1977). More details on this aquifer can be found in Part B of the Anoka County Geologic Atlas.

The St. Peter aquifer is present in the extreme southern (Columbia Heights and Fridley) and lower southeastern (Lino Lakes, Circle Pines, and Lexington) areas of the County. Very few wells in the County are located in the St. Peter aquifer. The St. Peter appears to have a maximum thickness of about 55 feet in the County and generally yields 10-100 gpm to wells (Adolphson, Ruhl, and Wolf, 1981). The aquifer is recharged by leakage directly through overlying drift and from buried bedrock valleys (Schoenberg, 1990). In Anoka County, the St. Peter thins out, becoming present in a patchy pattern that makes it negligible in effect or presence and allowing it to be considered part of the same aquifer as the Prairie du Chien-Jordan aquifer.

The Prairie du Chien-Jordan aquifer is the major water supply aquifer in the metropolitan area, but it is not found extensively in Anoka County. The Prairie du Chien-Jordan exists primarily in Fridley, Spring Lake Park, southern Blaine, and southeastern Lino Lakes (Figure 3.1). Where present, the vast majority of bedrock wells are developed in the Prairie du Chien-Jordan aquifer because it is an excellent source of water for large capacity wells, yielding as much as 1,800 gpm from the Prairie du Chien and 2,400 gpm from the Jordan. Horizontal hydraulic conductivity regionally ranges from 25 to 50 feet per day (Schoenberg, 1990).

The properties of the St. Lawrence Formation are variable. Where the Prairie du Chien-Jordan overlies the unit, it generally acts as a confining layer. Elsewhere, as the first bedrock layer, it can yield water up to 20 gpm, serving as an aquifer (Schoenberg, 1990).

Throughout most of the County, the Upper Tunnel City aquifer is the first bedrock aquifer encountered beneath the drift. The Upper Tunnel City yields 10 to 20 gpm of water. Although the Upper Tunnel City aquifer yields relatively low volumes of water, it is an adequate aquifer for private domestic wells pumping approximately 12 gpm. A large number of residential wells are located in this aquifer in the County. Some municipal wells that draw from the Upper Tunnel City are constructed to also draw from the adjacent Wonewoc aquifer, which has a higher water yield, to achieve sufficient well yields.

The Wonewoc aquifer is a relatively thin layer of highly permeable sandstone (meaning water can easily pass through its pore spaces) that represents a major aquifer in central and northern Anoka County. In many cases, this is the next aquifer in the County after the glacial drift capable of producing high volumes of water. The Wonewoc provides large volumes of water to wells reaching up to 400 gpm (Schoenberg, 1990).

The Mt. Simon-Hinckley aquifer is the deepest aquifer in Anoka County, making it cost-prohibitive for the construction of private, residential wells. Well yields range from 125 to 2,000 gpm (Schoenberg, 1990). As the aquifer of last resort for metropolitan communities, high capacity wells are prohibited from being constructed in the Mt. Simon-Hinckley aquifer (MN Statute 103G.271, Subd. 4a) unless all measures to utilize existing water resources have been exhausted and the well is used for potable (drinking) water only. Below the Hinckley, there are additional minor sedimentary units and eventually volcanic rocks that are not known to contain any aquifers.

Mt. Simon-Hinckley Aquifer Use Restrictions

As mentioned, the Mt. Simon-Hinckley aquifer is the deepest aquifer in Anoka County and can yield 125 to 2,000 gpm of water. However, this aquifer is the aquifer of last resort for metropolitan communities. Minnesota Statute 103G.271, Subdivision 4a prohibits high capacity wells from being constructed in the aquifer within a metropolitan county by not allowing the DNR to issue a new water use permit “unless the appropriation is for potable water use, there are no feasible or practical alternatives to this source, and a water conservation plan is incorporated with the permit”. This law protects the use of the aquifer for drinking water purposes and prohibits the use of the aquifer for lower priority and nonessential purposes. The provision related to the Mt. Simon-Hinckley aquifer was included in the Ground Water Protection Act of 1989.

Public water supply wells need MDH plan approval before construction may begin. In order for MDH to approve these plans for public water suppliers that serve more than 1,000 people, the demand reduction measures must be approved by the DNR. This allows for coordination with MDH to identify proposals for new public water supply wells in the Mr. Simon-Hinckley

aquifer. However, identifying non-municipal well proposals is challenging, as there is no process for doing so besides periodically reminding well drillers of the restrictions of the use of the Mt. Simon-Hinckley aquifer.

In order to meet the "no feasible or practical alternative" requirement, applicants must evaluate the surface and groundwater sources available in the area and report to the DNR as to why these sources are not feasible or practical alternatives. If the DNR determines that "there are no feasible or practical alternatives" and decides to issue a permit for use of the Mt. Simon-Hinckley aquifer, the law requires that a water conservation plan be made a condition of the permit. This plan ensures that water withdrawn from the aquifer will not be used for purposes other than domestic consumption (drinking, cooking, cleaning, washing, etc.). More information on the Mt. Simon-Hinckley aquifer use restrictions can be found on the DNR's website and in the DNR Waters Guidance Paper of March 1998 on the Mt. Simon-Hinckley Aquifer. The DNR's water appropriation permit and application processes will be discussed further later in Chapter 3.

North and East Metro Groundwater Management Area

As mentioned in Chapter 1, the North and East Metro Groundwater Management Area was established in 2013. The NEM-GWMA includes the Anoka County communities of Blaine, Centerville, Circle Pines, Columbia Heights, Columbus, Fridley, Hilltop, Lexington, Lino Lakes, and Spring Lake Park, along with portions of other counties (Figure 3.3).

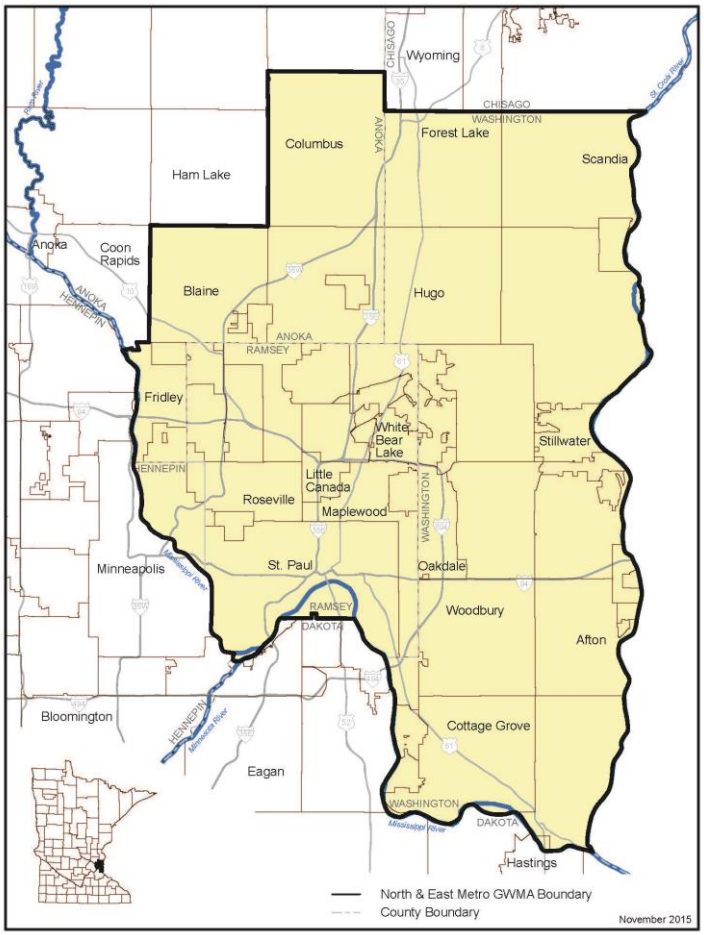

Figure 3.3: Map of the North and East Metro Groundwater Management Area. Source: Minnesota Department of Natural Resources.

Through the designation of the NEM-GWMA, the DNR has developed a plan for a comprehensive approach to assuring adequate supply of groundwater to meet both human and ecological needs within the area. The North & East Metro Groundwater Management Area Plan was published in November 2015 and is a five-year plan to guide the DNR's efforts to manage groundwater appropriations sustainability in the area. The plan sets the stage for managing appropriations more carefully and comprehensibly by establishing sustainability goals for appropriation permit holders.

The plan was developed through two years of work with DNR technical staff and a Project Advisory Team, which consisted of representatives from city, township, and county governments, industrial water users, a lake conservation district, a watershed district, the Met Council, and State and Federal agencies. Several public meetings on the plan also took place before the plan was finalized and internally and externally reviewed.

The plan lays out five broad objectives to ensure that groundwater use is sustainable in the NEM-GWMA: 1) Identify and embrace water conservation best practices; 2) Protect surface waters; 3) Preserve water quality; 4) Improve appropriations permitting; 5) Protect water availability. To meet these objectives, the DNR will take specific actions, including: 1) Increase monitoring and evaluation of groundwater and groundwater-dependent natural resources; 2) Improve communications around water use and impact on natural systems; 3) Evaluate water appropriations relative to established sustainability thresholds; 4) Develop sustainability thresholds where they do not exist; 5) Improve the appropriations permitting process.

A newly configured Project Advisory Team meets semi-annually to discuss updates and hear concerns. Recent projects discussed at these meetings include a feasibility study of enhancing groundwater recharge, a lawsuit against the DNR alleging mismanagement of groundwater appropriations in a way that negatively affected White Bear Lake, a transient groundwater flow model for the White Bear Lake area, and groundwater contamination in the area arising from 3M's manufacture and use of a group of chemicals known as PFAS.

As 2020 will be the final year of the plan for the NEW-GWMA, the DNR and the Advisory Team will continue to work on evaluating what the plan and group has achieved and what they would like to achieve in the future.

Groundwater Recharge

The County's most recognizable geologic feature is the relatively flat sand plain that covers the surface. This glacially deposited sand feature is named after the county in which it is most prevalent and is thus called the Anoka Sand Plain.

The sandy surface that covers the County provides an efficient natural process in which rainwater readily seeps down into soils, reaching a layer of saturated sand referred to as the water table aquifer or Sand Plain aquifer. The process of addition of water to an aquifer is called groundwater recharge. The area covered by the Anoka Sand Plain within the metropolitan area is considered a groundwater recharge zone.

Below the water table, all geologic formations are saturated with water. Groundwater moved within the saturated zone both laterally (within a geologic formation or aquifer) and vertically (into other geologic formations). It is believed that the groundwater recharge in the Anoka Sand Plain makes a significant contribution to the groundwater resources of the metropolitan area, however some studies have found that recharge of deep aquifers is modest.

The two Met Council water supply workgroups within the County studied groundwater recharge, along with stormwater capture and reuse. The reports were published in 2016 and both groups included a regional assessment of enhanced groundwater recharge in their respective study areas: The North and East Metro area and the Northwest Metro area. The purpose of these assessments was to perform an initial screening of their respective study areas to identify areas where water applied at the surface could recharge drinking water aquifers.

The North and East Metro area study found nearly 13,00 acres (approximately 3% of the study area) that could be classified as having “good” potential for groundwater recharge. An additional 49,000 acres were found that could be classified as having “limited” potential for groundwater recharge. However, more of these areas classified as either “good” or “limited” were located in the eastern and southern portions of the study area, which do not include Anoka County. Factors contributing to the “poor” potential for groundwater recharge in the northern and western portions of the study area include low hydraulic conductivity, shallow water table, and land development.

The Northwest Metro area study found only 65 acres that could be classified as having “good” groundwater recharge potential. An additional 27,000 acres were found that could be classified as having “limited” groundwater recharge potential. Most areas classified as “good” or “limited” were not within Anoka County, however, some opportunities for enhanced recharge may exist in the Anoka County communities of Andover and Ramsey. A few areas in Anoka that are classified as “limited” that overlap areas of greatest projected aquifer decline.

Both studies site that further analysis and studies are needed to assess how feasible it would be to construct enhanced recharge facilities, as well as more study into the nature and extent of contaminant plumes. Many evaluations and potential impacts need to be explored before implementation of any aquifer rechange projects. In addition, long-term monitoring would be required to evaluate groundwater quality and mounding, which occurs when a localized groundwater surface temporarily rises below an infiltration best management practice.

Groundwater Supply

Groundwater is found in a complex system of geologic formations that vary, at depth, throughout the County covered by the Anoka Sand Plain.

It is generally accepted that shallow or water table groundwater and surface water features are hydrologically connected at some level in the Anoka Sand Plain formation. The extent of the hydrologic interactions between surface, water table, and deeper aquifer units has not been determined conclusively.

The Anoka Sand Plain and associated drift, sand, clay, and gravel cover the entire County, making it appear that the deeper geology is as uniform. However, this is not the case. The southern portion of the County possesses bedrock aquifers that are either absent or reduced

in thickness in the middle and northern portions of the County. The northern metropolitan area, including the western and northern two-thirds of the County, does not possess the Prairie du Chien-Jordan aquifer (Figure 3.1). This aquifer is the region's principal groundwater source for municipal wells.

Recent geologic and hydrologic investigations have indicated that surface water and shallow and deep groundwater may be impacted by land and water use in the middle and northern developing areas of the County. These impacts include lowering of the water table and surface water features and the infiltration of pollution into deep aquifers resulting from increased groundwater withdrawal by deep high capacity wells.

The characteristics of the County's physical environment determine the rate of infiltration of water, susceptibility to contamination, yield to wells, and the adequate quality and quantity of groundwater resources. The geologic and hydrologic conditions presented here are based on the best available information from multiple sources that have performed investigations and studies on a statewide, regional, county, watershed, and site scale. Understanding the physical environment is essential to water management and protection. The growth and expansion of the Twin Cities is, in part, driving development in the County that has seen its southern communities reach mature suburban municipalities undergoing redevelopment. Agriculture and open land in the northern communities are expected to be developed. Indications of increasing groundwater withdrawal in the middle portions of the County may impact surface water features and groundwater sustainability.

Cooperative Groundwater Monitoring Program

The DNR maintains a network of observation wells (called "obwells") through a program called the Cooperative Groundwater Monitoring Program. Static groundwater-level data is collected to assess groundwater resources, determine long-term trends, interpret pumping and climate impacts, plan for water conservation, and evaluate water conflicts. Most DNR observation wells are not used for pumping in order to avoid interference with measurements. At any given time, approximately half of the wells are actively monitored in the network, which contains over 2,000 obwells across Minnesota. There are 42 DNR obwells in the County (Figure 3.4), and the Anoka Conservation District is contracted to monitor water level readings at 14 of these wells during the period of March through September. Automated devices record water levels multiple times per day.

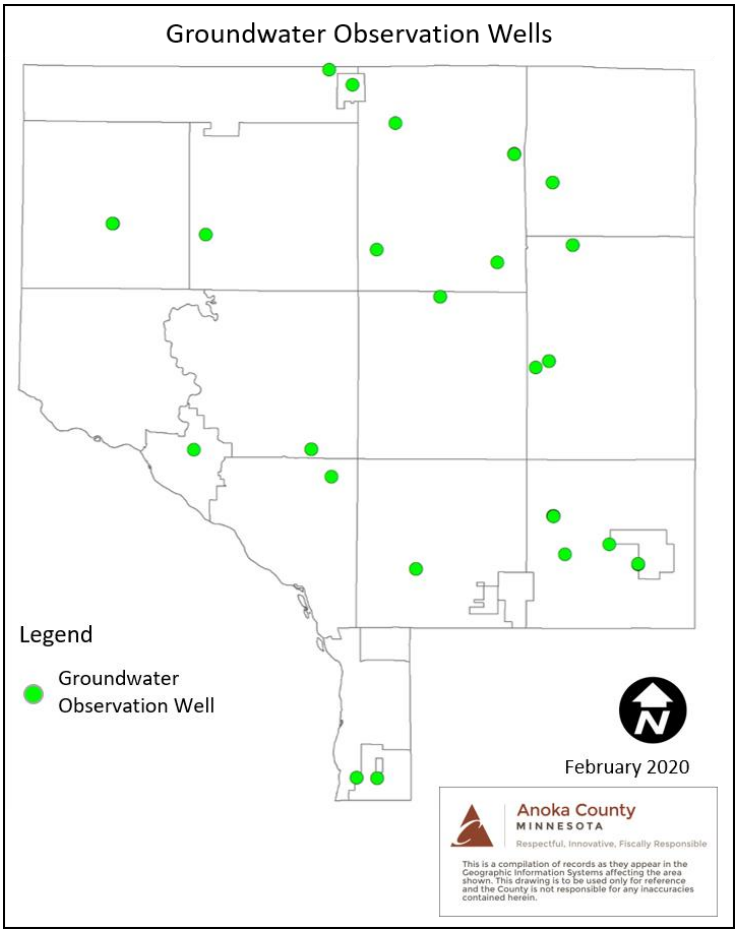

Figure 3.4: Map showing the groundwater observation wells in Anoka County. Data source: Minnesota Department of Natural Resources.

Groundwater Quality and Susceptibility to Contamination

Most of the County's communities are fortunate to have groundwater resources providing quality drinking water without treatment to remove chemical or biological contaminants. The drinking water contaminants found in private and public well water supplies are from either natural geologic sources, such as arsenic, radium, and manganese, or from commercial and residential chemical use.

As pollution reaches groundwater especially used as a source for drinking water, the specific chemical or microbial constituents are referred to as contaminants and the groundwater resource as contaminated. The concentration of a contaminant determines whether the water is safe to drink.

Most of the County's shallow water table aquifer, the uppermost source of water found 1-20 feet below land surface, has been determined to be high or very highly susceptible to contamination. Although the sources of contamination are on the land (e.g. factories, salt storage impoundments) or buried immediately below (e.g. petroleum tanks, dumps/landfills), contamination has been discovered in deep groundwater used by Blaine and Fridley

municipal wells. The contamination has been addressed through treatment and other remediation efforts.

Groundwater contamination has also been confirmed at landfill sites (e.g. the Anoka-Ramsey Landfill in Ramsey and the Waste Disposal Engineering (WDE) Landfill in Andover) and industrial sites (e.g. the Naval Industrial Reserve Ordinance Plant in Fridley and Kurt Manufacturing in Fridley). Many contamination incidents have taken place or were identified over 30 years ago. These incidents have been addressed through containment, cleanup, and treatment measures. However, the County and its communities will likely encounter new challenges in the protection and use of our groundwater resources.

Abandoned Wells

It was previously believed that deep groundwater and wells were safe from pollution because the time that a pollutant would take to travel by natural pathways down a deep well would take decades or even centuries. However, numerous incidents of deep groundwater pollution and well contamination indicate that old, abandoned, decayed, and damaged wells have allowed rapid movement of pollution into deep groundwater and wells.

In 1975, the Minnesota Department of Health (MDH) established a Well Construction Code, Minnesota Rules Chapter 4725. The Minnesota Groundwater Protection Act of 1989 (the Act) required all owners to seal unused wells by a State-licensed well contractor or obtain an annual well maintenance permit. The Act also requires the seller of a property to disclose to the buyer, and MDH, the presence and condition of all wells in the property. MDH has estimated that about half of the unused wells in Minnesota have been sealed since 1990.

The cost associated with these protection activities is an obstacle for well owners. Property owners have little incentive to search for an old well on their property. If a well is found, the property owner is liable to either seal the abandoned well, return the well to working order if possible, or obtain an annual maintenance permit for a fee. An annual maintenance permit it only approved if the well is structurally sound and is in a safe, sanitary location. A permit will not be approved if the well is completely buried, “lost”, or is a threat to health, safety, or the environment. Various cities within Anoka County and the Anoka Conservation District have applied for and received State funding to help residents with the cost of well sealing. Residents are encouraged to contact their local city hall to inquire about these opportunities. Residents meeting certain criteria may also qualify for grants or low interest loans through MDH’s Well Management Program or the Anoka County Community Development Department’s program.

Multi-Aquifer Wells

Municipal and other high capacity water wells constructed before 1994 were allowed to draw from multiple aquifers in the County. Multi-aquifer wells permit groundwater to move into the well, from one aquifer, and out of the well into a deeper or shallower aquifer, depending on the difference in water pressure between the aquifers. This represents a transfer of water

from one aquifer to another. If the transfer is to the deepest aquifer, the Mount Simon-Hinckley aquifer, it represents a loss of available water. The Mount Simon-Hinckley aquifer is statutorily prohibited (MN Statute 103G.271, Subd. 4a) for use by future municipal water supply wells in the metropolitan area, as discussed earlier in this chapter.

Such multi-aquifer wells can also allow pollution, normally found in soils and shallow groundwater, to rapidly move into deep groundwater and wells. Pollution found in deep groundwater is often a result of multi-aquifer wells or unused and unsealed abandoned wells. In 1994, MDH prohibited construction of multi-aquifer wells.

MDH and the DNR are addressing multi-aquifer wells under their well construction and water appropriations permit authorities. A multi-aquifer well may be required to be reconstructed, making it a single aquifer well, as a condition for future well construction or water appropriation when the agency has found the well may threaten groundwater quality or sustainability. If pollution is found in a multi-aquifer well, it is either reconstructed to prevent the spread of pollution or it is sealed.

Permitted Groundwater Withdrawal

The DNR is required by Minnesota Statute 103G.265 to “manage water resources to ensure an adequate supply to meet long-range seasonal requirements for domestic, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes”. To balance the competing management objectives of development and protection of water resources, the DNR established their Water Appropriations Permit Program, in which a water use permit is required for all water users in Minnesota withdrawing more than 10,000 gallons of water per day or 1 million gallons per year from a surface or groundwater source.

Domestic uses serving less than 25 people for general residential purposes, test pumping of a groundwater source, reuse of water that is already authorized by a permit, and certain agricultural drainage systems are exempt from water appropriation permit requirements. Individuals seeking an exemption should contact the DNR.

As a condition of the permit, all permitted users are required to submit annual reports of their water usage. This information can be used to evaluate any impacts from pumping on surface and groundwater resources. Data on water use are also used for water supply planning and for resolving any water use conflicts and well interferences.

There are currently 436 active permits in Anoka County, as of August 1st, 2019. 366 are classified as Individual Permits and 70 are classified as General Permit Authorization. Figures 3.5-3.9 illustrate the active permits in the County.

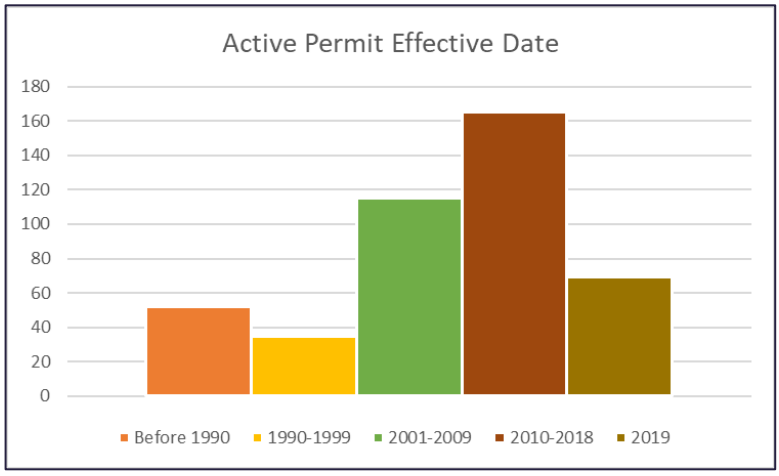

Figure 3.5: Bar chart showing the distribution of the dates currently active permits in Anoka County were effective. Data source: Minnesota Department of Natural Resources Water Use Data.

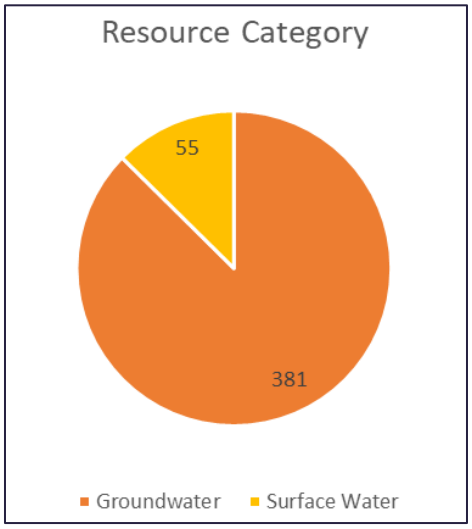

Figure 3.6: Pie chart showing the distribution of the water resource category of the currently active permits in Anoka County. Data source: Minnesota Department of Natural Resources Water Use Data.

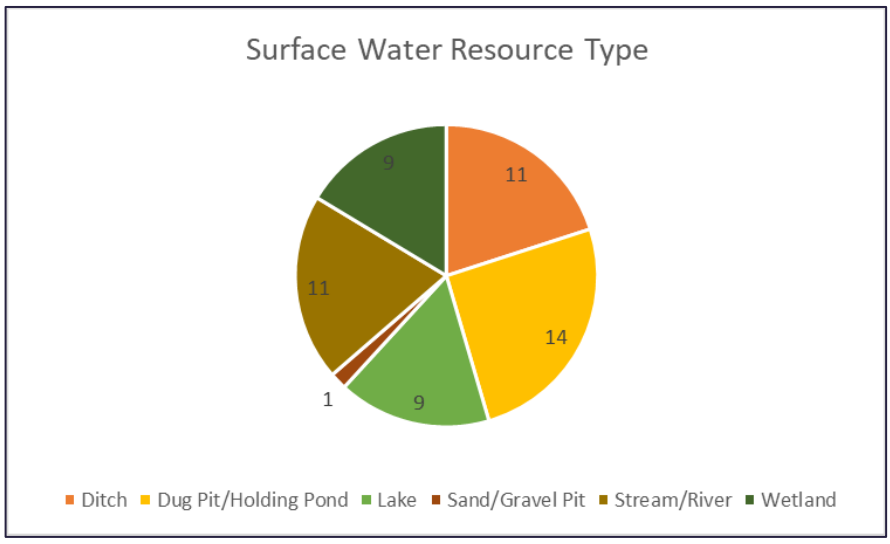

Figure 3.7: Pie chart showing the distribution of surface water resource type of currently active permits in Anoka County utilizing surface water. Data source: Minnesota Department of Natural Resources Water Use Data.

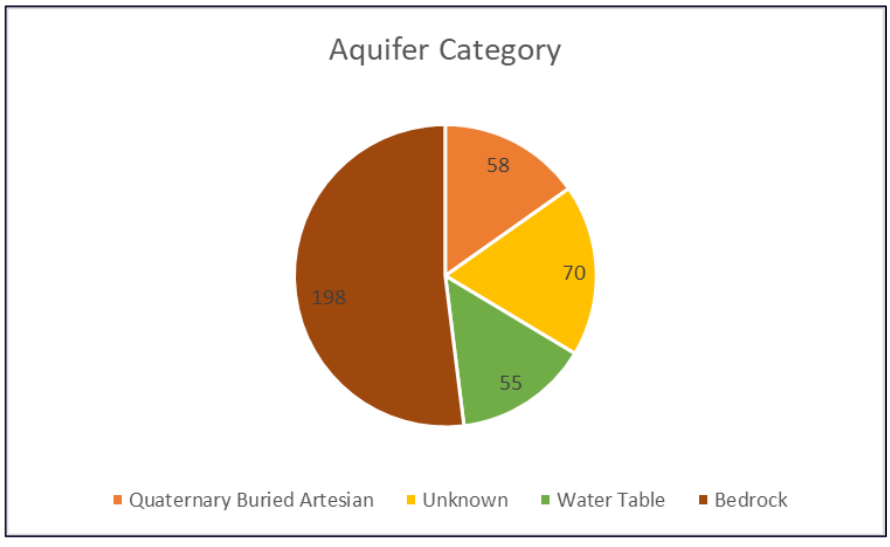

Figure 3.8: Pie chart showing the distribution of aquifer category of currently active permits in Anoka County utilizing groundwater. Data source: Minnesota Department of Natural Resources Water Use Data.

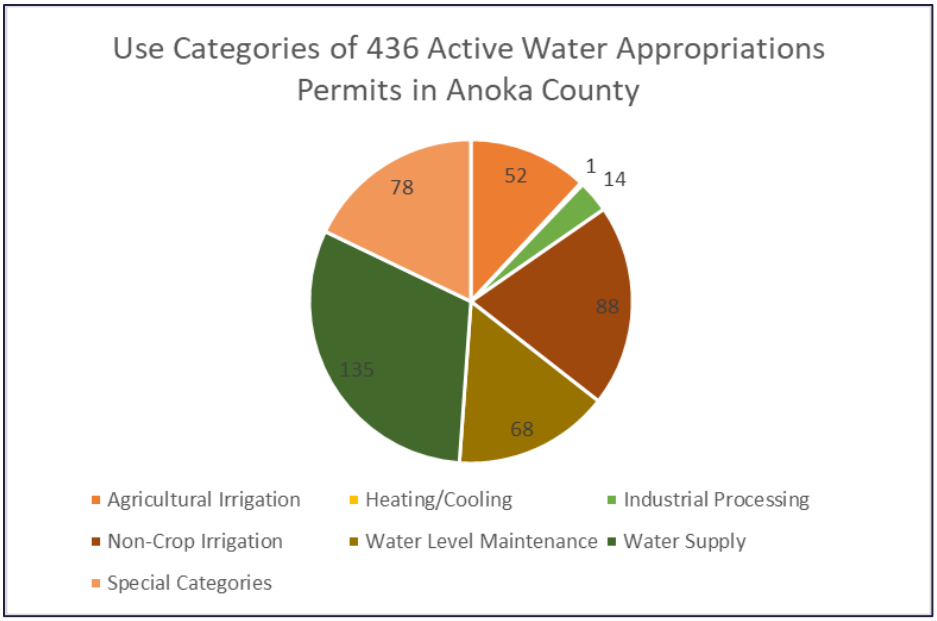

Figure 3.9: Pie chart showing the distribution of water use category of currently active permits in Anoka County. Data source: Minnesota Department of Natural Resources Water Use Data.

Unpermitted Groundwater Withdrawal

The DNR manages the use of surface and groundwater through its Water Appropriations Permit Program. A person must obtain an annual water appropriation permit to withdraw more than 10,000 gallons per day, or 1 million gallons per year. Excessive groundwater withdrawal has impacted surface water features and interfered with other wells in some areas of the state.

Lack of compliance with water appropriations permit requirements is relatively common throughout the state. It is not certain how extensive unpermitted water use exists in the County. The DNR must determine that a person's water use exceeds the daily or annual maximum volume to require an appropriations permit.

In the past, the DNR had indicated that current law did not provide sufficient incentive for violators to comply with the requirements of the water appropriations permit program. Because the penalty costs were minimal and obtaining evidence of water use that requires a permit was difficult, some violators refused to obtain a permit or report the volume of water that they withdrew. They simply paid the DNR citation fees and continued to appropriate water illegally. However, since then, the DNR was authorized by the 2014 Minnesota Legislature to issue an administrative penalty order (APO) for water appropriations activities conducted without a permit. To ensure that Minnesota's water resources are protected for today and for the future, the DNR can use the APO authority as an enforcement tool to gain compliance with water appropriation law. In its "Plan for the Use of Administrative Penalty Authority", the DNR states that the primary goal of the APO is to ensure compliance with the law and not to exact penalties. Therefore, all violators have the opportunity to come into compliance with water appropriation law before penalties are assessed. The plan establishes

a framework that provides for clear and consistent application of the DNR's APO authority. The DNR will also continue to increase their education and outreach efforts in the years to come in order to enhance the public's understanding of the need to manage Minnesota's water resources.

Special Well and Boring Construction Areas

There are three Special Well and Boring Construction Areas (SWBCA), sometimes also called well advisories, in Anoka County (Figure 3.10). These contaminated sites have the potential to create challenges regarding water supply. The MDH Well Management Section reviews requests and plans involving any changes in these areas. The three sites in Anoka County are:

1. East Bethel Sanitary Landfill
2. Southwestern Fridley and Southwestern Columbia Heights
3. Twin Cities Army Ammunition Plant (TCAAP)

The East Bethel Sanitary Landfill SWBCA went into effect in March 1998. The site is a 1.25 square mile area around and including the landfill. Contaminants have migrated down through the sand and gravel layers on the site but have not been found in the bedrock aquifer 100 to 150 feet below. Wells constructed, repaired, and sealed in this area must be designed to draw from an uncontaminated aquifer and must be approved by MDH before work begins. If contaminants are found in the well, the owner may be required to seal the well. The site is an active groundwater containment and cleanup site.

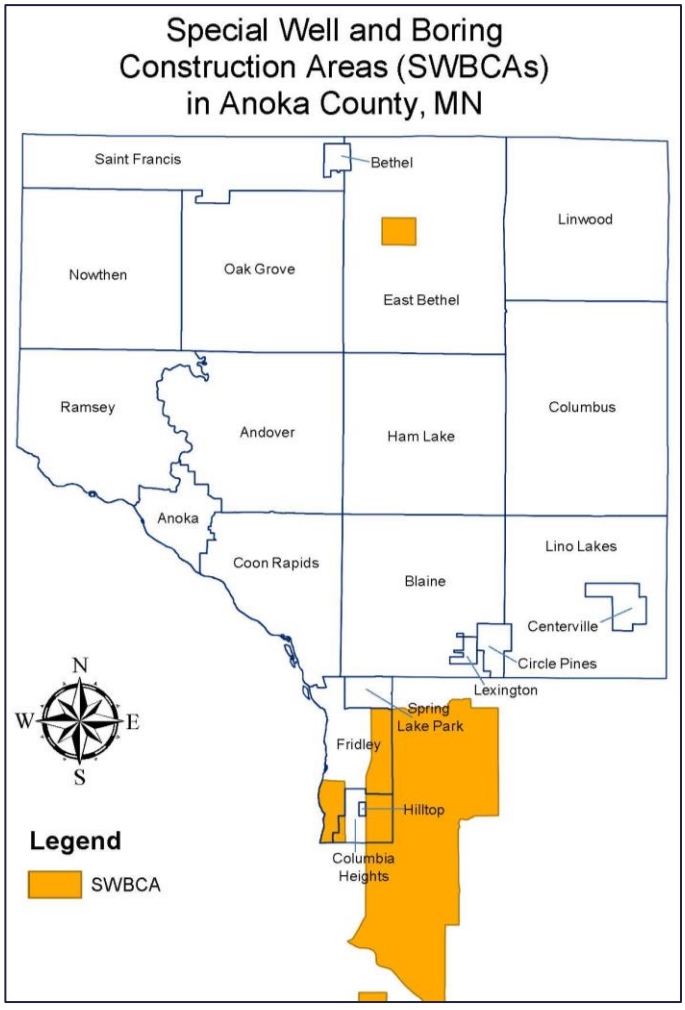

Figure 3.10: Map of the special well and boring construction areas in Anoka County.

The Southwestern Fridley and Southwestern Columbia Heights SWBCA went into effect in October 2015. The area includes several Federal and State Superfund sites and a Resource Conservation and Recovery Act site. The MPCA discovered that chlorinated solvents and their breakdown products were present in the groundwater and requested that the SWBCA be established. Wells constructed in this area but be designed to draw from an uncontaminated aquifer and must be approved by MDH before work begins. Before a well or boring construction plan is approved by MDH, the owner must pay for a volatile organic

chemical (VOC) analysis to determine if the well can be completed, if the well must be reconstructed, or if the well must be sealed. Other special conditions may apply to approved well or boring construction plans.

The TCAAP SWBCA went into effect in July 1996. The area includes 11 communities having groundwater contamination originating at TCAAP, in Arden Hills, and migrating south and west into the City of Fridley. The contamination has migrated down through the sand and gravel layers into the first bedrock layer, the Prairie du Chien-Jordan aquifer, to depths of several hundred feet. Wells constructed in this area but be designed to draw from an uncontaminated aquifer and must be approved by MDH before work begins. If contaminants are found in the well, the owner may be required to seal the well. The site is an active groundwater containment and cleanup site.

Solid Waste and Hazardous Waste Management

Since 1973, only licensed facilities are permitted to dispose of solid waste on land in accordance with the restrictions on standards of the Anoka County Regional Mixed Municipal Solid Waste Hauler Licensing Ordinance (#2018-2). Since 1985, PHES has regulated industrial, commercial, and institutional facilities to prevent improper disposal of hazardous waste. Regulations are enforced through the Hazardous Waste Ordinance (#2018-7).

A successful program for management of residential hazardous and solid waste has been implemented by Anoka County Recycling and Resource Solutions and 21 communities through collaborative recycling and operation of the Anoka County Household Hazardous Waste drop-off facilities and multiple municipal drop-off facilities. The residential program is guided by the Solid Waste Abatement and Advisory Team.

Waste Disposal Engineering Landfill Hazardous Waste Removal

According to the MPCA, the Waste Disposal Engineering (WDE) Landfill in Andover is the only mixed municipal solid waste landfill in the state ever permitted for disposal of hazardous waste. The site began accepting hazardous waste for disposal in November 1972. Hazardous waste was disposed of in a pit separate from the rest of the landfill. Spills and a breakage of the pit's asphalt liner were documented early on and the pit was eventually closed in January 1974 with approximately 6,600 barrels of hazardous waste inside. In 1983, the whole landfill closed, and shortly after, studies on the pit began. Several systems have been installed in the last 30 years to control pollution at the site, including a groundwater extraction and treatment system installed in 1992. In 1995, the landfill entered MPCA's Closed Landfill Program and has been owner by the State ever since. Polychlorinated biphenyls (PCBs) were found to be leaking from the hazardous waste pit in 2011, leading to the installation of a separate system in 2012 to treat the PCBs in groundwater.

Rather than maintaining and operating the various remediation systems for the pit, the removal of the hazardous waste has begun, funded by the State Legislature. A vapor extraction system installed in 2013 has helped to lessen the risk of exposing nearby residents to high levels of vapors during removal of the hazardous waste. Crews completed the removal

of the drum layer of the pit on October 10, 2019, removing 1,425 empty or non-intact drums and 397 drums with recoverable contents. The hazardous materials were transported out of state to a facility for proper handling. The next stage of the project is to excavate the pit and fill it with clean soil, which is expected to be completed in the summer of 2020.

Metro Model 3 and Groundwater Sustainability

The Minnesota Legislature directed the Met Council to "carry out planning activities addressing the water supply needs of the metropolitan area" (MN Statute 473.1565) by developing technical information supporting water management and the Metropolitan Area Master Water Supply Plan. The Met Council produced the first version of their groundwater-flow model, called the "Metro Model", in 2007 in conjunction with Barr Engineering. The primary purpose of the model is to predict the effects of current and future groundwater withdrawals and land use on groundwater levels and the base flows of streams at a regional scale. The model gives the Council and various planners throughout the metro information to consider in regard to groundwater availability and land use during their planning processes.

In 2009, the Met Council developed the Metro Model 2, which is a computer model of groundwater resources that analyzes and simulates regional groundwater conditions. The Metro Model 2 predicted that future development and groundwater use in the central and northern areas of the County would result in the lowering of surface water levels.

The Metro Model 2 has been updated to the Metro Model 3, which was used in revising the Twin Cities Metropolitan Area Master Water Supply Plan. Metro Model 3 is intended to assess the impact on groundwater levels by projected land use changes, population growth, and water demand. The Met Council will use the Metro Model 3 to assess regional groundwater withdrawal, groundwater availability, and areas that are facing future water supply limitations. The Twin Cities Metropolitan Area Master Water Supply Plan is discussed in Chapter 5.

Many changes were made from the Metro Model 2, leading to many benefits of the revised model. According to the Met Council, these include: 1) Incorporation of new information; 2) Implementation of newer and better-supported software; 3) Enhanced methods to understand parameter sensitivities and uncertainty in model predictions; 4) Improved representation of Quaternary unconsolidated sediments and their influence on the groundwater-flow system; 5) The ability to simulate seasonal effects of climatic and pumping stresses; and 6) An expanded model domain.

Potential Impacts of Increasing Groundwater Withdrawal

Typically, a maximum sustainable rate of groundwater withdrawal is not determined for a location until the impact is observed. However, the DNR requires Columbus, Coon Rapids, East Bethel, Ramsey, and St. Francis municipal water systems to perform additional monitoring to determine if increasing groundwater withdrawal is impacting surface water features and groundwater sustainability.

The City of Ramsey has encountered limits to its use of local groundwater. Recently, the City constructed additional wells in the only available bedrock aquifer, the Franconia-Ironton-Galesville, requesting DNR permission to increase its withdrawal from this geologic formation. As a condition to expand use of the aquifer, the DNR required the City to include plans to supplement or replace these wells in the event that increased withdrawal causes significant impacts on surface water features or groundwater sustainability. The City has investigated and prepared preliminary plans to draw and process drinking water from the Mississippi River.

CHAPTER 4 – SURFACE WATER

Surface water such as lakes, rivers, streams, and wetlands are the County's water resources that we can see. The connection between surface water and groundwater may not be readily seen but is a feature that defines water resource sustainability because the two are dependent upon one another. This is especially the case with the County's surface water on sandy soils that readily permit water movement below the surface and into groundwater.

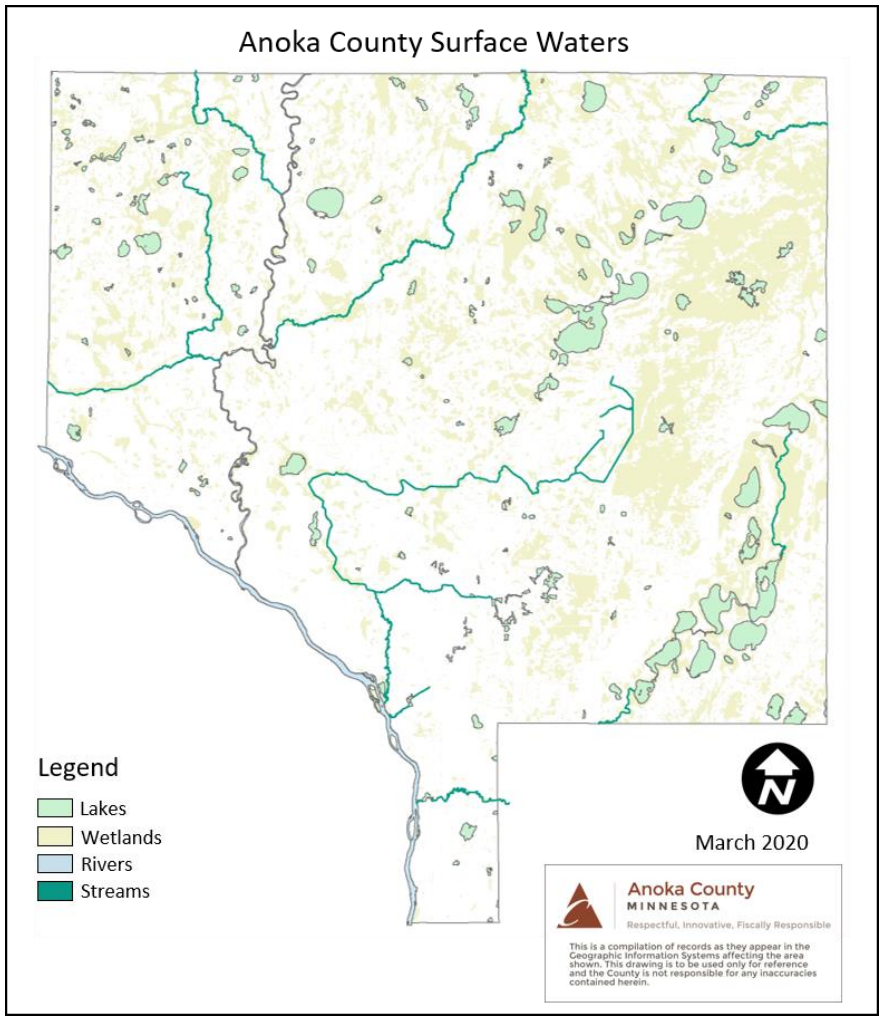

Figure 4.1: Map of the surface waters in Anoka County.

Approximately 25% of the County's 446 square miles are covered by surface water and surface water features, including more than 120 lakes that are 10 acres or larger (Figure 4.1). Most lakes are located in the northern and far eastern portions of the County. Many provide good fishing and recreational opportunities. The shallow lakes provide wildlife habitat and limited waterfowl hunting. Approximately 60 miles along the Mississippi and Rum Rivers is suitable for canoeing, as is Rice Creek along the Rice Creek Water Trail, which is over 15 miles in Anoka and Ramsey counties.

The 7 WMOs in the County (Figure 4.2) are responsible for managing surface water under the provisions of the Metropolitan Surface Water Management Statutes (MN Statute 103B.201-.253). Effectively, WMOs manage surface waters and drainage through comprehensive planning and permitting of development projects which directly affect the quantity and quality of surface water. Local municipal water management plans (MN Statute 103B.235) bring land use management into conformance with watershed plans.

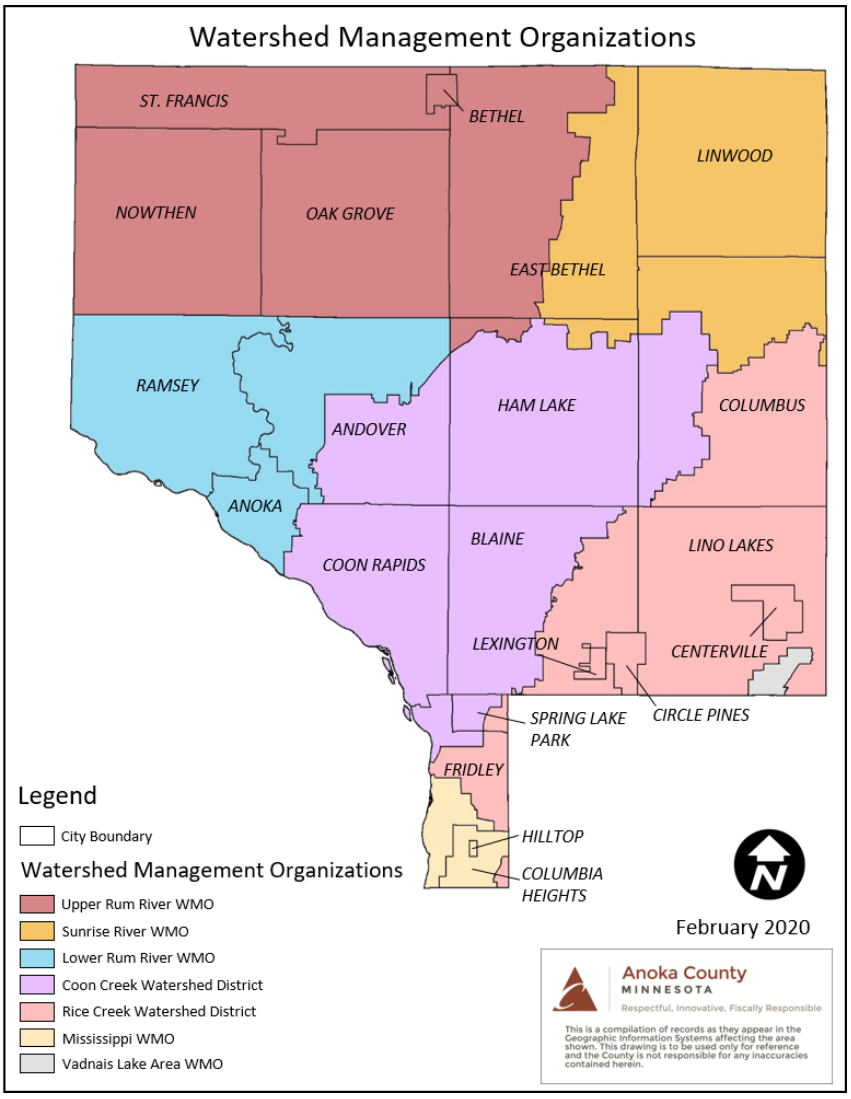

Figure 4.2: Map of the watershed management organizations (WMOs) in Anoka County.

Clean Water Act

The Federal Clean Water Act (CWA) establishes standards to protect lakes, streams, and wetlands from pollution such as bacteria, nutrients, turbidity, mercury, and chloride. The CWA standards establish the maximum concentration of a pollutant permitted in water used as a drinking water source, for swimming, or for fishing. Surface water that exceeds the maximum concentration is determined to be “impaired” for such use. The MPCA administers CWA programs that include regulating discharge of pollutants into surface water from a permitted

source such as a wastewater treatment plant. The MPCA also lists surface waters that do not meet CWA standards, known as the 303d list, and sets pollution-reduction goals to restore water quality.

In 2006, the Minnesota Legislature passes the Clean Water Legacy Act (CWLA) to accelerate monitoring of surface water, restore impaired waters, and protect unimpaired waters. The MPCA administers the CWLA using a watershed management approach to integrate State agency water management with local government and community efforts to restore and protect water quality.

Impaired Waters and Total Maximum Daily Loads

The MPCA has listed over 3,600 surface water bodies, including lakes and sections of creeks or rivers, as impaired waters in Minnesota. 41 surface water bodies in the County are listed as impaired waters and are distributed throughout the County's seven watersheds (Figure 4.3).

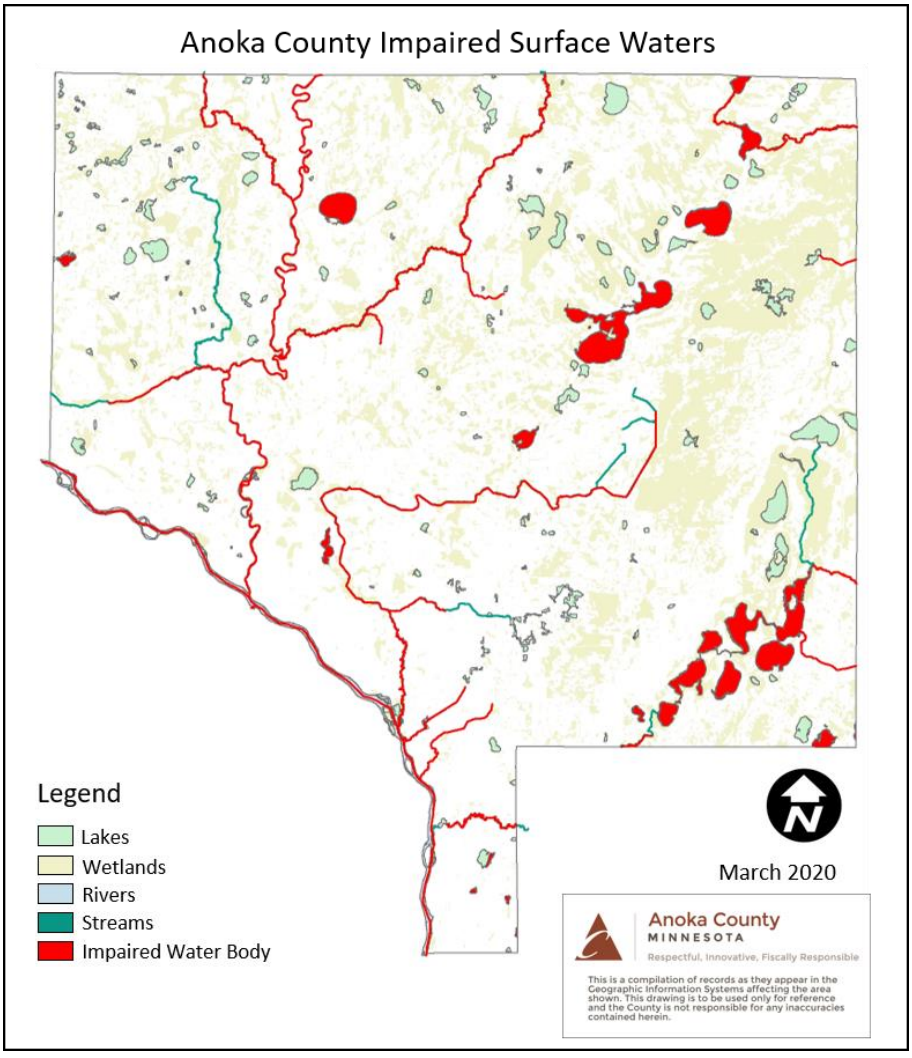

Figure 4.3: Map showing the impaired surface waterbodies in Anoka County. Data source: Minnesota Pollution Control Agency, Impaired Waterbodies, Minnesota, 2018).

Impairment is based on the use of the water, including aquatic fish consumption, supporting aquatic life, or suitability for recreation and/or as a source of drinking water. The MPCA establishes a goal for pollutant reduction called the Total Maximum Daily Load (TMDL) for the impaired water body.

A TMDL is “the maximum amount of a pollutant a body of water can receive without exceeding water quality standards, and an allocation of that amount to the pollutant’s sources.” Throughout the TMDL process, all sources of a specific pollutant are identified and how much each source must reduce its contribution to meet the standard is determined. A TDML must be developed for a body of water once it is added to the Minnesota Impaired Waters List. The MPCA organizes impaired waters into TMDL projects and each project may contain one or more bodies of water or segments of a body of water. Implementation of restoration measures to meet TMDLs are also required by Federal and State regulations and programs.

When a TMDL is established, WMOs are charged with developing a strategy to reduce the specific pollutant or quality impairment to restore the surface water body to meet Clean Water Act standards. The implementation of a project for reduction of pollution is performed by both the watershed organization and the municipality as a local water plan activity and stormwater pollution prevention project.

Surface water pollution is a result of both point- and nonpoint-source pollution. State and local programs have addressed point-source pollution through permitting and monitoring plants and factories. The runoff pollution that washes off driveways, parking lots, buildings, warehouse yards, and other developed land into surface water is a greater challenge.

The impaired use of a water body is often the result of accumulation of pollution from many properties and activities. This makes management and reduction of the pollutants collecting in a lake or stream difficult. Plans to restore surface water quality often focus on public information and engagement to encourage residents and businesses to change habits that contribute to pollution of surface water resources.

Stormwater Systems, Pollution Prevention, and Use

Rain and snow add to our local water resources. As rain reaches the ground, it infiltrates into soils and recharges groundwater. Storms that product a greater amount of water will saturate the County’s sandy soils and additional precipitation will runoff the land collecting in lower areas such as wetlands, creeks, and lakes. Water generated by rainfall or snowmelt that causes runoff is called stormwater.

With development, land is covered by roofs, driveways, roads, and parking lots that change how and where rain and snow add to our water resources. The natural process of water infiltrating into soils and groundwater is reduced as systems are installed to collect the increasing stormwater runoff. Constructed ditches and storm sewers channel water into creeks and rivers where it moves away and outside local systems. The sustainability of local

water resources is impacted through decreased groundwater infiltration and expanding systems that shed increasing volumes of water away from our local natural resources.

Stormwater runoff is a leading source of water pollution, according to the 1996 National Water Quality Inventory. As snow melts or rainwater flows over the ground, it picks up pollutants in the water. Stormwater typically contains litter, oil, chemicals, pet waste, metals, phosphorous, chloride, and disease-causing organisms. The impact of stormwater pollution is compounded as development covers land that would naturally permit the water to infiltrate into the County's sandy soils. Roofs, driveways, parking lots, streets, and highways shed stormwater and the pollutants it picks up into storm sewers and ditches that carry the water, and pollutants, to streams, rivers, and lakes.

Recent developments in stormwater management practices include increasing popularity of iron-enhanced sand filters and biochar, along with tree trenches and underground cisterns. Research is showing that storm ponds can export phosphorous when they become anoxic, even though they are designed for phosphorous capture. In addition, there have been changes to the Construction Stormwater and MS4 General permits, the latter of which is discussed below.

Municipal Storm Sewer Systems (MS4s)

Under the Federal CWA and the State Disposal System, the MPCA regulates stormwater pollution prevention by requiring industrial sites, construction sites, and Municipal Storm Sewer Systems (MS4) to operate under a general permit, or in some cases, an individual permit. Each general permit program incorporates Federal and State requirements for stormwater management.

A MS4 is a water conveyance system associated with state highways, county roads, municipal streets, and public facilities that employ drainage systems such as catch basins, curbs, gutters, storm sewers, drains, and ditches. The rain and snowmelt that collects and runs off these facilities are commonly directed to ditches, streams, creeks, ponds, and lakes. The MS4 facilities are often impacted by industrial and construction stormwater facilities that direct their stormwater runoff into MS4 facilities.

Anoka County, many of its municipalities, and its two watershed districts must obtain an MS4 permit. Two non-traditional entities in Anoka County, Anoka Ramsey Community College and the Lino Lakes Juvenile Correction Facility, also must obtain an MS4 permit, which lasts for five years. To obtain a permit, the operator of an MS4 must develop a Stormwater Pollution Prevention Program (SWPPP) that incorporates best management practices (BMPs) applicable to the facilities that are installed and operated. SWPPPs must have six components called Minimum Control Measures (MCMs):

1. Public education and outreach – "inform residents about the impacts of stormwater and foster proper stormwater management behaviors";

2. Public participation/involvement – "motivate communities to act to prevent stormwater pollution" (e.g. storm drain stenciling, storm drain adoption programs, and volunteer monitoring programs);
3. Illicit discharge detection and elimination – "detect and eliminate illicit discharges to their systems";
4. Construction site stormwater control – "enforce construction site stormwater runoff controls to reduce the impacts of land disturbing activities on stormwater";
5. Post-construction stormwater management – "enforce a post-construction stormwater management program that prevents or reduces stormwater pollution in new and redevelopment projects";
6. Pollution prevention/good housekeeping – "take steps to prevent stormwater pollution, as the first line of defense for many pollutants entering storm sewer systems".

MS4 permits do not specify end-of-pipe discharge effluent limits, as other National Pollutant Discharge Elimination System (NPDES) permits do. Instead, MS4 permits reduce pollutants discharged by using program requirements. Therefore, MS4-permitted entities have the flexibility to select which practices they will use to meet the requirements of the permit. The entities are evaluated by the MPCA on program compliance, the appropriateness of their selected management practices, and progress towards their identified goals. They also must pay an annual fee and submit an annual report to the MPCA by June 30th of each year.

An update to the MS4 General Permit is currently in progress. The draft MS4 General Permit was available for public comment through January 11, 2020. The comments have been posted by the MPCA and are now under review by the agency. Increased fees, regulation, and reporting were of concern to local MS4 agencies.

Water Reuse

Many communities are modifying their stormwater management programs to include rainwater harvesting and stormwater reuse. An example of stormwater reuse is the Centerville irrigation project that captures stormwater in a runoff pond where it is used to irrigate 11 acres of ball fields at Laurie LaMotte Park. This project reduces the need for irrigation water pumped from the park's wells and even recharges groundwater as pond water infiltrates into the soils and irrigation water into the ballpark soils.

Water reuse can be defined as "the capture and use of stormwater, wastewater and subsurface water to meet water demands for intentional and beneficial uses". As there are limits to water resource supplies, the need for more efficient use of water has begun to be explored. Water reuse offers multiple benefits, such as managing stormwater, in addition to reducing surface and groundwater use, and interest in water reuse has rapidly increased in the past decade. However, the State of Minnesota lacks a comprehensive, statewide approach to guide interested parties in implementing water reuse, not unlike many other states.

MDH was directed by the Minnesota Legislature in 2015 to "prepare a comprehensive study of and recommendations for regulatory and non-regulatory approaches to water reuse for use in the development of State policy for water reuse in Minnesota" (Session Law 2015, 1st special session, Chapter 2, Article 2, Section 8). Responding to this directive and to the funding provided by the Clean Water, Land and Legacy Amendment, the Water Reuse Interagency Workgroup ("Workgroup") was formed. The Workgroup included representatives from MDA, MDH, the Minnesota Department of Labor and Industry, the DNR, MPCA, BWSR the Met Council, and the University of Minnesota Water Resources Center. Three main project objectives were established by the Workgroup, including:

1. "Define successful implementation of water reuse in Minnesota.
2. "Identify current conditions that support successful water reuse, and identify barriers and solutions to barriers.
3. "Develop recommendations for safe and sustainable water reuse practices and policies."

The Workgroup's definition of successful water reuse can be summarized by the following elements:

- Water reuse systems are safe, sustainable and sanitary.
- Water reuse is integrated into governance.
- Water reuse has a clear regulatory pathway.
- Water reuse is integrated into water infrastructure and public services, planning (e.g. water supply, wastewater).
- Benefits to water resources are quantified.
- Water reuse is economically feasible.
- Continuing research and technical expertise for water reuse are available.
- Water reuse is a common practice.

For further details on these statements and what successful water reuse looks like, refer to "Advancing Safe and Sustainable Water Reuse in Minnesota – 2018 Report of the Interagency Workgroup on Water Reuse".

The current regulatory system for water reuse is complex, with various State agencies having overlapping responsibilities and some areas that are not clearly regulated. Various local authorities (e.g. watershed management organizations, municipalities, and soil and water conservation districts) also play important roles in managing stormwater. The Workgroup identified a variety of issues relating the current system, including that agency expertise does not always align with agency authority.

The Workgroup developed eight recommendations specific to Minnesota to be considered in developing regulations and guidance for water reuse for State and local governments, non-governmental organizations, municipalities, businesses, and industries. The recommendations include:

1. "Create an expanded workgroup with practitioners, advisors, and stakeholders to continue development of standards and programs.

2. Prioritize research needs and integrate ongoing research to address questions about reuse.
3. Define roles and responsibilities to oversee and monitor water reuse.
4. Establish an information and collaboration hub on the web to share information and resources.
5. Develop a risk-based management system to determine if regulation or guidance is needed.
6. Develop water quality criteria for a variety of reuse systems based on the log reduction target approach for pathogens to manage human health risks.
7. Resolve unique issues related to graywater reuse to determine feasibility of expanding graywater reuse.
8. Provide education and training to support water reuse.

The Workgroup also collected information on the types of water reuse projects that are currently happening in Minnesota and are gaining the most interest. The types of reuse explored by the Workgroup were wastewater reuse (non-potable and potable), stormwater and rainwater reuse (outdoor and indoor use), graywater reuse, and additional reuse categories (industrial process, subsurface, and superfund program). Figure 4.4 shows estimations of the common types of water reuse projects in Minnesota by source and end use.

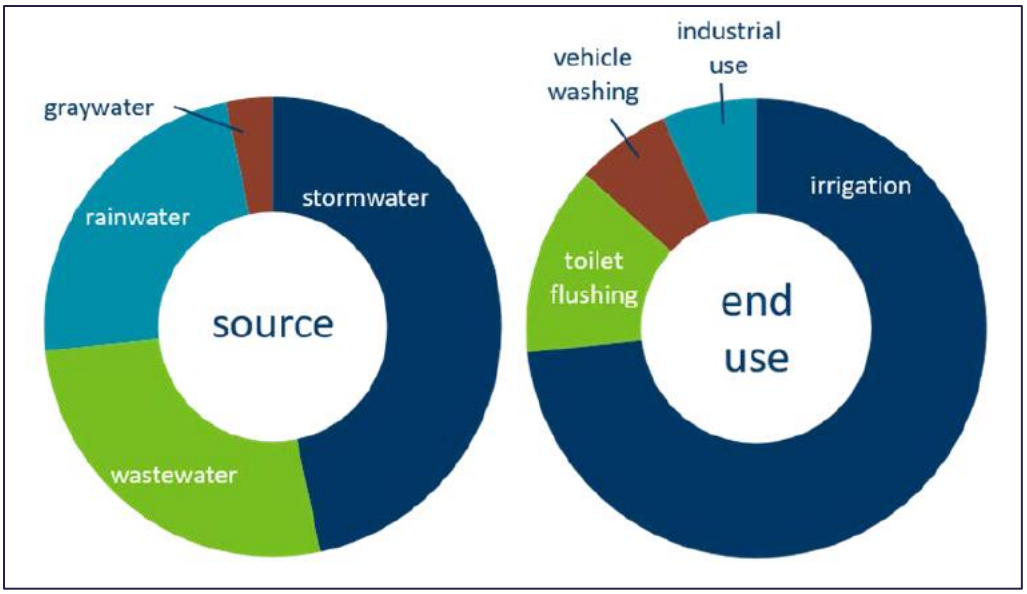

Figure 4.4: Estimations of the common types of water reuse projects in Minnesota. Source: Advancing Safe and Sustainable Water Reuse in Minnesota – 2018 Report of the Interagency Workgroup on Water Reuse.

The research conducted and recommendations provided by the Workgroup helps to assist decision makers and stakeholders in setting a course of action to advance the safe and sustainable practice of the growing topic of water reuse in Minnesota.

The Regional Groundwater Recharge and Stormwater Capture and Reuse Study – North and East Metro Study Area (2016) evaluated the potential for stormwater to serve as a source for

enhanced groundwater recharge or as a non-potable water supply in the North and East Metro area, which includes the Anoka County communities of Centerville, Circle Pines, Columbia Heights, Columbus, Fridley, Hilltop, Lexington, Lino Lakes, and Spring Lake Park. The purpose of the study was to "conduct a preliminary assessment of stormwater capture and reuse systems as a way to offset demand on groundwater sources for non-potable uses, and to quantify the potential to use captured stormwater as a source for enhanced recharge" in the study area. Smaller scale opportunities and the potential for stormwater reuse to supply future development or needs were not evaluated as a part of the regional study. A key finding of the study was that 73% of the 180 high-volume, non-potable groundwater users identified in the study could potentially capture and reuse stormwater as an alternative to groundwater use. The study also produced a set of recommendations similar to those produced by the Water Reuse Interagency Workgroup described above.

A very similar study, Regional Water Supply, Enhanced Groundwater Recharge, and Stormwater Capture and Reuse Study – Northwest Metro Study Area (2016), was conducted in the Northwest Metro area, which includes the Anoka County communities of Andover, Anoka, Coon Rapids, Fridley, and Ramsey. A key finding of this study was that 73% of the 62 high-volume, non-potable groundwater users identified in the study could potentially capture and reuse stormwater as an alternative to groundwater use.

Aquatic Invasive Species

Aquatic invasive species are threatening Minnesota and Anoka County waters. Aquatic invasive species (AIS) are non-native plants, animals, and pathogens that thrive in a new environment and can cause economic loss, environmental damage, and harm to human health. These no-native species harm fish populations, lower water quality, lower property values, and interfere with water recreation. Some AIS present in Anoka County lakes are Eurasian Watermilfoil, Curly Leaf Pondweed, Flowering Rush, non-native Phragmites, Purple Loosestrife, and Mystery Snails. In the Rum and Mississippi Rivers, Spiny Water Flea and Zebra Mussels are present.

In the 2014 Session, Law Chapter 308 enacted by the Legislature provides Minnesota counties a County Program Aid grant for AIS prevention. The amount designated for each county is based on the number of watercraft trailer launches, as well as the number of watercraft trailer parking spaces within each county. Anoka County is allocated approximately 4.5% of the total, which equates to approximately $135,000 per year, to implement a comprehensive AIS program. Anoka County Parks coordinates with many watershed districts, lake associations and improvement districts, volunteer groups, cities, and townships to maximize the impact of the AIS Prevention Aid Program. The program focuses on education, early detection, monitoring, and preventing the spread of these invasive species. Anoka County develops and distributes educational information through city and County events, schools, local newspapers, and to local lake associations and businesses in the area. The AIS program created and coordinates monitoring programs with volunteers and hires seasonal watercraft inspectors to help educate the public and stop invasive species from transporting to another body of water.

Surface Water Source for Drinking

Surface water can be utilized for drinking water if treated, stored, and distributed in a manner that prevents the presence of microbes and pollutants. The use of surface water for drinking typically requires greater treatment and monitoring than groundwater supplied by a well.

A surface water source supplying a public water system must possess certain characteristics that ensure that the resource is capable of meeting quantity and quality requirements. The principal quantity requirement of the surface water source provides a minimum volume of water consistently for use. Major rivers and the Great Lakes possess this characteristic.

The quality of the surface water source for a public water supply system must be thoroughly evaluated to determine the extent of treatment that is necessary to remove chemical and biological pollutants making the water safe to drink. The use of surface water for public water supply will require treatment. All surface water must undergo treatment to remove microbes. Other pollutants that may enter the surface water, such as fertilizer, road salt, and vehicle spills, must also be addressed by the treatment plant.

The Mississippi River as a Water Supply

The Mississippi River defines part of the southwestern and western border of the County. In addition to acting as a transportation conduit for barge traffic, the Mississippi provides for recreational activities and the drinking water source for community supply systems. From St. Cloud through the City of Ramsey and Dayton, the Mississippi has been designated as a wild and scenic river.

The mean annual discharge or flow of the Mississippi River is 8,572 cubic feet per second (cfs), or 64,123 gallons per second, at a monitoring station near the City of Anoka. This discharge volume represents a significant water resource to the County communities and the region. The lowest mean monthly discharge recorded for the Mississippi River was 715 cfs in August of 1934.

Table 4.1 – Discharge (Flow) of the Mississippi and Rum Rivers

RIVER	Mean Annual Discharge	Mean Monthly Discharge (High Flow)			Mean Monthly Discharge (Low Flow)		
		April	May	June	Dec.	Jan.	Feb.
Mississippi*	8,572	17,626	15,570	12,483	5,165	4,439	4,322
Rum**	679	1,588	1,209	961	347	257	258

Values are in cubic feet per second (or 7.48052 gallons per second)
*based on USGS historical information 1931 to 2018
**based on USGS historical information 1929 to 2018

The municipalities of Minneapolis and St. Paul obtain their water from the Mississippi River. In 2004, over 34 billion gallons were withdrawn from the Mississippi River to supply Minneapolis, St. Paul, and inter-connected communities. The mean annual discharge of the Mississippi River at Anoka is approximately 2,022,500,000,000 gallons per year, or over 50 times the volume withdrawn for Minneapolis, St. Paul, and surrounding communities in 2004. The municipal water supplies for Columbia Heights and Hilltop come from the Mississippi River through interconnection with the Minneapolis Water Works (MWW) treatment plant in Fridley.

Prolonged drought conditions can reduce the flow of the Mississippi River. Such a reduced flow has concerned public water supply systems that rely on the river for a constant and sustained source.

The last prolonged drought affecting the Mississippi River took place in 1988 when the measured discharge at the Anoka gaging station fell below 1,000 cfs for over 72 hours on July 25-27, 1988. The DNR had determined that such a reduced flow will be a threshold in which water conservation and other measures must be instituted. In response to the reduction in river flow, Minnesota Governor Perpich requested that the U.S. Army Corps of Engineers increase the discharge of water from the Headwaters Reservoirs from 270 to 570 cfs. The proposed additional flow was intended to temporarily relieve drought-induced low flows. However, headwaters communities objected to the request, characterizing it as ever-increasing and wasteful water use.

The Mississippi River is expected to play an increasing role in supplementing public water supply systems in the County if groundwater resources cannot sustain growing demand. The City of Ramsey has encountered potential limitations to expanded use of its main groundwater source, the Franconia-Ironton-Galesville aquifer. Ramsey has studied the feasibility of using the Mississippi River to supplement its system of wells.

The City of Ramsey is looking into eventually constructing a water treatment plant to process river water. Similar to the MWW that supplies or supplements a number of adjacent municipal water supply systems, a Ramsey municipal water treatment plant might supply water to adjacent communities too.

Upper Mississippi River Source Water Protection Project

As the source of drinking water for the cities of Minneapolis, St. Paul, and St. Cloud is the Mississippi River, the three cities worked collaboratively to prepare Source Water Protection Plans (SWPPs) through the Upper Mississippi River Source Water Protection Project (UMRSWPP). The SWPPs were prepared voluntarily, however the precursory Source Water Assessments (SWAs) were required. SWAs are prepared by MDH and are used to inform consumers of public water supply systems of the source of their drinking water, the susceptibility to the source of the drinking water to contamination, the potential contaminants of concern to the source of the drinking water, and the sources of the potential contaminants

of concern, to the extent practical. The SWAs for the three cities were prepared collaboratively.

The SWPPs build upon the SWAs by:

1. Delineating a “source water protection area”,
2. Responding to the potential contaminants of concern that were identified in the SWA,
3. Developing implementation strategies and management practices designed to reduce the risk to the water supply, and
4. Raising awareness of the source of and risk to the water supply.

Overall, a SWPPP serves to provide a means of reducing the risk of contamination of the drinking water supply by managing the potential sources of contamination within the area that supplies drinking water to a public water supply, which may be a public well, or in the case of the UMRSWPP, a surface water intake.

The source water protection areas delineated in the SWPPs consist of two areas: Priority Area A and Priority Area B. Each area also has an associated Drinking Water Supply Management Area (DWSMA). Delineating Priority Area As assists the public water suppliers in identifying, inventorying, and managing potential sources of contamination that present an immediate health concern to consumers. Delineating Priority Area Bs assists in protecting consumers from long-term health effects related to low levels of or periodic exposure to contaminants.

Parts of Anoka County are included in Minneapolis’s Priority Area A (Figure 4.5) and nearly the entire County is included in Priority Area B (Figure 4.6). St. Paul’s Priority Area A (Figure 4.7) includes parts of Anoka County as well, and nearly the entire County is included in Priority Area B (Figure 4.8). The St. Paul SWPP also delineates Priority Areas A and B for the Vadnais Lake area, which overlaps with the southeastern corner of Anoka County (Figures 4.7 and 4.8).

Partners of the UMRSWPP are continuing to develop and implement management strategies to address contaminant threats to source water. They are also working to determine areas where the Mississippi River discharges to, or is recharged by, groundwater, to determine the potential for contaminant transport. They are continuing to coordinate and collaborate with WMOs and other local organizations and groups to advance the common goals of watershed management and source water protection. The three cities of Minneapolis, St. Paul, and St. Cloud are continuing to implement their SWPPs and address challenges that arise. Each water supplier is working to update the Potential Contaminant Source Inventory based on the geographic and contaminant priorities established through the SWPP process. Plan implementation emphasizes partnerships with local organizations and groups, particularly WMOs. The Vadnais Lake Area WMO and the Rice Creek Watershed District, along with many others, have worked with the UMRSWPP on implementation objectives.

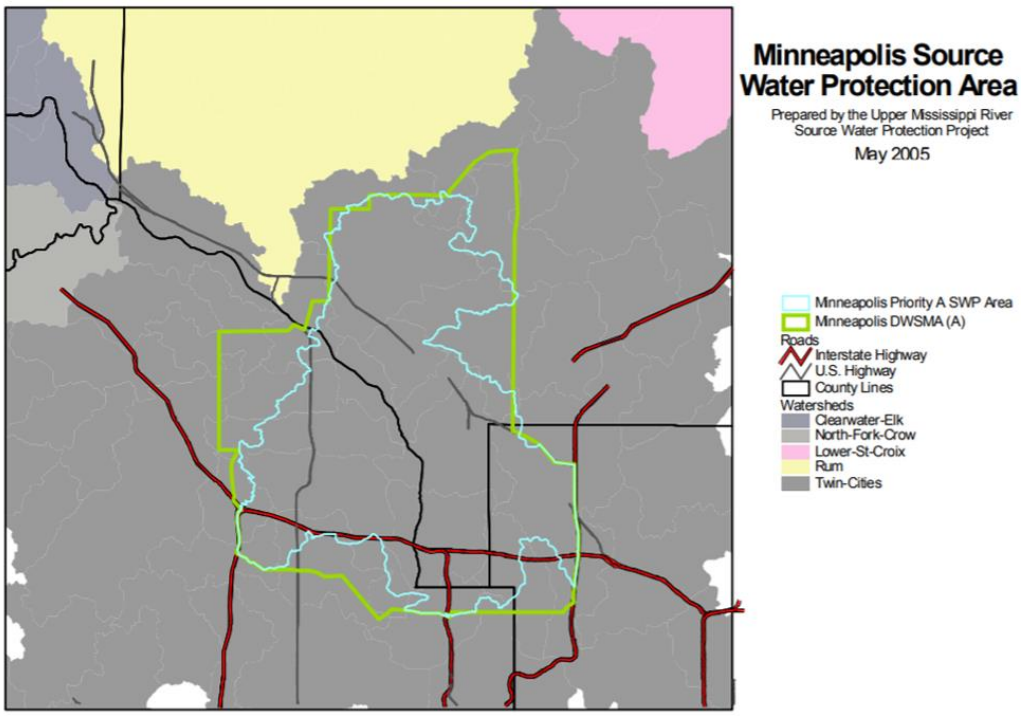

Figure 4.5: Map of the Minneapolis Priority A Source Water Protection Area and DWSMA. Source: City of Minneapolis Source Water Protection Plan (2005).

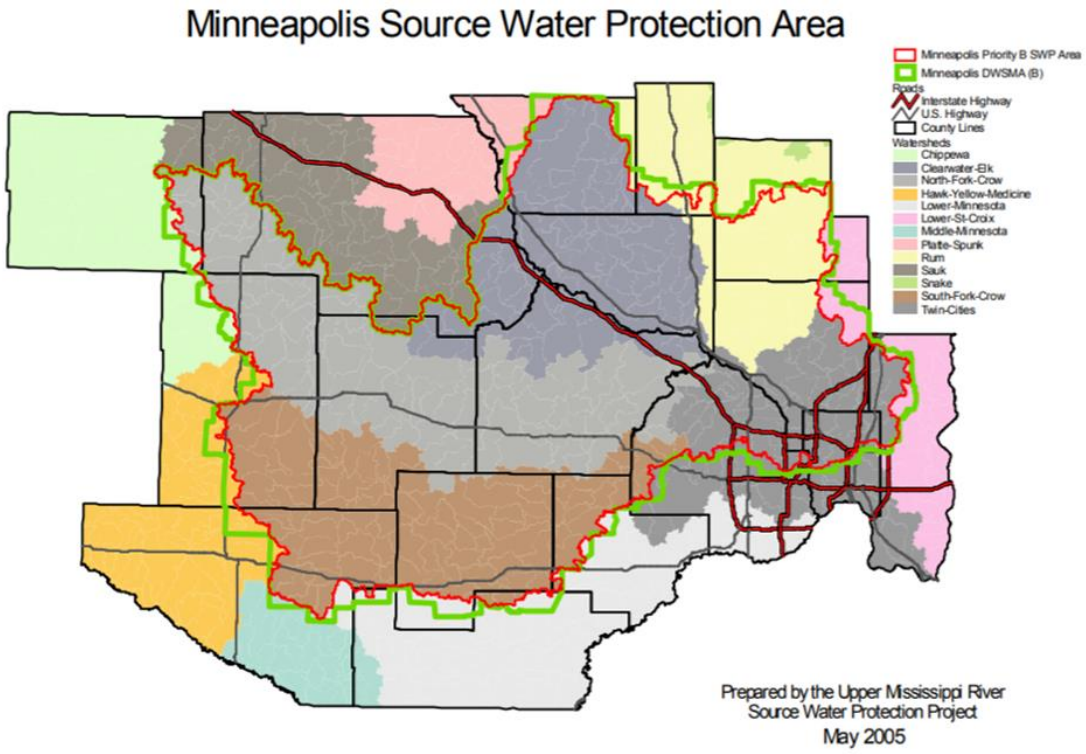

Figure 4.6: Map of the Minneapolis Priority B Source Water Protection Area and DWSMA. Source: City of Minneapolis Source Water Protection Plan (2005).

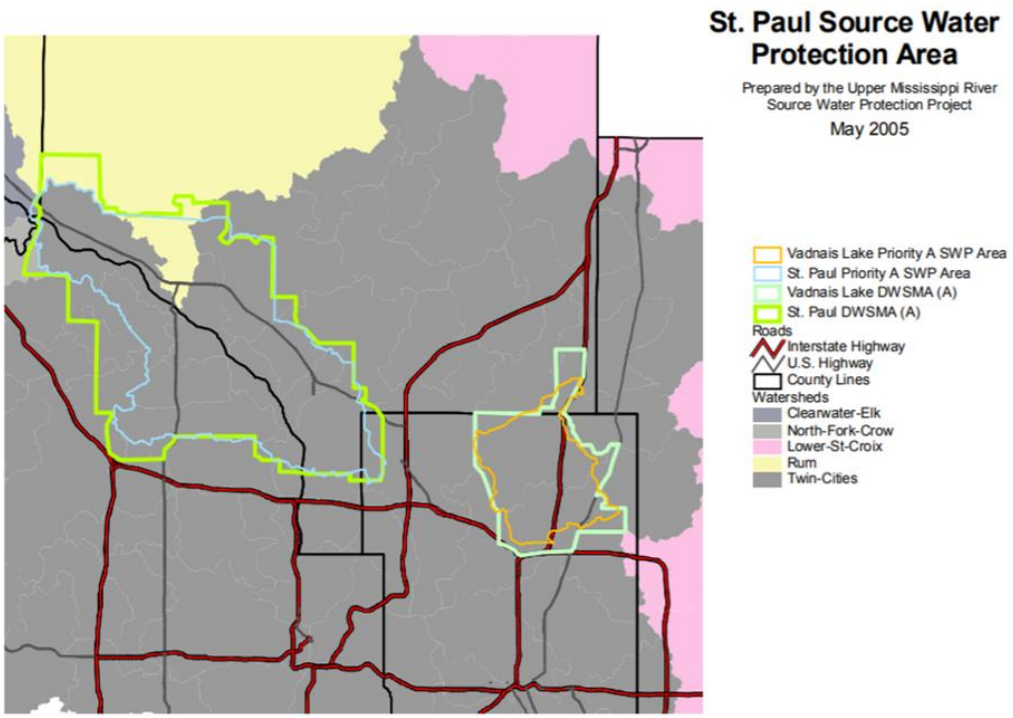

Figure 4.7: Map of the St. Paul Priority A Source Water Protection Area and DWSMA, along with the Vadnais Lake Priority A Source Water Protection Area and DWSMA. Source: City of St. Paul Source Water Protection Plan (2005).

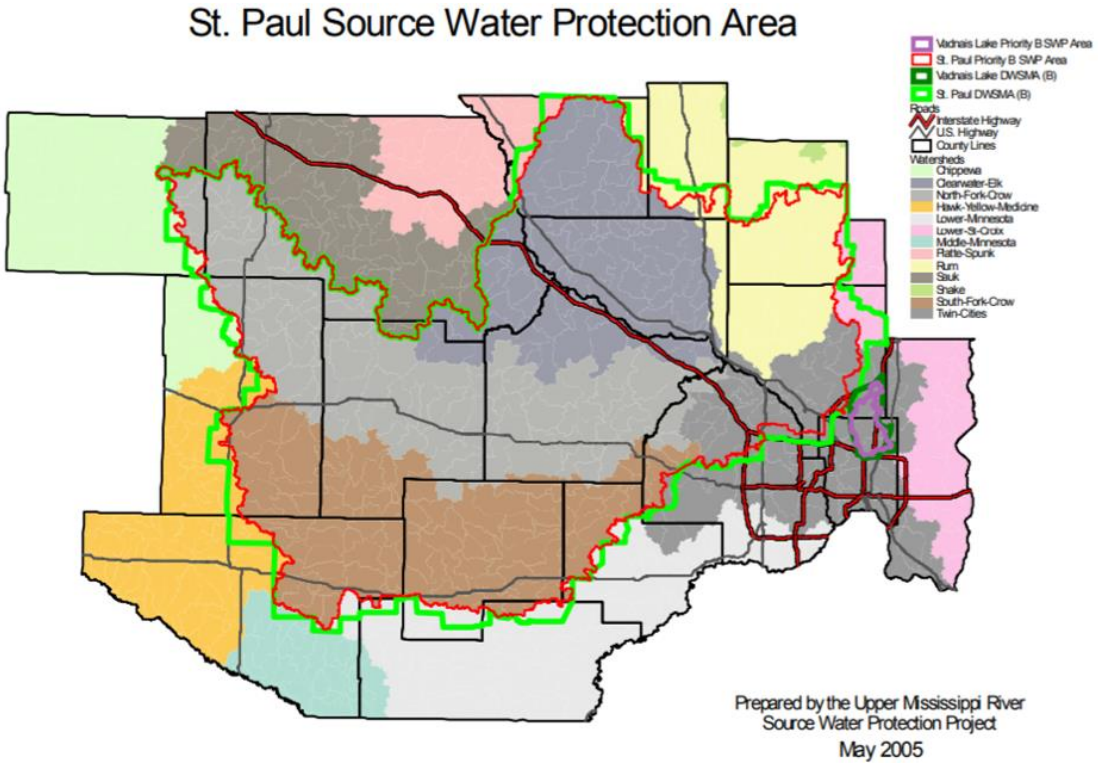

Figure 4.8: Map of the St. Paul Priority B Source Water Protection Area and DWSMA, along with the Vadnais Lake Priority B Source Water Protection Area and DWSMA. Source: City of St. Paul Source Water Protection Plan (2005).

Mississippi River Water Quality

The MPCA has identified several reaches or segments of the Mississippi River from St. Cloud to St. Paul as impaired by bacteria (Figure 4.9). Some of the identified reaches are adjacent County communities. In fact, drainage from the County communities is suspected to contribute to the bacteria impairment of the river.

One reach of the Mississippi River, Coon Creek to St. Anthony Falls, is designated for drinking water use, providing water to the MWW and the St. Paul Regional Water Services systems. The protection of the Mississippi River from pollution is a priority of MDH because a healthy river provides consistent water quality that existing treatment plants are designed to process before distribution to the public. Deteriorating quality of the Mississippi River places greater stress on the treatment systems to process and maintain their product to drinking water quality, such as the case of cryptosporidium contamination of Milwaukee's water supply system in the spring of 1993.

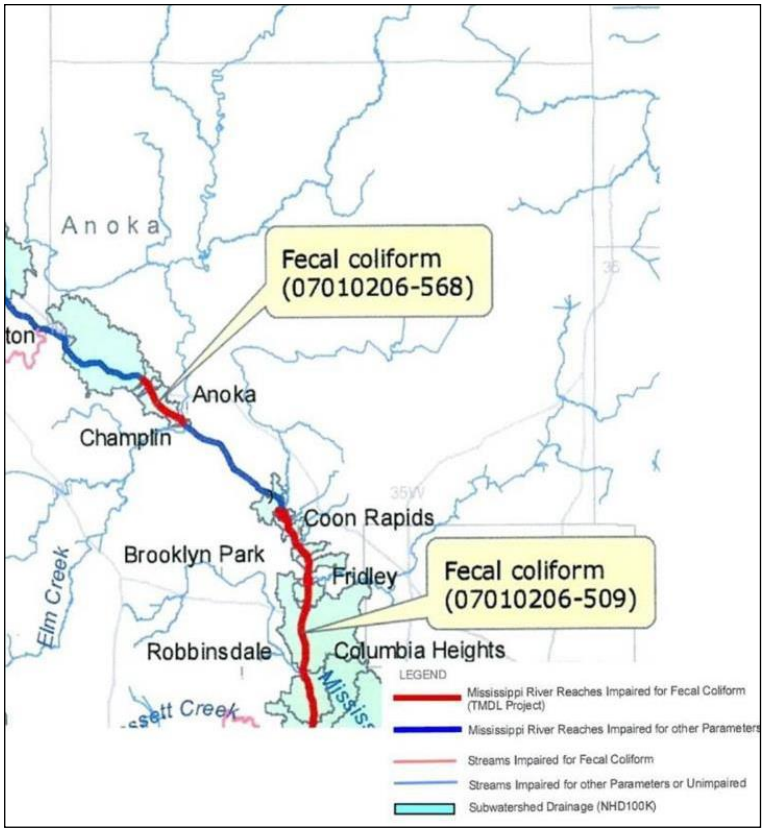

Figure 4.9: Map showing the reaches and segments of the Mississippi River in and near Anoka County that have been identified by the MPCA as impaired by bacteria.

CHAPTER 5 – WATER SUPPLY AND SUSTAINABILITY

Water supply remains a priority of the County and its communities. This sustainability of local water resources is a growing priority of communities on a local, regional, and state-wide scale. Determining the water-sustainability balance between withdrawing water to supply residents and businesses while maintaining natural resources and ecosystems is the newest challenge and priority.

County residents, businesses, and institutions get their water from local sources. Groundwater supplies the majority of the County's needs through water wells, with 94% of residents relying on groundwater for their drinking water. Private water wells are constructed on a property that serves a single home or cabin. Public water wells supply many homes or a business that provides water or related products for consumption to the public or employees.

The municipalities of Columbia Heights and Hilltop are the County's exception in that they purchase Mississippi River water that is treated to drinking water standards by the Minneapolis Water Works. These municipalities maintain water distribution systems but do not own or operate water supply wells. The relationship naturally developed with the establishment of the Minneapolis water treatment plant in Fridley and reservoir in Columbia Heights. The City of Minneapolis also provides water to other adjacent communities that use Minneapolis water to supplement their well water system.

St. Paul Regional Water Services (SPRWS) includes facilities that draw Mississippi River water into a collection/screen tank in Fridley and transports raw water through a pipe and series of lake reservoirs to their treatment facility in St. Paul. The SPRWS does not provide water to the County's communities, however, the Met Council has highlighted this existing infrastructure that could be expanded to establish a regional water supply treatment plant, possibly in the Lino Lakes area. The feasibility of transitioning Lino Lakes, along with the other northeast metro communities, from groundwater to surface water through connect to the SPRWS was studied in the Met Council's "Feasibility Assessment of Approaches to Water Sustainability in the Northeast Metro" (December 2014). At this time, communities in the northeast metro have not expressed the desire to further investigate this transition.

North and East Metro Groundwater Management Area

With the establishment of the North and East Metro Groundwater Management Area in 2013, the DNR has begun exploring methods to determine the water-sustainability balance within this area, which includes ten County communities (Blaine, Centerville, Circle Pines, Columbia Heights, Columbus, Fridley, Hilltop, Lexington, Lino Lakes, and Spring Lake Park). The DNR has developed a GWMA plan to guide their actions in managing the appropriation and use of

groundwater within the NEM-GWMA over the five-year period beginning in November 2015. The plan is a comprehensive approach to assuming adequate supply of groundwater to meet both human and ecological needs within the area. See the section on the NEM-GMWA in Chapter 3 for more information on the area and current projects.

Metropolitan Council's Metro Water Supply Workgroups and Regional Feasibility Assessments

Facilitated by the Met Council, Water Supply Work Groups help address water supply issues in the Metro region. The Met Council helps communities, industries, and other community groups work together to address potential or on-going water supply issues. There are currently two active Water Supply Work Groups that include Anoka County communities: The Northeast and Northwest Water Supply Work Groups (Figure 5.1). The groups are each working on various projects related to water supply and sustainability.

The Met Council was directed by the 2005 Minnesota Legislature to "carry out planning activities addressing the water supply needs of the metropolitan area", which included the development of the Twin Cities Metropolitan Area Master Water Supply Plan (see Chapter 5 for more information) (MN Statute 473.1565). The development of the water supply workgroups and subsequent studies and projects were a result of completing the plan, with the goal of strengthening local and regional water supply planning efforts. Some of these projects include Regional Feasibility Assessments. The assessments are "technical analyses supporting long-term reliability and sustainability of water supplies in the Twin Cities metropolitan area". A variety of approaches to support sustainable water supplies across the region are evaluated with these assessments. Three study areas within the metro were chosen, including two that overlap with Anoka County boundaries:

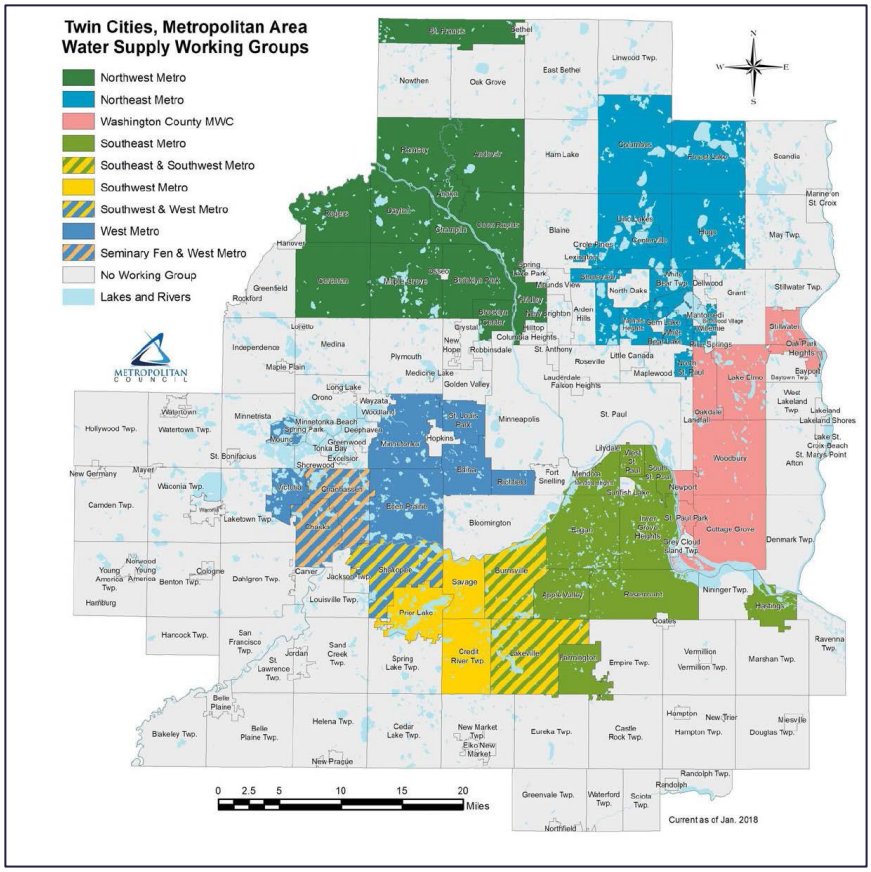

Figure 5.1: Map showing the Twin Cities, Metropolitan Area Water Supply Working Groups. The Northwest Metro workgroup is in dark green and the Northeast Metro workgroup is in dark blue. Source: Metropolitan Council.

1. The northeastern portion of the metro area, which included the Anoka County communities of Centerville, Circle Pines, Columbus, Lexington, and Lino Lakes;
2. The northwestern portion of the metro area, which included Anoka, Andover, Coon Rapids, Fridley, and Ramsey.

The study areas were selected where "communities face potential problems with the long-term sustainability of current water supplies, and where community stakeholders expressed interest in learning more about sustainable water supply options". Each study area was evaluated, and the results were compiled in study area reports. Representatives from the communities within these study areas make up the water supply work groups, shown in Figure 5.1.

Northeast Metro Water Supply Work Group

As previously mentioned, the Northeast Metro Water Supply Work Group includes the Anoka County communities of Centerville, Circle Pines, Columbus, Lexington, and Lino Lakes, along with communities in other counties. The boundary for this group was designed to match the North and East Groundwater Management Area boundary. As part of the Regional Feasibility Assessments, a study was conducted to examine the feasibility of alternative approaches to water supply in the study area. The report on the study, "Regional Groundwater Recharge and Stormwater Capture and Reuse Study – North and East Metro Study Area", was published in May 2016. The report considers alternatives such as the capture and reuse of stormwater to serve non-potable uses and the potential to enhance recharge to local aquifers. The group continues to address the concerns related to the effects of increased groundwater pumping on surface water features and finding a regionally sustainable solution for water supply. In addition to the Regional Feasibility Assessment study, the group has also been involved with the following studies and projects:

- Feasibility Assessment of Approaches to Water Sustainability in the Northeast Metro (December 2014)
- Industrial Water Conservation in the North and East Groundwater Management Area – Project Final Report (February 2016)
- Feasibility Study of Joint Water Utility – Cities of Centerville, Circle Pines, Columbus, Hugo, Lexington, and Lino Lakes (December 2015)
- Characterizing Groundwater and Surface Water Interaction in Northeast Metro Area Lakes, MN (USGS Report, 2016)

Northwest Metro Water Supply Work Group

The Northwest Metro Water Supply Work Group includes the Anoka County communities of Andover, Anoka*, Blaine*, Coon Rapids, Fridley, Ramsey, and St, Francis*, along with other communities in Hennepin County (* indicates inactive members as of December 2019). This group addresses the concern of finding a regionally sustainable solution for water supply. Their recent project is the "Regional Water Supply, Enhanced Groundwater Recharge, and Stormwater Capture and Reuse Study", published in December of 2016, as part of the Regional Feasibility Assessments. The report considers alternatives such as demand reduction through municipal water conservation, the use of surface water sources to meet

drinking water demands, the capture and reuse of stormwater to serve non-potable uses, and the potential to enhance recharge to local aquifers. The group continues to examine the feasibility of alternative approaches to water supply in the Northwest Metro.

Twin Cities Metropolitan Area Master Water Supply Plan

The Met Council began developing the first Twin Cities Metropolitan Area Master Water Supply Plan (Master Water Supply Plan) in 2006 and it was completed in 2010, approved by both the Met Council and the DNR Commissioner. When significant changes in the Met Council's or partners' roles or responsibilities are mandated by legislative actions and/or when our current understanding of water supply issues are changed due to new technical analyses, the Master Water Supply Plan is updated. An update to the Master Water Supply Plan is also triggered with 10-year updates of the Met Council's *Thrive 2040*, the region's 30-year comprehensive plan.

In September 2015, the Met Council updated the Master Water Supply Plan to include new data and information that has been collected since the previous plan was completed in 2010. The following information is new in the 2015 Master Water Supply Plan:

- New population forecasts by Met Council
- Analysis of groundwater and surface water relationships by Met Council
- Mapping of the vulnerability of bedrock aquifers to flow through glacial sediments by MGS
- MDH aquifer tests, which are based on data collected through community source water protection programs starting in 2009
- New DNR surface water and groundwater level monitoring data
- Met Council Water Supply Work group water supply feasibility assessments (discussed in the previous section)
- Metro Model 3 (discussed in Chapter 3)

The core of the 2010 plan, including the rationale for regional water supply planning, goal, guiding principles, key water supply sources and challenge, and statutory roles and responsibilities of the Met Council and partners, remains the same in the 2015 plan.

The Master Water Supply acknowledges that roles and responsibilities related to water supply vary across the metro region, however, they emphasize that all communities can plan for sustainable water supply. In addition, owners of private wells of all sizes can take steps to protect from wellhead contamination and to use water as efficiently as possible.

Water Supply Planning and Community Comprehensive Planning

The DNR and the Met Council are coordinating their efforts to encourage communities to develop a water supply plan that meets both DNR and Met Council standards.

The DNR requires all public water suppliers in Minnesota that operate public water distribution systems that serve more than 1,000 people and/or are located within the seven-

county metropolitan area, such as municipal water utilities in Anoka County, to have a water supply plan according to Minnesota Statute 103G.291 approved by the DNR. The plan must include demand reduction and conservation initiatives.

Per the Met Council, all metropolitan communities that operate a public water supply system must prepare a water supply plan as part of their local comprehensive plans, and these plans must be consistent with the Master Water Supply Plan (MN Statute 473.859, Subd. 2). Along with the local comprehensive plan, communities and utility boards must officially adopt the water supply plan. Planning criteria developed by the DNR and Met Council satisfies the water supply planning requirements of both agencies. Updated community water supply plans are approved by the DNR and Met Council before and during the process of communities updating their local comprehensive plans.

Municipalities and counties within the seven-county metro area maintain current comprehensive management plans according to the Metropolitan Land Planning Act (MN Statute 473.851-.871). Local comprehensive plans are revised and updated on a 10-year cycle. The Met Council oversees and approves comprehensive plans. Local comprehensive and public water supply plans that were updated in 2016 and 2017 last for 10 years; the plans will require updating again in 2026-2027.

The Metropolitan Land Planning Act also requires counties within the metro area to prepare comprehensive plans. The Anoka County Comprehensive Plan is currently being updated. The section of the plan on Intergovernmental Cooperation highlights the water management partnerships discussed in this report. Other sections of the plan include the Anoka County Parks Park System Plan and the Anoka County 2040 Transportation Plan Update.

Water Use and Conservation

The DNR monitors water resources and regulates the appropriation of large quantity uses. During a declared water emergency, the governor has the authority to implement mandatory water conservation measures as detailed in Minnesota Statute 103G.291.

In 2018, surface and groundwater withdrawal by large water supply systems amounted to approximately 43.9 billion gallons in the County, with the majority, 32 billion, drawn from the Mississippi River by Minneapolis and St. Paul water systems at Fridley intake sites. Groundwater withdrawal totaled 11.9 billion gallons with municipal water systems representing the bulk of the volume, 9.8 billion gallons.

A comparison of annual permitted water withdrawal in the County for 1998 and 2018 indicates a 2.2% increase (or 0.25 billion gallons) in groundwater withdrawal. During the same interval, surface water withdrawal decreased by 21% (or 8.4 billion gallons). The increase in groundwater withdrawal during the past 20 years is also indicated in regional studies. Groundwater use is expected to increase on a pace with population growth. Figure 5.2 shows the trend in water use in Anoka County for groundwater, surface water, and total permitted water withdrawal from 1998 to 2018.

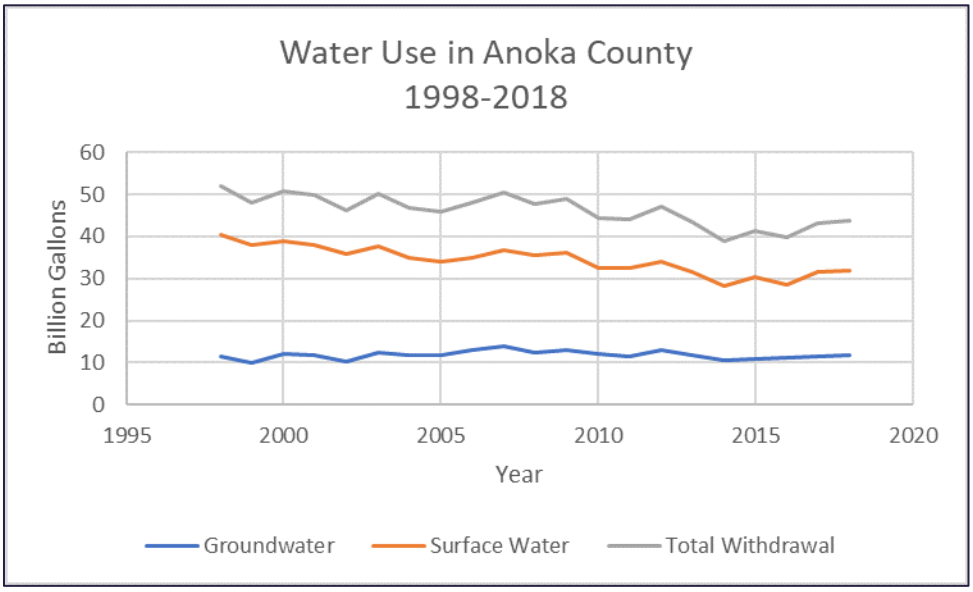

Figure 5.2: Graph showing the water use in Anoka County from 1998 to 2018. Data source: Minnesota Department of Natural Resources Water Use Data.

Table 5.1 – Comparison of Water Use/Appropriation (1998 and 2018) of Municipal-Owned Public Water Systems

	1998	2018	Change (vol.)	Change (%)
Andover	663.3	975.4	+312.1	+47%
Anoka	1140.0	813.5	-326.5	-29%
Blaine	1788.4	2376.9	+588.5	+33%
Centerville	51.6	93.8	+42.2	+82%
Circle Pines	185.0	145.3	-39.7	-21%
Columbus	0.0	16.5	n/a	n/a
Coon Rapids	3001.0	2406.2	-594.8	-20%
East Bethel	0.0	13.4	n/a	n/a
Fridley*	1415.0	1180.1	-234.9	-17%
Lexington	79.3	68.7	-10.6	-13%
Lino Lakes	294.1	508.9	+214.8	+73%
Ramsey	306.0	711.1	+405.1	+132%
Spring Lake Park	321.7	255.3	-66.4	-21%
St. Francis	114.0	197.9	+83.9	+74%

Volumes are in million gallons per year. Data source: Minnesota Department of Natural Resources Water Use Data.

On a regional scale, a shift in water use from surface water from the Mississippi River to groundwater is indicated in a summation of records over approximately 70 years (Figure 5.3). The increasing use of groundwater is the result of growth of communities and well water systems that are not part of the Minneapolis and St. Paul regional water supply systems. Municipal water supplies have constructed high-capacity wells to withdraw groundwater that

is treated and provided to residents and businesses and development has grown out from the urban core.

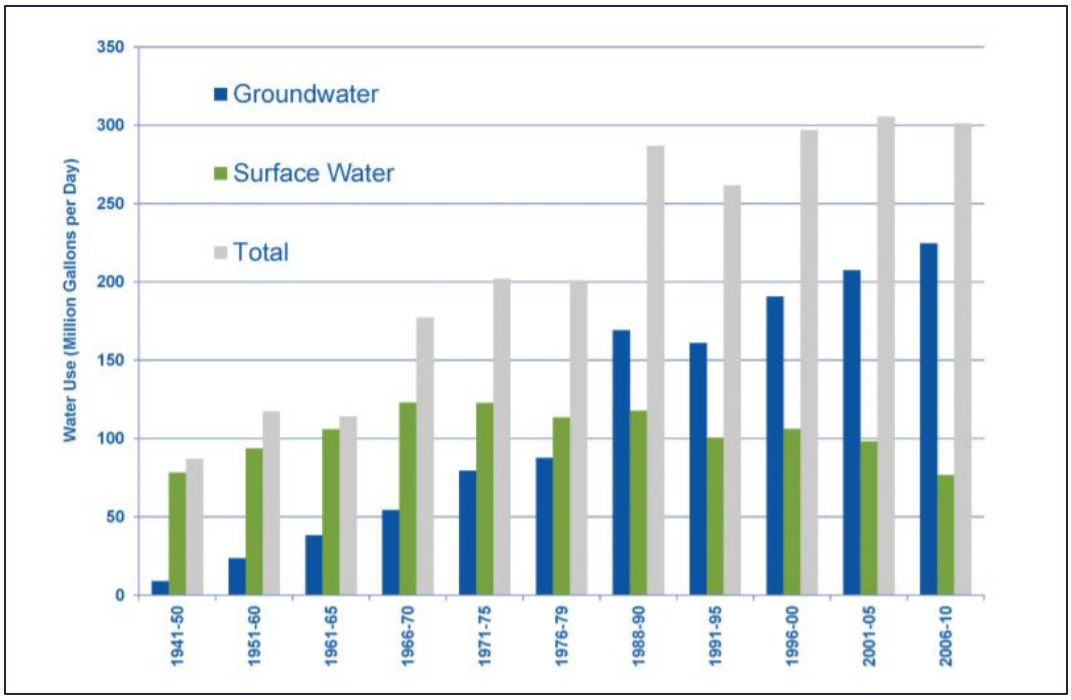

Figure 5.3: Bar chart showing water use changes by decade in the Twin Cities metropolitan area, 1941-2010. Source: Master Water Supply Plan (2015).

The North and East Metro Groundwater Management Area Plan laid out a list of five objectives to ensure that groundwater use is sustainable in the NEM-GWMA. The plan is currently in its fifth of five years and the Project Advisory Team will hold their last scheduled meeting later this year. The future of the biannual meetings and the possibility of updating the plan are uncertain at this time. The DNR will conduct a comprehensive review of the plan and its results to determine future actions. The original purpose of the plan was to establish sustainability goals to help water appropriation permit holders in the NEM-GWMA plan for their future water use.

Anoka County's growth presents increasing demand on local water resources. The Mississippi River and major groundwater aquifers provide safe, reliable, and affordable water to support our quality of life. However, County communities have variable local water resources.

DNR Water Conservation Reporting System

The DNR has begun utilizing its new Water Conservation Reporting System, which is a new water conservation reporting tool to help water suppliers improve their water efficiency and reduce water loss. The new system is a supplement to the online Minnesota Permitting and Reporting System (MPARS), which the DNR transitioned to in 2014. The Water Conservation Reporting System supplements the MPARS annual water use report by collecting annual water conservation data from cities, commercial, industrial, and institutional water users. The system helps to track Minnesota's water conservation success .

Once water conservation use is recorded by users, the system creates a "water conservation report card" that highlights water conservation accomplishments. Users can present this report for planning and budgeting purposes. The report also helps the DNR and others determine the effect of conservation efforts throughout the state. The report compares users' water conservation efforts to the established water conservation goals, rather than to other comparing users to each other, to show what is effective and to encourage water conservation and efficiency. The water conservation goals are:

- Unaccounted for water loss: < 10%
- Residential gallons per capita demand (GPCD) daily: < 75
- Annual % reduction in nonresidential use: > 1.5%
- Trend in total per capita demand: ≥ 1.0
- Total peaking factor: < 2.6

All water appropriation permit holders are being trained and given access to the system by January of their first reporting year in phases from 2018 through 2021. Public water suppliers serving more than 1,000 people were due to report by March 30, 2018 and will report by March 30 every year moving forward. Commercial, industrial, and institutional sectors were due to report by March 30, 2019 and will report by March 30 every year moving forward. Public water suppliers serving less than 1,000 people will first report by March 30, 2020 and will report by March 30 every year moving forward. Lastly, other water use sectors will first report by March 30, 2021 and will report by March 30 every year after.

The 2019 Minnesota Water Conservation Report for Large Water Suppliers and Commercial, Industrial, and Institutional permittees for the 2018 year revealed:

- 94% of the invited water suppliers (348) submitted data
- A water loss of 8.4%, a 0.48% improvement from the previous year and meeting the conservation goal of 10% or less
- 92% met the water conservation goal of 75 GPCD
- 80% met the peaking factor water conservation goal of 2.6
- 7,679 customer water conservation projects around the state, saving over 52 million gallons of water
- More than 40% of the commercial, industrial, and institutional water appropriation permittees completed the report.

The DNR Water Conservation Reporting System will assist in identifying trends in water use efficiency and conservation efforts over time with year-to-year data. The system also allows water users to learn from each other about effective water efficiency and conservation strategies, which help them minimize water loss. Many permittees are realizing the benefits of the web-based water conservation tracking and reporting, even though it is not directly required by Statute.

Water Reuse as a Conservation Strategy

As previously discussed in Chapter 4, water reuse can be defined as "the capture and use of stormwater, wastewater and subsurface water to meet water demands for intentional and beneficial uses". In areas of the country like Minnesota, treated drinking water is often used for urban irrigation, which drives peak summertime demands. Capture, retention, and reuse of stormwater, wastewater, and subsurface water has the potential to reduce groundwater withdrawals and demands for treated potable water supplies. As there are limits to water resource supplies, the need for more efficient use of water has begun to be explored. Interest in water reuse has rapidly increased in the past decade.

Specific studies, described in Chapter 4, determined that 73% of the identified high-volume, non-potable groundwater users had the potential to alternatively capture and reuse stormwater instead of withdrawing groundwater. The DNR's Minnesota Water Conservation Report 2018 states that 13 water use projects reported by utilities resulted in a water savings of 74,925,501 gallons in 2017. This figure is an estimate, as gallons saved due to the installation of projects for stormwater management purposes were not reported. In addition, 7% of utilities reported having an ordinance related to "permit storm water irrigation or reuse".

Met Council's Water Efficiency Potential Project

The Met Council worked in cooperation with CDM Smith consultants to assess the economic benefits to water efficiency programs for growing communities in the Twin Cities, focused on residential water efficiency for communities that rely on groundwater as their primary source of water. The Met Council and CDM Smith consultants worked with 15 metro communities to conduct an initial economic analysis of their water use efficiency programs. The results showed economic benefits to utilities when applying efficiency measures. Where the utility fully covered the cost of the measures, financial gain was realized by 14 of the 15 communities and, in total, 21 wells were eliminated for the communities, saving $20.7 million. Where the utility covered half of the cost of the measures, financial gain was realized by all 15 communities and, in total, 22 wells were eliminated for the communities, saving $26 million.

These results are for various combinations of efficiency measures, so results can vary based on which efficiency measures a community implements. In addition, a set of assumptions were used for the analysis. Therefore, a Water Efficiency Potential Tool was created for individual communities to estimate their potential savings by entering community-specific information. Overall, the analysis concluded that growing communities, like many in Anoka County, have the potential to save millions of dollars by finding efficiency measures geared toward outdoor irrigation. Due to rapidly increasing lawn irrigation systems, the summer to winter monthly water demand ratio, or peaking factor, is also increasing. This increase results in the need for communities to construct new water supply wells. By implementing efficiency measures, communities can eliminate and/or delay water supply well installations.

Public Water Supply

A public water supply (PWS) serves piped water to at least 25 people or 15 connections for at least 60 days annually and may be publicly or privately owned. A PWS is further classified as a community or noncommunity PWS, which is essentially based on whether it serves people in their homes or in places where they work, gather, and play. Noncommunity PWSs provide water to people outside their places of residence. If a PWS serves at least 25 of the same people over 6 months of the year, it is considered a non-transient noncommunity PWS. If a PWS serves at least 25 people at least 60 days of the year but does not serve the same 25 people over 6 months of the year, it is considered a transient noncommunity PWS. A restaurant or hotel is typically a transient noncommunity PWS, while a larger office building, day care, or school is typically a non-transient noncommunity PWS.

There are nearly 7,000 PWSs throughout Minnesota. In the County, there are 252 PWSs, with 47 transient noncommunity PWSs that supply water to food and lodging establishments licensed by PHES. The County oversees the MDH drinking water protection program at these 47 transient noncommunity PWSs with County food and/or lodging licenses. The program consists of an annual site visit and sampling, along with a full sanitary survey of the water system once every three years.

Table 5.2 – Public Water Supply Wells in Anoka County

PWS Classification	Ownership	Examples of Consumers
Community 31 systems	Municipal (17)	City water utility customers
	Individual/Business (13)	Apartments & mobile home parks
	State of MN (1)	Lino Lakes correctional institution
Noncommunity Nontransient 38 systems	Individual/Business (15)	Shopping malls and office buildings
	Organization (23)	Schools and churches
Noncommunity Transient 183 systems	Licensed by PHES (47)	
	Other (136)	
252 Systems		

Data source: Minnesota Drinking Water Information System (MNDWIS), December 2019.

Regardless of whether a PWS's drinking water source is a well or surface water intake, such as the Mississippi River, the method for classification of the system applies equally. Even those who have private wells in their home still rely on public suppliers for their drinking water at school, work, places of worship, or while travelling.

Drinking Water Protection and Source Water Protection

Protection of public water supplies has expanded from the original 1974 Safe Drinking Water Act program that focused on routine tests to determine if a water supply remains safe to drink. The MDH Source Water Protection program addresses pollution before it reaches the public

water system through source water assessments, wellhead protection, and protection of surface water intakes.

Large public water suppliers (those serving over 1,000 people) are required to prepare an annual Consumer Confidence Report, commonly referred to as a water quality report, for their customers. The report tells consumers where their drinking water comes from, what's in it, and how they can help protect themselves and their water system.

Source water protection addresses pollution before it contaminates a PWS. A Source Water Assessment (SWA) provides basic information specific to each PWS:

- A description of the water source(s) used by the PWS,
- Determination of the susceptibility of the water sources to contamination, and
- A list of potential contaminant sources that could impact the water supply.

A SWA should not be confused with a wellhead protection plan. Where a SWA determines the susceptibility of the water system to contamination, a wellhead protection plan seeks to reduce the threat to the water system. SWAs have been completed for each community PWS in the County.

Wellhead Protection

Wellhead protection addresses threats to public water supply wells by inventorying potential contamination sources within a wellhead protection area that contributes water to the well. The public water well operator prepares a wellhead protection plan and carries out activities to protect the water supply. Community and nontransient noncommunity public water supplies are required to prepare a wellhead protection plan. It is recommended that transient noncommunity public water supplies prepare a wellhead protection plan, but it is not required.

In 1997, the County entered into a Joint Powers Agreement (JPA) with 10 communities (Anoka, Blaine, Centerville, Circle Pines, Coon Rapids, Fridley, Lexington, Lino Lakes, Ramsey, and Spring Lake Park) to form the Anoka County Municipal Wellhead Planning Group.

PHES cooperated with the municipal members of the group to prepare their wellhead protection plans in a coordinated and cost-effective manner. With their wellhead plans completed, many members of the group reorganized themselves to jointly implement the common elements of their plans.

In 2010, the County and the municipalities of Anoka, Blaine, Centerville, Circle Pines, Fridley, Lexington, Lino Lakes, and Spring Lake Park entered a new JPA and formed a new group called the Anoka County Municipal Wellhead *Protection* Group (ACMWPG). The ACMWPG cooperatively implements the projects that benefit all members while reducing the costs to each city.

On July 15, 2014, Andover Public Works joined the ACMWPG to better coordinate the City's drinking water protection program with neighboring communities and the County and State health departments. Coon Rapids, Ramsey, and St. Francis have also since joined the ACMWPG, and the communities of Columbus and East Bethel have recently expressed interest in joining. The County continues to support this group by facilitating the coordination of their wellhead protection activities with County and State agencies.

Private Wells

It is estimated that there are 25,000 private water supply wells currently in use in the County. The Minnesota Well Code establishes minimum standards for the location and construction of public and private water supply wells. A private well is tested by the well contractor after completion to ensure the water is safe to drink. After this initial test, the owner must maintain the well in good condition and perform periodic water tests to monitor the safety of their drinking water.

Private water systems that serve licensed in-home day care and foster care establishments are required to submit water samples that are reviewed by PHES. Since 1973, PHES has provided water testing services to County residents. In addition, PHES maintains a citizen well testing program to encourage private well owners to protect their well and groundwater source through education and consultation services. Each year during the first week of May, PHES holds the Well Water Wise promotional week to encourage private well owners to test their wells by offering extended sample drop-off hours.

The PHES water testing program has received over 20,000 water samples for private wells, which are maintained in a database index. In 2019, PHES performed 636 sanitary analysis tests, which analyzes for total coliform, *E.coli*, and nitrate-nitrogen, for residents, and 258 analyses for various metals.

Table 5.3 – 2019 Private Water Well Test Results

Sanitary Analysis Tests (636 tests)			
Sanitary Analysis (MCL: Present)		Nitrate Nitrogen (MCL: 10.0 mg/L)	
Absent	500	Less than 1.0 mg/L	563
Present	136	1.1 – 9.9 mg/L	43
		Greater than 9.9 mg/L	5
		Not requested	25
Other Water Testing Parameters			
Arsenic (MCL: 10.0 ug/L)		Manganese (MCL: N/A)	
Less than 10.0 ug/L	49	Less than 0.100 mg/L	76
10.0 mg/L or greater	11	0.100-0.299 mg/L	24
		0.300 mg/L or greater	26

Surface Water Supply

The Mississippi has been the sole source of water to the City of Minneapolis for over 125 years. The City of St. Paul draws from the Mississippi as well. The Mississippi River supplies Columbia Heights and Hilltop municipal water distribution systems that wholesale purchase their water from the Minneapolis Water Works facility.

St. Paul Regional Water Services obtains its water from the Mississippi River appropriated from the Rice Creek Chain of Lakes, Centerville Lake, and tributaries. There are also 10 deep wells that serve as a backup water supply system. SPRWS serves the City of St. Paul and supplies water, wholesale and retail, to 9 adjacent communities.

The mean annual discharge, or flow, of the Mississippi River is 8,572 cubic feet per second (cfs), or 64,123 gallons per second, and represents a significant water resource to the County communities and the region. The lowest mean monthly discharge recorded for the Mississippi River was 715 cfs, or 5,348 gallons per second, in August of 1934. County communities are fortunate to have the Mississippi River nearby that can provide large volumes of water. Other surface water bodies in the County could not support sustained withdrawal for public water supply.

The City of Ramsey has determined that its local groundwater resources may not be sufficient to meet future demand. Ramsey has investigated the option of using the Mississippi River to supplement its system of well, both on its own, as well as in coordination with the neighboring communities of Corcoran, Dayton, and Rogers (Hennepin County). The DNR requires Ramsey, as well as Coon Rapids, Columbus, East Bethel, and St. Francis, to monitor the impact of their water wells on groundwater and surface water features by reporting groundwater level data as part of their DNR water appropriation permits. The Met Council has indicated that groundwater withdrawal in some parts of Anoka County will increasingly affect surface water features such as lake levels. A detailed investigation can determine the optimum location and design of a multi-community surface water system in the County.

Groundwater Supply

It is generally accepted that shallow, or water table, groundwater and surface water features are hydrologically connected in the County. The extent of the hydrologic interactions between surface, water table, and deeper aquifer units has not been determined conclusively.

Southern communities in the County possess bedrock aquifers that are either absent or reduced in thickness in middle in northern communities. The northern 2/3 of the County do not possess the Prairie du Chien-Jordan bedrock aquifer, the regions principal groundwater source for municipal wells.

Recent geologic and hydrologic investigations have indicated that surface water and shallow and deep groundwater may be impacted by land and water use in the middle and northern developing areas of the County. These impacts include lowering of the water table and

surface water features and the infiltration of pollution into deeper aquifers resulting from increased groundwater withdrawal by deep, high capacity wells.

The DNR has expressed concern regarding the effects of increasing groundwater withdrawal, in Blaine, Ramsey, and Andover on surface water levels and groundwater sustainability, as forecasted population growth is expected to be concentrated in these communities. In addition, the Met Council and the Rice Creek Watershed District have indicated concern that increased groundwater withdrawal has the potential to impact surface water features.

Additional information and investigation of groundwater is necessary to develop an understanding of the threshold volume that groundwater may be appropriated in the areas in the County.

CHAPTER 6 – CONCLUSIONS AND RECOMMENDATIONS

Local water resources are key to Anoka County's (the County) future. The quality and sustainability of the County's water resources impacts the health of its residents and its economic future. A sustained and adequate supply of safe water is critical to support the County's growing communities.

Oversight is key in maintaining local water resources that are adequate to support a healthy community and strong economy. The County's oversight is achieved by monitoring water resources and maintaining a collaborative approach to management with State and local agencies. State programs establish water management priorities and goals. Local agencies play a significant role in achieving local water management goals by managing development, land use, environmental protection, and natural resources. In all respects, local agencies support the County's goal of maintaining an environment that benefits the public's health, safety, and welfare.

Determining the adequacy of water management programs to support public health is an oversight function of the County. To achieve the mutual goals of State and local agencies, the Anoka County Board of Commissioners directed the PHES Department to prepare the Water Resources Report, which was to be updated concurrently with and incorporated into the Community Health Assessment and Planning process starting in 2009. As of 2019, water resources are not identified as a priority concern in the Community Health Improvement Plan. Therefore, the Water Resources Report is no longer required or incorporated into the plan. However, the PHES Department is committed to continue to update the Water Resources Report every five years to ensure continued monitoring of the County's water resources.

Issues and New Developments

The Anoka County Water Resources Management Task Force has identified several emerging issues and new developments relating to water resources in the County. Increasing development in the County has the potential to increase the amount of water that is used, resulting in concern over water quantity. The North and East Metro Groundwater Management Area was established by the DNR and is discussed throughout the report. In addition, the Prairie du Chien-Jordan aquifer, a major regional aquifer, is not present in the western and northern two-thirds of the County. Increasing water demand in the County's growing communities has resulted in cities drawing groundwater from other aquifers that hold less water. The DNR and Met Council have expressed concern that development and increasing water demand in Andover, Blaine, and Ramsey may exceed their groundwater resources to sustain both human and ecological needs. Although water use trends are not showing an overall increase, as discussed in Chapter 5 and as shown in Figure 5.2, water quantity remains an emerging issue for the County as population and development continue

to increase. Conservation efforts are increasingly important for public water supplies and individual water users alike. The data in Table 5.1 – Comparison of Water Use/Appropriation (1998 and 2018) of Municipal-Owned Public Water Systems can be used as a reference when triaging water efficiency actions, education and outreach efforts, and other actions. The Task Force will continue to monitor developments in the North and East Metro Groundwater Management Area and the developing issue of groundwater sustainability.

Due to encountering limits to its use of local groundwater, the City of Ramsey has investigated and prepared preliminary plans to draw and process drinking water from the Mississippi River in coordination with the neighboring communities of Corcoran, Dayton, and Rogers (Hennepin County). Additional information on this topic can be found throughout this report. At the time of the development of this report, the city was still awaiting the results of a feasibility study conducted with the Met Council.

Another emerging issue identified by the Task Force is runoff pollution. On the whole, the natural quality of the County's water resources supports a healthy population. Some lakes, rivers, and streams have been designated as impaired, due to impacts of various contaminants. Contamination of private and public drinking water supplies has been observed in some areas of the County. The source of surface water quality impairments and drinking water contamination is from either old pollution sources, such as landfills, or from non-point source pollution, such as runoff into ditches, streams, and infiltrating groundwater. The State of Minnesota and Anoka County agencies have addressed point source pollution. The cumulative impact of non-point source pollution from homes, lawns, driveways, parking lots, streets, septic systems, pet waste, and the like challenges communities to find an innovative non-regulatory approach.

The 5-year NPDES MS4 Permit update is due in 2020. The permit is discussed in detail in Chapter 4. The updated permit includes more requirements, including those pertaining to education and outreach, as well as documentation. Currently, the MPCA is reviewing comments submitted by local MS4 agencies, who have expressed concerns. These concerns include increased fees, regulation, and reporting. The Task Force will continue to monitor the developments of the update to the permit, along with developments in stormwater management and implementation of pollution prevention programs that include seeking opportunities for State and local agency collaboration to enhance the sustainability of water resources and the protection of water quality.

Many communities are modifying their stormwater management programs to include rainwater harvesting and stormwater reuse. Water reuse can be defined as "the capture and use of stormwater, wastewater and subsurface water to meet water demands for intentional and beneficial uses". As there are limits to water resource supplies, the need for more efficient use of water has begun to be explored. Water reuse offers multiple benefits, such as managing stormwater, in addition to reducing surface and groundwater use, and interest in water reuse has rapidly increased in the past decade. The Task Force will continue to monitor developments in the issue of water reuse.

Contaminants of emerging concern (CECs) will continue to be an issue for the entire state. MDH collaborates with partners and the public to identify contaminants of interest through their CEC initiative. At any given time, there are hundreds of CECs identified as contaminants of interest. Each year, MDH selects some of these contaminants to investigate their health risk and exposure potential. They then inform their partners and the public of appropriate actions that can be taken to prevent pollution and to reduce exposure to contaminants that might be unhealthy. Some contaminants are also selected for special projects to investigate them further. The Task Force will continue to monitor CECs and nominate any contaminants suspected to be of concern in the County that are not already on the list.

Some County communities have experienced pricing increasing because of conservation efforts, which is a cause for concern for many residents. In general, as discussed in Chapter 5, conservation efforts can save water supply utilities money in the long-term. Further attention should be given to the issue of conservation practices and costs for water consumers. The Task Force will continue to monitor this issue across the County.

Changes in precipitation patterns result in higher risk of localized flooding, as well as drought. In regard to this issue, FEMA, the Federal Emergency Management Agency, has revised their floodplain maps, but updated maps for Anoka County are still in the works. The National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation data is now the standard used locally by engineers in designing stormwater best management practices. The Task Force will continue to monitor changes in precipitation patterns and the resources that are available to communities to adapt to these changes.

In addition to these issues and new developments, the Task Force will continue to monitor developments in the One Watershed, One Plan project and developments of the Northeast and Northwest Metro Water Supply Work Group projects. The Task Force has also identified opportunities for local agencies and organizations to:

- Enhance the protection of groundwater through the sealing of abandoned wells;
- Enhance the protection and sustainability of local water resources by cooperating with the DNR to locate unpermitted water appropriators and encourage efficient use through outreach, education, and local land use management programs; and
- Enhance the protection and sustainability of their water resources by establishing, or collaborating in the establishment of, a county-wide or regional program to encourage pollution prevention and sustainable water use practices by residents and businesses.

Recommendations

The Task Force has identified four primary recommendation categories for the continued management of water resources within the County:

1. Continue coordinated water management programs
2. Continue county-wide water education programs
3. Source water protection
4. Drinking water protection

Continue Coordinated Water Management Programs

Water programs of State and local agencies focus on specific protection and management issues. A comprehensive approach, by local agencies, can address how these programs may cooperate to achieve mutual goals in water resources management in Anoka County. The Anoka County Board of Commissioners has approved the PHES Department to conduct water resources assessment and planning under Minnesota Statutes Chapter 145A.

Recommendations:

- Continue updating the Water Resources Report every five years, even though it is no longer a requirement for the Community Health Assessment and Planning process.
- Maintain the Task Force that meets a minimum of twice yearly to review, update, and coordinate the efforts and information of organizations and their agencies to manage local water resources.
- The Task Force will monitor current and emerging water resource issues to identify opportunities for collaboration in implementing programs that enhance the management of local water resources and protection of human health and ecosystems. The Task Force should also identify and assess gaps in the management of water resources, finding opportunities or making recommendations to address significant gaps.
- Through multi-agency collaboration, many water management goals can be accomplished more efficiently and effectively than what a single partner could do alone. Partnerships like the Anoka County Water Resource Outreach Collaborative that are organized in this way result in more consistent messaging for residents and reduced duplication of effort.
- Participate in One Watershed, One Plans that seek to focus the combined resources of local entities and State dollars onto the regionally most important water projects.
- The Anoka County PHES Department supports the above activities as part of the Department's assessment and planning activities.

Continue County-Wide Water Education Programs

The numerous community-based conservation and environmental education initiatives addressing specific issues such as stormwater pollution prevention, wellhead protection, and lake and shoreland protection will have a greater impact with coordinated efforts.

Recommendations:

- Facilitate the development of partnerships to coordinate and enhance the numerous community-based natural resources and environmental programs. The Anoka County Water Resource Outreach Collaborative is a crucial partnership in this regard. The PHES Department and the Task Force will continue to participate in and support the collaborative. This includes supporting the investigation of funding for the WROC coordinator position.
- Utilize work groups of technical and education professionals to develop and deliver informational messages.

- Use existing data and resources, such as Table 5.1 – Comparison of Water Use/Appropriation (1998 and 2018) of Municipal-Owned Public Water Systems, to target education messaging. Due to the sandy soils in most of Anoka County, special efforts should be made to reduce outdoor water use, reduce waste, and improve water use efficiency.
- Maintain the *Know the Flow* website (www.KnowtheFlow.us) to provide a water resources information and outreach project. This website supports County agencies, cities, WMOs, lake improvement districts, and other organizations that promote protection and sustainable management of water resources.
- Continue participating on the Metro Area Children's Water Festival planning team and continue to send at least two PHES employees to volunteer at the festival each year.
- The PHES Department may consider action to secure grant funding for facilitation of a coordinated approach to conservation and environmental education outreach.

Source Water Protection

Quantity and quality of local source water remain priority issue areas in regard to water resource protection. The potential of insufficient water to sustain increasing demand has resulted in concern and desire to improve understanding of local natural resources. Potential contamination due to unsealed unused wells remains a concern as well.

Recommendations:

- Monitor and promote best practices and other sustainability and conservation efforts recommended by partners to be in tune with current trends in sustainability.
- Support other groups that are working on the issues of sustainability and conservation.
- Continue to monitor the North and East Metro Groundwater Management Area planning and evaluation process.
- Identify opportunities to cooperate with the DNR in locating and educating unpermitted water appropriators through local land use and environmental programs.
- Identify opportunities to encourage County residents and property owners to locate and seal abandoned wells through education, citizen engagement, and financial assistance.

Drinking Water Protection

The protection of public water supply wells, municipal and privately owned, continues to be a priority of communities, water system operators, and MDH. Over 250 public water supply systems provide drinking water to a majority of the County's residents and businesses, including 47 food and beverage establishments and hotels licensed by the PHES Department. The PHES Department is facilitating the joint implementation of common elements of municipal wellhead protection plans of the Anoka County Municipal Wellhead Protection Group.

Recommendations:

- PHES will continue to support and facilitate the cooperative wellhead protection efforts of the Anoka County Municipal Wellhead Protection Group and encourage communities not part of the group to participate.
- PHES will continue the inspection and testing of public water supplies serving County-licensed food and lodging establishments.

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APPENDIX A - AUTHORITY AND RESPONSIBILITY FOR WATER RESOURCES MANAGEMENT

Water governance in Minnesota is summarized broadly in Figure A1. The rest of this appendix expands on the authority and responsibility for water resources management in Anoka County.

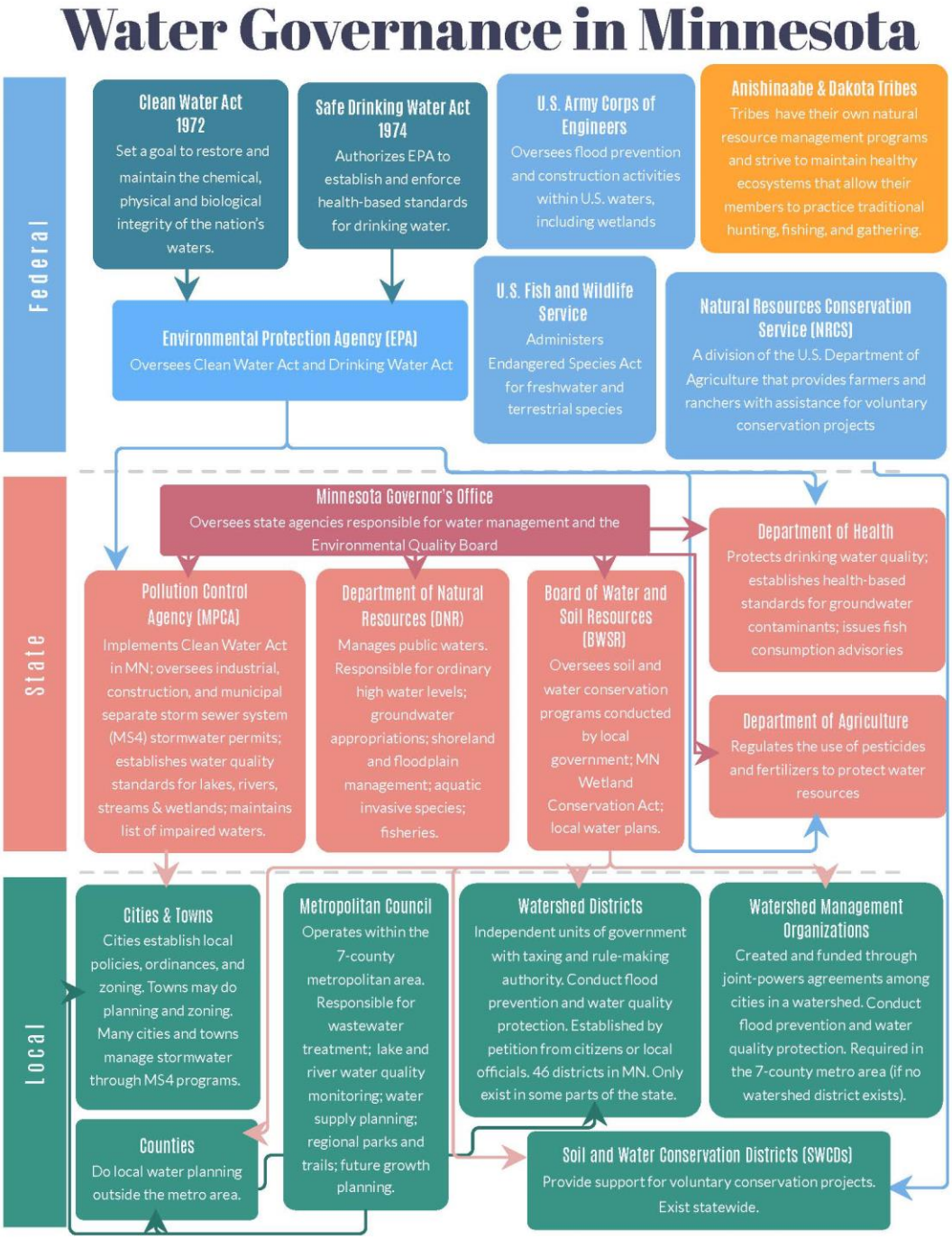

Figure A1: Water Governance in Minnesota flowchart. MPCA contracted with the East Metro Water Resource Education Program to create this flowchart.

Federal Government Agencies

The Environmental Protection Agency (EPA) is the dominant Federal agency addressing water resources protection. On a limited scale, the U.S. Army Corps of Engineers also has some regulatory responsibilities of wetlands and navigable waters. Other Federal agencies supporting water resources protection include the U.S. Geological Survey (USGS) and the U.S. Department of Agriculture (USDA) through research and technical assistance. In Minnesota, Federal water resources protection and contamination response has primarily been delegated to the State.

State Government Agencies

The State of Minnesota has divided water resources activities into a complex arrangement of multi-agency involvement. Although such organization recognizes that water resources quality and quantity have a wide variety of effects and uses, it does create a complicated management system. Minnesota's organizational approach allows separate agencies to manage water resources activities beneficial to their specific area of interest.

A majority of the EPA's statutory responsibilities and regulatory programs for water resources protection have been delegated to three State agencies: The Department of Natural Resources (DNR), the Department of Health (MDH), and the Pollution Control Agency (MPCA). There are several other State agencies involved in some aspect of supporting water resources protection, including the Minnesota Department of Agriculture (MDA) and the Board of Water and Soil Resources (BWSR). As an example of the division of responsibility for water resources management, Figure A2 lays out the roles of various State agencies in groundwater. See Table A1 for further clarification on the roles of various State agencies relating to water resources management.

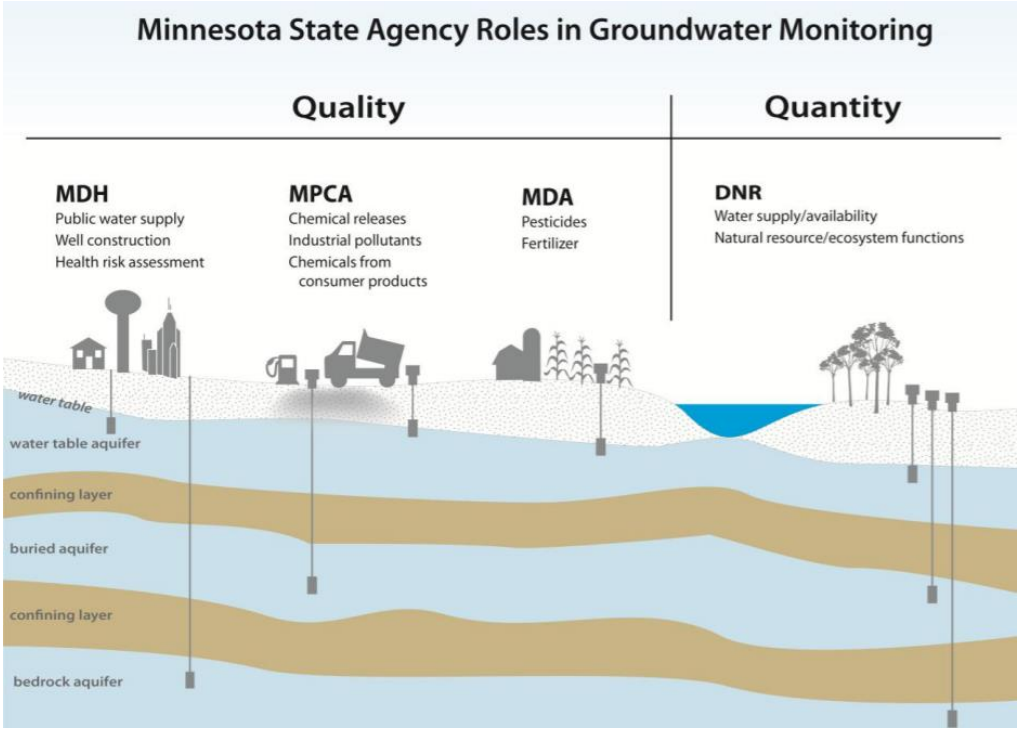

Figure A2: State agency roles in groundwater monitoring. Source: Minnesota Department of Natural Resources.

Regional Government

The Metropolitan Council (Met Council) is the regional planning agency serving the Twin Cities seven-county metro area and providing essential services to the region. The Met Council works with local communities to provide: solid waste comprehensive planning (MN Statute 473.149); the Metro Transit regional transportation system; metro wastewater treatment facilities; guidance for coordinated growth; affordable housing opportunities; planning, acquisition of, and funding for a regional park system and trails; and a framework for implementation of regional systems including aviation, transportation, parks and open space, water quality, and water management.

The Met Council reviews all metro area county and municipal plans, including any long-term plans determined to have an area-wide effect, a multi-community effect, or a substantial effect on metropolitan development (MN Statute 473.165). The Met Council's mission is "to foster efficient and economic growth for a prosperous metropolitan region". Their core mission also includes "efficiently operating transit, wastewater treatment services, and administering housing assistance programs for households with low incomes".

The 2005 Minnesota Legislature directed the Met Council to "carry out planning activities addressing the water supply needs of the metropolitan area" (MN Statute 473.1565). Specifically, the Council is charged to develop a base of technical information, prepare a report to the Legislature about metropolitan water supply that is updated every five years, and prepare a metropolitan area master water supply plan. The legislation also established a Water Supply Advisory Committee to assist the Met Council in its initial planning activities. The report was submitted to the Legislature in January 2007. The Metropolitan Area Master Water Supply Plan was updated in 2015, is included in the Minnesota Water Plan (MN Statute 103B.151) and is implemented through the Council's comprehensive plan guidance and review process (MN Statute 473.851).

Local Government

Federal laws mandate or encourage state government to participate in programs such as public wellhead protection and surface water management to enhance water resources management and protection. Involvement of local government in water resources management has evolved in much the same manner. Some local programs have been mandated into existence while other programs have been voluntarily created. Local water management authorities and agencies include watershed management organizations (WMOs), cities and townships, Anoka County, University of Minnesota Extension-Anoka County, and the Anoka Conservation District (ACD). These organizations and agencies are discussed in Chapter 1 and in Table A1.

Table A1: Governmental Water-Related Responsibilities

FEDERAL AGENCY	RESPONSIBILTIES
Environmental Protection Agency	- Set safe drinking water standards - Set solid and hazardous waste storage and disposal standards and oversee state regulation - Oversee state administration of sewage and industrial waste discharge and approve wastewater treatment construction grants - Oversee administration of “superfund" - Register pesticides and oversee state regulation of pesticides
U.S. Department of Agriculture	- Conservation Reserve Program - Environmental Quality Incentives Program - Resource Conservation and Development - Watershed Protection and Flood Prevention - Wildlife Habitat Incentives Program - Support local soil and water conservation programs
U.S. Geological Survey	- Conduct hydrological research - Assist state and local governments with water resource planning
U.S. Army Corps of Engineers	- Construct dams and control flooding on navigable waters - Regulate construction and other works on navigable waters - Regulate filling of wetlands
Federal Emergency Management Agency	- Disaster response activities - Floodplain and flood hazard mapping

STATE AGENCY	RESPONSIBILTIES
MN Department of Natural Resources	- Issue water appropriations permits - Issue permits for works in protected waters - Inspect dams - Manage wetlands - Regulate shoreland development - Maintain fish and wildlife habitats - Monitor and maintain Minnesota’s water resources - Monitor surface and groundwater levels - Monitor water conservation efforts (Minnesota Water Conservation Reporting System)
MN Pollution Control Agency	- Develop standards and issue permits for municipal sewage and industrial waste treatment and discharge - Administer State and Federal wastewater treatment plant construction grants - Regulate solid and hazardous waste storage and disposal - Monitor surface and groundwater quality - Administer State and Federal “superfund” laws

	- Regulate cleanup of leaking underground storage tanks
MN Department of Health	- Monitor and analyze public water supplies - Approve treatment of contaminated public water supplies - Establish/enforce water well construction code - Evaluate health risks with contaminated water supplies - Record sealing of unused wells
MN Department of Agriculture	- Administer erosion and sedimentation control programs (Soil and Water Conservation Board) - Monitor water used for dairy and food processing - Regulate pesticides and fertilizers
MN Planning/Environmental Quality Board	- Facilitate environmental planning and coordination among agencies - Maintain database and provide technical support to agencies - Responsible for comprehensive state water plan
MN Board of Water and Soil Resources	- Establish watershed districts - Approve local water management plans - Resolve disputes involving water issues
Minnesota Geological Survey	- Conduct geological research to assist in water resource planning - Maintain groundwater database
MN Department of Transportation	- Monitor water pollution from bridge or road construction - Regulate transportation of hazardous materials
MN Department of Public Safety	- Provide emergency water supplies - Hazardous Materials Team – disaster control

REGIONAL/LOCAL AGENCY	RESPONSIBILTIES
Metropolitan Council	- Facilitate water resource planning in the metropolitan area - Devise and implement regional planning in the metro area - Coordinate and manage regional sewage treatment and discharge (Metro Waste Control Commission)
Municipalities	- Provide and treat public water supplies - Manage sewage treatment and disposal - Regulates land use and development - Implement wellhead protection plan (if have a public water supply)
Watershed Management Organizations	- Comprehensive local water planning in the metropolitan area - Manage projects to control flooding, conserve water, and protect or improve water quality
Anoka Conservation District	- Provide assistance to local governments and residents with water quality improvement, habitat, and other conservation projects - Water condition monitoring, including water levels at DNR groundwater observation wells
Anoka County Public Health and Environmental Services	- Plan for the environmental health and protection of residents - Regulate floodplain and shoreline development in townships - Regulate water supply at public facilities

	- Regulate and monitor solid waste disposal - Regulate hazardous waste generators and facilities - Record the status of wells (abandoned and active) on properties - Provide well water testing program for private wells
UMN Extension – Anoka County	- Education and outreach programs for: water quality initiatives, safe drinking water and wells, septic system maintenance, family finances, and wise agricultural and garden chemical use

APPENDIX B – TASK FORCE MEMBERSHIP

Local Members
League of Women Voters
Public Representatives
Realtors (St. Paul Area Association of Realtors)
Well Contractors (EH Renner & Sons Well Co.)

Municipal Members
City of Andover
City of Anoka
City of Blaine
City of Fridley
City of Lino Lakes
City of Ramsey

Watershed Management Organization Members
Coon Creek Watershed District
Lower Rum River Watershed Management Organization
Rice Creek Watershed District

County-Level Members
Anoka County Environmental Services
Anoka Conservation District
Anoka County Highway Department
Anoka County Library
Anoka County Parks
Anoka County Water Resource Outreach Collaborative
University of Minnesota Extension-Anoka County

State-Level Members
Minnesota Board of Water and Soil Resources
Minnesota Department of Health
Minnesota Department of Natural Resources
Minnesota Geological Survey