Minnesota River – Mankato 1W1P

Policy Committee Meeting

Monday, October 14, 2024 • 3:00 – 5:00 PM

Meeting Location

Nicollet County Courthouse
EOC Conference Center Room
St. Peter, MN 56082

Agenda Items	Action	Time
1. Welcome and Business Items • Approve agenda and minutes • Approve financials	Approve	10 min
2. Advisory Committee • Approve Roster	Approve	5 min
3. Land and Water Resources Narrative • Approve as working draft section of the plan	Approve	15 min
4. Plan Issues • Approve priority issue rankings	Approve	15 min
5. Next Steps • Priority Issues Section • Measurable Goals and priority areas	Discuss	15 min
6. Action Items and Next Steps • Steering Committee: October 23 • Policy Committee: November 11	--	5 min

Minnesota River-Mankato 1W1P

Recommended Advisory Committee

Organization	Full Name and Title	Email Address	Telephone	Notes	Partner	Address
MN Board of Water and Soil Resources	Shane Begeja, Board Conservationist	Shane.Bugeja@state.mn.us	(507) 995-9566			
MN Board of Water and Soil Resources	Jeremy Maul, Clean Water Specialist	jeremy.maul@state.mn.us	(507) 766-9819			
MN Department of Agriculture	Reid Christianson, Supervisor, Clean Water Technical Assistance Unit	reid.christianson@state.mn.us	(651) 201-6026			
MN Department of Health	Scott J. Hanson, Regional Planner	scott.j.hanson@state.mn.us	(507) 206-2734			
MN Department of Natural Resources	Al Gleisner, Hydrologist	alan.gleisner@state.mn.us	(320) 753-0344			
MN Environmental Quality Board*	Catherine Neuschler	catherine.neuschler@state.mn.us	(651) 757-2607			
MN Pollution Control Agency	Bryan Spindler, Watershed Project Manager	bryan.spindler@state.mn.us	(507) 344-5267			
Conservation Technology Information Center	Dan Coffman, Soil Health Specialist	dan.coffman55@gmail.com	(507) 508-6556	Local farmer	Nicollet County & SWCD	41862 271st Ave, Cleveland, MN 56017
Crystal Waters Project	Mike Roll	mike@rhenryconstruction.com	(507) 380-1794	Has worked extensively with BES/water, and other conservation projects. Measuring and monitoring, completing grant applications, lakeshore restoration, pollinator, and rain gardens, plans fishing events for kids	City of Lake Crystal	39770 Ottawa Rd, Le Sueur, MN 56058
Lake Washington Improvement Association	Chuck Brandel	chuck.brandel@isginc.com	(507) 327-8282		Le Sueur County & SWCD	
Minnesota River Congress	Scott Sparlin, Executive Director	sesparlin@gmail.com	(507) 276-2280	Can provide staff contacts for specific issues	City of Mankato	
Nicollet Conservation Club	Fred Froehlich	None	(507) 232-3366	Nicollet Conservation Club merged Swan Lake Association	Nicollet County & SWCD	
Seitzer Seeds	Jaime Seitzer, Agronomist	james.seitzer@plantpioneer.com	(507) 381-0052		Nicollet County & SWCD	
Sibley County Zoning	Geoff Beranek, Planning & Zoning Administrator	GeoffBeranek@sibleycounty.gov	(507) 237-4091		Sibley County	
Sibley SWCD	Joel Wurscher, District Manager	joel.wurscher@sibleyswcd.org	(507) 702-7077		Sibley County	

2. Land and Water Resources Narrative

This **Land and Water Resources Narrative** plan section describes the watershed and its resources, including:

- History
- Geology
- Land Use
- Climate
- Surface Water
- Groundwater

The Minnesota River - Mankato Watershed (referred to throughout the plan as "the watershed"), located in south-central Minnesota, is defined by the veering path of the Minnesota River and its many tributaries. The segment of the Minnesota River within the watershed flows southeast along the border towards New Ulm, continues to Mankato, and veers north and passes through St. Peter to the watershed outlet near Ottawa. The Watershed is largely in Blue Earth, Le Sueur, and Nicollet Counties, with the Minnesota River oftentimes serving as county border lines. The northern segment of the watershed is in Sibley County, with smaller amounts of land in Brown, Watonwan, and Renville Counties. Major towns in the watershed include Mankato, St. Peter, Lake Crystal, Courtland, and Nicollet.

At 370,960 acres, the Comprehensive Watershed Management Plan (CWMP) planning area is less than half the size of the major (HUC-8) hydrologic watershed (**Figure 2-1**). Land in the western side of the major watershed including the Little Cottonwood River subwatershed has been incorporated into the neighboring Redwood, Yellow Medicine, and Cottonwood River CWMPs. The water quality of the Watershed is not only important for local aquatic life and recreational opportunities but is also regionally significant as the downstream watershed drains into the Mississippi River.

Photo: MPCA

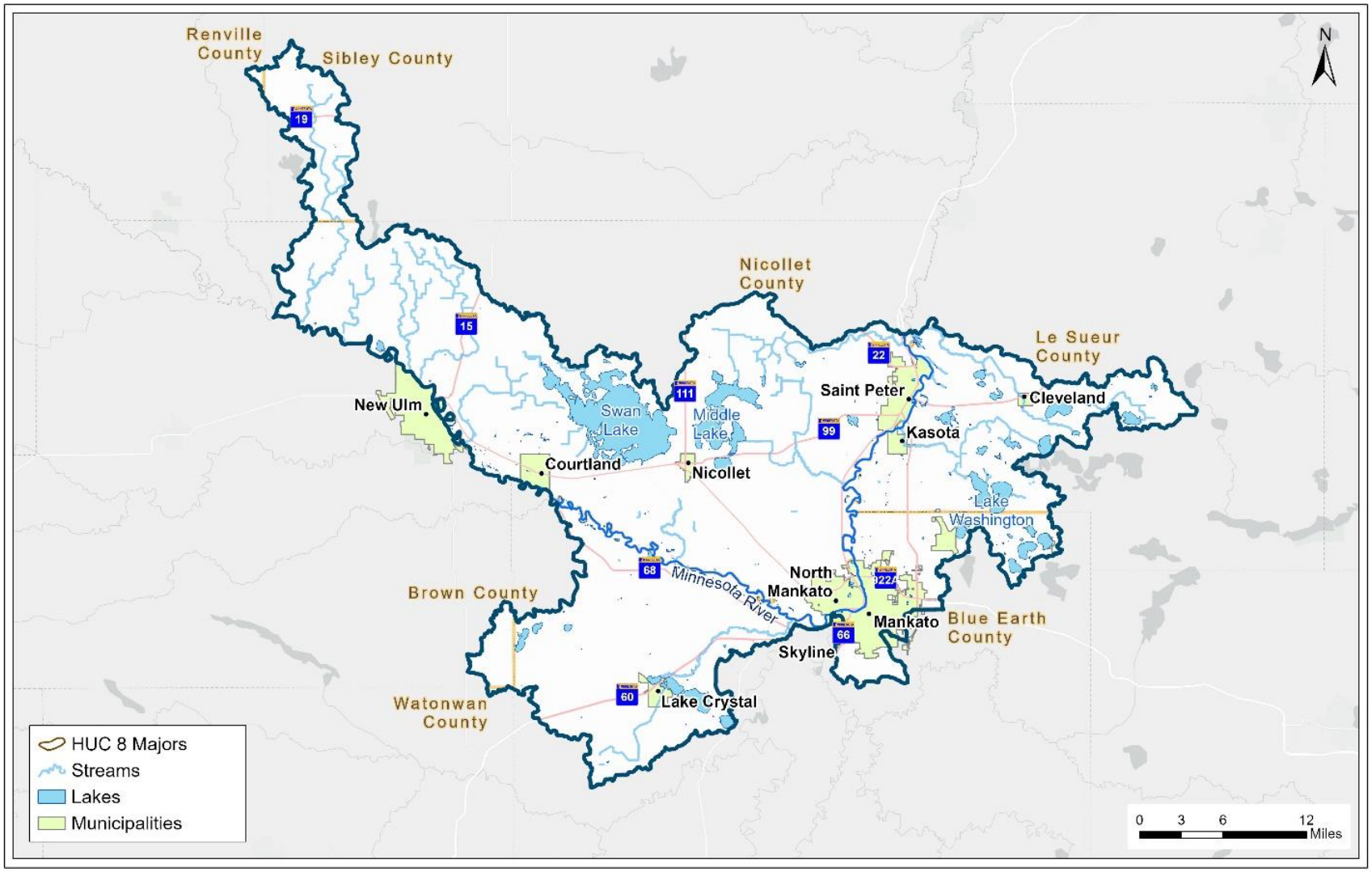

Figure 2-1. Map of the watershed.

History

Photo: Minnesota River Valley National Scenic Byway

People have lived in the Minnesota River Valley for thousands of years, where the valley provided for hunting, fishing, and growing crops. Historically, Dakota inhabitants relied on the shallow water of the Minnesota River near what is now St. Peter to cross the river, calling it the Oiyuwege (place of crossing) (Minnesota River Basin Data Center, 2011).

Europeans first settled in the area in the 1700s. The Treaty of Traverse de Sioux was signed in the mid-1800s. Following the treaty, counties in the Minnesota River Valley were established and development accelerated soon after with the construction of the railroad in the late 1800s. Agriculture became a common way of life, leading to the widespread conversion of prairie and wetlands. Early crops included hay, alfalfa, barley, oats, and corn (DNR, 2016).

Geology

During the last glacial period about 16,000 years ago, what is now the watershed was covered by the Des Moines ice lobe. Its retreat left loess and glacial till deposits over sandstone, carbonate, and shale bedrock with some karst geology to the east and gneiss, limestone, and quartzite bedrock in the rest of the watershed (MPCA, 2019a; DNR, 2016). The receding glacier also impounded meltwater in lakes, with the largest being Lake Agassiz. Glacial River Warren formed as an outlet to the lake and this river incised what is now the Minnesota River Valley.

Topography

The land has gently rolling plains and is largely flat in the central valley of the watershed, with steep slopes around the Minnesota River in the north and far east. The geology of the region influences water quality. The deep Minnesota River Valley resulted in steep bluffs and sharp changes in elevation of tributaries and streams, which are highly erosive as they cut through steep banks to reach the river. Additionally, some durable bedrock is less easily eroded, resulting in the formation of waterfalls such as Minneopa Falls that can act as fish barriers.

Photo: Minneopa State Park, DNR

Soils

The soils in the watershed are some of the youngest in the country (DNR, 2016). Historically, soils were poorly drained from the prairie and wetland land cover, but were rich in organic matter. The organic matter made agriculture valuable for growing crops, but the wet soils made agriculture challenging. This drove early farmers to drain the land to dry out the soil, making them more suitable for agricultural production. Later in the 20th century, farmers increased the drainage potential and therefore the agricultural productivity of fields by installing drain tiles. Today, the soil has less organic matter than historic conditions due to changing land cover, agricultural practices, and a lack of residue on fields (DNR, 2016).

Land Use

Present-day land use in the watershed is largely agricultural, with 70% of the land used for row crops and pasture (**Figure 2-2**). Following agriculture, the next largest land use is developed land and wetlands (each 9%), followed by forest (6%), open water (4%), and grasslands and barren land (2%) (USGS, 2021). Developed land covers a larger area of the watershed than most Minnesota watersheds. The population of Nicollet, Blue Earth, and Le Sueur Counties is expected to grow in the upcoming decade, however this growth is projected to be slower than the projected overall grow rate of Minnesota (Department of Employment and Economic Development, 2024).

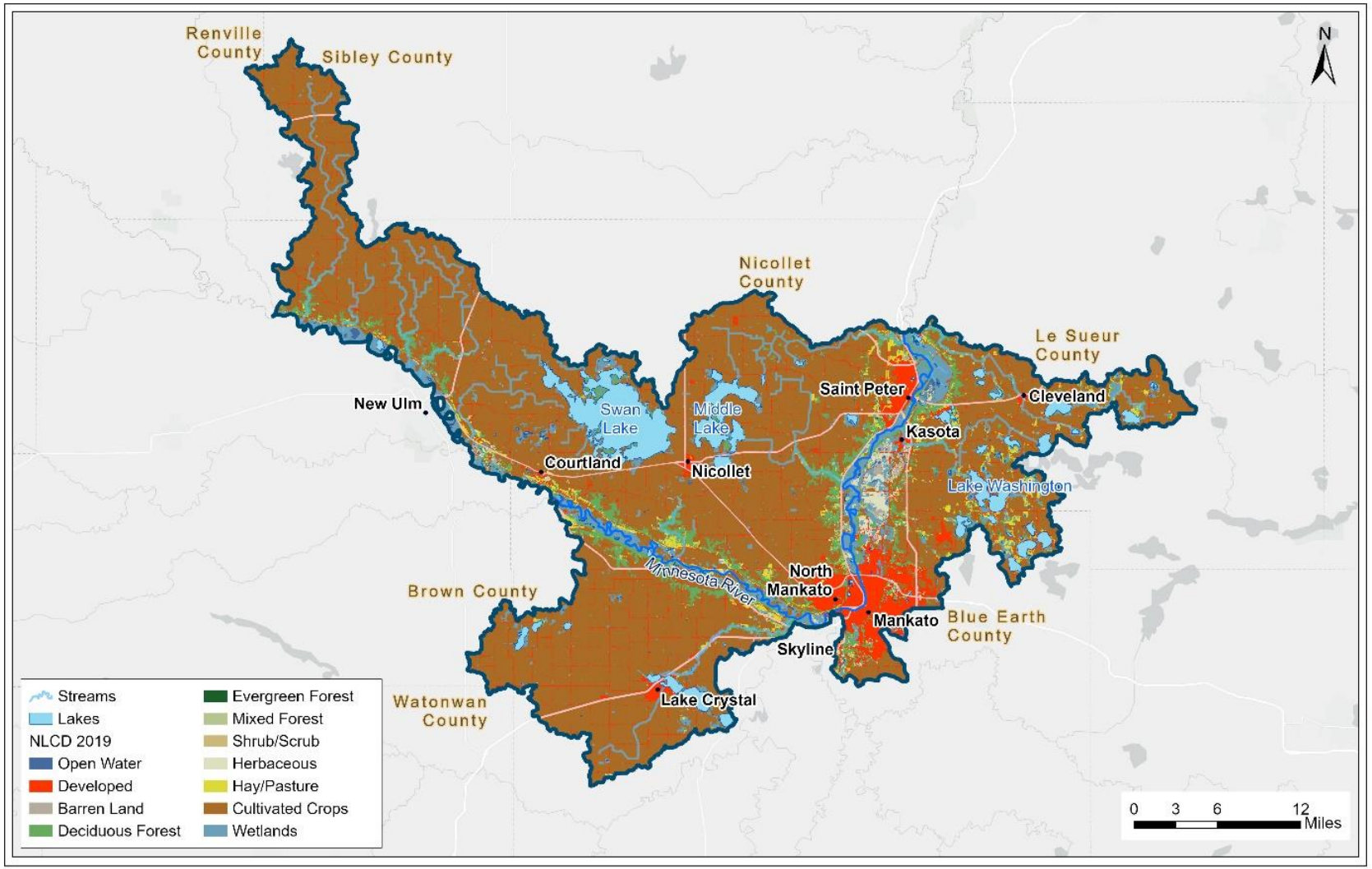

Figure 2-2. Current land use in the watershed.

The pre-European land use is known through Marschner vegetation maps, which show the watershed was historically covered by prairie (**Figure 2-3**). It is on the eastern boundary of the prairie pothole region and the southern boundary of the the Big Woods region, and has river bottom and aspen-oak forests along the Minnesota River (DNR, 2016).

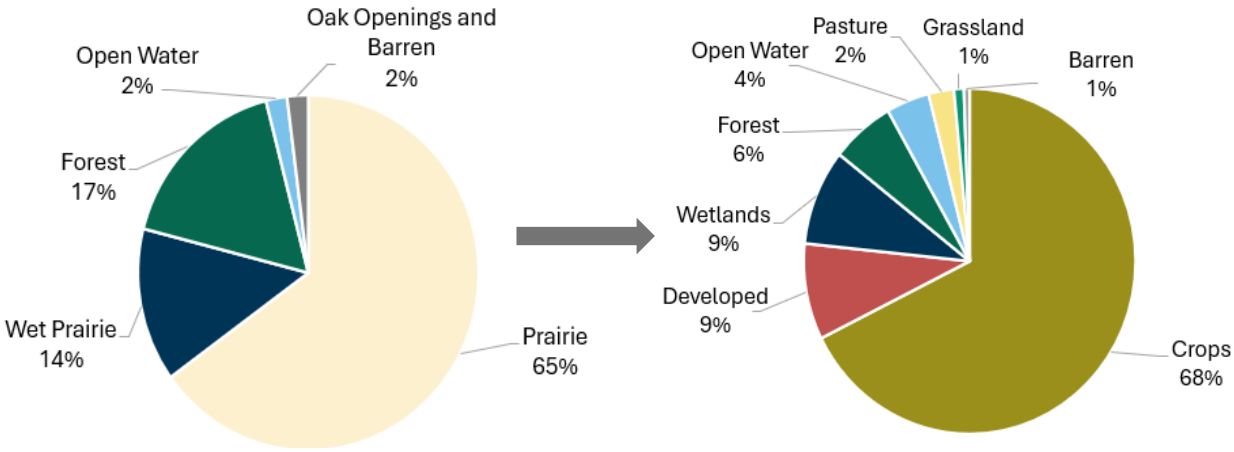

Figure 2-3. Historical land use from Marschner map (left, DNR 2016) and current land use from National Land Cover Database (right, USGS 2021).

Drainage

As shown in **Figure 2-3**, the land has been heavily altered in the past 200 years, with prairies largely converted to row crops and urban land, wet prairies drained, and streams ditched or straightened. This land alteration has also impacted the hydrology of the watershed, or how water flows over the landscape. Altered hydrology has increased and hastened the delivery of water downstream. Rather than the slow infiltration and/or evapotranspiration of water that fell in the landscape, water that lands in a field or city is quickly moved to a drainage system and delivered downstream. Artificial drainage has benefits, as it allows fields to support agriculture. However, draining land on a large scale (between 28 and 63% of the watershed is estimated to be tile drained) is not without impacts and it is important to maintain drainage systems and install improvements when needed (WRAPS, 2020).

Agriculture

Agriculture is the largest land use category in the watershed and is important for the local economy and way of life. The 2022 census found the average watershed farm size (averaged between Nicollet, Le Sueur, and Blue Earth Counties) is 280 acres (USDA-NASS, 2022). Most of the row crops are soybeans and corn, with a small number of acres used for sugarbeets, cultivated perennials, or small grains (MPCA, 2017). Productive land is not only

used for row crops, as many producers in the watershed are also raising livestock. There are 283 active feedlots; 40 of these are concentrated animal feeding operations (CAFOs) which have at least 1,000 animals (MPCA, 2024a). There has been a shift from dairy cattle to other livestock. Most of the CAFOs have swine as the primary stock, as well as 5 dairy operations and 1 chicken operation.

Ecological Provinces, U of M

Natural Land

The watershed lies within the Prairie Parkland and Eastern Broadleaf Ecological Provinces and in the Big Woods and Minnesota River Prairie subsections. Much of the natural prairie has been converted to other land uses, but 15% of the watershed is still covered today by wetlands and forests that provide ecosystem benefits such as storing water, removing pollutants, providing habitat, and more. As can be seen in **Figure 2-2** and **Figure 2-4**, much of the remaining natural lands are along the Minnesota River. There are two Scientific and Natural Areas (SNA) over about 50 acres, 38 WMAs in nearly 6,000 acres, and over 20,000 acres of Minneopa State Park.

The watershed has four sites of outstanding biodiversity significance, seven calcareous fens, and numerous fragments of native plant communities, particularly red oak/basswood/sugar maple forest, southern dry prairie, and silver maple floodplain forest. These pockets of historical forest and prairie are essential to supporting the wildlife and ecosystem of southern Minnesota. Endangered and threatened species can be found in the watershed, including the northern-long eared and tricolored bats, the monarch butterfly, and the rusty patched bumble bee (Center for Biological Diversity, n.d.).


Photo: Kasota Prairie SNA, DNR

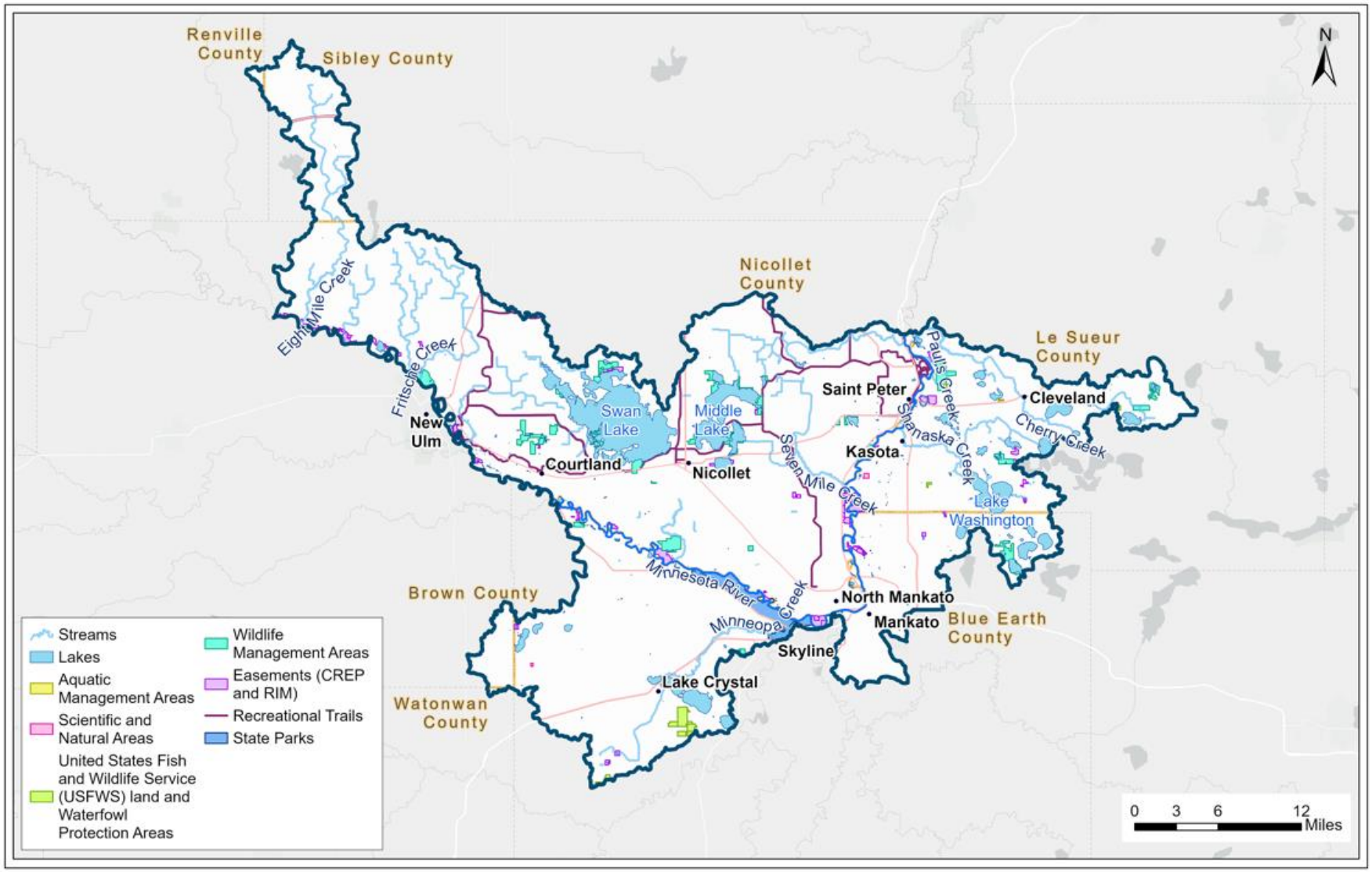

Figure 2-4. Public and protected land.

Climate

The watershed experiences a typical climate for southern Minnesota: cold, snowy winters with hot summers. The watershed receives an average of about 30 inches of precipitation each year (MPCA, 2017). However, Minnesota has been experiencing changing climate patterns, including increasing frequency of heavy rains, longer periods of drought, and shorter winters. In the watershed, precipitation has been more variable in recent decades, specifically less precipitation in May and June and more precipitation in the fall (MPCA, 2019a). Changes in rainfall patterns are of special concern to this region due to the prevalence of agriculture that relies on a stable climate. Intense rainfall is also a concern for the communities in the watershed as extreme rainfall combined with land use changes that reduce natural water storage can result in damaging floods.

Surface Water

Previous to land use conversion and drainage, the watershed was covered in wet prairie. It is estimated that the watershed has lost between 30 and 65% of historical wetlands, which is a loss of natural water storage. The restorable wetland inventory estimates that about 15% of the watershed could be restored for water storage (DNR, 2016). The surface water quality is impacted by numerous lake and stream impairments, of which the main stressors have been evaluated to be altered hydrology, connectivity, habitat, and nitrate (MPCA, 2019a) (**Figure 2-5**).

Photo: Lake Crystal city webpage

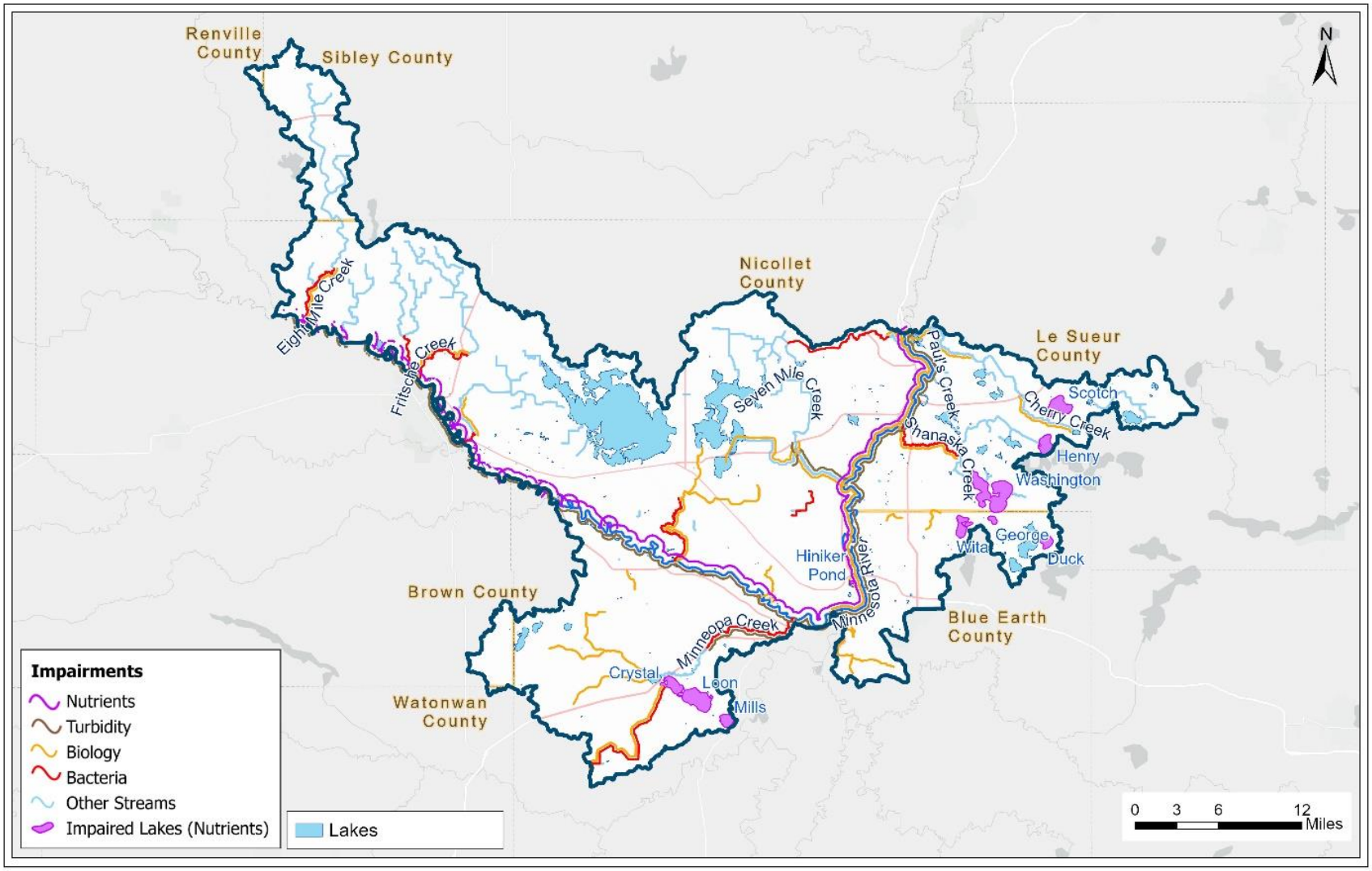

Figure 2-5. Impaired waters (MPCA, 2024b).

Lake Water Quality

Lakes are a treasured resource for watershed residents for boating, swimming, fishing, and social enjoyment. There are 33 public access sites in watershed lakes, 25 of which accommodate boat trailers (MPCA, 2019b). Of the 45 public water basins, notable lakes include Lake Washington, Lake Crystal, and Swan Lake. At 9,600 acres, Swan Lake is the largest prairie pothole lake in North America.

The federal Clean Water Act requires each state to adopt water quality standards to protect waters from pollution. Minnesota water quality standards protect lakes, rivers, streams, and wetlands by defining how much of a pollutant can be in the water before it is no longer drinkable, swimmable, fishable, or useable in other, designated ways. A body of water is designated "impaired" if it fails to meet one or more water quality standards (MPCA, 2024).

Photo: Lake Washington Improvement Association

As of 2024, nine lakes in the watershed are impaired due to nutrients, five lakes due to mercury in fish tissue, and two lakes due to the index of biological integrity for fish (**Table 2-1).** Aquatic invasive species (AIS) are not classified as impairments but have adverse effects on lake ecosystems as well. Invasive species found in and around the watershed include Eurasian watermilfoil, flowering rush, zebra mussels, and bighead and grass carp.

Table 2-1. 2024 lake impairments

Lake	Impairment(s)
Crystal	Fish (Bio); Nutrients
Duck	Mercury in fish tissue; Nutrients
George	Mercury in fish tissue; Nutrients
Henry	Nutrients
Hiniker Pond	Mercury in fish tissue
Loon	Mercury in fish tissue; Nutrients
Mills	Nutrients
Scotch	Nutrients
Washington	Fish (Bio); Mercury in fish tissue; Nutrients
Wita	Nutrients

Stream Water Quality

The watershed is unique in that it hosts several trout streams, which are a draw for people that fish. Designated trout streams include Seven Mile Creek and its tributaries, Paul's Creek and four unnamed streams around it, and several unnamed streams just south of the Minnesota River near Judson (DNR, 2020).

There are 41 impaired stream reaches in the watershed, as summarized in **Table 2-2**. Main stressors to aquatic life include altered hydrology, degraded habitat, nitrate, and a lack of connectivity (MPCA, 2019a).

Table 2-2. Stream impairments.

Impairment	Number of Reaches
Macroinvertebrates (bio)	22
Fish (bio)	17
Fecal Coliform	13
E. coli	12
Turbidity	10
Mercury in fish tissue	6
PCBs in fish tissue	4
Mercury in water	4
Nutrients	4
PCBs in water	2
Nitrate	2
TSS	1

Photo: Minnesota River in watershed, DNR

Hydrology

The Evaluation of Hydrologic Change (EHC) is a DNR report that looks at how hydrology in Minnesota watersheds has changed. In the watershed, the report identified 1983 as the point of hydrologic change, where the hydrology pre-1983 is significantly different than the hydrology after. The watershed has experienced a 12% increase in precipitation when comparing post 1983 to pre-1983. This is small in comparison to other changes: annual discharge, bankfull flows, flood duration, and the rate of flood rise have more than doubled. Flow has increased during all stages, and the minimal increase in precipitation indicates it is not a main driver of these changes. Rather, the EHC report estimates that land use changes, a lack of storage, drainage systems, and loss of perennial cover are more likely to explain the increase in flow metrics (DNR, 2023). Within the watershed, about 65% of streams have been altered (MPCA, 2020).

Groundwater

Most of the watershed obtains drinking water from groundwater, although Kasota, St. Peter, and Mankato have vulnerable drinking water supplies because they are under the influence of surface water. Of the 22 DWSMAs in the watershed, part of Kasota has very high vulnerability to contaminants, and St. Peter, part of Kasota, Lakes and Links Homeowners Association, and Valley Mobile Home Park have high vulnerability. Two have moderate vulnerability and 13 have low vulnerability (**Figure 2-6**).

Photos: St. Peter Wellhead Protection Area, Minnesota River Basin Data Center (left)
Mankato Ranney well, MDH (right)

Most of the surface materials have a moderate vulnerability to contamination, but there is high sensitivity to pollution around the Minnesota River and in the southern edge of the watershed (**Figure 2-7**). St. Peter obtains drinking water from an aquifer which receives crop runoff infiltrating through sandy soils. Nitrate in the drinking water has been increasing, which drove St. Peter to install an expensive reverse osmosis water treatment plant (MPCA, 2020). Mankato receives about 70% of its drinking water from two Ranney wells drawn from a shallow aquifer influenced by the Minnesota and Blue Earth Rivers. Mankato also has deeper groundwater wells from the Mt. Simon aquifer. Concern over drinking water influenced by surface water is due to the potential presence of pesticides, microbes, nitrate, and volatile and synthetic organic compounds (MPCA, 2020).

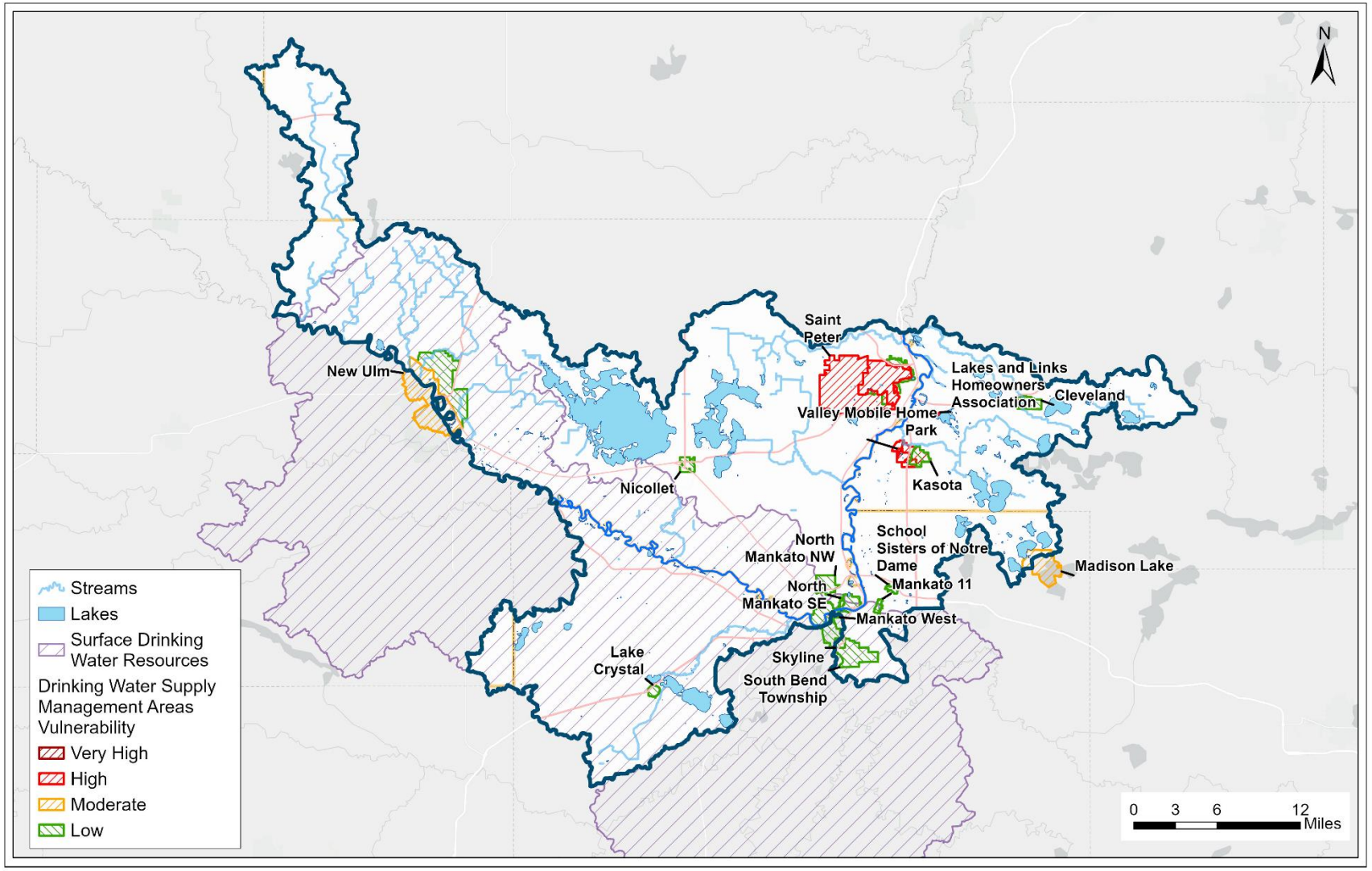

Figure 2-6. DWSMA vulnerability in the watershed.

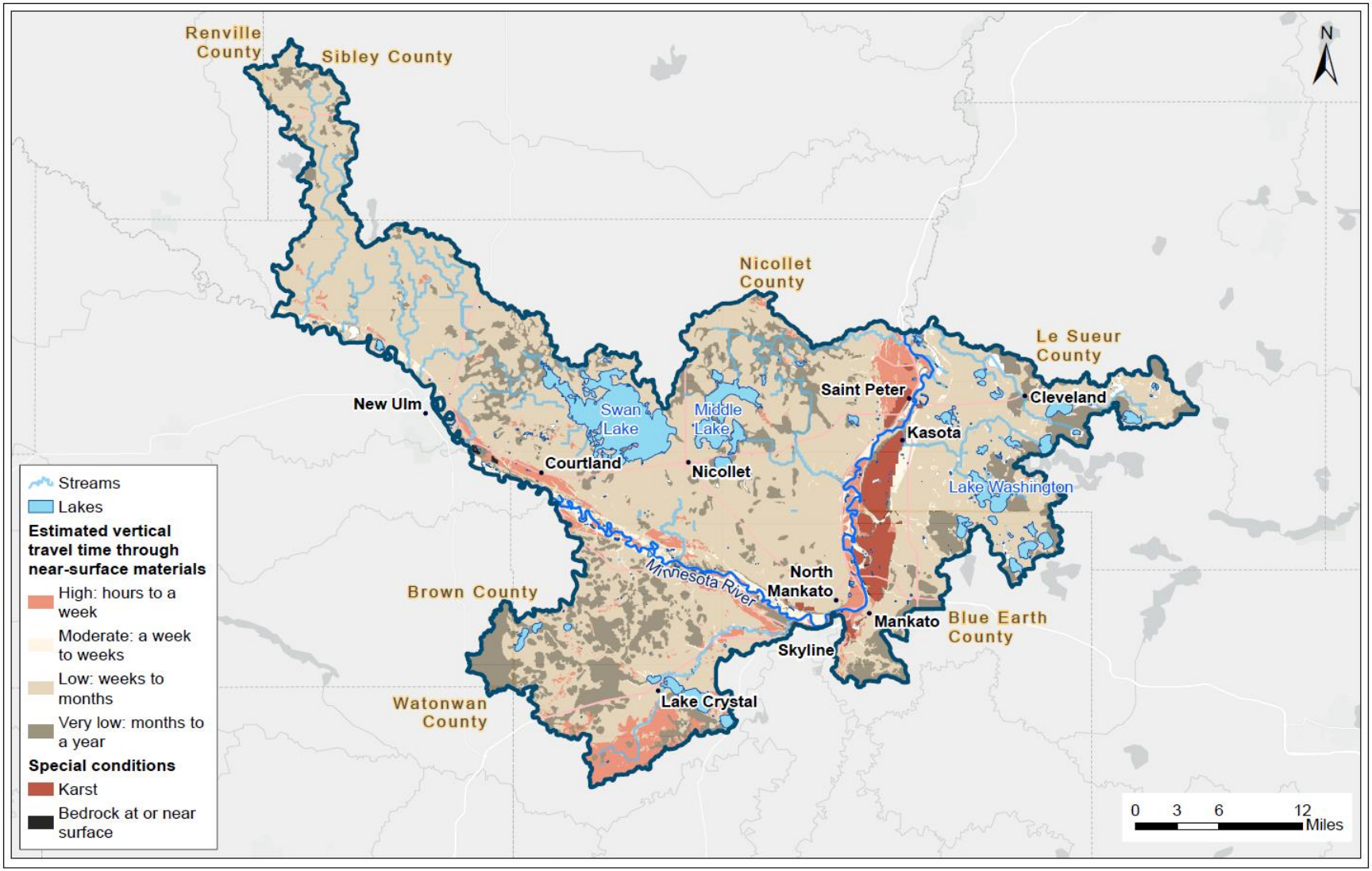

Figure 2-7. Pollution sensitivity in the watershed.

Urban Stormwater

Photo: City of St. Peter

The watershed has many urban areas, which generally have more impervious surfaces, such as pavement. When rain falls on pavement or roofs, instead of infiltrating into the ground it flows over the pavement, into the storm sewer, and eventually into surface waters. Urban stormwater is a water quality concern because of the pollutants that stormwater picks up on its way to the storm sewer system, including trash, nutrients, chloride, sediment, and bacteria. Mankato City, St. Peter, Mankato Township, South Bend Township, City of North Mankato, and Minnesota State University are MS4s in the watershed. MS4s, or municipal separate storm sewer systems, are the network of infrastructure that conveys stormwater through and out of urban areas. They are required to have a stormwater management plan and reduce pollutants through best management practices (BMPs) and outreach efforts.

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Prioritized Issue Statements

Below is a table summarizing the prioritized issues impacting resources in the Minnesota River-Mankato Watershed. Issue statements are provided to describe each issue. Issues were initially prioritized based on how prominent the issue was mentioned in review of the following sources:

- Agency reports and TMDLs: WRAPS, DNR Characterization, Stressor Identification, Minnesota River/Blue Earth River TSS TMDL, MRMW TMDL
- County Plans: Blue Earth, Le Sueur, Nicollet, and Sibley Water Management Plans
- 60-Day Letters: MPCA, DNR, BWSR, MDH
- Public survey responses

The number of sources that mentioned an issue were ranked 1-4 below, with 4 representing a higher prominence. The initial issue priority as determined by these ranks were reviewed and adjusted by the Steering Committee during their September meeting to better reflect local work and expertise. The final "Priority" column indicates the resulting Steering Committee priority recommendation for each issue.

Resource	Issue	Issue Statement	Agency Reports/ TMDLs	County Plans	Agency Letters	Public Survey	Ranking
Surface Water Quality	Nutrient Loading	Nutrient loading (phosphorus and nitrogen) has led to numerous impairments and an increase in algae blooms.	3	4	2	4	**High**
	Sediment and Erosion	Excess sediment, largely from channel erosion, ravine erosion, and cropland, is the cause of numerous aquatic life impairments	4	3	3	4	**High**
	Bacteria	Bacteria from livestock, human, and wildlife waste contribute to *E. coli* and fecal coliform impairments.	2	4	2	4	**Medium**

Resource	Issue	Issue Statement	Agency Reports/ TMDLs	County Plans	Agency Letters	Public Survey	Ranking
Drinking Water and Groundwater	Surface Water / Groundwater Interaction	Much of the watershed obtains drinking water from groundwater that is influenced by surface water, which makes contamination (especially with nitrate) more likely.	1	0	2	4	**High**
	Groundwater Quality	Groundwater that is used for drinking water can be contaminated with pollutants such as nitrate and arsenic, making it a public health problem.	0	2	2	4	**Medium**
	Groundwater Quantity	Protection of groundwater supplies through increasing recharge and wise water use is important to ensure the future drinking water supply as well as adequate base flow supply to streams.	0	2	1	3	**Low**
Flood Damage Reduction and Hydrology	Loss of Water Storage	Land use change has led to a loss of water storage in the landscape, which contributes to excess flow and pollutants in streams.	4	4	2	4	**High**
	Altered Hydrology	Altered hydrology due to changes in land use and drainage and combined with an increase in precipitation has led to flooding and high flow volume.	4	3	3	3	**High**
	Stormwater	Stormwater from developed areas contains salt, sediment, nutrients, fertilizer, and more that pollutes receiving waters.	1	3	2	3	**Medium**
	Flooding	Altered hydrology combined with an increase in annual and heavy rain events has increased the likelihood of flooding, which is costly to infrastructure or farmland in impacted areas.	1	2	2	1	**Low**
	Stream Connectivity	Natural and built barriers such as perched or improperly sized culverts limit stream connectivity, impeding fish passage.	3	0	2	1	**Low**
	Precipitation	An increase in annual precipitation and changes to historic weather patterns impacts agricultural productivity, increases peak stream flows, and exceeds design of infrastructure.	2	0	1	3	**Low**

Resource	Issue	Issue Statement	Agency Reports/ TMDLs	County Plans	Agency Letters	Public Survey	Ranking
Land Use and Habitat	Soil Health	Degraded soil health on productive land can lead to more erosive soils.	3	4	1	3	**High**
	Invasive Species	The presence of aquatic and terrestrial invasive species degrades habitat quality and recreation opportunities.	2	1	2	2	**Medium**
	Wildlife Habitat	Historic wetlands, forest, and prairie have been lost, reducing available habitat and associated ecosystem benefits.	0	1	2	2	**Low**
	Riparian and Shoreline Areas	Insufficient vegetation in riparian and shoreland areas decreases riparian and shoreline stability, increases water temperatures, and degrades aquatic habitat.	3	0	0	2	**Low**