RURAL WATER ISSUES

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Acronyms and Abbreviations

Environmental Services – Metropolitan Council Environmental Services
Metro region – Seven County Twin Cities Metropolitan Area
Met Council – Metropolitan Council

Policy research approach

The Metropolitan Council (Met Council) is charged by state statute to develop plans for the growth and economic development of the seven-county Twin Cities metropolitan area (metro region). Publications like the metropolitan development guide (***Thrive MSP 2040***) and associated system plans, including the ***Water Resources Policy Plan***, are the primary vehicle for us to share our vision and goals for the region. They are updated every ten years but have a twenty-five-year planning horizon to allow for long-term development of the region. Each iteration of regional planning builds upon the previous effort while adjusting our actions, policies, and vision to address current issues, mitigate future risks, and optimize regional opportunities.

The 2050 Water Resources Policy Plan, like the 2040 plan before it, will be an integrated plan that supports our core mission to operate and manage the regional wastewater system, provide water supply planning, and provide surface water planning and management throughout the region. It will serve as our guide to address issues affecting our waters and to protect these resources for future generations.

This research paper is part of a series investigating current and future water concerns for the metro region. Together, these papers will inform our 2050 Water Resources Policy Plan. The paper topics are:

- Protecting source water areas
- Rural water concerns
- Water and climate
- Water availability, access, and use
- Water reuse
- Water quality
- Wastewater concerns

The project intent is to share our current understanding of issues, identify current policy connections or gaps, and propose future policies and strategies to ensure sustainable water resources. Not all the recommendations included in the papers will move forward for inclusion into the Water Resources Policy Plan, and conversely, the Water Resources Policy Plan may include policies not discussed in these papers. The intent is to begin to develop a shared understanding and conversation about topics that are connected to all aspects of our core services.

Research paper topics were investigated using three core principles:

- **One Water, integrated water management:** The metro region is water-rich, and that water holds immense value. Integrated water management, also known as "One Water," addresses water as it moves from water supply, through wastewater systems and into surface waters. The ultimate goal of integrated water management is sustainable, high-quality water in the region.
- **Use existing systems:** The metro region has a robust water planning and wastewater operations system with many actors – community water and wastewater utilities; watershed management organizations; and regional, county, state, and federal agencies. Coordination and collaboration between these groups is necessary to protect our water for future generations.
- **Metric-based policies:** It is hard to quantify policy success without accountability. We will provide policy options with associated metrics and measurable outcomes, where possible, to demonstrate the effectiveness of our water policies and actions.

Introduction/Background

Land use and land use changes impact water quantity and quality. Rural water issues are complex. While rural areas are important for natural resource protection and groundwater recharge areas for drinking water wells, certain rural land uses and agricultural practices can negatively impact waterbodies and drinking water sources.

Farming is crucial for providing us with the food necessary to live and corn for ethanol or animal consumption, and the metro region's agricultural land must be preserved. In our rural areas, farmers are producing higher yields on less land than in the past with the use of synthetic fertilizers and drainage, which if managed incorrectly, can negatively impact water quality. A balance must be found between producing economical yields and water quality and quantity protection.

Rural areas typically rely on community treatment plants or private subsurface treatment systems, and community well water supply systems, or private wells. Aging infrastructure, lack of system resilience, treatment costs, and drinking water contamination threats are all water concerns in rural areas. Additionally, rural lands are threatened by urban sprawl and increased development. Unchecked growth and development threaten high value natural resource areas and strains infrastructure, and increases in impervious surfaces from development can have negative impacts on water quality.

The Met Council strives to foster and maintain a growing and resilient economy. We provide essential services and infrastructures – such as public transportation and wastewater treatment, regional parks, affordable housing, and sustainable natural resource planning – that support communities and businesses and ensure a high quality of life for residents. Sustainable and plentiful high-quality water resources provide a firm foundation for the region's future economic growth, sustainability, livability, and high quality of life.

Regional sustainability means protecting our vitality for generations to come by preserving our capacity to maintain and support our region's well-being and productivity over the long-term. Protecting our rural lands and understanding rural water concerns are crucial for achieving sustainable water resources within the metro region. Sustainable water resources include abundant, high-quality groundwater and surface water resources that support the state's growing water supply needs and unique ecosystems.

In the Met Council's current Regional Development Framework, *Thrive MSP 2040,* the Met Council sets the land use policy for the region through Community Designations, which group jurisdictions based on urban or rural character for the application of regional policy. The Met Council defines maximum residential development densities to help avoid premature development and protect natural resources until urban densities are needed to accommodate regional growth. Rural Community Designations in the metro are Rural Centers, Rural Residential, Diversified Rural, and Agricultural. Together, *Thrive MSP 2040's* land use policies and community designations help implement the region's vision by setting expectations for development density and the character of development.

Issue statement

Rural lifestyles and high-quality natural resources provide critical benefits to the region's economy. Rural and agricultural areas account for about half of the region's land but represent a

much smaller proportion of the population. Our region benefits from a diversity of natural resources, communities, land uses, and economies. As the region grows and climate shifts in the coming decades, rural areas are likely to experience significant changes.

Long-term development, land use change, and limited funding to address aging infrastructure pose substantial threats to water resources and ecosystems in rural and downstream areas. To plan for a sustainable and vibrant future, the Met Council must establish adaptive, forward-looking policies that support rural livelihoods, protect and enrich our region's waters, and promote equitable outcomes for current and future generations.

Council role

The Met Council is the regional policy-making body, planning agency, and provider of essential services in the metro region. Under state statute, the Met Council is responsible for developing the comprehensive development guide, which establishes the policy foundation used to complete regional systems and policy plans, development policies, and implementation strategies. The Water Resources Policy Plan is defined by state statute as a policy plan within the comprehensive development guide.

The Met Council is the regional wastewater system operator and wastewater, surface water, and water supply planning agency for the seven-county metro region. We ensure sustainable water resources through intentional planning and operations, which is informed by the comprehensive development guide. Our wastewater treatment plants continually meet National Pollutant Discharge Elimination System (NPDES) permit requirements. Our wastewater, surface water planning, and water supply planning functions promote sustainable water resources by addressing pollution and other factors that impact those resources. Clean water for drinking and recreating and the water treated by our wastewater treatment plants all are important parts of the region's livability and prosperity. We work with our partners, leverage our regional influence, and perform our statutory responsibilities to protect and preserve our water.

We have three primary water planning focuses supported by state and federal statute.

- **Wastewater:** We prepare a comprehensive development guide consisting of policy statements, goals, standards, programs, and maps prescribing guides for the orderly and economic development of the region. The regional wastewater collection and treatment system is one of the four regional systems included in this effort (Minn. Stat. § 473.145).

- **Water Resources Management:** State and federal law requires us to adopt a water resources plan and federal requirements for a regional management plan to address pollution from point sources, such as treatment plant discharges, and nonpoint sources, such as stormwater runoff (Minn. Stat. § 473.157; 33 U.S.C. §1288).

- **Water Supply Planning:** We are required to create plans to address regional water supply needs, including the regional Master Water Supply Plan, developing and maintaining technical information related to water supply issues and concerns, providing assistance to communities in the development of their local water supply plans, and identifying approaches for emerging water supply issues (Minn. Stat. § 473.1565).

Additionally, we have planning responsibilities under the Total Watershed Management statute. Total watershed management means identifying and quantifying at a watershed level the sources of point and nonpoint pollution, causes of conditions that may or may not be a result of pollution, and means of reducing pollution or alleviating adverse conditions (Minn. Stat. § 473.505).

As a part of our statutory authority, we are required to review and comment on Local Comprehensive Sewer, Local Surface Water Management, and Local Water Supply Plans (as described in Minn. Stat. § 103G.291, subd. 3) to ensure that they conform to and comply with the regional plans.

The metro region has several levels of water governance with municipal, county, watershed, regional, state, and federal agencies all having a role. Cross-agency coordination and partnerships are key to successfully manage the region's waters (**Figure 1**). These partnerships broaden our reach and influence to achieve regional water goals. For example, we adaptively manage water resources in partnership with watershed organizations and communities by:

- Monitoring regional river, lake, and stream water quality.
- Collecting and assessing data to understand surface water and groundwater conditions.
- Providing technical guidance on surface water management and drinking water protection through research, advisory committees, plan reviews, and other activities with cities, townships, counties, and watershed organizations.
- Assisting communities through grants to implement water efficiency, stormwater, and inflow and infiltration (I/I) programs.

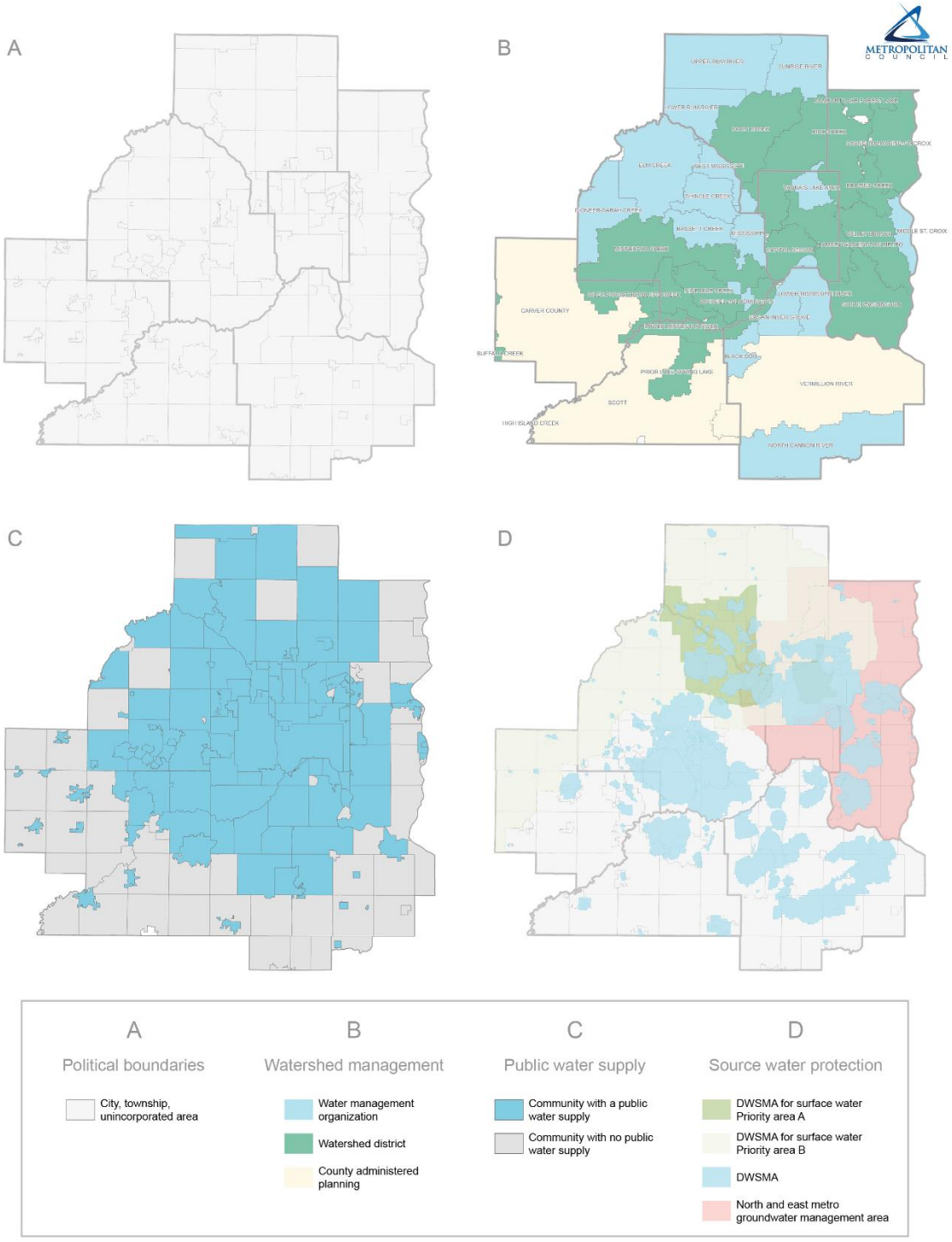


Figure 1: Water planning boundaries

Political boundaries (top left), watershed boundaries (top right), water supply planning subregions boundaries (bottom left), and drinking water supply management area boundaries (bottom right).

The Metropolitan Council's rural areas

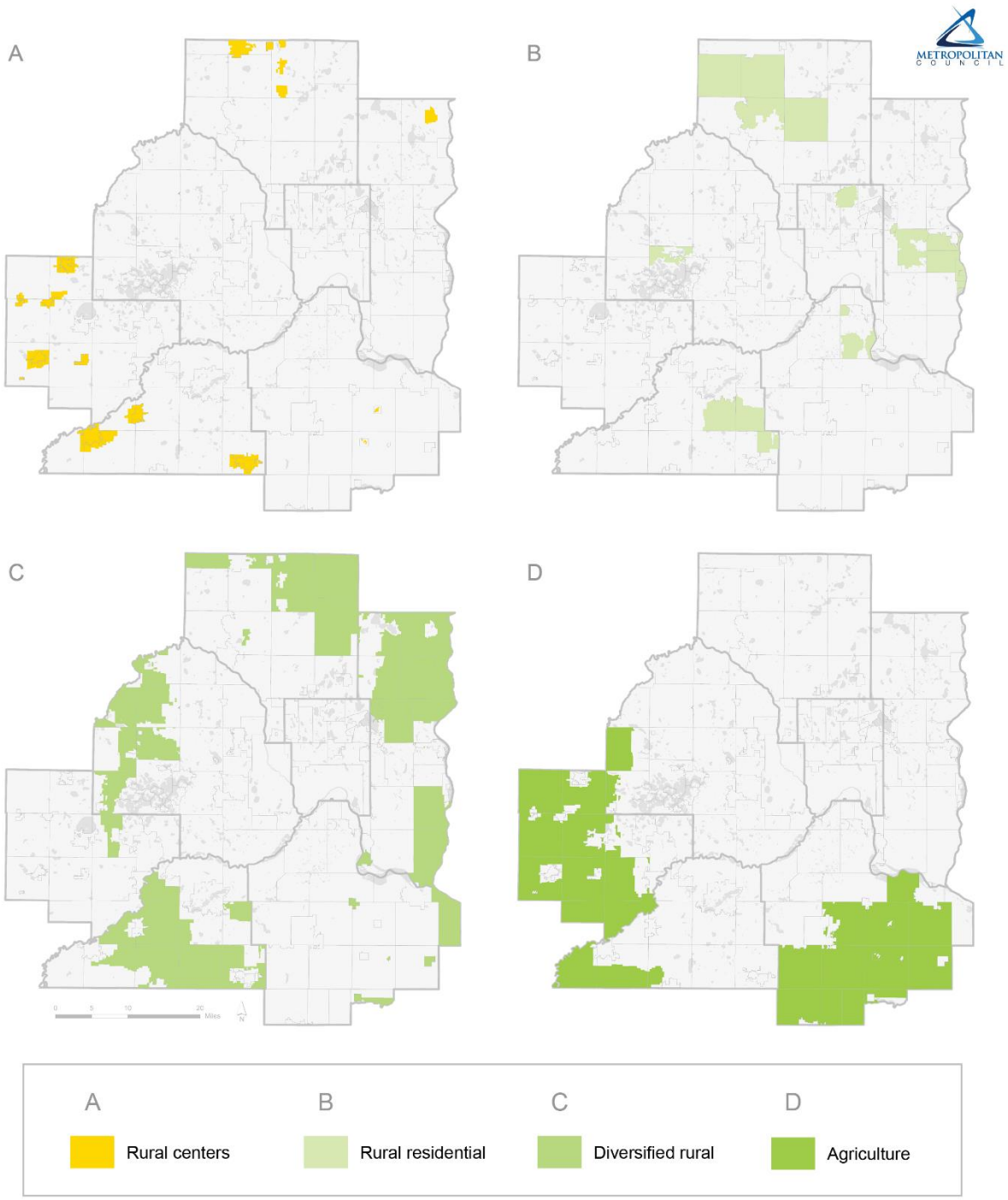


Figure 2: Rural designations in the metro region

Rural centers (top left), rural residential (top right), diversified rural (bottom left), agriculture (bottom right).

The Met Council limits urbanization and higher development densities in rural areas to reduce development pressure on farmland and to protect natural and water resources (**Table 1**). Land use, development densities/patterns, natural resource and water resource protection are all interrelated and important in thinking about water protection as well as potential future water considerations and issues. Each of the rural designations have different requirements for planned residential densities/development patterns and water considerations.

High density developments in rural areas are limited through community designations. There are four rural community designations: Rural Centers, Rural Residential, Diversified Rural, and Agricultural Communities (**Figure 2**). The current designations are being updated as part of the Regional Development Guide update process. This paper utilizes the current 2040 rural community designation requirements. These four community designations encompass more than 1,600 square miles of land in the metro region. Communities in the region are required to meet density expectations and plan for associated rural level growth forecasts as part of their comprehensive plans. More than 85 communities in the region (about 47%) are either partially or fully within a rural designation.

Rural Centers are local commercial, employment, and residential activity centers serving rural areas in the region. This rural designation has greater forecasted growth compared to the others. Rural Centers are small towns surrounded by agricultural lands that serve as centers of commerce to those surrounding rural and agricultural lands.

Communities with the Rural Residential designation typically have a historic development pattern, which does not advance the Met Council mission of ensuring efficient, orderly, and economical extension of wastewater services because of their large lot sizes and the fact they are located outside the MUSA. Therefore, Met Council policy discourages any new Rural Residential areas.

The Diversified Rural designation includes farm and non-farmland uses from very large-lot residential, clustered housing, hobby farms, and agriculture. Diversified Rural communities accommodate limited rural forecasted growth without requiring the provision of regional urban services. These communities are adjacent to the Metropolitan Urban Service Area and suburban area and may be within the Met Council's Long-Term Sewer Service Area. This designation supports rural lifestyles with a development density that preserves efficient future urbanization.

Communities with an Agricultural designation have prime agricultural soils that are planned for long-term agricultural use. Most of the communities in the Agricultural designation have very little change or forecasted growth. These communities have the greatest number of contiguous

lands enrolled in the Metropolitan Agricultural Preserves as well as the statewide Green Acres Programs (**Figure 3**).

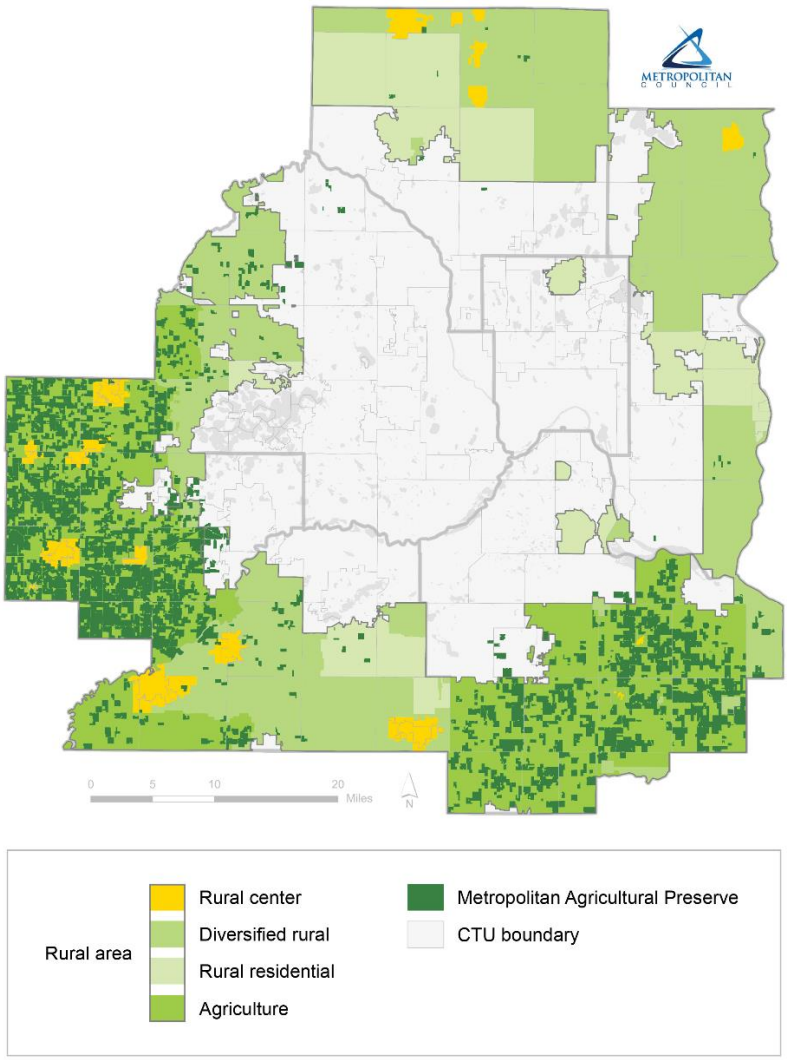


Figure 3: Land enrolled in the Agricultural Preserves Program (2021) (with rural areas highlighted)

The Metropolitan Agricultural Preserve Program was established by statute in 1980. The purpose of the statute is to encourage the use of agricultural lands for the production of food and other agricultural products. It establishes a local and regional planning process to designate agricultural areas as a long-term land use and provides incentives to maintain viable, productive farm operations in the metro area.

The Met Council tracks acres that are enrolled in the Metropolitan Agricultural Preserve Program. The greatest number of acres in the program are in Carver County (85,295 acres) and Dakota County (67,545 acres). The Green Acres program offers similar incentives, allowing eligible agricultural properties that are at least 10 acres to be taxed at a value less than its fair

market value and special assessments to be deferred and paid back when the acres are withdrawn from the program or no longer eligible.

Table 1: Rural designations and water considerations

Designation	Planned density	Drinking water supply and wastewater treatment	Water Considerations	#
Rural Center	3-5 units/ acre	Supply water through a community system and treat wastewater at a community treatment facility or are connected to the Met Council's regional system.	Cost burden to increase wastewater treatment infrastructure due to changing permit requirements, which may result in asking the Met Council to takeover service. Aging/failure infrastructure of both wastewater and stormwater, which may result in associated local impacts to environment/people. Inflow/ infiltration.	25
Rural Residential	1-2.5 units/ acre	Private water and Subsurface Sewage Treatment Systems or Community Sewage Treatment Systems. No plans to provide centralized drinking water or wastewater treatment.	Concern for increased failing private/ community sewer systems, water quality, and potential impacts on the environment and natural resources. These areas were not planned for extension of regional sewer. Large lots that require more resources per capita, particularly if irrigating lawn areas.	19
Diversified Rural	4 units/ 40 acres	Rarely provide any drinking water or centralized wastewater treatment.	Agricultural water quality concerns. Protection of natural resources. Private well protection.	39
Agricultural	1 unit/40 acres	No plans to provide drinking water or wastewater treatment. Irrigation wells are more likely to be present along with private domestic wells and subsurface sewage treatment systems.	Water quality, agricultural impact, aggregate impact. Protection of natural resources. Nitrates from land applications, impact to water bodies and aquifers, drinking water sources. Land application (biosolids, septage, pesticides); Nutrient application and management (commercial fertilizer, animal manure); agriculture chemicals, petroleum products. Private wells protection.	22

#: Reflects number of communities that are completely or partially within the community designation (2023).

Crucial concerns

To meet the water needs of rural communities – now and for future generations – balanced water strategies need to be implemented to preserve and promote the agricultural economy,

rural centers, rural residential lifestyle, and natural resources. To improve and protect water quantity and quality in rural areas, we need to highlight the challenges we face.

Primary drivers

In this section, we address the primary drivers that influence key rural water concerns in the metro region, and the important connection between water quality and equity. These are the most crucial components to understand and are the basis of our policy recommendations.

Climate change

Minnesotans and the metro are already feeling the impact of climate change. Our winters are warming, the frequency and intensity of storm events have shifted from historical record, and we are projected to experience more extreme heat and drought events. The shifts in climate and weather patterns impact natural systems by altering the length of growing seasons, causing record breaking floods, and increasing periods of drought (MPCA, n.d.). Changing growing seasons, invasive species, floods, and droughts all threaten the productivity of agricultural fields. Additionally, intense droughts exacerbate surface water quality impairments and reduce the ability of receiving water's accommodate wastewater treatment plant effluent.

Climate change will continue to impact the metro region's rural areas. Flooding can endanger private wells and subsurface sewage treatment systems posing a public health risk. Of the 46,000 private wells in rural areas of the metro region, approximately seven percent (about 3,200 wells) are located in potential surface flooding areas, which are referred to as "bluespots" in the localized flooding section of the Met Council's Climate Vulnerability Assessment (Metropolitan Council, 2011). One third of the private wells in bluespots are in the primary zone, the first areas to fill with water.

In contrast, as the effects of climate change on the region become more prevalent and pronounced, water use conflicts may become more common. Periods of drought, such as those in 2021 and 2022, led to increased water use around the region, and in turn, more pumping of groundwater from aquifers, particularly for irrigation for agriculture. From 2002 to 2017, irrigation expanded by 34% in the state of Minnesota, and the use of groundwater for irrigation continues to expand (National Agricultural Statistics Service, 2019). Farmers view irrigation as a way to protect crop productivity under an increasingly variable climate and its weather patterns. Since aquifers in the region are shared resources accessed at a variety of depths and pumped in different capacities, increases in groundwater pumping from drought or developing communities could lead to more well interference (DNR, n.d.a). In areas where there are both deep high-capacity public wells and shallow low-capacity private wells, the shallower wells are more likely to be impacted by interference.

Well interference is a condition that limits access to water from smaller, often domestic, wells. It occurs when a high-capacity well pumps water from an aquifer and causes the surrounding water level of the aquifer to drop. This drop can cause water levels to drop below the pump settings in shallower wells (DNR, n.d.c). Although well interference issues are often temporary and localized, growing populations, high-volume water users such as irrigators, and new water supply systems – especially in rural areas where more residents rely on private wells – could pose issues in the future.

R.D. Offutt and the Pineland Sands Aquifer

In 2021, Minnesota was experiencing one of the worst droughts in decades. R.D. Offutt is one of the largest potato growers in America and has planted crops on thousands of acres of land in northern Minnesota to take advantage of the sandy potato-friendly soil (Rojanasakul & Searcey, 2023). In 2021, roughly one-third of R.D. Offutt's fields were planted with potatoes, but growing any crops in sandy soils requires significant water (Rojanasakul & Searcey, 2023). To protect their crop, and grow aesthetic potatoes R.D. Offutt blew through limits designed to protect aquifers that supply drinking water to surrounding communities (Rojanasakul & Searcey, 2023).

Farmers pumping more than their permitted levels can cause well interference issues, which impacts their neighbor's wells. In 2021, complaints about irrigation impacting and drying up residential private wells were filed with the Minnesota Department of Natural Resources faster than inspectors could keep up with them (Rojanasakul & Searcey, 2023). Many of these complaints were from poorer or older people with limited income (Rojanasakul & Searcey, 2023). In 2023, Minnesota lawmakers moved to attempt to rein in irrigators by increasing fines for pumping too much water, but officials said they were hesitant to fine farmers who were already struggling with crop loss (Rojanasakul & Searcey, 2023).

Additionally, this area is located in the sensitive Pineland Sands Aquifer. The Pineland Sands Aquifer is sensitive, partly because it is shallow in places. Extracting water from shallow locations can impact surface water in the area, lowering levels of rivers, lakes, and negatively impacting waterbodies with cultural significance and trout streams (Rojanasakul & Searcey, 2023). While this case study is outside of the metro area, similar increased need of irrigation waters for food production is a concern for our rural communities inside the metro region.

Blaine and Ham Lake case study

Recently well interference issues have been observed in Blaine and Ham Lake. Blaine is designated as Suburban Edge, and Ham Lake as Rural Residential. The City of Blaine added four additional wells to their water supply system in 2021 and commissioned a consultant to perform a study to determine the likelihood of the new wells causing well interference issues for nearby private wells, including those outside its city border in Ham Lake. The region experienced a drought in 2022, and as anticipated in the Blaine Well Interference Plan, heavy pumping during the summer's drought condition caused nearby private well owners to have issues with their water supply. Blaine is prepared for private wells in the city and Ham Lake to be repaired or replaced. The city is using modeling performed for the Well Interference Plan to base their response to complaints. If the drawdown in a complainant's well matches or is close to the model, the homeowner will be reimbursed by the city of Blaine. If the drawdown is significantly different than the model, the well owner must follow the Department of Natural Resources' Well Interference Process.

Climate change is a complicated problem to tackle. The Met Council, other government agencies, nonprofits, tribal communities, and individuals are all responding to climate change. The response typically falls into either mitigation or adaptation actions. For more information on climate change. please refer to the Water and Climate Change: Impact on Water and Water Utilities in the Twin Cities Metropolitan Area research paper.

Population growth and land use change

The population of the metro region doubled between 1960 and 2020, climbing from 1.5 million residents to 3.2 million residents, and it is forecast to continue to increase to slightly over 4 million by 2050 (**Figure 4**). Without careful planning and best management practices, this growing population can place significant stress on water availability and quality in rural areas (Damania, 2019). This is a crucial concern for the Met Council, as we support regional growth and ensure sustainable water resources. Policies, planning, and investment will be needed to prevent conflicts between these goals.

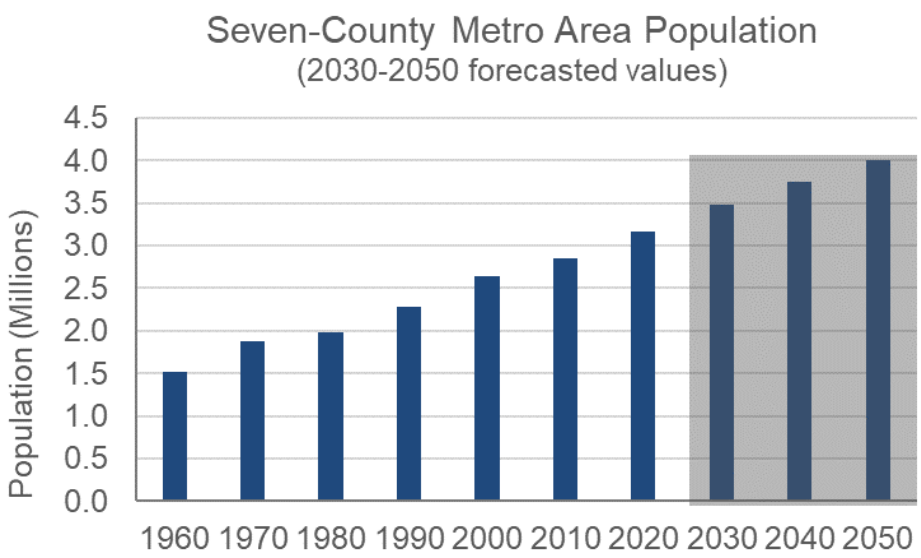


Figure 4: Seven-county metro area population and forecasts, 1960-2050 (US Census Bureau, n.d.; Metropolitan Council, 2021)

As more people relocated to the metro region in these decades, the land use changed. Centralized development expanded outward across the seven counties. In the process, rural lands were developed into roads, parking lots, and buildings. There was a 56% reduction in agricultural, woodland, or undeveloped areas from 1968 to 2020. These changes affected the amount of environmental pollution, modified the ways water infiltrated and moved across the landscape, and reduced the potential for groundwater recharge – all factors influencing the quality and quantity of water in the former rural areas of the metro region. Urban sprawl is known to have negative environmental impacts, which has led the Met Council to create policies to protect rural areas through the creation of rural land use designations.

As rural land use declined, areas with active farming in rural lands also declined between 1968 and 2020. Although there is less land in agricultural production, technological improvements have increased crop yields. From 1968 to 2020, average corn (grain) yields increased from 76.4 bushels per acre (bu/ac) to 188.3 bu/ac and soy yields increased from 20.3 bu/ac to 53.8 bu/ac (National Agricultural Statistics Service, n.d.). Farmers are now producing more on less land, but these agricultural improvements like hybrid and modified crops, tile drainage, and synthetic fertilizer, if managed incorrectly, can have negative water quality impacts (USEPA, 2021; University of Minnesota Extension, 2018a).

Key Concerns

Water quality

The quality and quantity of water has direct effects on our ecosystem, health, agriculture, and infrastructure. The severity and type of contamination impacts how Minnesotans use and value the state's waters. The sources of contamination can be both natural and driven by human activities.

Contaminated surface waters are harmful to humans and ecosystems. The Clean Water Act and state water quality laws significantly reduced the amount of pollution in rivers, lakes, and streams (Keiser & Shapiro, 2018). However, the country has not met the ambitious Clean Water Act goal of all waters being "drinkable, swimmable, and fishable."

In Minnesota, waters that do not meet state water quality standards are tracked on the Minnesota's Impaired Waters List. Usually, waterbodies are added due to persistent pollution, increased monitoring, or new, emerging contaminants. Currently, there are 751 water quality impairments in 438 river sections, lakes, or stream reaches in the metro region, with many waters having more than one impairment (MPCA, 2022b). Many of these waters are located or run through rural areas and are impaired as a direct result of rural land uses and practices (**Figure 5**).

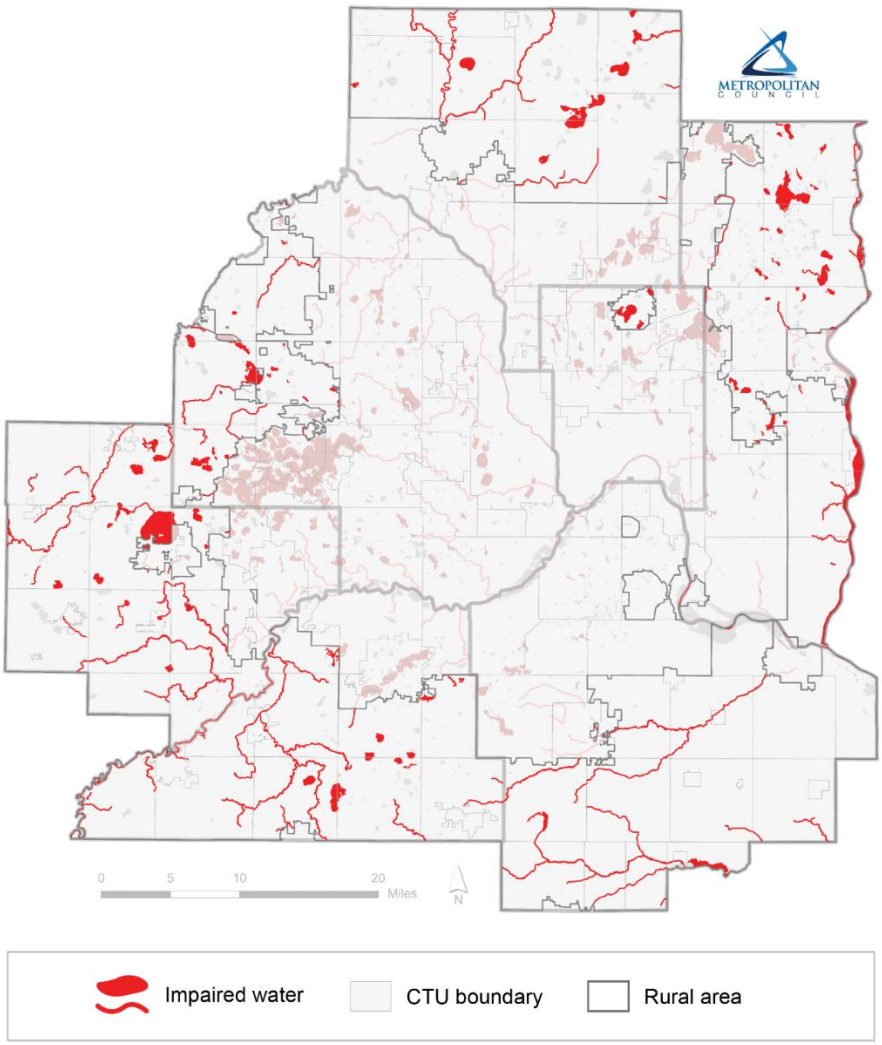


Figure 5: Impaired waters (with rural areas highlighted)

Rural wetland loss and protection

Wetlands are transitional landscapes, caught between aquatic and terrestrial ecosystems. They vary widely in appearance and function but are closely linked to the water table. Historically, wetlands were considered undesirable and were drained by farmers and developers, but they are now considered an essential landscape feature. Wetlands retain water on the landscape which reduces flooding, allows for suspended sediment to be deposited, and creates areas for groundwater recharge. Resource managers and scientists now understand that wetlands should be preserved and restored where possible.

The Minnesota Department of Natural Resources estimates that prior to statehood, nearly 35% of the landscape was wetlands (about 18.6 million acres). Since statehood, we have lost around 40% of our original wetland area, with about 10.6 million acres of wetlands remaining in 2008 (DNR, n.d.d; DNR, 2013). Today, wetlands are protected by Minnesota law (Minn. Stat. § 103A.201), under the Wetland Conservation Act, and if they meet certain requirements, they are

also protected by the Minnesota Department of Natural Resources under the Public Waters Work Permit Program (DNR, n.d.b).

The Wetland Conservation Act was enacted in 1991 to protect wetlands that don't qualify as public waters, to mitigate unavoidable wetland impacts, and to achieve the goal of no net loss of the state's remaining wetlands (Minn. Stat. § 103A.201). These protections have succeeded in stopping the loss of Minnesota's wetlands. It is estimated there has been a net increase of 8,900 acres of wetland area from 2006 to 2014 (Kloiber, et al, 2017). The basic rule of the Wetland Conservation Act is that wetlands may not be wholly or partially drained or filled unless replaced, created, or restored by wetland areas of comparable value.

Despite these regulations, small amounts of wetland areas are still impacted each year. As rural areas are developed, unavoidable impacts will increase (**Figure 6**). However, these impacts are mitigated through the restoration of equivalent amounts of wet area or the purchase of credits from approved wetland banks. The purpose of the wetland banking system is to provide a market-based structure that allows for the replacement of unavoidable impacts with pre-existing replacement wetlands. In the Twin Cities metro region, the majority of current wetland impacts are to nonpublic waters wetlands and are generally mitigated through the acquisition of wetland credits.

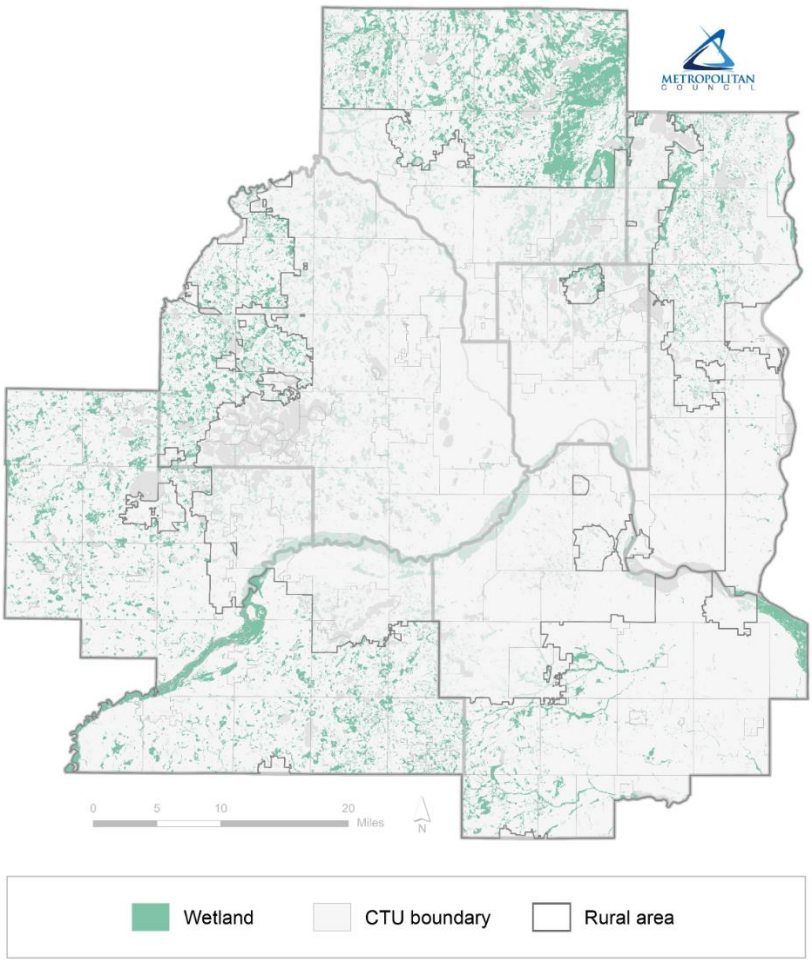


Figure 6: Wetlands in the metro region (with rural areas highlighted)

Soil Loss from Agricultural Practices

Agricultural practices in the Twin Cities metro region have evolved over time and are dominated by intensively managed row crop fields of corn and soybeans, which require tillage. Tillage operations are used to prepare soils for planting and improve seed germination, and "clean up" fields after crop harvest. Tillage breaks up soil aggregates and leaves soils more vulnerable to erosion by wind and water. Soil loss has been recognized as a threat to soil fertility and farm productivity. Eroded soils impede flows, reduce stream capacities, and carry nutrients and pollutants. Aquatic organisms are impacted when soil particles cover habitat and reduce water clarity.

In 1984, Minnesota passed a law to address excessive soil loss, focusing on preservation of agricultural productivity (Minn. Stat. § 103F.401-103F.455). However, the law only encourages local government units to adopt a soil loss ordinance. The Board of Water and Soil Resources developed a model soil loss ordinance to support adoption by local government units, which requires a soil conservation plan if erosion is greater than soil loss tolerance rate. Zero counties in the Twin Cities metro region have adopted the soil loss ordinance. Protecting the productivity of agricultural lands aligns with the existing goals of supporting our agricultural economy and rural "lifestyle."

Regenerative agricultural systems promote soil health by practicing more traditional less intensive farming methods. Regenerative agricultural systems include practices such as conservation tillage, reduction or elimination of agricultural chemicals, use of cover crops, and controlled grazing on agricultural fields. Regenerative agricultural systems may be incorporated on any farm. Planting cover crops is the most common regenerative practice. Maintaining living roots improves "soil health and reduces erosion and fertilizer losses." Another example is conservation tillage systems, which seek to retain 30% or more of the crop residue on the soil surface. However, each of the various methods can have disadvantages such as lengthening the time needed for soils to dry.

One of the Minnesota Department of Agriculture's primary programs to address water quality impacts from agriculture is the voluntary Minnesota Agricultural Water Quality Certification Program. Farmers and agricultural landowners who implement and maintain approved conservation practices are certified and obtain regulatory certainty that they are in compliance with any future water quality rules or statutes for a period of ten years.

Agricultural Drainage

In many parts of Minnesota, (including parts of the metro region), row crop production is not feasible without soil drainage due to water retaining soils and high-water tables (University of Minnesota Extension, 2018b). To farm these lands, the landscapes are drained by a network of drainage ditches and subsurface drainage tiles. Today, Minnesota has 19,950 miles of drainage ditches. Land drainage for agricultural production has long been recognized and accepted by the state government.

Drainage has a variety of impacts on aquatic ecosystems. The primary function of drainage is to alter the landscape's hydrology by transporting water from depressions and saturated soils to rivers. Land drainage for agriculture has significantly altered the hydrology of wetlands, streams, rivers, and riparian floodplains (Blann et al., 2009). Altered hydrology has led to unstable stream

morphology. As flows increase, phosphorus bearing sediment is eroded from the stream bed and banks. This process increases phosphorus loads and degrades aquatic habitats.

Surface and subsurface drainage systems both contribute to nutrient loading but in different ways. Drainage ditches transport more sediment and the pollutants that absorb into sediment, such as phosphorus and pesticides. Subsurface drainage transports more soluble pollutants like nitrate (Blann et al., 2009).

One recent innovation in ditch management is the creation of two-stage ditches. They are most suited for ditches with perennial flow and high sediment loads and frequently form naturally under such conditions. These types of ditches can improve aquatic habitat and water quality and reduce future maintenance needs (Skaggs et al., 1994).

Nutrient Issues – Phosphorus and Nitrogen

Phosphorus and nitrogen, along with potassium, are the primary macro nutrients required for plant growth. As such, they are frequently applied to agricultural fields as fertilizers to assure healthy plant growth and increase crop yields. However, these elements also contribute to the growth of aquatic plants (macrophytes) and cause eutrophication and algae blooms in surface waters.

The Minnesota Nutrient Reduction Strategy (MNRS) categorizes nutrient loading and reduction needs by major drainage basin areas based on the receiving water. The metro region lies in the Mississippi River basin. Excessive levels of phosphorus and nitrogen present a substantial threat to Minnesota's lakes and rivers, as well as downstream water bodies. These threats are not only to the environment, but also to drinking water and public health (MPCA, 2014). These excessive nutrients also contribute to nutrient issues downstream of Minnesota, which have reached critical levels in the Mississippi River and the Gulf of Mexico.

Priority sources of phosphorus for the Mississippi River Basin are cropland runoff, wastewater point sources and streambank erosion; priority sources of nitrogen for the same basin are agricultural tile drainage and other pathways from cropland. (MPCA, 2014). According to the Minnesota Nutrient Reduction Strategy, increased adoption of agricultural best management practices is critical to achieving nutrient reduction goals and milestones.

Phosphorus is considered relatively immobile in soils and enters surface waters by attaching to soil particles eroded from the land surface. Therefore. measures that reduce soil erosion are effective ways to reduce phosphorus loading. Phosphorus is persistent and can build up in soil. Where soil phosphorus concentrations are high, it can leach from fields and be transported with surface runoff or in drain tile water (MPCA, 2014).

The Nitrogen in Minnesota Surface Waters study estimated that agriculture contributes 73% of the statewide nitrogen load in a typical year (MPCA, 2013). Because agricultural sources contribute the bulk of the statewide nitrogen load and a substantial portion of the phosphorus load, nitrogen and phosphorus reductions from agricultural sources are key to achieving the nutrient reduction milestones (MPCA, 2014).

For more information on phosphorous and nitrogen, refer to the Water Quality research paper.

Pesticides

The Groundwater Protection Act directs the Minnesota Department of Agriculture to review relevant pesticide-related water quality monitoring (Minn. Stat. Ch. 103H). The Minnesota Department of Agriculture water quality monitoring program is robust, and Environmental Services is an active partner in the program. The Minnesota Department of Agriculture creates a guidance document of best management practices for the prevention, evaluation, and mitigation of occurrences of pesticides or their breakdown products in Minnesota groundwater and surface water due to non-point source pollution from the use of pesticide products. The report states that water quality problems due to pesticide pollution are best addressed by focusing on prevention (MDA, 2007).

Results of the Minnesota Department of Agriculture's ambient pesticide monitoring since 2006 show that a few pesticides are widespread but at low concentrations. The herbicides 2,4-D, metolachlor, and atrazine were detected in 83%, 54% and 52% of surface water samples. However, all detections were below the applicable reference values.

Although some pesticides are common in surface water, few waters are impaired for pesticides. The Minnesota Pollution Control Agency's 2022 inventory of impaired waters summary reports 6,167 individual impairments. The pesticide responsible for the most impairments is chlorpyrifos, an insecticide used to control aphids on soybeans. The Minnesota Pollution Control Agency has listed 14 surface waters as impaired for chlorpyrifos.

Further information on pesticides can be found in the Community Water Supply and Private Wells section.

Water quality recommendations

- Investigate how to create better agricultural partnerships with soil and water conservation districts to limit land management decisions' impacts on our drinking water supply and wastewater permits.
- The Met Council will continue to support the Wetland Conservation Act and wetland preservation, enhancement, and restoration.
- When drainage systems are upgraded, the Met Council will support incorporation of practices to reduce peak flows and nutrient loading.
- The Met Council will support the agriculture certification program and soil health/regenerative agriculture in rural areas through partnerships with metro soil and water conservation districts.
- The Met Council supports preservation of regionally significant ecologic areas as rural areas develop through educational outreach to local governments and plan review.
- The Met Council will promote the use of green infrastructure best management practices for new development and redevelopment through educational outreach to local governments and plan review.
- The Met Council will continue to partner with the Minnesota Department of Agriculture to monitor pesticides.
- Water quality credit trading is a potential strategy for meeting NPDES permit requirements but will require strong policies and careful implementation to provide regulatory certainty. The Met Council will develop a water quality credit trading policy

and explore potential agreements that conform with it and the MPCA's water quality trading guidance.

Wastewater

In rural areas, sanitation needs are met through two primary treatment options: individual and community wastewater systems, such as subsurface sewage treatment systems, or municipally owned and operated local wastewater treatment plants. All treatment systems share the same primary purpose of protecting the health and well-being of the community and the environment, though they vary in execution. Subsurface sewage treatment systems process waste from individual households in buried septic tanks that separate solids, provide simple biological treatment, and discharge water to a drain field.

Rural communities face significant obstacles in maintaining wastewater services due to limited financial resources and a challenging population distribution. Aging infrastructure and underperformance can further exacerbate concerns and cause systems to become noncompliant, posing environmental and public health risks. As infrastructure ages, it becomes prone to failure with increasingly costly repairs.

Private subsurface treatment systems

The metro region has over 75,000 subsurface sewage treatment systems (**Figure 7**), the majority of which are located in rural service areas. Despite aging infrastructure (including private systems), subsurface sewage treatment systems in Minnesota are becoming increasingly compliant. Statewide, the estimated percentage of systems failing to protect groundwater and those posing an imminent threat to public health and safety have decreased over the past decade, from 16 to 13% and 5 to 4%, respectively (MPCA, 2022a).

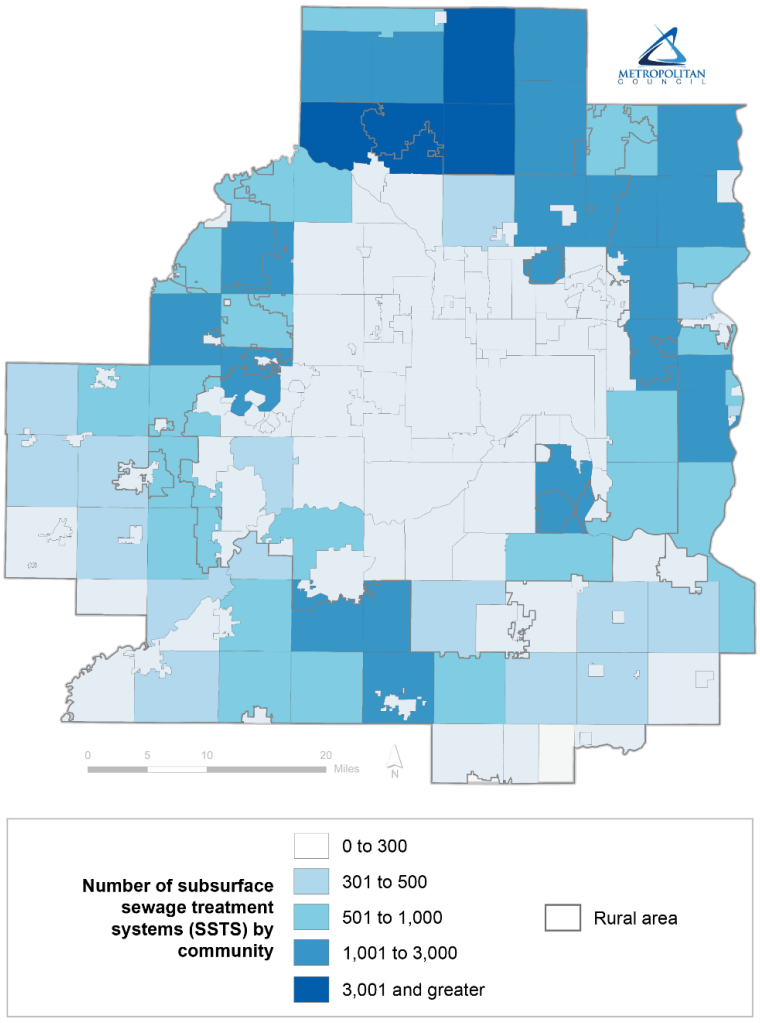


Figure 7: Subsurface sewage treatment system counts in the metro region (with rural areas outlined)

State statute requires systems identified as an imminent threat to public health and safety to be upgraded, replaced, repaired, or discontinued within ten months of receipt of a notice of noncompliance. Systems may be considered an imminent threat to public health and safety if sewage backs up into the connected building, uncontrolled discharge to land or surface waters occurs, or unsecured and damaged maintenance hole covers are present. A system that is an imminent threat to public health and safety could pollute nearby wells without the owner realizing. Notice of noncompliance can occur after an inspection, with approximately 3% of SSTS in the metro region inspected annually (**Table 2**, MPCA, 2022c).

Table 2: Metro county subsurface sewage treatment systems statistics. Adapted from PCA's 2021 Subsurface Sewage Treatment Systems Annual Report (MPCA, 2022c)

County	Total SSTS reported in 2021	Construction permits reported in 2021	Total construction permits issued 2002-2021	Number of compliance inspections of existing SSTS conducted countywide	Percent of total existing SSTS inspected in 2021 out of total SSTS	Counties with compliance inspections for property transfer
Anoka	29939	548	9234	607	2.0%	No
Carver	5016	108	2105	220	4.4%	Yes
Dakota	6468	110	3299	111	1.7%	Yes
Hennepin	9330	126	2799	407	4.4%	No
Ramsey	1644	25	377	66	4.0%	N/A
Scott	8782	158	2943	221	2.5%	No
Washington	19626	374	5394	608	3.1%	Yes
Total	80805	1449	26151	2240	2.8 %	N/A

Rural subsurface sewage treatment system owners with failing systems most often choose to replace their systems, but those discontinuing use have four options to mitigate their noncompliant properties: 1) connection to a centralized sewer, 2) abandonment or removal, 3) abandonment and installation of a new system, or 4) a government buyout (MPCA, 2022a). The Council will allow a community to connect a failing subsurface sewage treatment system or private wastewater system to the regional wastewater system at the community's expense if the change is consistent with Council policies. However, due to geography, this can end up being prohibitively expensive. Nonetheless, failing systems need to be remedied in a timely manner.

All counties require the disclosure of subsurface sewage treatment systems in the event of property transfer, though the extent varies. Federal funding, such as the EPA Nonpoint Source Section 319, the United States Department of Agriculture, Rural Development Funding, or grants for states or homeowners may also serve as sources of funding to aid homeowners in mitigating failing systems. Beyond what is required by the state, the seven metropolitan counties differ in compliance, disclosure requirements, and potential funding aid for homeowners to mitigate failing systems (**Table 3**, MCES 2016).

Table 3: Subsurface sewage treatment systems disclosure and available financial aid

	Inspection / Disclosure Requirements	Funding Details
Anoka	Inspection not required in disclosure	Low-interest financing up to $100k per individual or project for repair/replacement
Carver	Inspection required in disclosure	Low-interest financing up to $15k for failing systems meeting “priority criteria”
Dakota	Inspection required in disclosure – three-to-five-year look-back eligible	Low-interest and fix-up grant program – grants subject to income constraints, reimbursement >$2000
Hennepin	Inspection not required in disclosure	Minnehaha Creek Watershed District residents eligible for up to $2000 for failing systems, prioritizing receiving water body effects.
Ramsey	Inspection required in disclosure	N/A
Scott	Inspection not required in disclosure	Low-interest financing up to $20k per property for failing systems
Washington	Inspection required for systems greater than five years old	Low-interest and fix-up grant program – ranging ~$4-5k subject to income constraints

Environmental Services is responsible for ensuring adequate water quality and to regionally plan for water supply for all residents. Critical to the mission is the responsible handling and treatment of wastewater in the region. Environmental Services ensures that all communities adopt ordinances that are consistent with Minnesota Pollution Control Agency Chapter 7080-7083 Rules on subsurface sewage treatment system design, construction, inspection, and maintenance through our comprehensive planning review process. Cities and townships may regulate their own programs, albeit with standards at or above state requirements. Approximately 56 cities or townships in the metro region have their own subsurface sewage treatment system programs, while the remaining 125 have either phased out subsurface sewage treatment systems or rely on their respective counties to administer the programs. While Environmental Services relies on local communities to enforce their ordinances to ensure these facilities are properly maintained and operated, the comprehensive planning and review process helps ensure communities are planning to meet current and future demand and achieve regional goals.

Rural wastewater treatment facilities

There are 14 municipal wastewater treatment plants that serve rural communities in the metro region. Municipal wastewater treatment plants have smaller capacity (0.05 to 1.3 MGD) than Environmental Services facilities. The municipally owned treatment plants in the metro region range from simple stabilization ponds to advanced treatment systems. Many are projected to need plant extensions or enhancements to meet future permit requirements as the state seeks to maintain high water quality.

Many rural communities with limited financial resources struggle, either currently or in projections, to maintain effective wastewater treatment systems. Environmental Services balances stewardship of the environment and health of the population with preserving rural and agricultural land uses outside the long-term service area.

Future sanitation needs for these areas could be met through several different options: 1) continued operation and maintenance, 2) potential enhancements and extensions of municipal wastewater treatment plants to meet future demands and permit requirements, 3) design and construction of future Environmental Services wastewater treatment plants to serve rural areas, or 4) extension of the current long term service area to provide wastewater treatment via one of the nine operational Environmental Services wastewater treatment plants (**Figure 8**).

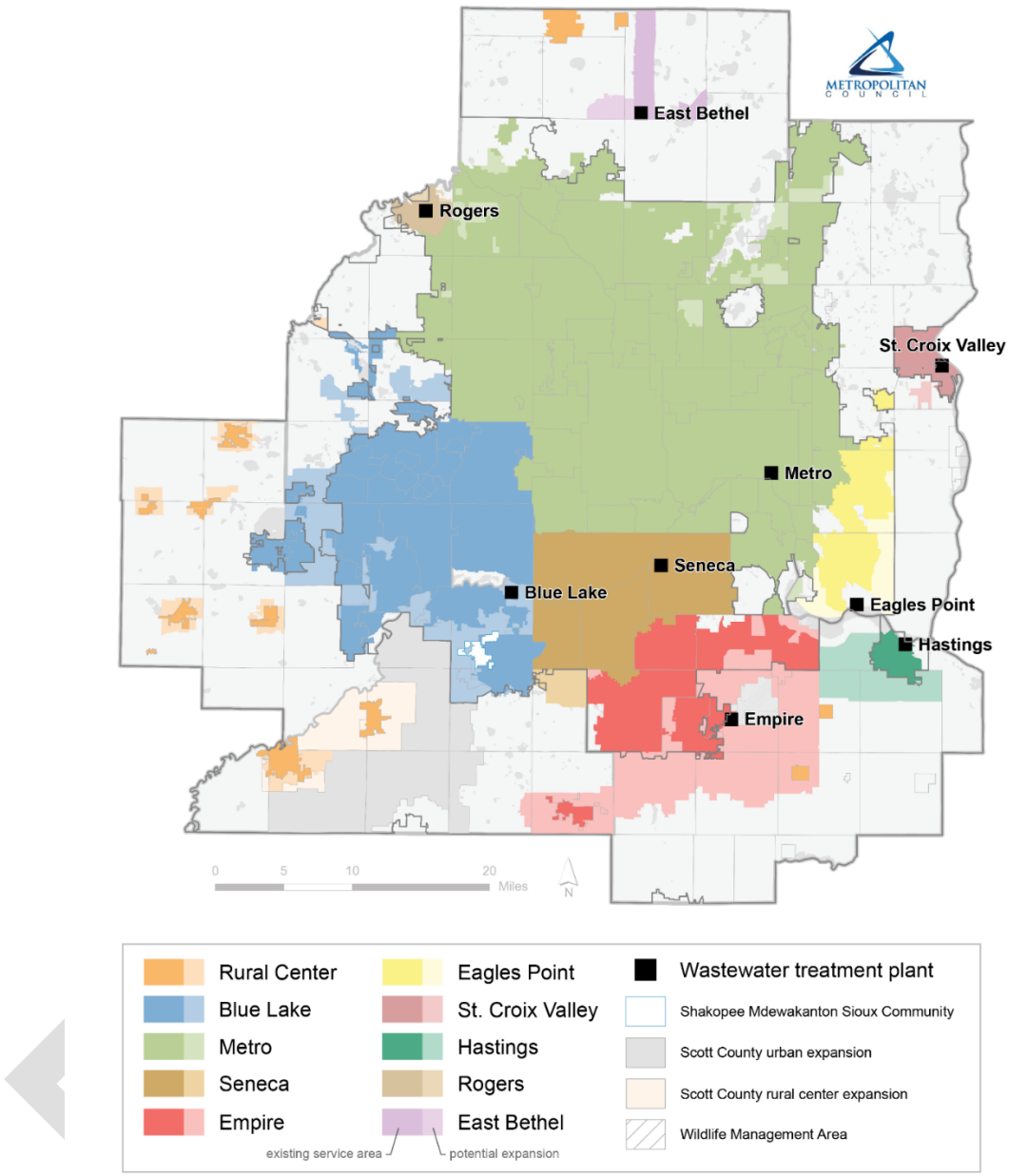


Figure 8: Wastewater treatment plants and long-term service areas (with rural areas outlined)

For communities looking to explore options three and four, they may request (through the comprehensive plan and sewer plan processes) that the Met Council either extend regional interceptor service or acquire their wastewater treatment plant, based upon criteria that ensure direct identifiable regional benefits. From the wastewater perspective, an action or decision is considered a regional benefit if the action supports regional growth, is a benefit to more than one community, is cost effective, and enhances knowledge and experience that can be used to further our vision.

However, some communities prefer to provide their own wastewater services instead of accepting the Council's growth forecasts and development requirements. Other communities are simply located outside the long-term service area, or there is no identifiable regional benefit in serving them. The Met Council is thus challenged to balance stewardship of the environment and health of the population; preserving rural and agricultural communities; equitable service; and promoting timely, orderly development. Additional details can be found in the Wastewater White Paper.

Credit River case study

At times, failing subsurface treatment systems may result in unanticipated connections to the regional wastewater system. This Credit River case study from the 2040 comprehensive planning process discusses how unplanned connections to the regional wastewater system can result in changes to the Council's Regional Wastewater System Plan, Thrive MSP 2040 community designation, as well as changed to a community's planned land uses and proposed growth forecasts.

Thrive MSP 2040 designated Credit River as rural community, with the northern part of Credit River within the Diversified Rural community designation (Figure10). Community designations provide specific land use policies and strategies. Diversified Rural areas plan for growth at densities of 4 units per 40 acres, preserve areas where post-2040 growth can be provided with cost-effective and efficient urban infrastructure, and support forecasted growth through 2040 without the provision of regional wastewater services. The 2040 Water Resources Policy Plan identifies the Diversified Rural area as a long-term sewer service area.

Credit River is not currently served by the Regional Wastewater System. All existing development in Credit River is served by subsurface sewage treatment systems or community wastewater treatment systems. Credit River's comprehensive plan identified approximately 440 failing subsurface sewage treatment systems. Most of these were identified in neighborhoods in the northern part of the city and on lots with one home on less than 1.5 acres. In addition, many of the failing systems were constructed in the 1960s and 1970s, and do not conform to current design standards.

Credit River requested regional wastewater service for these areas through the comprehensive planning process. The Council's Water Resources Policy Plan anticipated wastewater service within Credit River after 2040. The regional wastewater system was assessed to determine if there was sufficient capacity to provide regional wastewater service to Credit River. The Met Council's Revised Municipal Urban Service Area Guidelines were used, as they discuss failing subsurface treatment systems in context of the Met Council's net residential density policies. The community was required to provide proof of subsurface sewage treatment system failures from a licensed inspector.

Council staff found wastewater service to Credit River could be accommodated without posing a regional wastewater system impact. With action on Credit River's 2040 comprehensive plan, the Regional Wastewater System Plan was revised to reflect the timing of regional wastewater service to before 2040. Initial wastewater connections will serve existing residential neighborhoods with failing subsurface treatment systems. In addition, some new residential developments will receive regional sanitary sewer service after the year 2030.

Through the comprehensive planning process, Credit River's community designation and forecasted growth to 2040 were also revised. Portions of northern Credit River were redesignated from Diversified Rural to the Emerging Suburban Edge community designation (**Figure 9**).

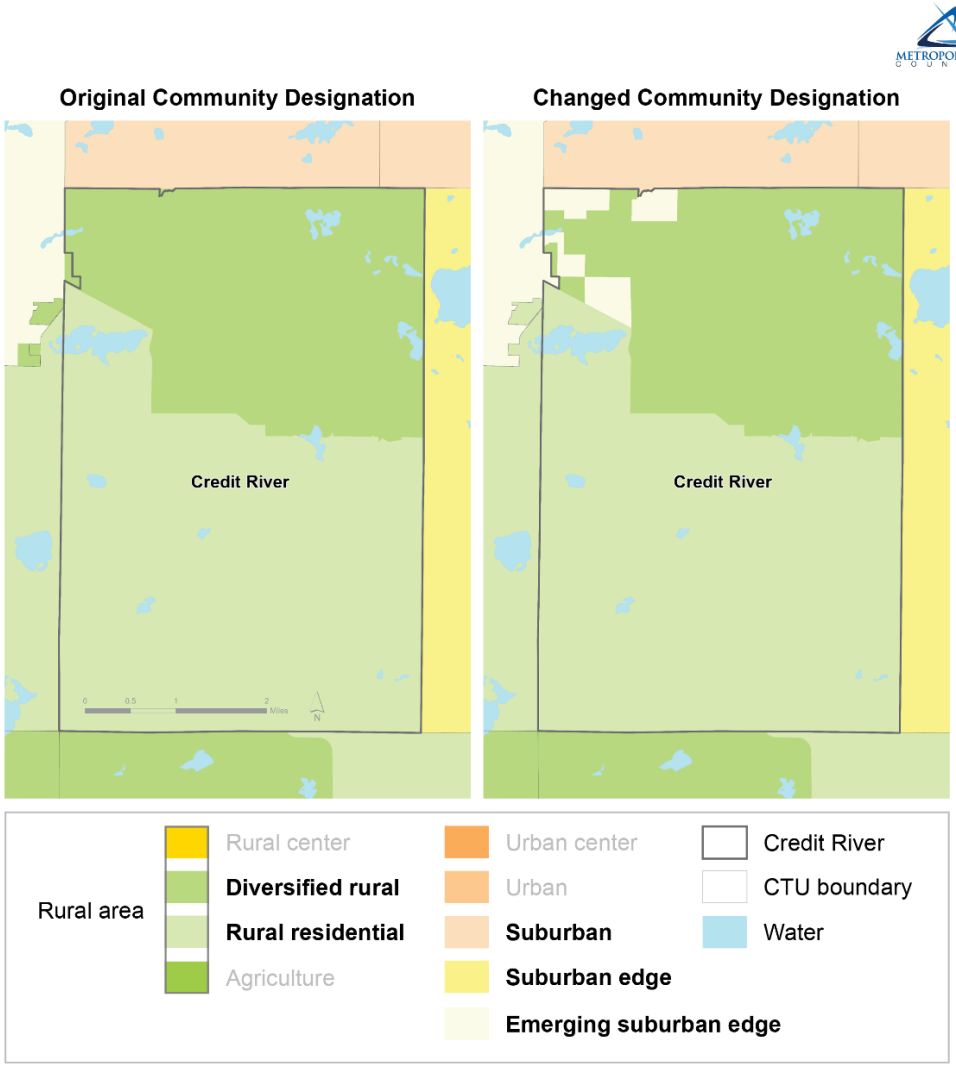


Figure 9: Original community designation vs changed community designation for Credit River

The Emerging Suburban Edge community designation includes cities, townships, and portions of both that are in the early stages of transitioning into urbanized levels of development. These areas receive regional wastewater service and are expected to plan for forecasted population and household growth at average densities of at least 3-5 units per acre for new development and redevelopment.

To achieve this residential density and be consistent with Council policies for Emerging Suburban Edge areas, the Credit River's future land use plan included new areas guided for post-2030 Low, Medium, and High-Density Residential land uses. Credit River's overall household forecasts were increased to 2,200 households by 2040. The number of households forecasted to be served by the regional wastewater system was revised from zero regionally sewered households to 700 by 2040.

Future wastewater service to Credit River will be provided through two trunk systems that will connect to the city of Savage's wastewater collection system. Wastewater service will be provided to the neighborhoods with failing subsurface sewage treatment systems. Savage will provide Credit River with wastewater service until the Met Council can acquire the trunk sewer system. Acquisition of Savage trunk is anticipated by 2030, at which time Credit River's next development phase will include additional undeveloped land areas and satisfy the requirements of direct interceptor service. Credit River and the city of Savage have initiated discussions to develop an intercommunity agreement outlining the terms of the service which will include direct wastewater service billing to Credit River by Savage.

Easing the process, Savage has long identified its trunk sewer as being of potential regional significance, anticipating Credit River to eventually request sewer service. Communication and planning between these communities have paved the way for a smooth transition. Trunk acquisition will require that Environmental Services acquires any outstanding debt related to the Savage trunk facility (and associated lift station and force main), complete surveying, inspection and condition assessments, and perform temporary wastewater monitoring and modeling to ensure adequate capacity for planned growth.

Pollutant trading

Water quality trading, also known as pollutant trading, is a market-based approach for addressing point and non-point source pollution. The Minnesota Pollution Control Agency supports water quality trading for several reasons: greater environmental benefits can be achieved, watershed approaches that achieve multiple environmental and economic benefits are encouraged, and cost-effective alternatives for new and increasing discharges resulting from growth can be provided to maintain water quality levels (MPCA, 2022d).

Water quality trading allows permitted dischargers to meet water quality-based effluent limits by reducing a pollutant from an alternative source. Trading can be point source to point source, point source to non-point source, or nonpoint source to non-point source. Frequently trades are between regulated (permitted) point source entities and unregulated non-point sources (often agricultural operations). Water quality trades are implemented and enforced through Minnesota Pollution Control Agency issued permits. Trades are limited to pollutants without chronic toxicity-based limits because those limits must be applied at the point of discharge. Trading requires the calculation of reductions, credits, and safety factors; after a trade is approved and implemented, monitoring and performance tracking are required to assure reductions are being achieved. This has many possible benefits for NPDES permit holders, landowners, and the ecosystem. However, water quality trading also has many prerequisites, and to date, trading has been relatively limited in Minnesota.

There are benefits of reducing non-point sources when compared to point sources. Best management practices that target non-point phosphorus sources may also protect hydrology and recharge groundwater and create habitat. In contrast, investment in a point source reduction typically benefits a single pollutant. Thoughtful and carefully executed water quality trading will maximize the benefits of capital investments. Additionally, trading can save permitted dischargers money because buying credits can cost less than the cost of building new or rehabbing current infrastructure (MPCA, 2022d).

Water quality credit trading must be guided by robust policies to ensure that it doesn't inadvertently create regulatory uncertainty. Additionally, it requires compliance monitoring,

performance tracking, and enforceability to be successful. Non-point source credits are generated from best management practices installation and performance. Permittees who purchase non-point source generated credits assume responsibility for best management practices implementation, maintenance, and credit generation (MPCA, 2022d). Uncertainty results from the life expectancy of best management practices. For example, cover crops are a cost-effective best management practice but would have a credit life of only one year. Credits which expire before an associated NPDES permit create risk because a new equivalent credit will be needed by the expiration date for the permittee to maintain compliance. Best management practices that rely on vegetation, like treatment wetlands, will generate fewer credits when first constructed. Eventually sedimentation will degrade best management practice performance and credit generation.

There has been significant interest in water quality trading in Minnesota, but to date it has been limited. A barrier to implementing water quality trading is that Met Council's NPDES permits do not have additional capacity or waste load allocations which could be sold as water quality credits. Environmental Services is dedicated to maintaining its compliance record. However, Environmental Services does not have a regulatory strategy and therefore it is unclear how trading would contribute to our compliance goals. Currently, Met Council is meeting all existing NPDES permit requirements for its wastewater systems, but looking ahead, pollutant trading may be necessary to meet permit needs or facilitate regional benefits.

Princeton phosphorus trade case study

In 2008, Princeton, Minnesota had to upgrade its wastewater treatment plant on the Rum River. However, the Lake Pepin phosphorus Total Maximum Daily Load study was not completed. Therefore, Princeton was unable to receive a waste load allocation. To allow the necessary upgrades at the Princeton wastewater treatment plant, both the Met Council and the Minnesota Pollution Control Agency developed water quality credit trading policies. The trade was formalized in NPDES permits in 2008 and extended until 2015.

At this time, the Metropolitan Wastewater Treatment plant effluent was below the permit requirements for phosphorus, thus creating the opportunity for a trade to Princeton. The Met Council, in an effort to provide the greatest possible benefit to the watershed, took payment for the credits in the form of non-point best management practices to further reduce phosphorus loads to the Rum River.

The Princeton phosphorus trade took place despite Princeton being outside the region. The trade lowered our permitted effluent limit, which marginally increased the risk of non-compliance. The Met Council received no economic benefit from this partnership.

Rural wastewater recommendations

It is recommended, in partnership with the wastewater white paper, that we modify the current wastewater policy as suggested in bold below:

"The Council will acquire wastewater treatment plants owned by Rural Centers, based upon their request through the comprehensive plan and comprehensive sewer plan processes, ***if the acquisition provides cost-effective service, accommodates assigned growth, protects public health and wellbeing, and the facility currently meets or with improvement can***

meet environmental and regulatory requirements, *after soliciting customer input and conducting a public hearing on the request."*

The following implementation strategies relate to wastewater concerns under this policy:

- Accept the wastewater service request only when the following criteria are met:
  - The community accepts the Met Council's growth forecasts, as well as preserves at least 1,000 developed or developable acres for growth through the land use planning authority of the county or adjacent township(s) or through an orderly annexation agreement or similar mechanism to provide for staged, orderly growth in the surrounding area.
  - The community has a Department of Natural Resources approved water supply plan.
  - The community has a watershed approved local surface water plan.
  - The community has adequate transportation access.
  - The community lies within the Long-Term Wastewater Service Area or other regional benefits would result, such as economic development unique to the rural area or preservation of high-value water resources.
  - There are feasible and economical options for siting and permitting an expanded wastewater treatment plant or for extending interceptor service.
  - The Met Council has sought customer input, has conducted appropriate financial analysis, and has conducted a public hearing on the community's wastewater service request.
- Require that, if the most economical and beneficial wastewater service option is to construct a regional interceptor to serve the community, the Met Council will not acquire the community's wastewater treatment plant, and the community will be responsible for decommissioning its treatment plant.
- Not allow connections to the regional wastewater system outside the sewered rural community. The Met Council may construct capacity to serve the long-term needs of the rural and agricultural planning areas, but will not provide service until the Met Council, in consultation with the appropriate community, designates the area as a developing community and the community amends its comprehensive plan accordingly.
- Preserve areas outside the Long-Term Wastewater Service Area for agricultural and rural uses while protecting significant natural resources, supporting groundwater recharge, protecting source water quality, and allowing limited unsewered development.

Additional recommendations to implement this policy, resulting from an analysis of the Crucial Concerns outlined in this paper and from the Wastewater Planning and Service Considerations white paper include:

- The Met Council will consider providing a higher level of service for liquid waste haulers by investigating, adding, and maintaining additional liquid waste receiving sites.
- The Met Council will partner with other state agencies to discuss subsurface sewage treatment system disposal facilities and rural access to disposal sites.

Community water supply and private wells

Approximately 340,000 residents of the region live in rural areas and rely on either private wells or municipal water supply systems for their drinking water. Increases in population, surrounding land uses, and climate change can threaten the water quantity and quality in rural areas, and resilience of water supply systems. There are 87 cities and townships that lie partially or

completely in the region's rural areas. Twenty-eight of the communities that lie partially or completely in the region's rural areas operate municipal water supply systems and the remaining 59 rely on private wells. The 28 public water suppliers collectively serve more than 180,000 people, some in areas outside the rural designation. They are projected to roughly double their service population by 2040.

Aquifer use

Rural communities in the metro region draw most of their water from one of four primary aquifers: the Quaternary, the Prairie Du Chien-Jordan, the Tunnel City-Wonewoc, and the Mt. Simon-Hinckley. Several other minor aquifers are also used. Water availability around the region is dictated by the presence or absence of these aquifers and their pumping and recharge capacities (Metropolitan Council, n.d.). While private wells access a range of aquifers to supply water, the majority draw from shallow quaternary aquifers rather than the deeper aquifers commonly used by public water supply systems.

Infrastructure

Community water supply systems

Growing populations in rural areas present a challenge for municipal water supply systems. As rural centers develop, many will expand their supply systems to meet the drinking water and use needs of a growing community. More than 80% of public water suppliers in rural areas have indicated plans to repair, replace, expand, or add to their systems by 2040 (based on 2016-2018 Local Water Supply Plans submitted by communities as part of comprehensive planning). Among the 28 public water suppliers partially or completely within rural areas, 19 have planned updates to distribution systems.

Rural water supply systems are often smaller and more isolated than those in the urban core or densely populated suburbs. Rural communities' overall smaller populations and lower proportion of residents connected to municipal systems mean fewer wells are needed to adequately supply water to customers. The 28 public water supply systems partially or completely in the region's rural areas have an average of four water supply wells and serve an average of 6,200 residents.

In times of emergency, isolation from other water supply systems can pose a challenge to systems that rely on relatively few wells. The majority of water supply systems in rural areas have no established interconnection with neighboring communities in case of emergency. The only two communities with an interconnection are not connected to other public water supply systems – one of the communities has an emergency interconnection with a fire station and the other has an emergency interconnection with a business. Many of the communities that do not have an emergency interconnection instead have backup or emergency wells.

Corcoran case study

In its 2040 Comprehensive Plan, the city of Corcoran laid out a conceptual water supply system to meet the future water needs of residents and to become an independent supplier of water. Currently, the majority of Corcoran's population gets their water from private wells, but a proportion of residents receive water via a connection to the Maple Grove water supply system. As development in the city continues, Corcoran expects municipal water demand to increase directly with the portion of sewered households. Projected water demands for the city of

Corcoran were calculated using the Metropolitan Council's projected sewer populations. The supply interconnections with Maple Grove will be maintained after the transition to provide emergency interconnections. As the region develops and new water supply systems are built, an inherently resilient model of infrastructure development that establishes supply interconnections and gradually transitions those interconnections to emergency use (where applicable) should be considered.

The city of Corcoran acknowledges the possibility of well interference if a new water supply system is built. As high-capacity wells are drilled and come online, it is possible that some private well owners who do not connect to the new system could be impacted by drawdown. The Tunnel City-Wonewoc aquifer has been identified as a likely water source. The city plans to examine potential aquifer yields and potential impacts to private wells to guide future well development.

Private wells

The Twin Cities metro region has over 65,000 private wells, approximately 70% of which are in areas designated as rural (**Figure 10**). Both community water supply wells and private wells face similar threats to water quality and quantity. A key difference is private well users do not have the same water quality safeguards as those who get their water from a public system.

The Minnesota Well Code ensures that private wells are properly located and constructed. Once a well is put into service, private well users are financially responsible for properly maintaining their well, testing it regularly, and treating the water when necessary. Contaminants that private well owners test for include nitrates, arsenic, and pesticides. There are several water treatments that can address contamination including reverse osmosis, distillation, anion exchange, and chlorination and filtration. Other options for the well owner could include constructing a new well, connecting to a public water system, or buying bottled water (MDH, 2022b). All options vary in cost and their required maintenance. Both treatment and drilling can be cost prohibitive for private well users.

Wells that are not being used for consumption or irrigation purposes are considered abandoned. Abandoned private wells must be sealed to avoid having contaminants enter the aquifer, increasing the likelihood similar surrounding wells will be polluted. Unless the well owner has a permit, Minnesota law (Minnesota Statutes § 103I.301) requires the sealing of abandoned wells. In the metro region, some counties have funds available for property owners to receive financial assistance for sealing abandoned wells, and some do not.

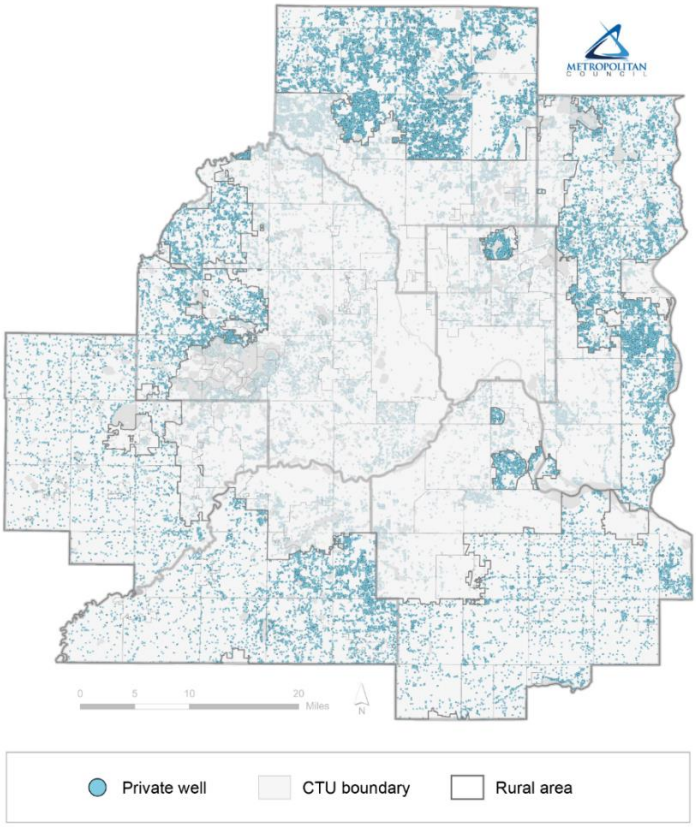


Figure 10: Private wells in the metro (with rural areas highlighted)

Contamination and Testing

Limited testing by counties and state agencies has documented growing problems with water quality in private wells, raising concerns about health and costs for treatment. Rural land use and management have a direct impact on the water quality for these drinking water sources. Wells are more vulnerable to contamination if they are shallow; in glacial drift aquifers; or have casings that are not watertight, damaged, or have leaking fittings (MDH, 2022d). Additionally, high concentrations of naturally occurring chemicals can impair the safety of a well's drinking water.

Public water systems are responsible for ensuring the drinking water is safe for end users, while private well owners and users are responsible for ensuring that their water is safe for consumption. Testing for contaminants in private wells is driven by residents and supported, to an extent, by counties and state agencies. Public water supply systems are required to routinely test for a variety of contaminants under the Safe Drinking Water Act to ensure safe drinking water for communities and to identify necessary actions for remediation. The Minnesota Department of Health tests for several major types of contaminants including pesticides and industrial contaminants, bacterial contamination, nitrate/nitrite, inorganic chemicals, radioactive elements, disinfection byproducts, lead, and copper.

Nitrates

Nitrate can be harmful to human health when consumed at high levels. Nitrates can affect how blood carries oxygen, which can cause blue baby syndrome in bottle-fed babies (MDH, 2021). Research shows a link between nitrate exposure and other health effects in adults including increased heart rate, nausea, headaches, abdominal cramps, and an increased risk of cancer (MDH, 2021).

Nitrate is a compound that naturally occurs and has many human-made sources. High levels of nitrate in rural waters can be a result of runoff or leakage from fertilized soil, wastewater, landfills, animal feedlots, or subsurface sewage treatment systems. Nitrogen fertilizer that leaches past the crop root zone is a major contributor to elevated levels of nitrate in groundwater in rural Minnesota (MDA, n.d.). It can be difficult to pinpoint where nitrate in drinking water comes from because it is typically from non-point source pollution (MDH, 2021). The Environmental Protection Agency determined a Health Risk Limit of 10 mg/L for nitrate, which is enforced by the Minnesota Department of Health for public water supply systems and serves as a guidance for private drinking water systems (MDA, 2019b).

The Minnesota Department of Health uses land use classification and hydrogeologic sensitivity to score nitrate-nitrogen contamination risk for the water table aquifer across 30 Minnesota counties (MDH, 2016). Rural areas in the Twin Cities metro region have relatively uniform proportions of nitrate risk to the water table aquifer – 27% of rural land area is designated as low risk, 33% as moderate risk, and 34% as high risk. Distribution of these risk areas is less uniform, with greater concentrations of high and moderate risk areas in southeastern Dakota County and, to a lesser extent, southwestern Carver and Scott counties (**Figure 11**).

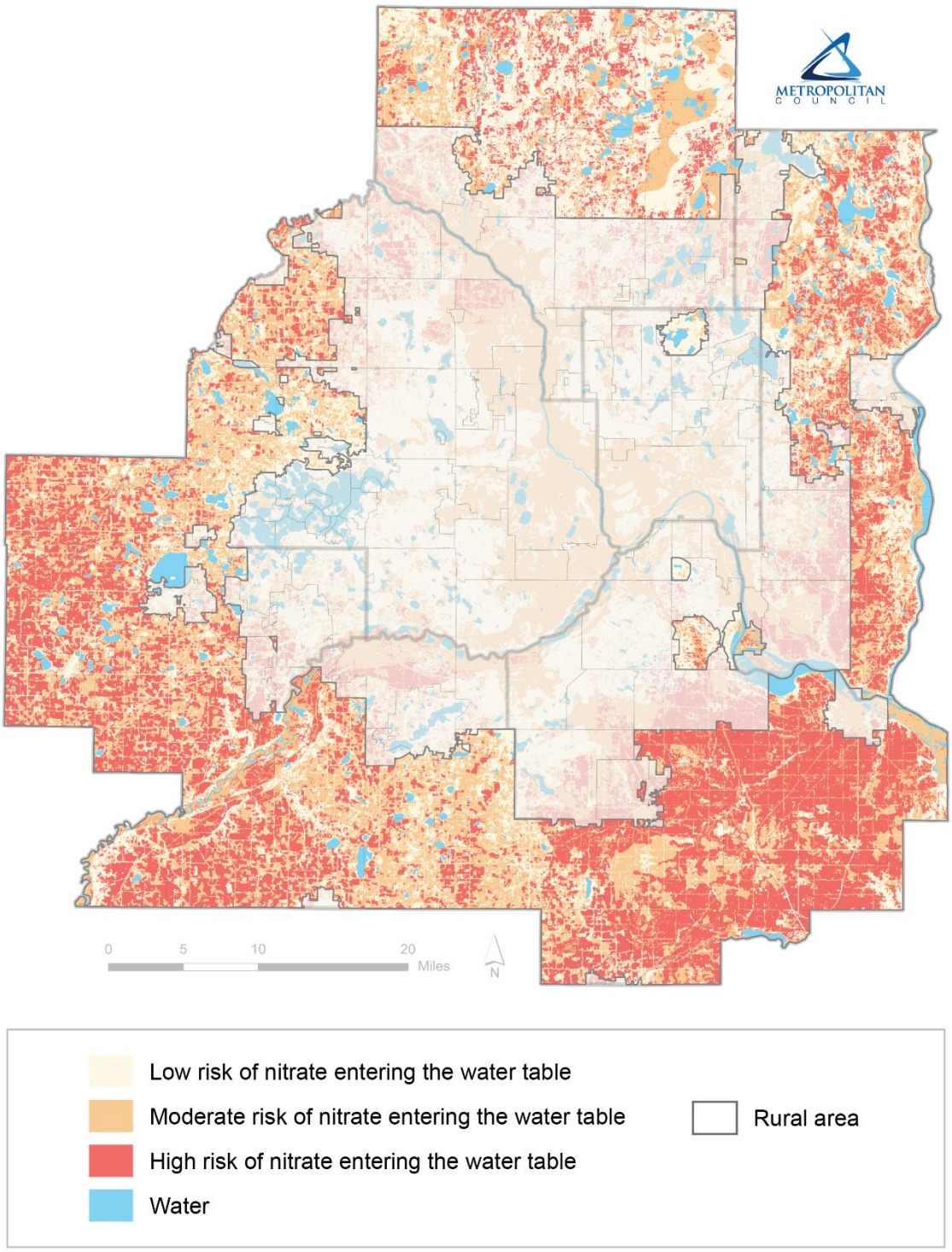


Figure 11: Nitrate risk to the water table aquifer (with rural areas highlighted)

Water drawn from shallower private wells is more prone to nitrate contamination than deeper public water supply wells, but municipal systems can also be susceptible to elevated nitrate levels in water. All public water systems in Minnesota are tested for nitrate once a year. If a

public water supply system exceeds the Health Risk Limit, reduction measures must be taken including treating the contaminated water or drilling a new water supply well (MDH, 2022c). In 2021, 92% of Minnesotans were served by community water supply systems with mean nitrate levels that were at or below normal levels (MDH, 2021).

The Minnesota Department of Agriculture is responsible for nitrogen fertilizer use and management under the Groundwater Protection Act. The Minnesota Department of Agriculture, with help from stakeholders, created the Minnesota Nitrogen Fertilizer Management Plan. The primary goal of the Minnesota Nitrogen Fertilizer Management Plan is to involve the agricultural community in addressing localized concerns about unsafe levels of nitrate in groundwater. Based on the Minnesota Nitrogen Fertilizer Management Plan, the Minnesota Department of Agriculture implemented the Groundwater Protection Rule to minimize nitrogen fertilizer's contribution to nitrate pollution in the state's groundwater. The Groundwater Protection Rule contains two parts: part one restricts the application of nitrogen fertilizer in the fall and on frozen soils (**Figure 12**), and part two focuses on mitigation efforts to protect public water supply wells before they exceed the drinking water standard (**Figure 13**).

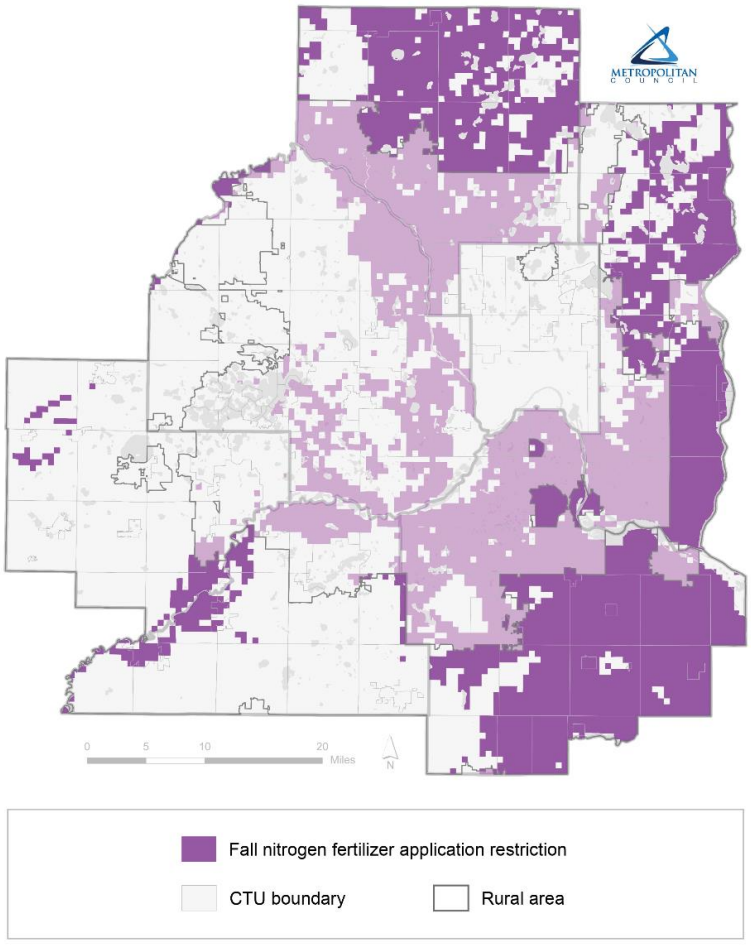
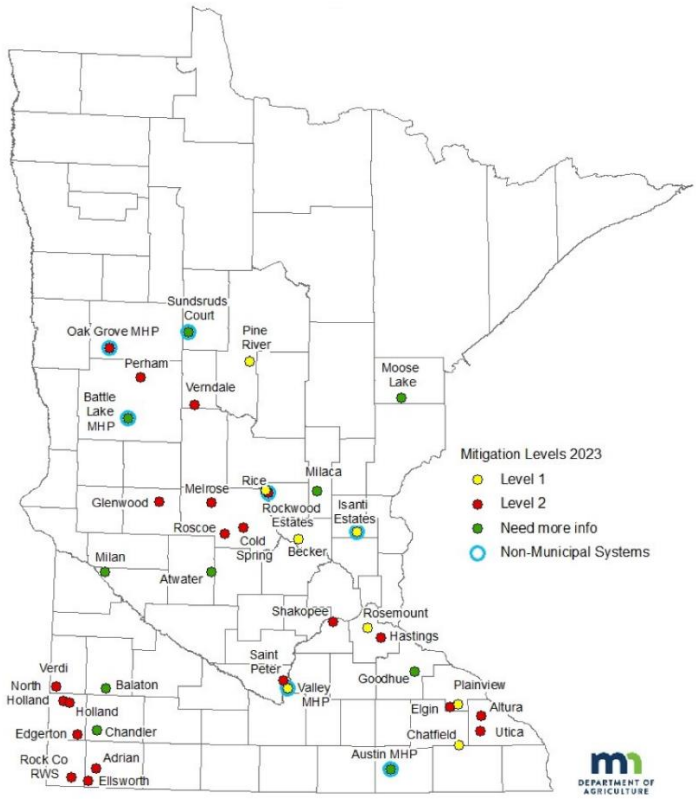


Figure 12: Nitrogen fertilizer fall restrictions (with rural areas highlighted)



Mitigation Level	Nitrate level used for determination*
Level 1	5.4 to less than 8 mg/L
Level 2	8 mg/L or greater; or are projected to exceed 10 mg/L in the next ten years

*Based on monitoring data from the MDH. Nitrate values can be from any time in the previous ten years.

Figure 13: Drinking water supply management area mitigation levels

Arsenic

Consumption of arsenic has multiple negative health impacts. The short-term effects of arsenic exposure include stomach pain, nausea, vomiting, and diarrhea. Long-term exposure is more severe and can include partial paralysis, numbness in hands and feet, blindness, lesions, and thickening and discoloration of the skin. Arsenic attacks the body's cells and can lead to cancer of the bladder, lungs, skin, kidneys, nasal passages, liver, and prostrate (MDH, 2022a).

Arsenic is an odorless, tasteless element that is abundant in the Earth's crust. The Minnesota Department of Health estimates that 15% of Minnesota's private wells exceed the legal limit for arsenic. Roughly 33% of the arsenic in drinking water comes from the erosion of deposits in the earth. The final advance of glaciers across Minnesota left behind a rich deposit of sediments containing arsenic, which leaches into aquifers, impacting private wells in rural areas (Vogel, 2015). This is known as the Des Moines lobe (**Figure 14**). The remaining percent of arsenic in drinking water is added by agricultural and industrial runoff and emissions (USGS, 2019).

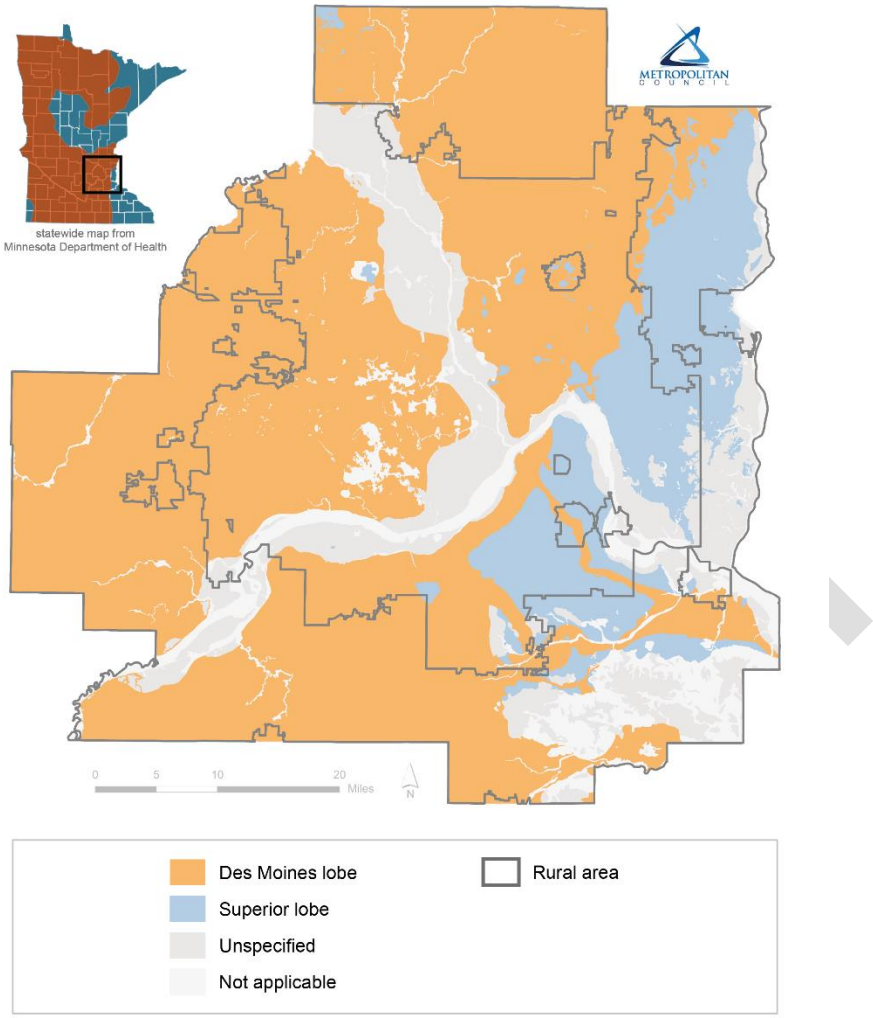
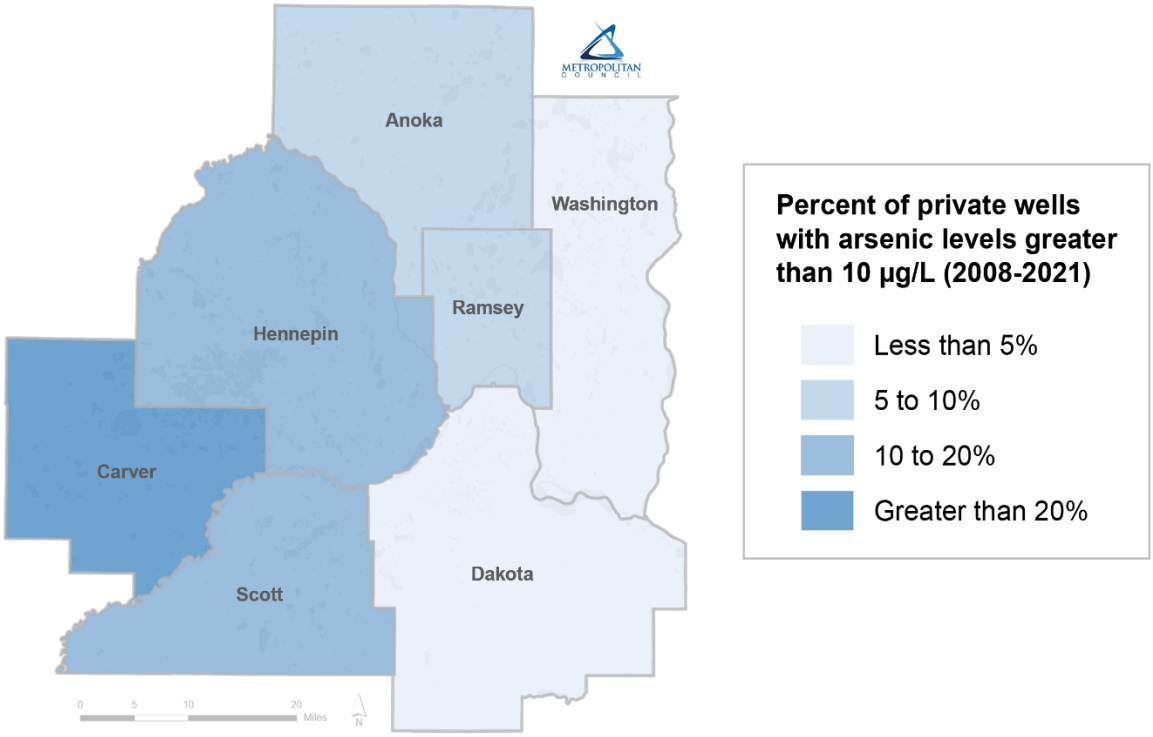


Figure 14: Des Moines lobe (with rural areas outlined)

The Minnesota Department of Health uses the Environmental Protection Agency standard 10 µg/L as the state's Health Risk Limit for public water supply systems and as a guidance for private drinking water systems. Since 2008, all new wells in Minnesota must be tested for arsenic (Vogel, 2015). According to the Minnesota Department of Health, few public water systems have detected arsenic levels above the Environmental Protection Agency standard of 10 µg/L. From 2008 to 2021, the Minnesota Department of Health tested new private wells for arsenic. Within the metro region, the Minnesota Department of Health determined that over 20% of Carver County new wells contain greater than 10 µg/L of arsenic. Roughly 10-20% of Hennepin and Scott counties new wells contain 10 µg/L of arsenic (**Figure 15**) (MDH, 2023).



County	Anoka	Carver	Dakota	Hennepin	Ramsey	Scott	Washington
Number of wells tested	3,084	590	530	1,607	104	939	1,247
Wells greater than 2 µg/L	1,615	430	118	1,142	45	447	297
Wells greater than 10 µg/L	246	124	4	283	7	126	39
95th percentile arsenic value	12.6	24.7	5.2	18.3	12.2	19.1	7.9
Median arsenic value	2.2	3.9	≤ 2.0	4.1	≤ 2.0	≤ 2.0	≤ 2.0

Adapted from Minnesota Department of Health's Arsenic in Private Wells Interactive Map

Figure 15: Arsenic in private wells (2008-2021)

Pesticides

As discussed in the Water Quality section, pesticides are chemicals registered for the control of insects, plants, or fungi. The Minnesota Department of Agriculture regulates the use, application, storage, sale, handling, and disposal of agricultural chemicals including pesticides.

The Minnesota Department of Agriculture performs ambient groundwater pesticide monitoring to ensure pesticide regulations are effective. However, five pesticides are listed as "Common

Detection" pesticides. The presence of common detection pesticides is not due to misuse or unusual circumstances but is likely to be the result of normal use of a product or practice. The common detection pesticides are Acetochlor, Alachlor, Atrazine, Metolachlor, and Metribuzin (MDA, 2022). The main findings from the samples collected were:

- Forty-two different pesticide or pesticide degradants were detected of the 181 pesticide chemicals evaluated.
- Pesticide degradants usually had higher frequencies compared to parent pesticides.
- The neonicotinoid insecticide dinotefuran was detected for the first time in a Minnesota Department of Agriculture sample since 2021. Its concentration was lower than the health concern value. (MDA, 2022)

Source water protection

Protecting drinking water sources is critical to ensuring a healthy and lasting water supply for the region. The Minnesota Department of Health works with communities to identify risks and to act when contamination issues arise. Public water suppliers across Minnesota complete Source Water Protection Plans to identify areas of land that supply water, assess vulnerability to contamination, and consider possible actions to reduce threats of contamination (MDH, 2022c). Private well owners are not covered by these protection programs.

Wellhead Protection Areas, Drinking Water Supply Management Areas, and Emergency Response Areas are surface and subsurface areas used to implement and monitor source water protection practices. These areas are delineated based on the time it takes for water to travel from the surface and through the ground to a well (MPCA, 2023).

There are 83 Drinking Water Supply Management Areas that fall within rural areas of the metro and cover 166 square miles. It is important to consider the different levels of vulnerability across rural areas and within individual Drinking Water Supply Management Areas. Some Drinking Water Supply Management Areas have a single vulnerability designation, but most have multiple. Of the 166 square miles of Drinking Water Supply Management Areas in rural areas of the metro region, about 58% of that area is considered highly vulnerable (**Figure 16**).

The Hastings Drinking Water Supply Management Area covers a significant swath of the southeast metro region and is considered highly vulnerable due to vertical travel times fewer than 50 years (Barr, 2019). In areas of high and very high Drinking Water Supply Management Area vulnerability, public water suppliers must manage all land uses and potential contaminant sources. This task requires collaboration because much of the land within drinking water supply management areas is privately owned. While public water suppliers and the Minnesota Department of Health are responsible for providing safe drinking water, they do not have the authority or capacity to protect drinking water sources on their own.

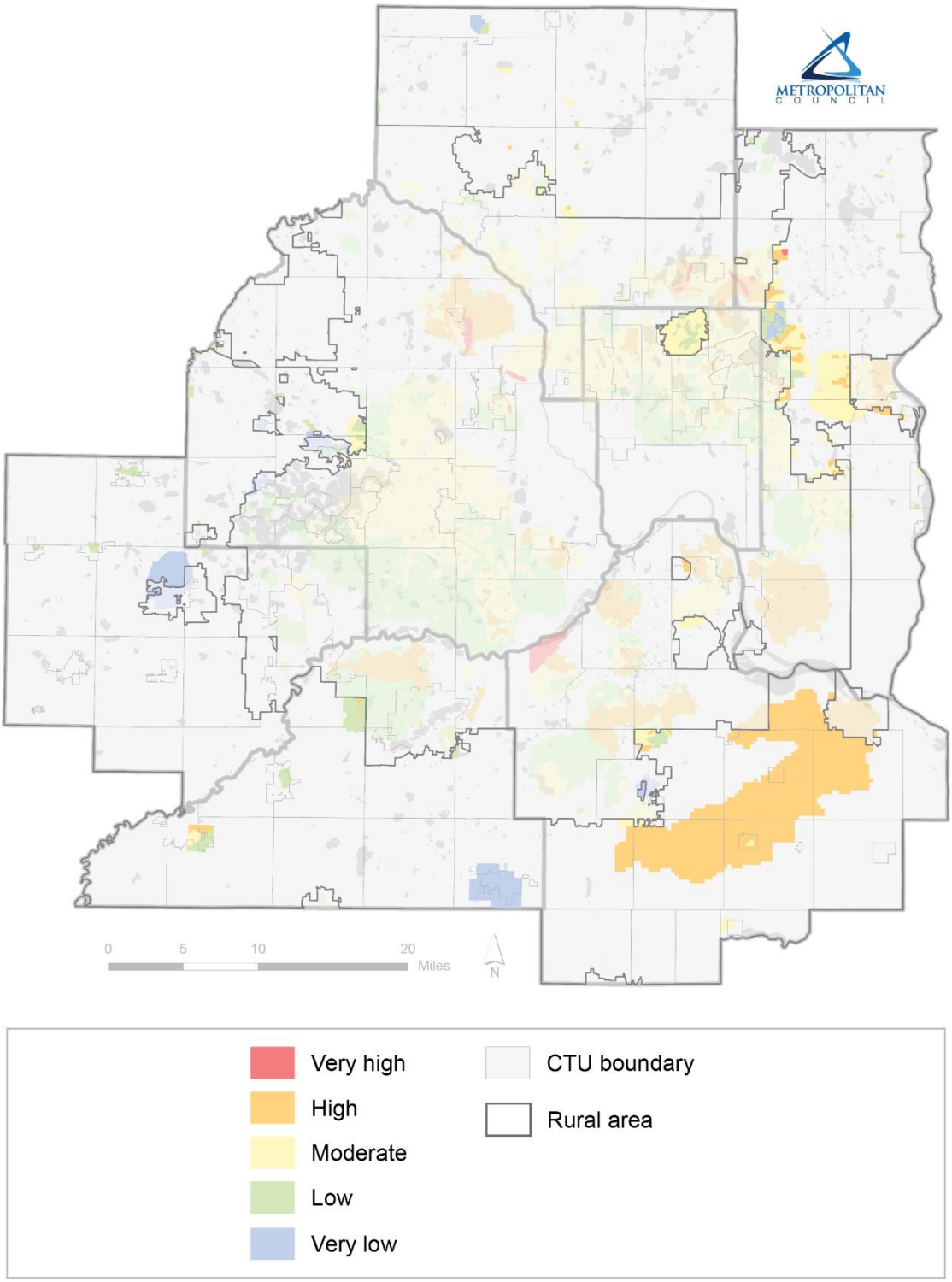


Figure 16: Drinking water supply management area vulnerability (with rural areas highlighted)

Additionally, areas of high pollution sensitivity make up 21% of rural areas in the metro region. High pollution sensitivity areas combined with moderate areas (11%) and karst landscapes (14%) comprise 47% of rural areas. These pollution sensitive areas are concentrated in northern Anoka County, eastern and central Washington County, and southern Dakota County. There are smaller concentrations of high, moderate, and karst landscapes along the Minnesota River and South Fork Crow River (**Figure 17**).

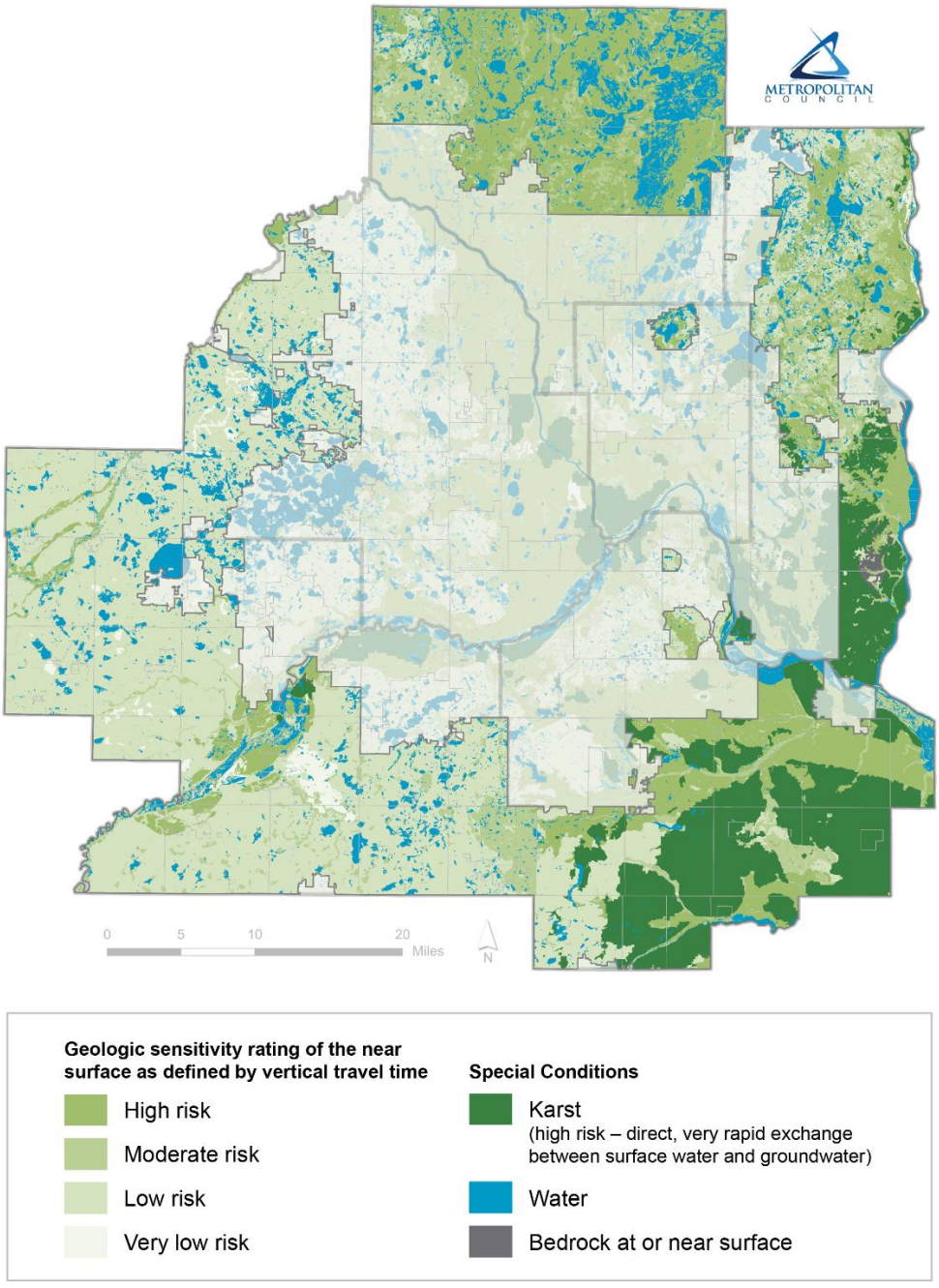


Figure 17: Pollution sensitivity of near-surface materials (with rural areas highlighted)

Dakota County Groundwater - Source Water Protection Collaborative

As issues persist and emerge for rural public water suppliers, improved and expanded collaboration between suppliers, their partners, and state agencies will be critical. To address this issue, Dakota County created the Groundwater - Source Water Protection Collaborative in 2021. The Collaborative is a forum to facilitate benchmarking, data sharing, share ideas, and collaboration between the County and drinking water stakeholders to increase protection of the quality and quantity of groundwater in the County. The Collaborative is open to all organizations that have an interest in protecting Dakota County drinking water (Dakota County, 2022). This forum is an excellent example of a collaborative effort to support source water protection and could serve as a model for other parts of the region.

Additional information on source water protection can be found in the Source Water Protection Research Paper.

Rural water supply recommendations

- The Met Council will convene rural water suppliers, private well users, and partner agencies to discuss and set planning priorities for rural areas around aging infrastructure, system resiliency, service population growth, and potential impacts to private users.
- The Met Council will research long-term water availability in rural areas of the metro region.
- The Met Council will support rural water systems by advocating for funding to improve or build new water supply infrastructure, as needed.
- The Met Council will partner with the state to help rural communities collaborate around emergency planning and service reliability by identifying community needs and potential service or funding gaps.
- The Met Council will (where applicable) encourage growing communities planning on building new water supply systems to transition existing interconnections from supply to emergency use.
- The Met Council will partner with local and regional experts to identify needs and develop tools that help to improve public understanding around contamination, well testing and maintenance, source water protection, and publicly available resources.
- The Met Council will support efforts to estimate the pumping volume and impacts of private wells in rural areas and the broader metro region.
- The Met Council will support funding or programs proposed by other state agencies to fund and enhance monitoring in the metro region and in significant source water areas that serve the metro region.
- The Met Council will support the evaluation of how growth and development, rural land uses, and land use change impact and influence water supplies and local water needs.

Equity considerations

Environmental justice, as defined by the Council's Environmental Justice Task Force, is the equitable engagement of policy creation for, and service delivery to, all people in the metropolitan region with the ***prioritization of communities of color and low-income***

communities. The term justice is used to acknowledge that there has been an ongoing history of harm and environmental racism toward Black, Indigenous and people of color in the state of Minnesota. Public policy has produced an unequal landscape for communities of color and low-income communities in rural areas, producing environmental justice issues.

Discriminatory policies by the federal government, primarily the United States Department of Agriculture, have led to the near elimination of farmers of color. In the early 1900s roughly 14% of farmers were black, and by 2012, only roughly 2% were people of color (Center for American Progress, 2019). Between 1920 and 2007, black farmers lost 80% of their land (Center for American Progress, 2019). As of 2020, 99% of farmers in Minnesota were white, even though white people make up roughly 80% of the state's population (Russell, 2021).

Farmers of color have had less access to credit and extensions programs than white farmers. A National Public Radio analysis of United States Department of Agriculture data looked at how many direct loans were accepted, rejected, and withdrawn per racial group (Bustillo, 2023). Black and Asian farmers who applied for United States Department of Agriculture direct loans in the 2022 fiscal year were approved at lower rates and rejected at higher rates than any other racial demographics (Bustillo, 2023). Additionally, farmers of color received less than 1% of coronavirus pandemic farming aid, despite making up 5% of farmers (Bustillo, 2023). Loan rejections often occur because the application process is too cumbersome. For example, Minnesota has a large Hmong farming population. These farmers typically lease land, but often are not given a written contract necessary to qualify for loans. Additionally, language barriers can be a major issue for Hmong and Hispanic farmers (Bustillo, 2023).

In Minnesota, Hmong American farmers occupy a unique space in our local food history. In the 1970s, Hmong refugees began resettling in the U.S., including Minnesota, as political refuges after the Vietnam War. Many of these families relied on their agricultural heritage to make a living growing produce and flowers for local markets and to keep them connected to their culture (HAFA, n.d.). In 2011, a group of Hmong American farmers formed the Hmong American Farmers Association (HAFA) to advance the prosperity of Hmong American farmers through cooperative endeavors, capacity building, and advocacy (HAFA, n.d.).

The Hmong American Farmers Association's work is based around the understanding that all aspects of the farming system must be addressed simultaneously to build intergenerational and community wealth. The model addresses five components: land access, new markets, training and capacity building, financing, and research and data collection (HAFA, n.d.). In 2022, the Hmong American Farmers Association purchased 155 acres of land in Dakota County, the first Hmong nonprofit-owned farm created and operated by Hmong American farmers on U.S. soil (Zhang, 2022).

Environmental justice and economic development considerations are important to improve and advance equity, prosperity, and health for future generations of the region. Within the region, urban and rural communities face different challenges. In rural areas, residents often rely on subsurface sewage treatment systems for wastewater treatment. As planning efforts look to 2050, there will be many rural sewage treatment systems reaching the extent of their normal lifespan. Communities are responsible for ensuring that the private systems are maintained and managed consistent with the Minnesota Pollution Control Agency's rules. Maintenance updates of sewage treatment systems or replacement can be a cost prohibitive, especially for residents who may already be experiencing cost burdens. In addition, as people age in their communities, maintenance and repairs may also be more difficult. Without maintenance or replacement,

failure of the system can occur and have negative impacts on surrounding water resources, wells, and natural resources. Contamination of wells can occur near failing systems.

The Met Council does not provide financial support to help communities with failing sewage treatment systems. Rural communities often have a smaller population, tax base, and fewer resources to help support improvement. Failure of aging sewage treatment systems could result in potential connection to the regional wastewater system before it was planned. New unplanned financial investment to add areas into the regional wastewater system should not result in a shift in funding, resources, or planned capacity from environmental justice areas or areas in the region where residents have been historically overburdened.

Additionally, for rural expansion, the cost of sewershed extension might be more favorable than a decentralized/local plant. When this cost is further examined through an environmental justice lens, it may have further implications and externalities. For example, within the metro region, all the upstream wastewater is routed through many neighborhoods in Minneapolis and Saint Paul that are predominantly communities of color by interceptors that already face capacity constraints. With the current affordable housing shortage and associated cost burdens, potential future affordable developments in the urban center could be limited if that capacity is allocated to rural expansion.

We need metro specific data in rural areas to help us gain a better understanding of the landscape of rural water and equity concerns in the metro region's rural areas.

Environmental justice and water equity recommendations

- The Metropolitan Council will investigate ways to include environmental justice frameworks into its decision-making processes, including expansion of the wastewater system, and the Council's infrastructure policy should consider environmental justice and racial equity principles at a regional level.
- Met Council staff will partner and support metro region organizations with a water equity focus.
- The Met Council will convene regional discussions about water equity and environmental justice concerns.
- Environmental Services will integrate equity metrics into our programs, projects, and services. Environmental Services will complete an equity analysis of where our capital program dollars are being spent.
- The Met Council will work toward securing funds to provide grants promoting water equity and to address identified environmental injustices.

Connections to current policy

2040 Water Resources Policy Plan

The 2040 Water Resources Policy Plan contains 11 separate policies. Four of these policies address rural water, as denoted below.

Policy on Watershed Approach

The Council will work with our partners to develop and implement a regional watershed-based approach that addresses both watershed restoration (improving impaired waters) and protection (maintaining water quality in unimpaired waters).

This policy includes the following implementation strategies related to rural waters.

- Through the review process for comprehensive plans, local water plans, and watershed management plans, make water resources management a critical part of land use decisions, planning protocols, and procedures to ensure these plans are making progress toward achieving state and regional goals for protection and restoration of water resources.

- Support educational efforts through partnership opportunities with agricultural communities in the region and collar counties on watershed issues.

Policy on Sustainable Water Supplies

While recognizing local control and responsibility for owning, operating, and maintaining water supply systems, the Council will work with our partners to develop plans that meet regional needs for a reliable water supply that protects public health, critical habitat, and water resources over the long term.

This policy includes the following implementation strategies related to rural waters.

- Collaborate with state agencies, watershed organizations, and community water suppliers to update the regional Master Water Supply Plan.

- Support community efforts to improve water supply resiliency by cooperatively identifying economically and technically feasible water supply alternatives.

- As required by Minnesota Statutes, review and comment on local water supply plans.

- As requested by the DNR, review and comment on Groundwater Management Areas and water appropriation permits.

- As required by Minnesota Statutes, review and comment on wellhead protection and county groundwater plans.

- Facilitate discussions on water supply issues that transcend community boundaries through subregional work groups and on an ad hoc basis.

- Collaborate with partners to perform special studies as needed.

Policy on Private Wastewater Systems

Communities that permit the construction and operation of subsurface sewage treatment systems and other private wastewater treatment systems within their communities are responsible for ensuring that these systems are installed, maintained, managed, and regulated consistent with Minnesota Pollution Control Agency rules. The Council will not provide financial support to assist communities if these systems fail.

This policy includes the following implementation strategies related to rural waters.

- To ensure that failing systems do not cause the need to prematurely extend the metropolitan disposal system, the Met Council, through the local comprehensive planning process, requires that communities submit copies of their ordinances for subsurface sewage treatment systems and information on their management programs for these systems.

- The Council will continue to support State rules for subsurface sewage treatment systems and other private wastewater systems.

- The Council will allow a community to connect a failing subsurface sewage treatment system or other private wastewater treatment system to the regional wastewater system at the community's expense.

Policy on Serving the Rural Area

The Met Council will acquire wastewater treatment plants owned by Rural Centers, based upon their request through the comprehensive plan and comprehensive sewer plan processes, and based upon criteria that ensure direct identifiable regional benefits, after soliciting customer input and conducting a public hearing on the request.

This policy includes the following implementation strategies related to rural waters.

- Not allow connections to the regional wastewater system outside the sewered rural community. The Met Council may construct capacity to serve the long-term needs of the rural and agricultural planning areas, but will not provide service until the Met Council, in consultation with the appropriate community, designates the area as a developing community and the community amends its comprehensive plan accordingly.
- Preserve areas outside the Long-Term Wastewater Service Area for agricultural and rural uses while protecting significant natural resources, supporting groundwater recharge, protecting source water quality, and allowing limited unsewered development.

Thrive MSP 2040

Thrive MSP 2040 is the vision for our region to the year 2040, which reflects concerns and aspirations, anticipates future needs in the region, and addresses our responsibility to future generations. *Thrive MSP 2040* includes seven policies to guide land use and regional development for a prosperous, equitable, livable, and sustainable future, which may impact rural waters.

Below are policies and associated implementation strategies related to rural water issues.

Policy on Water Sustainability

Conserve, restore, and protect the quality and quantity of the region's water resources to ensure ongoing availability, support public health, and maintain a high quality of life.

This policy includes the following implementation strategies related to rural waters.

- Support the Minnesota Pollution Control Agency's regulatory approach to private treatment systems, which requires permits for systems designed to treat an average flow greater than 10,000 gallons per day of wastewater (approximately 35 homes).

- Advocate that the local community be the permit holder for private wastewater treatment systems to ensure long-term accountability for the proper functioning and maintenance of systems.

- Provide technical assistance regarding private wastewater treatment systems and share information about the performance of these systems in the region.

Policy on Orderly and Efficient Land Use

Orderly and Efficient Land Use: Align land use, development patterns, and infrastructure to make the best use of public and private investment.

- This policy includes the following implementation strategies related to rural waters. Advance the Council mission of ensuring orderly and economical development.

- Develop/update regional plans to manage forecasted growth by using regional systems and land efficiently and effectively.

- Coordinate major regional investment projects with local infrastructure and planning for development and redevelopment.

Policy on Natural Resources

Conserve, restore, and protect the region's natural resources to ensure availability, support public health, and maintain a high quality of life.

- This policy includes the following implementation strategies related to rural waters. Promote agricultural practices that protect the region's water resources, including both surface water resources and groundwater resources.

- Provide information to communities about how to incorporate environmentally sensitive development techniques into farm-related construction.

- Provide technical assistance and tools for resource protection, such as best practices regarding the use of conservation easements and clustered development ordinances in the Diversified Rural area.

Policy on Building in Resilience

Promote sensitive land use and development patterns to contribute toward achieving Minnesota's adopted greenhouse gas emission goals at the regional scale and to develop local resiliency to the impacts of climate change.

This policy includes the following implementation strategies related to rural waters.

- Identify and address potential vulnerabilities in regional systems as a result of increased frequency and severity of storms and heat waves. Maintain dikes, emergency generators, and response plans for Met Council facilities facing extreme weather.

Draft new policy/implementation strategies

This section puts forth specific draft policies, strategies, and actions that are an integration of the Crucial concern section recommendations and our existing 2040 water quality-related policies that will be carried forward into the 2050 planning cycling. All of the content below is intended to spark discussion and ideas to help hone the policy language for the next plan. Where necessary, Met Council staff have developed new or modified policy language for consideration.

Proposed policy recommendation on environmental justice and water equity:

We will need to develop new policy to encapsulate our strategies and actions toward water equity and environmental justice within the region. Met Council staff will work with Council Members to develop the language in 2023. Below are the recommended actions from this paper:

Proposed actions:

The Met Council will investigate ways to include environmental justice frameworks into its decision-making processes, including expansion of the wastewater system, and the Council's infrastructure policy should consider environmental justice and racial equity principles at a regional level.

- Met Council staff will partner and support metro region organizations with a water equity focus.
- The Met Council will convene regional discussions about water equity and environmental justice concerns.
- Environmental Services will integrate equity metrics into our programs, projects, and services. Environmental Services will complete an equity analysis of where our capital program dollars are being spent.
- The Met Council will work toward securing funds to provide grants promoting water equity and to address identified environmental injustices.

Proposed policy recommendation rural wastewater:

It is recommended, in partnership with the wastewater white paper, that we modify the current wastewater policy as suggested in bold below:

"The Council will acquire wastewater treatment plants owned by Rural Centers, based upon their request through the comprehensive plan and comprehensive sewer plan processes, ***if the acquisition provides cost-effective service, accommodates assigned growth, protects public health and wellbeing, and the facility currently meets or with improvement can meet environmental and regulatory requirements,*** *after soliciting customer input and conducting a public hearing on the request."*

The following implementation strategies relate to wastewater concerns under this policy:

- Accept the wastewater service request only when the following criteria are met:
    - The community accepts the Met Council's growth forecasts, as well as preserves at least 1,000 developed or developable acres for growth through the land use planning authority of the county or adjacent township(s) or through an orderly annexation agreement or similar mechanism to provide for staged, orderly growth in the surrounding area.
    - The community has a Department of Natural Resources approved water supply plan.
    - The community has a watershed approved local surface water plan.
    - The community has adequate transportation access.
    - The community lies within the Long-Term Wastewater Service Area or other regional benefits would result, such as economic development unique to the rural area or preservation of high-value water resources.
    - There are feasible and economical options for siting and permitting an expanded wastewater treatment plant or for extending interceptor service.
    - The Met Council has sought customer input, has conducted appropriate financial analysis, and has conducted a public hearing on the community's wastewater service request.
- Require that, if the most economical and beneficial wastewater service option is to construct a regional interceptor to serve the community, the Met Council will not acquire the community's wastewater treatment plant, and the community will be responsible for decommissioning its treatment plant.
- Not allow connections to the regional wastewater system outside the sewered rural community. The Met Council may construct capacity to serve the long-term needs of the rural and agricultural planning areas, but will not provide service until the Met Council, in consultation with the appropriate community, designates the area as a developing community and the community amends its comprehensive plan accordingly.
- Preserve areas outside the Long-Term Wastewater Service Area for agricultural and rural uses while protecting significant natural resources, supporting groundwater recharge, protecting source water quality, and allowing limited unsewered development.

Additional recommendations to implement this policy, resulting from an analysis of the Crucial Concerns outlined in this paper and from the Wastewater Planning and Service Considerations white paper include:

- The Met Council will consider providing a higher level of service for liquid waste haulers by investigating, adding, and maintaining additional liquid waste receiving sites.
- The Met Council will partner with other state agencies to discuss subsurface sewage treatment system disposal facilities and rural access to disposal sites.

<u>Proposed rural water quality policy recommendation:</u>

The Met Council will support, collaborate, and partner on water quality efforts in rural areas.

Proposed actions:

- Investigate how to create better agricultural partnerships with soil and water conservation districts to limit land management decisions' impacts on our drinking water supply and wastewater permits.
- The Met Council will continue to support the Wetland Conservation Act and wetland preservation, enhancement, and restoration.
- When drainage systems are upgraded, the Met Council will support incorporation of practices to reduce peak flows and nutrient loading.
- The Met Council will support the agriculture certification program and soil health/regenerative agriculture in rural areas through partnerships with metro soil and water conservation districts.
- The Met Council supports preservation of regionally significant ecologic areas as rural areas develop through educational outreach to local governments and plan review.
- The Met Council will promote the use of green infrastructure best management practices for new development and redevelopment through educational outreach to local governments and plan review.
- The Met Council will continue to partner with the Minnesota Department of Agriculture to monitor pesticides.
- Water quality credit trading is a potential strategy for meeting NPDES permit requirements but will require strong policies and careful implementation to provide regulatory certainty. The Met Council will develop a water quality credit trading policy and explore potential agreements that conform with it.

<u>Proposed rural water supply policy recommendation:</u>

The Met Council will support adaptation and mitigation efforts of rural water systems and rural water users as the impacts of climate change become more substantial and the region continues to grow.

Proposed actions:

- The Met Council will convene rural water suppliers, private well users, and partner agencies to discuss and set planning priorities for rural areas around aging infrastructure, system resiliency, service population growth, and potential impacts to private users.
- The Met Council will research long-term water availability in rural areas of the metro region.
- The Met Council will support rural water systems by advocating for funding to improve or build new water supply infrastructure as needed.
- The Met Council will partner with the state to help rural communities collaborate around emergency planning and service reliability by identifying community needs and potential service or funding gaps.

- The Met Council will (where applicable) encourage growing communities planning on building new water supply systems to transition existing interconnections from supply to emergency use.
- The Met Council will partner with local and regional experts to identify needs and develop tools that help to improve public understanding around contamination, well testing and maintenance, source water protection, and publicly available resources.
- The Met Council will support efforts to estimate the pumping volume and impacts of private wells in rural areas and the broader metro region.
- The Met Council will support funding or programs proposed by other state agencies to fund and enhance monitoring in the metro region and in significant source water areas that serve the metro region.

The Met Council will support the evaluation of how growth and development, rural land uses, and overall land use change impact and influence water supplies and local water needs.

Next steps

This topical white paper is the first step in the process of creating regional water policies to safeguard our waters and to protect the livability and prosperity of the region (**Figure 18**). The ideas in this paper are intended to spark discussion and generate additional water-focused policy recommendations to provide the foundation of the 2050 Water Resources Policy Plan. This paper was created and reviewed by Met Council staff. Our planned next step is to gather and include vital perspectives from our partners on needed policy recommendations.

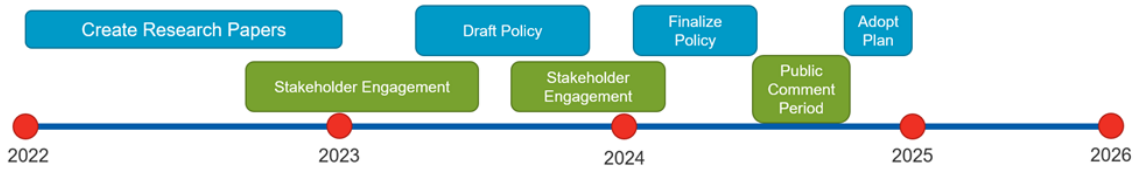


Figure 18: Water Resource Policy Plan timeline

After this additional information is gathered, Met Council staff will update the draft policy recommendations through an iterative process of drafting policies, listening to stakeholder feedback, and integrating the information collected to assist the Met Council Members to develop, evaluate, refine, and adopt policies. Alternating between engagement and policy creation will allow stakeholders to participate and shape plan content from the very beginnings of policy research and development through the public comment period prior to the adoption of the plan. This proposed process is an intentional attempt to bring in more voices and perspectives to help the Met Council produce policies and implementation strategies that are reflective of the region's water priorities.

If you have any questions or feedback about the content of this paper, please contact Maureen Hoffman at ***Maureen.Hoffman@metc.state.mn.us***.

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