Minnesota River – Mankato 1W1P

Steering Committee Meeting

Wednesday, September 25, 2024 • 9:30 – 11:30 AM

Meeting Location

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

Agenda Items	Action	Time
1. Welcome and General Updates • Revised logo and style guide • Final Advisory Committee roster	Recommend	10 min
2. Land and Water Resources Narrative • Overview of comments and revisions • Recommend for Policy Committee approval	Recommend	25 min
3. Plan Issues and Priority Issues • Review revised issues • Prioritize issues • Recommend for Policy Committee approval	Recommend	45 min
4. Plan Section: Priority Issues • Introduction to plan section • Planning regions • Process for revisions	Discuss	20 min
5. Next Steps: Geospatial Prioritization and Goals • Overview of process • Provide recommended direction	Recommend	15 min
6. Action Items and Next Meetings • Steering Committee: October 23 • Policy Committee: October 14 • Advisory Committee: ?	--	5 min

Minnesota River Mankato 1W1P

Public Kickoff Summary & Land and Water Resources Narrative Comment / Response Table

#	Commenter	Comment	Change Made	Revision
1	SC Meeting Notes	Historical landuse – clarify what the original land use data was. Prefer to label under figurer	Y	Added Marchner maps to caption
2	SC Meeting Notes	Punchy start that gives an overview of the plan section (something like bullets) - each section has a 'this section contains' and bullets	Y	Added section overview underneath heading
3	SC Meeting Notes	Something in style guide to differentiate subsections	Y	Added footer to differentiate plan sections
4	SC Meeting Notes	figure 2-3 make bigger and add percentages - Use same color pallets for consistent land covers -Prairie and wet pairire were combined (make separate or call out)	Y	Updated land use charts as recommended
5	SC Meeting Notes	Maps need to be bigger, likely landscape maybe full page	Y	Gave maps full page
6	SC Meeting Notes	Table 2-1 in text reference might be missing (bold in text references)	Y	Added in-text reference
7	SC Meeting Notes	Page numbers on drafts	Y	Added page numbers
8	SC Meeting Notes	Under soils section, 'soils are youngest in county"	Y	Changed to country
9	SC Meeting Notes	Figure 2-2 grammatical error under figure on big woods in east of mankato	Y	Deleted 'in'
10	SC Meeting Notes	Agriculture is very small. Need more information on ag such as feedlots. Shifts from dairy to other livestock	Y	Added detail on feedlots
11	SC Meeting Notes	Table 2-1 crystal listed twice	Y	Removed duplicate
12	SC Meeting Notes	In land use section- add some text about drainage (subheader under land use)	Y	Drainage heading added to drainage discussion and additional text added
13	SC Meeting Notes	Stormwater call urban stormwater	Y	Added urban
14	SC Meeting Notes	End of hydrology section, check stats in last sentence. Look at newer WRAPS	Y	Updated with number from WRAPS
15	SC Meeting Notes	MS4s some are missing. Scott sending list.	Y	Added MS4s from Scott
16	Scott	I didn't see a summary of the activity from the kickoff meetings of where we gave them the dollars and asked them to allocate that to categories that they cared about. I was wondering if a brief discussion should be added and a summary of the results..... and if anyone had a photo of that?	Y	Section added to Public Feedback Summary Appendix
17	Scott	Add values or percentages to pie charts regarding survey responses.	Y	Added percentages
18	Scott	Just a question about the use of MRMW. There are a few places where it is referred to as the watershed instead of MRMW. There are so many acronyms in the plan that I think using "the watershed" reads better since the MRMW is not something that many of us have ever used.	Y	Revised MRMW to the watershed

#	Commenter	Comment	Change Made	Revision
19	Scott	For the plan, it would be helpful for the maps of this watershed to be oriented landscape and full page so that they are easier to read.	Y	Maps moved to full pages
20	Scott	"soils are the youngest in the county." ? Should be clarified to which county or counties.	Y	Typo, fixed to country
21	Scott	Population growth rate refers to (DEET 2024) The acronym DEET is not spelled out anywhere in this section. Not sure what agency or report that is.	Y	Should have been DEED. Department of Employment and Economic Development spelled out
22	Scott	Historical Land Use Graph - Wondering if the prairie category should have Wet Prairie added to the label as there were a lot of wet prairie areas on the Marshner map in this watershed.	Y	Added wet prairie to chart
23	Scott	The historic land use section states that " the watershed was historically covered by prairie with occasional prairie potholes. Forested land was mostly Big Woods in east of Mankato…" I think it is worth pointing out that this watershed is on the eastern boundary of the prairie pothole region and the southern boundary of the big woods. I cannot speak to Nicollet County but the prairie potholes seem like an important feature in the watershed.	Y	Rephrased prairie potholes and Big Woods text
24	Scott	" There are 383 active feedlots and 40 concentrated animal feeding operations (CAFOs) in the MRMW (MPCA, 2024a). " I think it would be helpful to clarify how large the 40 CAFO's are. Does that refer to feedlots over 1,000 AU?	Y	Yes, CAFOS have over 1000 animals but some have under 1000 AU. Added 1000 animals to text
25	Scott	The map in figure 2-4 seems to contain more trails than expected. It appears that the Recreational Trails layer includes snowmobile trails. I am not sure that the those trails are helpful for the purpose of this map. Also wondering if the CREP and RIM could be combined into a category and if WPA's and USFWS lands could be combined to have fewer categories and make it easier to distinguish between the various protected land types.	Y	Removed obvious snowmobile trails, likely more are still present.Merged easements and USFWS/WPAs as suggested
26	Scott	Repeat rows for Duck and Crystal Lakes	Y	Removed duplicate
27	Scott	The pollution sensitivity classes of high to low are not listed directly below the legend heading like the geoglic atlases. It would be helpul for the classes/rankings of High to low to be listed below the heading like the example to the right	Y	Edited legend as suggested
28	Scott	The following are also MS4's in the watershed: Mankato Township, South Bend Township, City of North Mankato, and Minnesota State University, Mankato.	Y	Added those MS4s

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

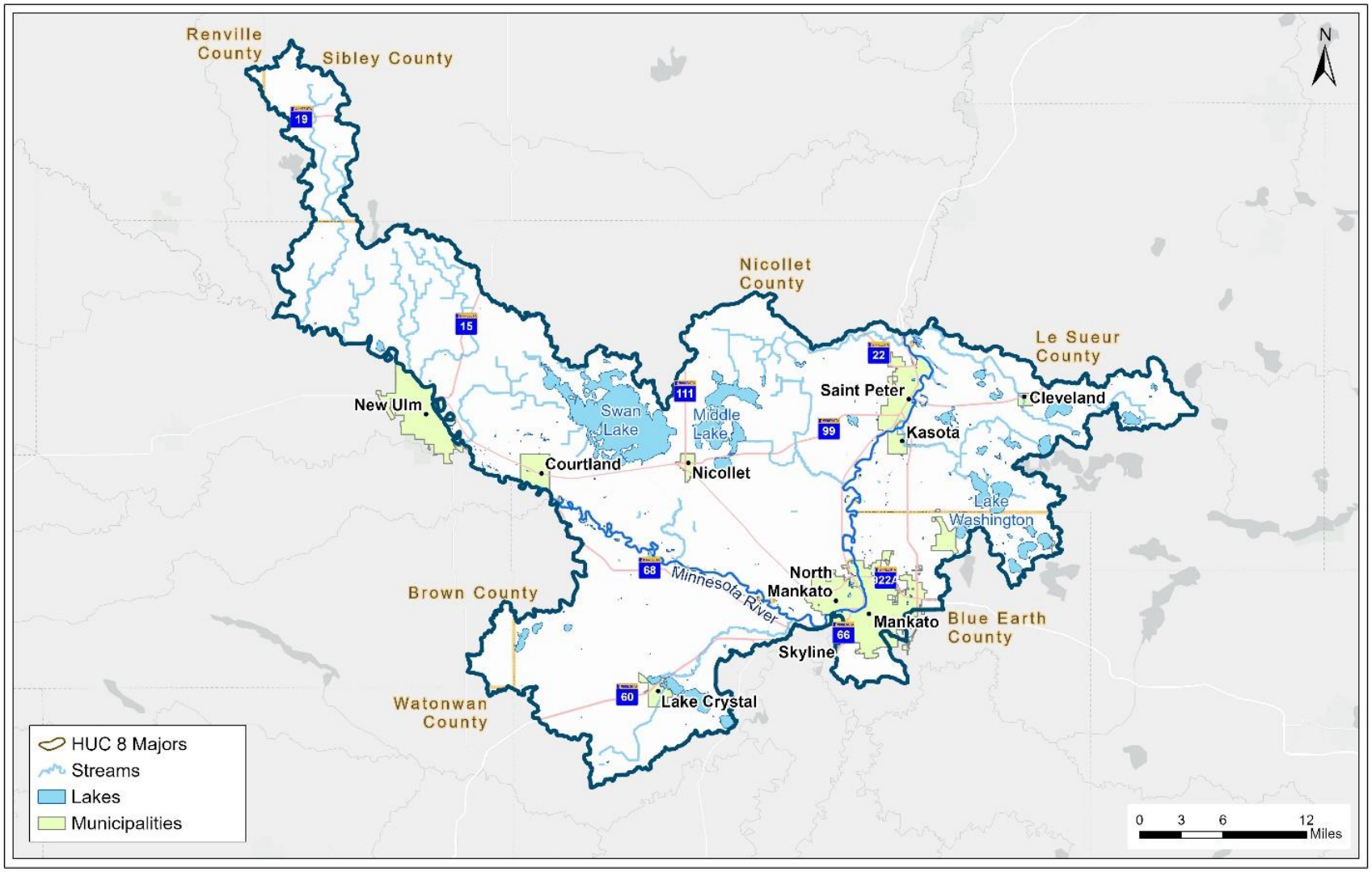

Figure 2-1. Map of the watershed.

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).

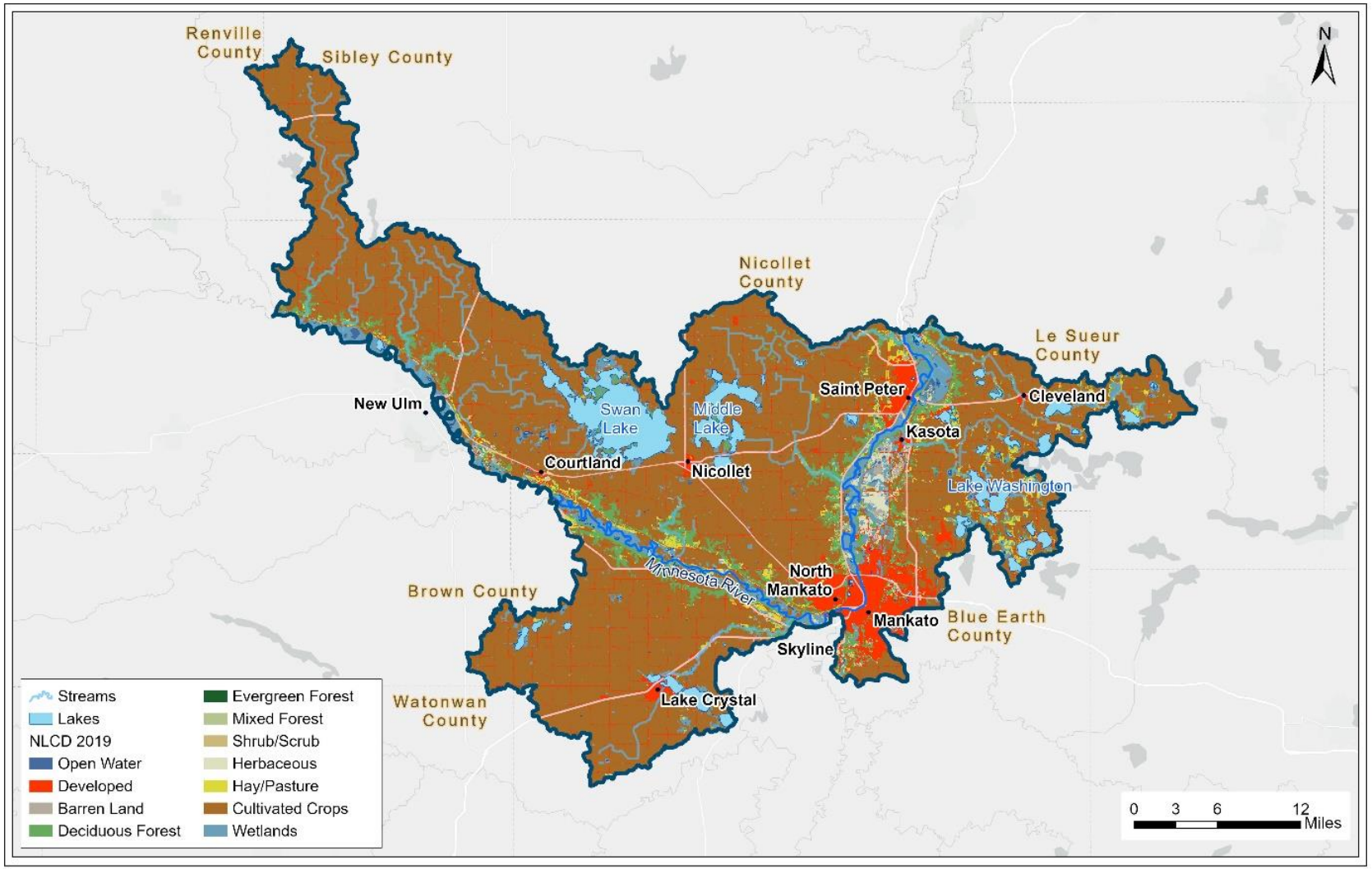

Figure 2-2. Current land use in the watershed.

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).

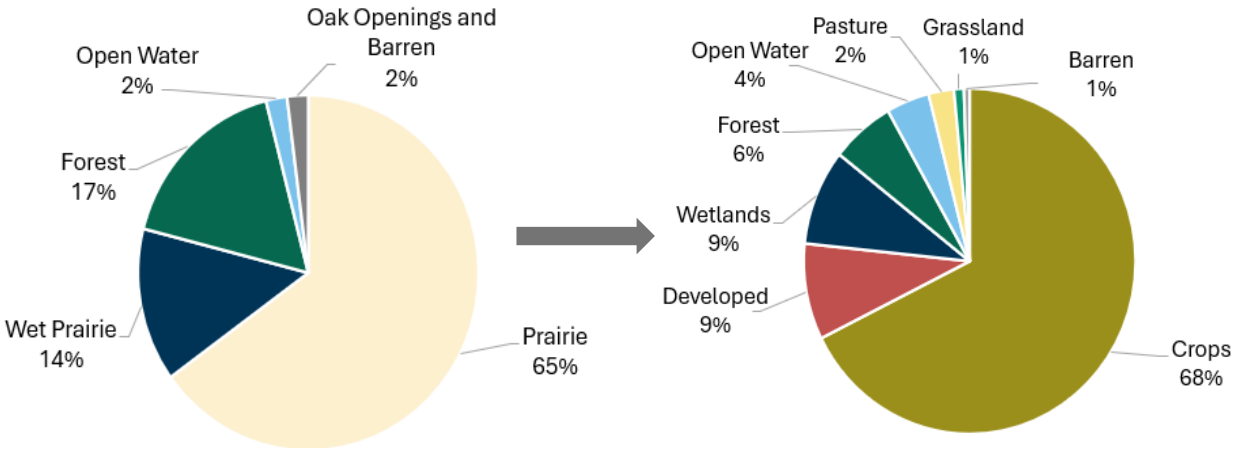

Figure 2-3. Historical land use from Marschner map (left, DNR 2016) and current land use from National Land Cover Database (right, USGS 2021).

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. 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

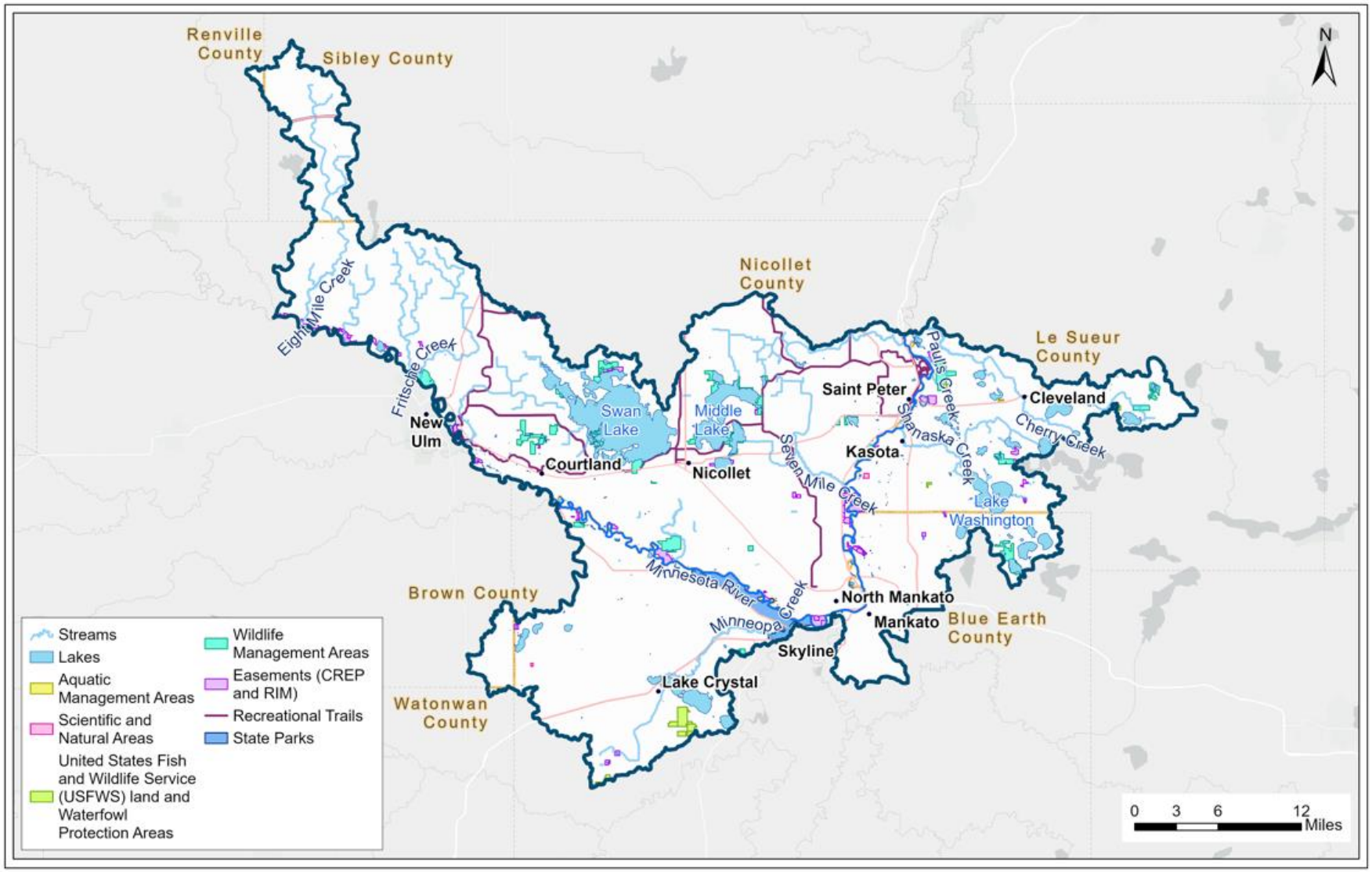

Figure 2-4. Public and protected land.

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

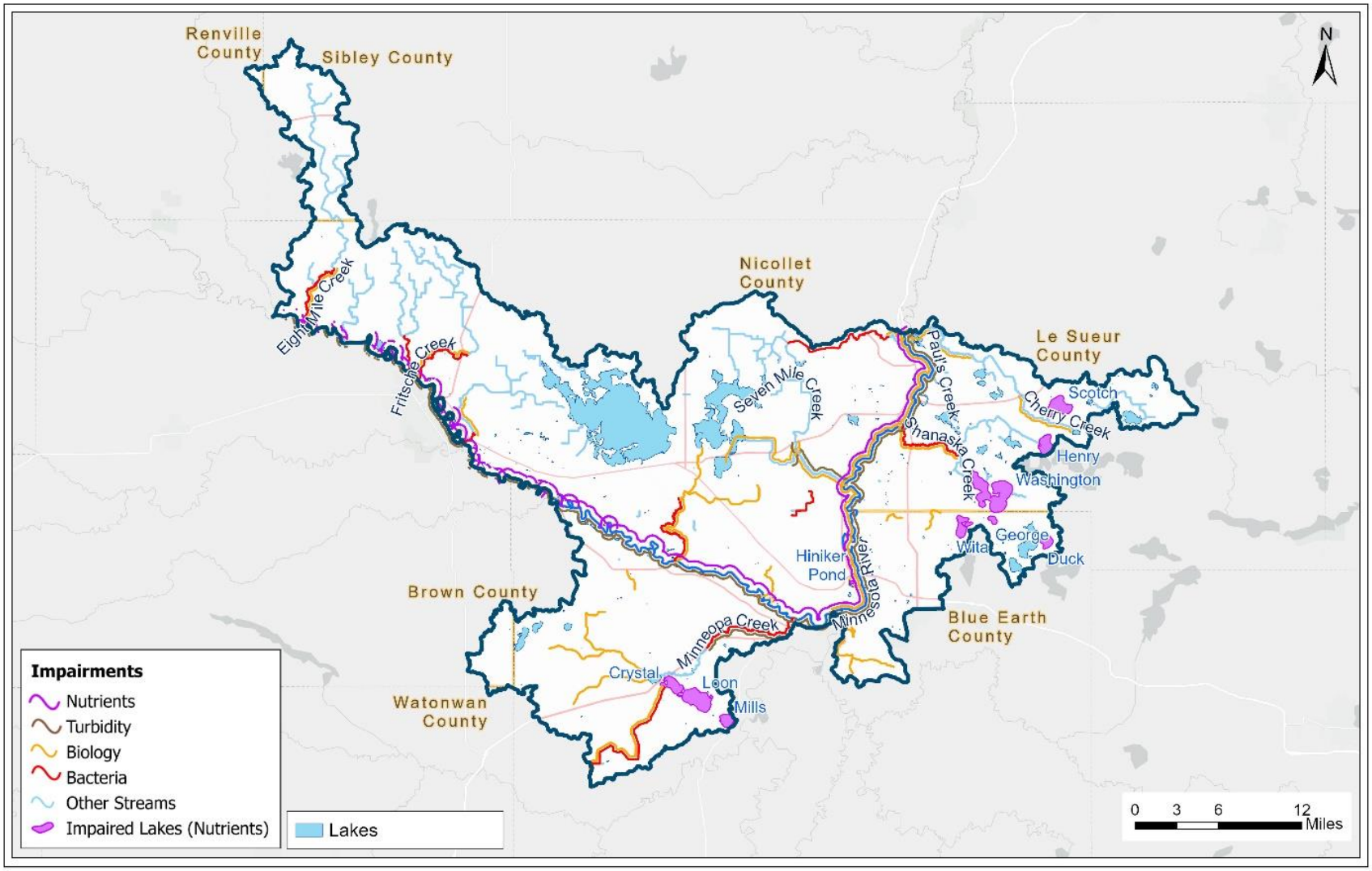

Figure 2-5. Impaired waters (MPCA, 2024b).

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).

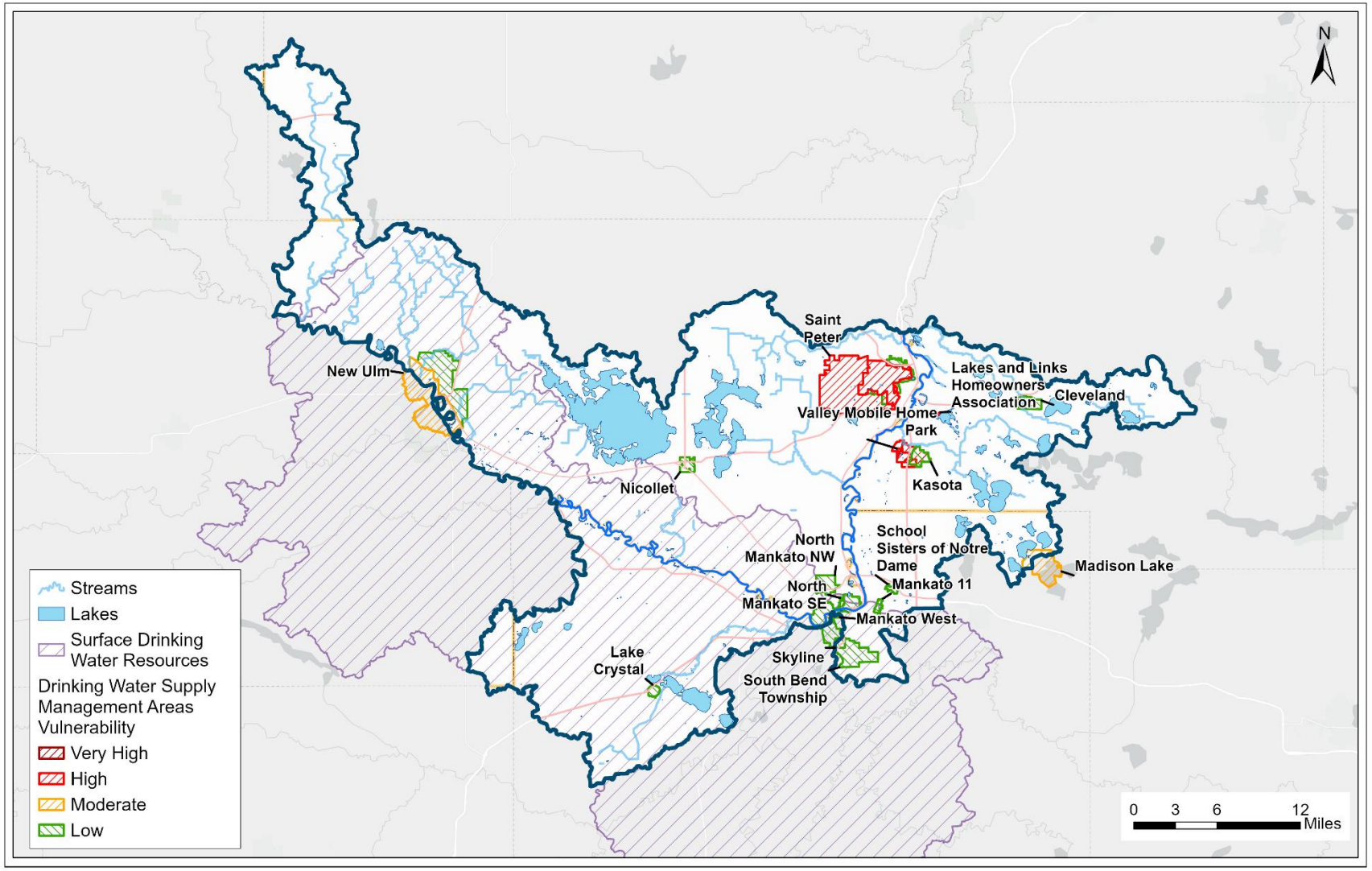

Figure 2-6. DWSMA vulnerability in the watershed.

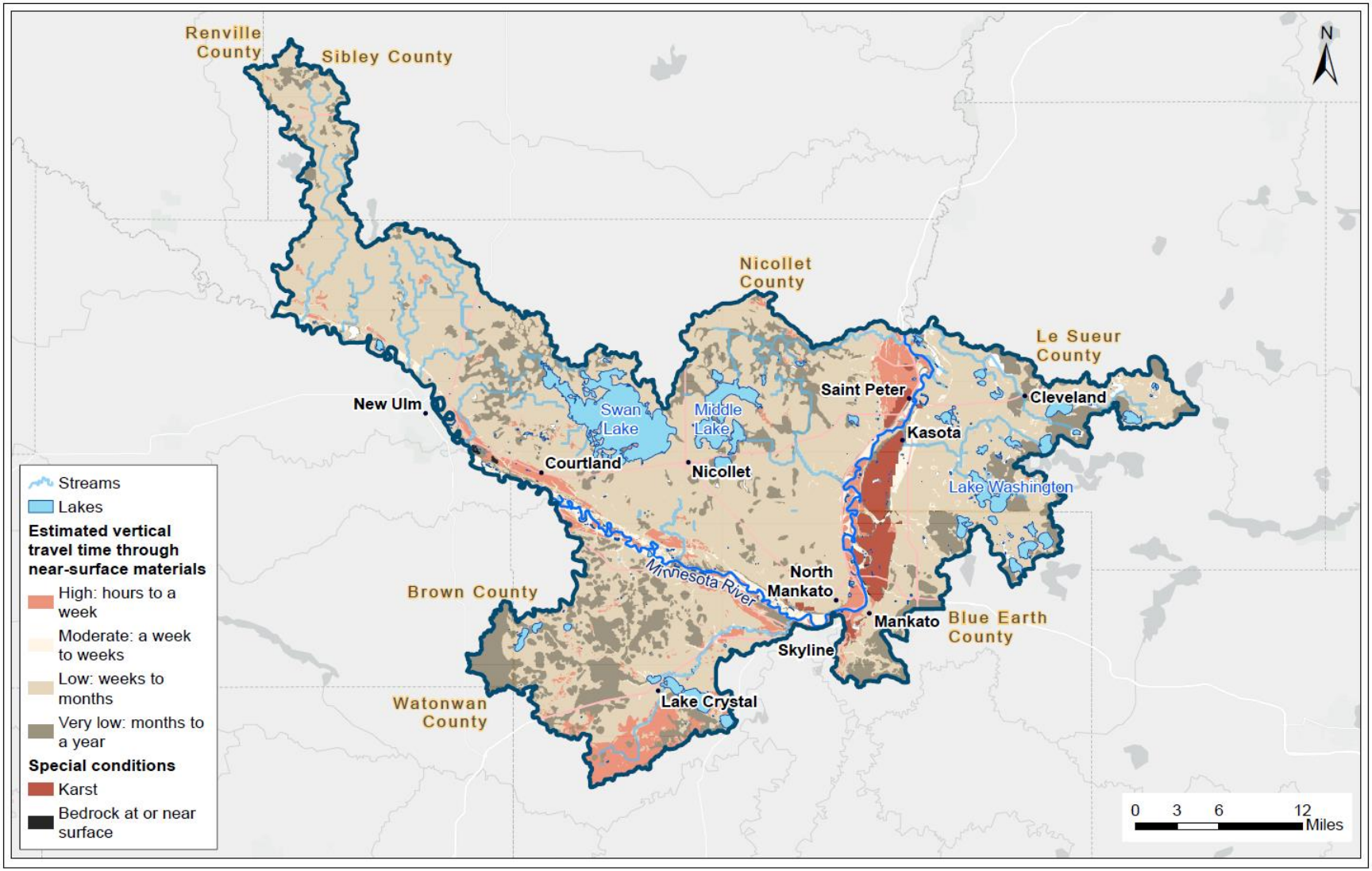

Figure 2-7. Pollution sensitivity in the watershed.

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.

Minnesota River – Mankato Watershed 1W1P

Revised Issue Statements: September 25, 2024

Below is a table summarizing the draft list of issues impacting resources in the Minnesota River-Mankato Watershed. Issue statements are also provided to describe each issue. This list of issues was developed after review and consideration of the following:

- Agency reports: WRAPS, DNR Characterization, Stressor Identification
- Total Maximum Daily Loads: 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
- Feedback from the Steering Committee on August 28, 2024

If an issue is discussed as an issue in the above sources, there is an "x" in the corresponding column of sources. The issues are organized by resource. **Initial ranks of each issue (based on prominence in above resources) will be presented on September 25, 2024.**

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

Resource	Issue	Issue Statement	Agency Reports	TMDLs	County Plans	Agency Letters
	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.	X		X	X
	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.	X			X
Flood Damage Reduction and Hydrology	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.	X		X	X
	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.	X	X	X	X
	Stream Connectivity	Natural and built barriers such as perched or improperly sized culverts limit stream connectivity, impeding fish passage.	X			X
	Stormwater	Stormwater from developed areas contains salt, sediment, nutrients, fertilizer, and more that pollutes receiving waters.		X	X	X
	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.	X	X	X	X
	Precipitation	An increase in annual precipitation and changes to historic weather patterns impacts agricultural productivity, increases peak stream flows, and exceeds design of infrastructure.	X			X
Land Use and Habitat	Wildlife Habitat	Historic wetlands, forest, and prairie have been lost, reducing available habitat and associated ecosystem benefits.			X	X
	Soil Health	Degraded soil health on productive land can lead to more erosive soils.	X	X	X	X
	Riparian and Shoreline Areas	Insufficient vegetation in riparian and shoreland areas decreases riparian and shoreline stability, increases water temperatures, and degrades aquatic habitat.	X			

Resource	Issue	Issue Statement	Agency Reports	TMDLs	County Plans	Agency Letters
	Invasive Species	The presence of aquatic and terrestrial invasive species degrades habitat quality and recreation opportunities.	X		X	X