Minnesota River - Mankato

Comprehensive Watershed Management Plan

BWSR Approval Draft : January 2026

CLEAN WATER LAND & LEGACY AMENDMENT

Plan Acknowledgements

Planning Partnership

Advisory Committee

Board of Water and Soil Resources
Minnesota Department of Agriculture
Minnesota Department of Health
Minnesota Department of Natural Resources
Minnesota Pollution Control Agency
Minnesota Environmental Quality Board
Conservation Technical Information Center
Crystal Waters Project
Lake Washington Improvement Association
Minnesota River Congress
Nicollet Conservation Club
Seitzer Seeds
Sibley County Zoning
Sibley Soil and Water Conservation District

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Appendices

Acronym List

1W1P	One Watershed, One Plan
AIS	Aquatic Invasive Species
BMPs	Best Management Practices
BWSR	Board of Water and Soil Resources
CAFO	Concentrated Animal Feeding Operations
CIP	Capital Improvement Projects
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Resource Program
CWMP	Comprehensive Watershed Management Plan
DWSMA	Drinking Water Supply Management Area
EAB	Emerald Ash Borer
EHC	Evaluation of Hydrologic Change
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FEMA	Federal Emergency Management Agency
FSA	Farm Service Agency
HSPF	Hydrological Simulation Program - FORTRAN
LGU	Local Government Unit
LIF	Local Implementation Funding
LSOHF	Lessard-Sams Outdoor Heritage Fund
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
NACD	National Association of Conservation Districts
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
PCB	Polychlorinated Biphenyls
RIM	Reinvest in Minnesota
SAM	Scenario Application Model
SSTS	Subsurface Sewage Treatment System
SWCD	Soil and Water Conservation District
TIS	Terrestrial Invasive Species
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WASCOB	Water and Sediment Control Basin
WBIF	Watershed-Based Implementation Funding
WCA	Wetland Conservation Act
WRAPS	Watershed Restoration and Protection Strategy

1. Executive Summary

1. Executive Summary

The Minnesota River-Mankato Watershed (referred to throughout the plan as “the watershed”) spans across the plains of south-central Minnesota, covering over 370,000 acres of land. Bisected by the Minnesota River, the watershed shares land over multiple counties, including large portions within Blue Earth, Le Sueur, and Nicollet counties. The Minnesota River flows through the central valley of the watershed towards the Mississippi River, supported by tributaries including Eight Mile Creek, Minneopa Creek, and Shanaska Creek. Larger cities in the watershed include Mankato, North Mankato, St. Peter, and Lake Crystal.

Topography and geology influence land use. The watershed’s rolling plains boast productive agricultural land, bringing economic opportunity through predominately corn and soybean production. The Minnesota River Valley cuts through the watershed creating steep elevation changes and recreational sites for visitors such as the Kasota Prairie Scientific and Natural Area, and the waterfalls in Minneopa State Park. Watershed lakes provide opportunities for connection among residents and are home to many recreational outlets such as fishing, kayaking, boating and swimming.

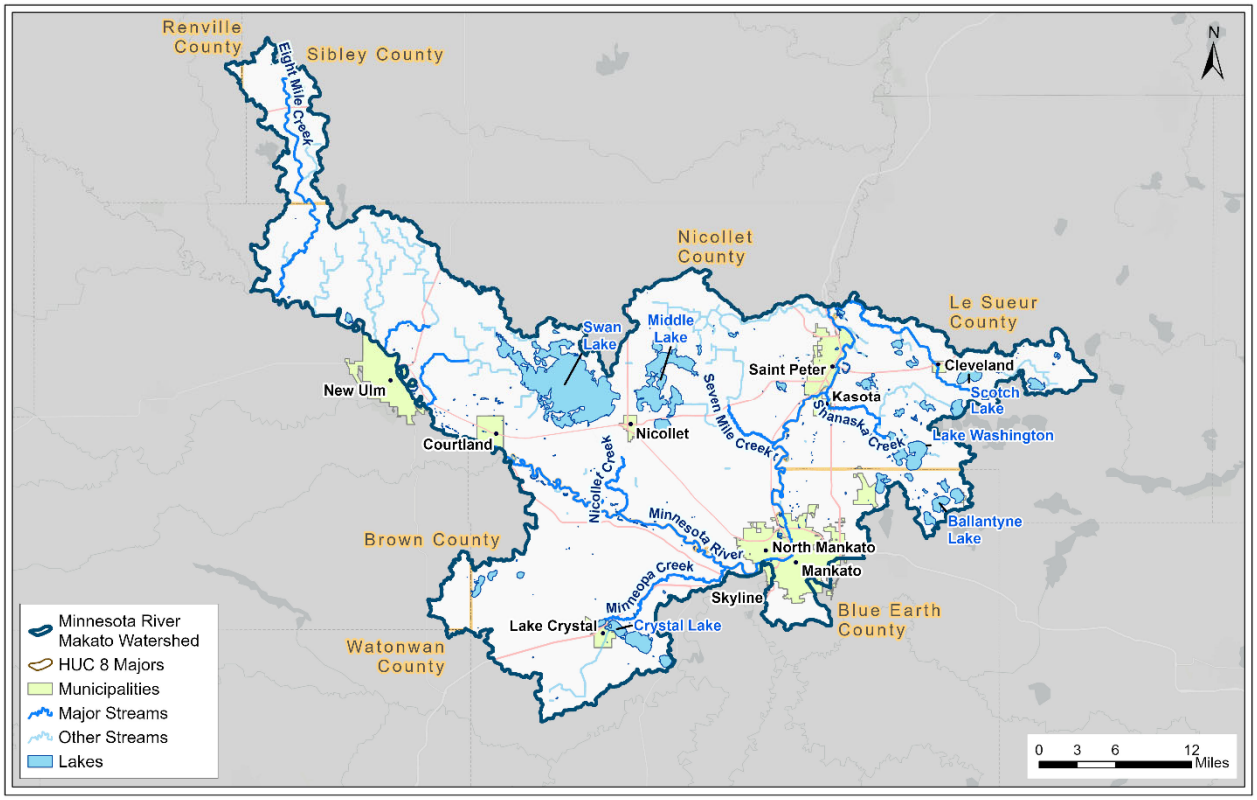


Figure 1-1: The Minnesota River-Mankato Watershed plan area.

The Plan

This Minnesota River-Mankato Watershed Comprehensive Watershed Management Plan (CWMP) was developed from 2024-2025 through the Minnesota Board of Water and Soil Resources One Watershed, One Plan (1W1P) program. 1W1P was created to aid in the transition for water planning in Minnesota to be along watershed boundaries rather than jurisdictional and political ones. This plan creates a guiding framework that can be used by its partnering Local Government Units to implement actions and meet shared goals for managing water and natural resources within the watershed.

This plan identifies watershed priority issues, sets 10-year measurable goals, and plans specific actions to make progress towards those goals. This CWMP is active from 2026-2036, at which point the issues, goals, and actions will be reevaluated. Progress will be assessed on an annual basis along with a mid-point evaluation.

Planning Partners

The planning process for the watershed CWMP began with a planning Memorandum of Agreement (**Appendix A**) between the counties and soil and water conservation districts of Blue Earth, Le Sueur, and Nicollet, and the cities of Lake Crystal, North Mankato, Mankato, and Saint Peter. The planning process was guided through decisions made by three committees: the Policy Committee, the Steering Committee, and the Advisory Committee.

Policy Committee	Steering Committee	Advisory Committee
Consists of elected and appointed board members from each of the participating entities	Consists of local staff from participating entities, state agency staff and consultants	Consists of agency staff, non-governmental organizations, and residents
Approved plan content	Developed plan content	Advised on plan content

The CWMP will be implemented through a Joint Powers Collaborative agreement between the following entities: Blue Earth County and Soil and Water Conservation District (SWCD), Le Sueur County and SWCD, Nicollet County and SWCD, and the cities of Lake Crystal, North Mankato, Mankato, and Saint Peter. **Section 7 – Plan Administration and Coordination** describes partnership roles and responsibilities during plan implementation.

Priority Issues and Goals

To begin this planning process, the local partnership wanted to gather as much public feedback as possible. Public hearings were held on July 23rd and July 30th, 2024, to allow residents to review presented issues and highlight resources important to them. Residents gave feedback on what resources and issues are the most important to them through discussion and a survey. This survey was online for one month to allow residents who could not attend to share their input as well. Approximately 40 community members attended these meetings, and there were 75 responses to the public survey.

To identify issues impacting natural resources in the watershed, existing agency reports, total maximum daily loads (TMDLs), county water plans, and feedback from both planning committees and public responses were reviewed. After reviewing feedback and existing data, 16 issues were identified. To better manage and organize efforts to meet the needs of these issues, they were placed into one of four resource categories.

Surface Water Quality

Drinking Water and Groundwater

Flood Damage Reduction and Hydrology

Land Use and Habitat

All 16 issues are important, but were prioritized to focus implementation efforts. Feedback from the public, prominence of issues mentioned in existing reports, TMDLs, county water plans and agency letters were utilized to prioritize issues. Issues were categorized as high, medium, and low. The high (**Table 1-1**) and the medium (**Table 1-2**) priority issues have actions and goals assigned to them in the plan. Low priority issues are not directly addressed throughout the plan, but may be indirectly impacted by addressing higher priority issues. A summary of issues and impacts is in **Section 3 – Priority Issues.**

An essential part of effective resource management is creating 10-year goals that are measurable and quantifiable. The planning partners developed seven goals addressing high and medium priority issues, summarized in **Table 1-1** for high issues and **Table 1-2** for medium issues. It should be noted that some goals address multiple priority issues.

Table 1-1: High Priority Issues and 10-Year Goals. Note: some goals address multiple issues and are not cumulative.

High Priority	Issue	Issue Statement	10-Year Goal
	Nutrient Loading	Nutrient loading (phosphorus and nitrogen) has led to habitat and recreation impairments from algae blooms.	Reduce total phosphorus by **3,150 lbs/year** (1.4% reduction); reduce total nitrogen by **60,748 lbs/year** (1.1% reduction)
	Sediment and Erosion	Excess sediment, largely from channel / ravine erosion and upland erosion, is the cause of numerous aquatic life impairments.	Stabilize or enhance **2,640 linear feet** of lake shoreline, ravines, or streambanks; reduce sediment loading by **314 tons/year** (or 1.7% reduction) from upland sources
	Surface Water/ Groundwater Interaction	A significant portion of the population obtains their drinking water from a groundwater source influenced by surface water, which makes contamination (especially with nitrate) more likely.	Protect or treat **395 acres** of vulnerable groundwater Drinking Water Supply Management Areas (DWSMAs) and **2,575 acres** of vulnerable surface water DWSMAs; seal **100 wells**; conduct **10** outreach events
	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.	Add **619 ac-ft** of water storage to the landscape
	Altered Hydrology	Altered hydrology due to changes in land use and drainage, combined with an increase in precipitation has led to flooding and high flow volume.	Add **619 ac-ft** of water storage to the landscape
	Soil Health	Degraded soil health on productive land can lead to more erosive soils.*	Implement soil health practices (e.g. cover crops, tillage management) on **3,960 acres**

** Soil health will be addressed watershed-wide, including in the Mankato surface water Drinking Water Supply Management Area (DWSMA).*

Table 1-2: Medium Priority Issues and 10-Year Goals.

	Issue	Issue Statement	10-Year Goal
Medium Priority	**Bacteria**	Bacteria from livestock, human, and wildlife waste contribute to *E. coli* and fecal coliform impairments.	Implement **10 manure management practices or plans** and address **220 noncompliant septic systems**
	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.	Protect or treat **395 acres** of vulnerable DWSMAs; seal **100 wells**; conduct **10** outreach events
	Stormwater	Stormwater from developed areas contains salt, sediment, nutrients, fertilizer, and more that pollutes receiving waters.	Reduce total phosphorus (TP) by **30 lbs/year** and total nitrogen (TN) by **480 lbs/year** through treating **200 acres** of municipal land with best management practices
	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.	Add **619 ac-ft** of water storage to the landscape
	Invasive Species	The presence of aquatic and terrestrial invasive species degrades habitat quality and recreation opportunities.	Prevent the spread of invasive species through **5** outreach and education efforts

Photo: Minneopa State Park, Minnesota River Valley webpage

Targeting Actions

With over 370,000 acres of land within the watershed spanning seven counties, resource management priorities can shift depending on where in the watershed issues and resources are most prominent. To maximize efficiency when addressing issues, the watershed has been organized into four implementation regions to aid in prioritizing funding and actions where they are most needed.

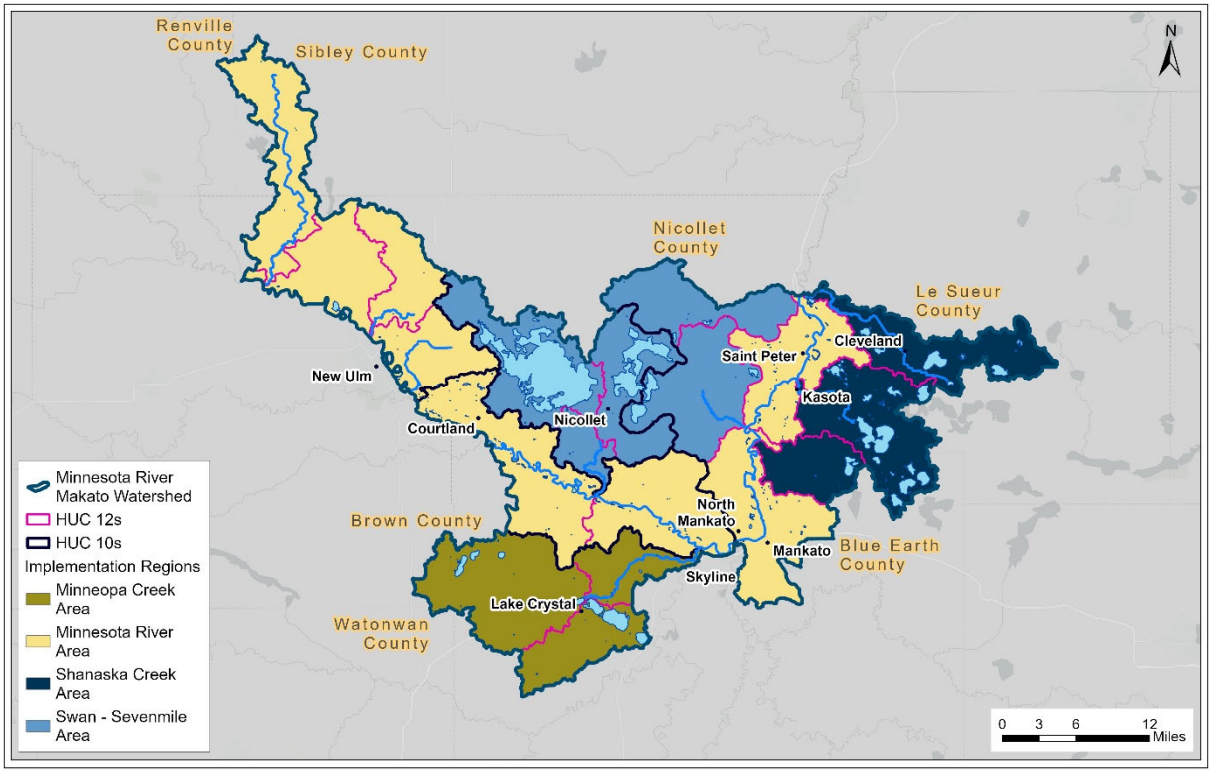


Figure 1-2: Implementation Regions in the Minnesota River-Mankato Watershed.

Ten-year measurable goals are summarized for each high and medium priority issue in **Tables 1-1** and **1-2**. In **Section 4 – Measurable Goals**, each goal is accompanied by a focus map to help show where targeted actions could make the most impact on addressing an issue. In addition to the focus maps for the goals, there is also a focus map for priority lakes and streams within the watershed based on local input and waters listed as barely or nearly impaired in the Watershed Restoration and Protection Strategy report. Of the priority resources, 'Tier 1' resources will be the focus during implementation. 'Tier 2' resources are acknowledged as locally important but not a primary focus of the plan. The priority water bodies are summarized on the next page.

Tier 1 Priority Resources

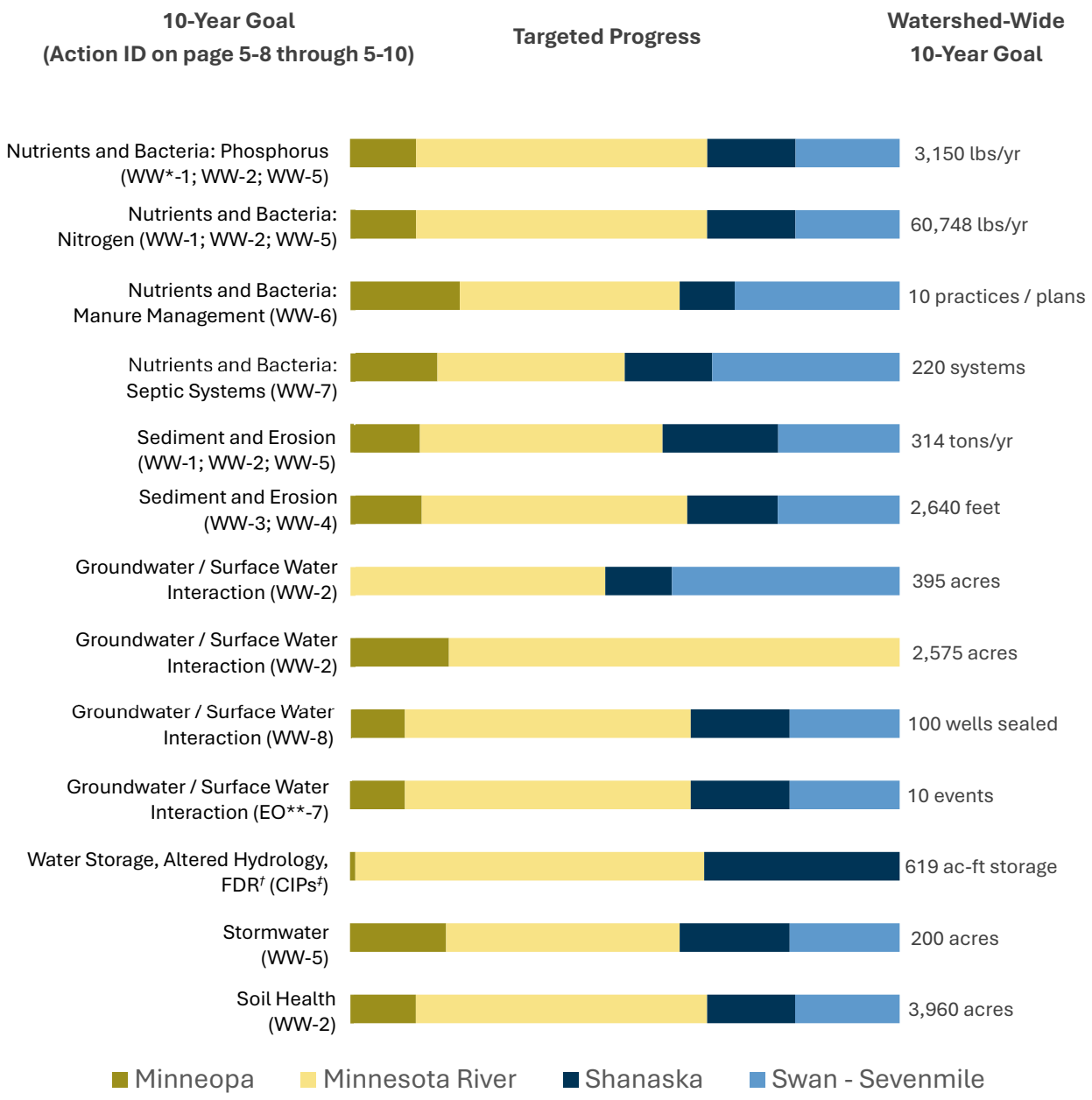
- Crystal Lake (Blue Earth County)
- Lake Ballantyne (Blue Earth County)
- Lake Emily (Le Sueur County)
- Lake Washington (Le Sueur County)
- Minneopa Creek
- Swan Lake (Nicollet County)

Tier 2 Priority Resources

- Duck Lake (Blue Earth County)
- Duck Lake (Nicollet County)
- Indian Creek
- Lake Hallett (Nicollet County)
- Loon Lake (Blue Earth County)
- Nicollet Creek
- Seven Mile Creek
- Shanaska Creek
- St. Peter Trout Ponds (Le Sueur County)

Figure 1-3 visually shows how work towards the goals in the plan will be split across the four implementation regions. This milestone chart shows the watershed-wide goal on the right, with each bar displaying the extent to which progress will be made in each implementation region, following the goal focus area maps. Implementation regions where the milestone chart has larger contributions for a goal indicate that the issue is more prominent in that area.

Photo: Minneopa State Park, Minnesota River Valley webpage



*WW = Watershed-wide
**EO = Education and Outreach
†FDR = Flood Damage Reduction
‡CIPs = Capital Improvement Projects

Figure 1-3: Progress made within implementation regions towards goals during plan implementation

Implementation

To make progress towards the measurable goals with the plan, targeted actions will be implemented. Targeted actions being used to achieve plan goals are summarized within action tables. The action tables include a description of the action, the focus area, the measurable output, impacted goals, responsible entity, estimated timeframe and the estimated cost for the action. Action tables are categorized by plan programs, as shown in **Figure 1-4**. A complete summary of actions can be found in **Section 5 – Targeted Implementation** for both watershed-wide and implementation region scales.

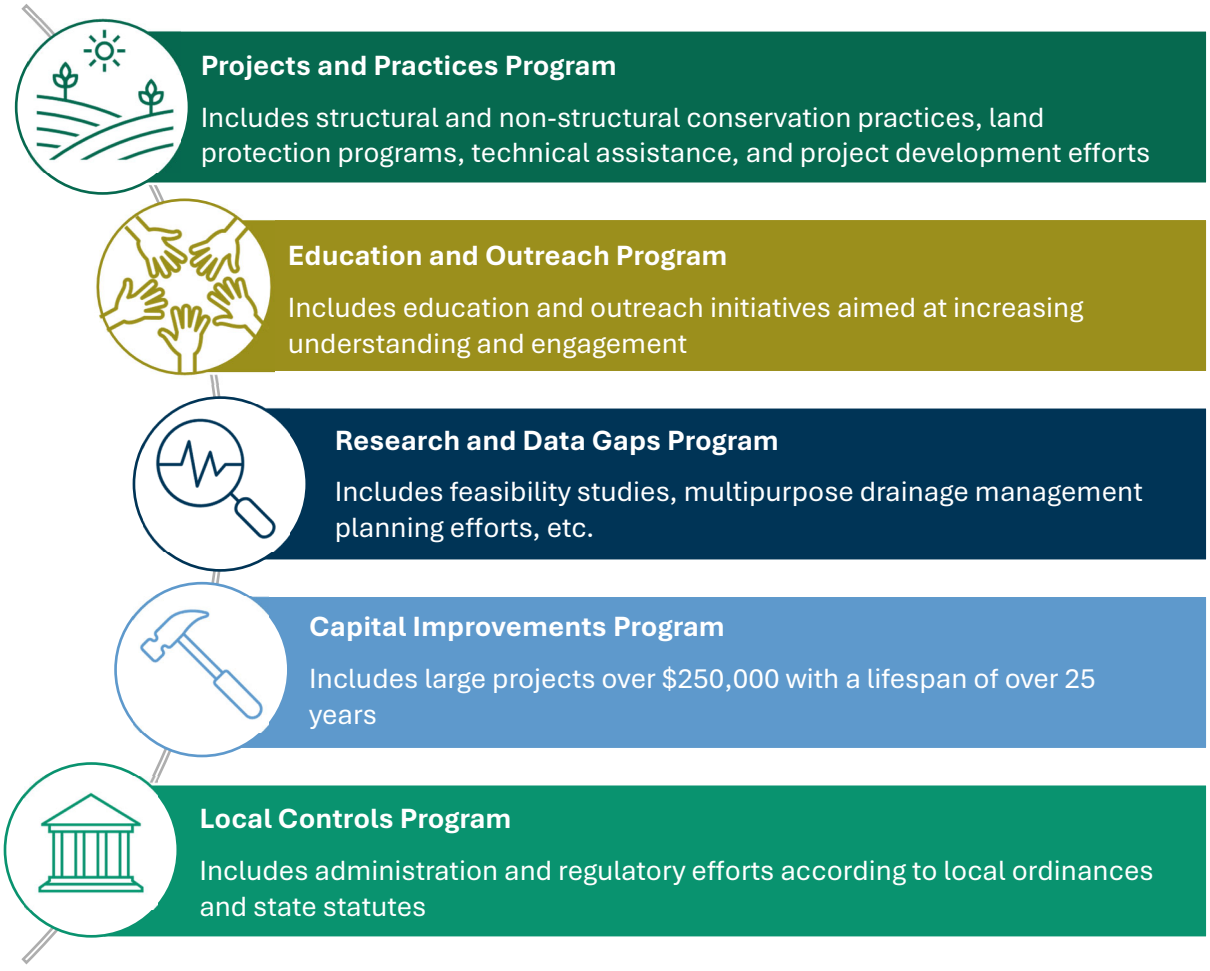


Figure 1-4: Implementation programs in the Minnesota River-Mankato Watershed.

Implementation Costs and Benefits

Progress towards goals can be impacted by many factors. One of the most significant factors is the funding available during the 10-year plan. To create a realistic scope of the actions that can be completed with anticipated state and local funding, this plan includes an estimated "Local 10-Year Plan Cost" that will be needed to implement the plan (**Table 1-3)**. The local cost includes baseline funding already available in the watershed on the county and state level.

Photo: Arboretum at Gustavus Adolphus College, Minnesota River Valley National Scenic Byway webpage

Planning partners acknowledge that to make full progress towards the watershed's goals, some actions will need to be funded beyond the "Local 10-Year Cost" and pursued by partnering entities (e.g., Minnesota Pollution Control Agency, Department of Natural Resources, United States Fish and Wildlife Service, The Nature Conservancy), federal dollars (e.g. Conservation Reserve Program, Conservation Reserve Enhancement Program), or other competitive funding programs. These funds and actions are represented in the action tables as "Partner/Federal 10-Year Cost" to account for all the funding needed to implement the goals of this plan. A full scope of implementation funding is illustrated in **Table 1-3**.

Table 1-3: Costs of implementing the Minnesota River-Mankato Watershed CWMP.

Program	Local 10-Year Cost	Partner 10-Year Cost
Projects and Practices	$3,509,300	$7,001,500
Project Development	$2,178,000	N/A
Technical Assistance	$2,003,000	N/A
Research and Data Gaps	$560,000	N/A
Education and Outreach	$5,676,000	N/A
Local Controls	$5,273,000	N/A
Capital Improvements	$1,825,000	$8,995,000
Operations and Maintenance	$574,000	N/A
Plan Administration	$420,000	N/A
Total	**$ 22,018,300**	**$15,996,500**

The Minnesota River – Mankato Partnership anticipates a local and state budget of $2,090,600 annually, or $20,906,000 over the 10-year plan (for more details, see Section 7—Plan Administration and Coordination). **This means that to meet plan goals, the Partnership estimates needing an additional $111,230 per year, or $1,112,300 over the 10-year plan.**

2. Land and Water Resources Narrative

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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'), is located in south-central Minnesota and is shaped 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, North Mankato, St. Peter, and Lake Crystal.

At 370,960 acres, the Comprehensive Watershed Management Plan (CWMP) planning area is less than half the size of the major (Hydrological Unit Code-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: Minnesota River, MPCA Watershed Information webpage

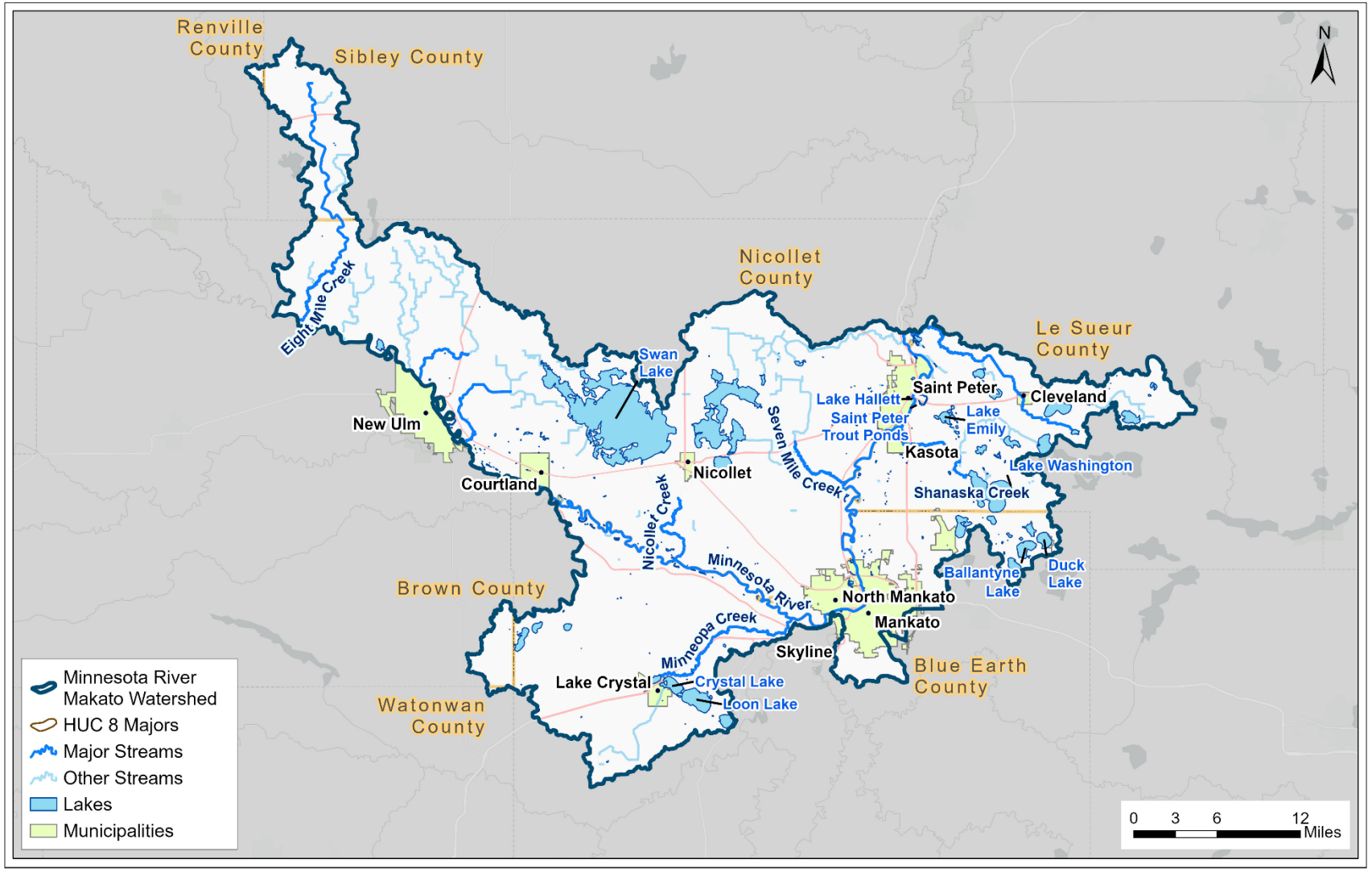


Figure 2-1: Map of the watershed.

History

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).

Photo: Art of the Dakota Homeland, Minnesota River Valley National Scenic Byway webpage

Europeans first settled in the area in the 1700s. The Treaty of Traverse de Sioux was signed in 1851 (Dakota and Ojibwe Treaties, n.d.). 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 (MNDNR, 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; MNDNR, 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 consists of 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, MNDNR

Soils

The soils in the watershed are some of the youngest in the country (MNDNR, 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 (MNDNR, 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 growth rate of Minnesota (Department of Employment and Economic Development, 2024). The increase in population leads to an anticipated future increase in developed land use.

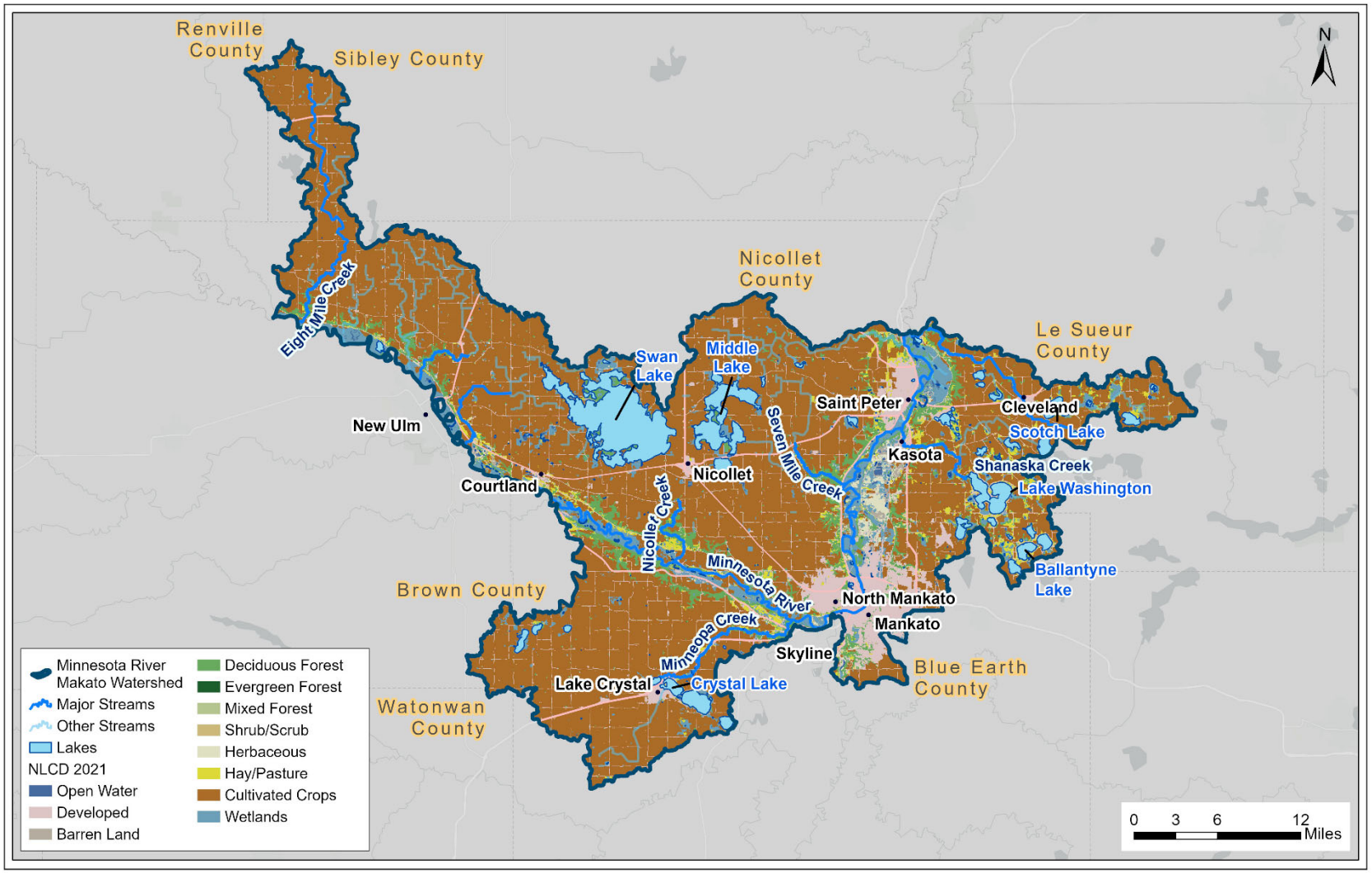


Figure 2-2: Current land use in the watershed.

The pre-European land use is known through Marschner vegetation maps, which show that 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 (MNDNR, 2016).

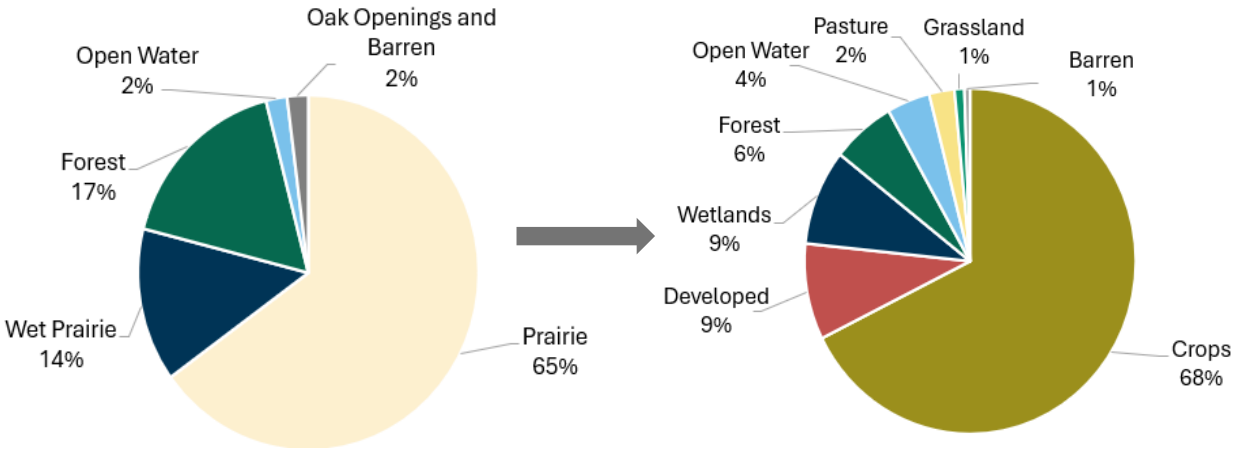


Figure 2-3: Historical land use from Marschner map (left, MNDNR, 2016) and 2021 land use from National Land Cover Database (right, USGS, 2021).

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 the volume of water 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 347 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 five dairy operations and one chicken operation.

Ecological Provinces, U of M

Natural Land

The watershed lies within the Prairie Parkland and Eastern Broadleaf Ecological Provinces, and is 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 presently still covered 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 (SNAs) that cover about 50 acres, nearly 6,000 acres spread over 38 Wildlife Management Areas (WMAs), and nearly 2,000 acres in 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, MNDNR

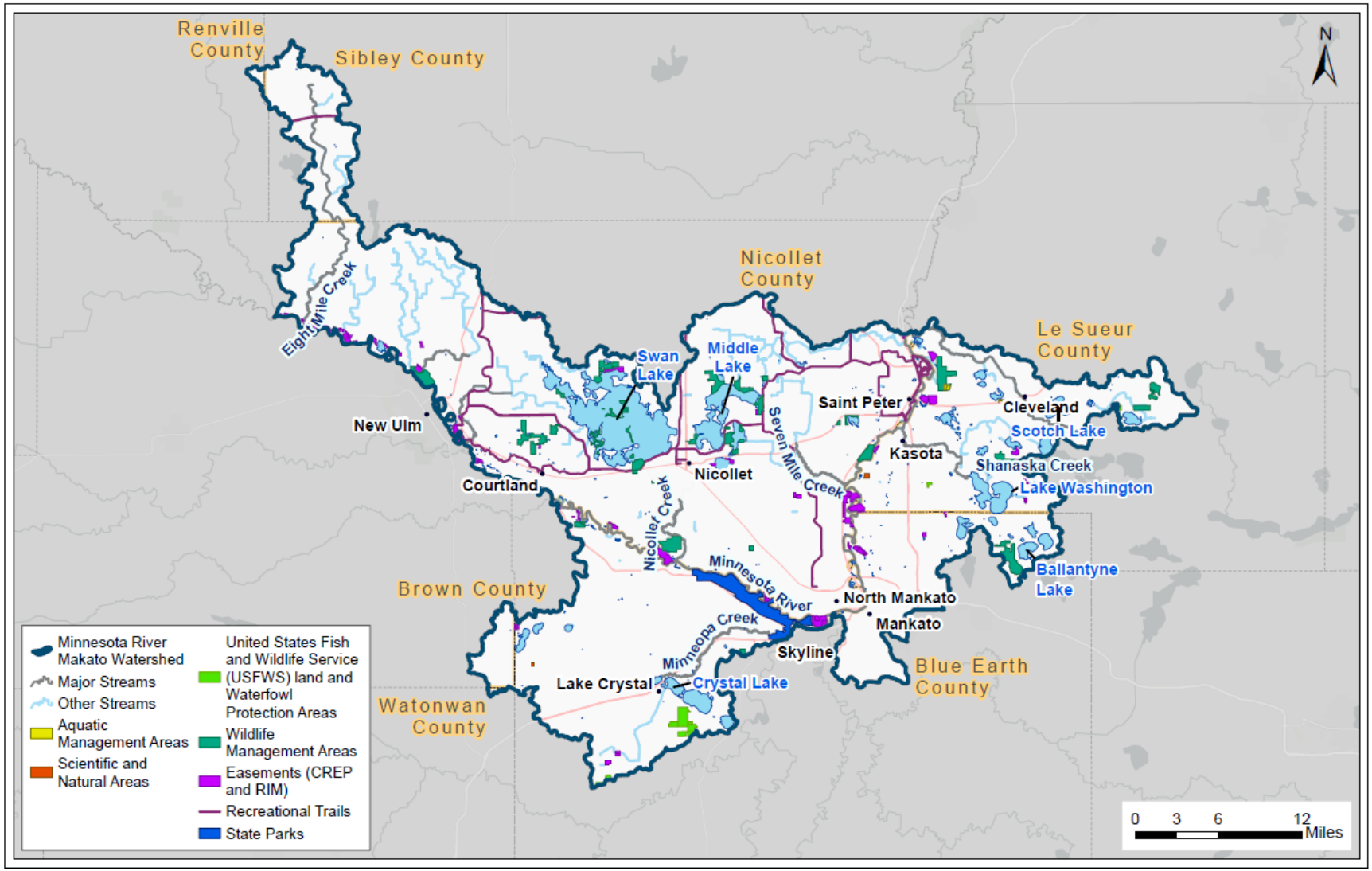


Figure 2-4: Public and protected land.

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

Prior 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 (MNDNR, 2016).

Photo: Lake Crystal Boat Landing, City of Lake Crystal

The federal Clean Water Act requires each state to adopt water quality standards to protect waters from pollution. Minnesota water quality standards define 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). Surface water quality is impacted by numerous lake and stream impairments (**Figure 2-5**), of which the main stressors have been evaluated to be altered hydrology, connectivity, habitat, and nitrate (MPCA, 2019a).

Approximately 70% of the city of Mankato's drinking water is supplied by two shallow Ranney wells that draw water from under the Minnesota and Blue Earth Rivers. Source water to these wells is considered to be groundwater under the direct influence of surface water. The wells are constructed horizontally under the river and draw water that has filtered through the riverbed sediments very quickly. Nitrate in these wells has previously reached levels of concern. Due to this, Mankato has a defined surface water Drinking Water Supply Management Area (DWSMA). Portions of the Mankato DWSMA-Surface Water, Emergency Response Area and the Spill Management Area are within the watershed planning area.

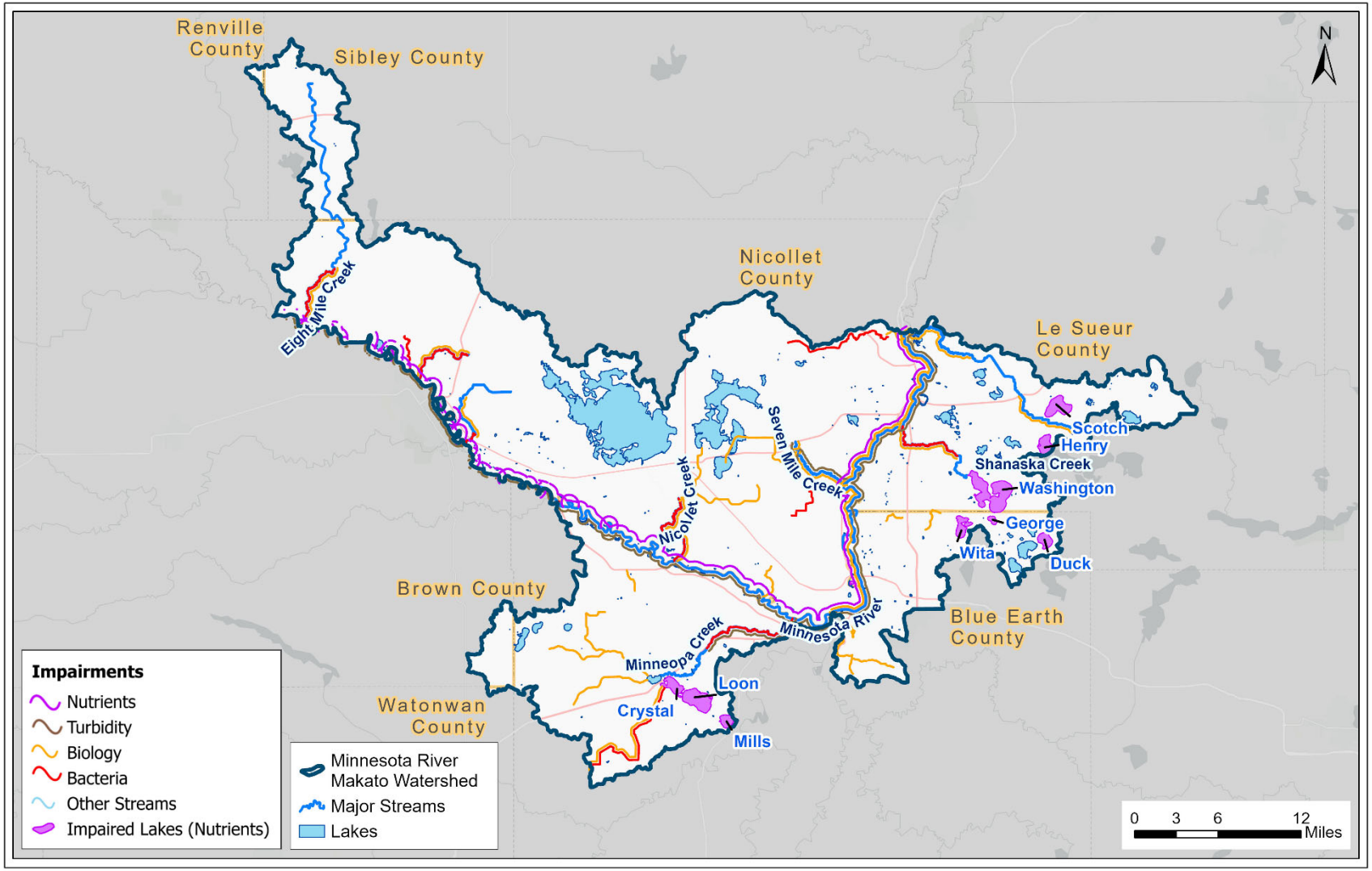


Figure 2-5: Impaired waters (MPCA, 2024b).

Lake Water Quality

Photo: Lake Washington, Lake Washington Improvement Association

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.

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).** An index of biological integrity synthesizes fish and lake data to determine if a lake supports a healthy fish population. 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, curly-lead pondweed, 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

Streams and Ditches

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 (MNDNR, 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: 2024 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
Polychlorinated Biphenyls (PCB)s in fish tissue	4
Mercury in water	4
Nutrients	4
PCBs in water	2
Nitrate	2
Total Suspended Solids	1

The channelization of streams and addition of tile drainage has altered hydrology in the watershed and made land more suitable for agriculture. See **Appendix B** for miles of open drainage ditches and tile drainage in watershed counties.

Hydrology

The Evaluation of Hydrologic Change (EHC) is a Department of Natural Resources (MNDNR) 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 before 1983 is significantly different than the hydrology after 1983. 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 and drainage systems, and loss of perennial cover are more likely to explain the increase in flow metrics (MNDNR, 2023). Within the watershed, about 65% of streams have been altered (MPCA, 2020). Federal Emergency Management Agency (FEMA) floodplains are present along the Minnesota River, and floodplains are shown on FEMA's National Flood Hazard Layer Viewer.

Groundwater

Both public and private wells utilize the same aquifers within the watershed. These aquifers range from surficial sand and gravel aquifers to crystalline bedrock aquifers. The prominent aquifers are sandstone bedrock and buried sand and gravel aquifers. The buried sand and gravel aquifers are typically overlain with glacial till which helps to provide geologic protection to the aquifer.

All of the watershed obtains drinking water from groundwater. There are 22 DWSMAs within the watershed (**Figure 2-6**). DWSMA boundaries and vulnerability are established by the Minnesota Department of Health (MDH) and are a delineated protection area based on the contribution area of a public water supply well and aquifer vulnerability. They provide an opportunity to prioritize specific geographic areas for drinking water protection purposes. There are 35 non-community public water systems in the watershed, which provide drinking water to people at places such as work or school.

The city of Kasota has a very highly vulnerable DWSMA and St. Peter and Mankato (DWSMA-Surface Water) have highly vulnerable DWSMA's which means they are at risk from surface contamination quickly impacting their drinking water. Valley Mobile Home Park and Lakes and Links Homeowner Association are public water supplies considered highly vulnerable to surface contaminants. The other DWSMAs delineated for public water supplies are moderate to low vulnerability.

Photo: Mankato Ranney well, MDH

Most of the surface materials have a moderate vulnerability to contamination, but there is higher sensitivity to pollution around the Minnesota River and in the southern edge of the watershed (**Figure 2-7**). Highly permeable sandy soils, shallow soils over karst geology, and groundwater under the influence of surface water are characteristics that can lead to surface contamination of drinking water sources. The aquifers that serve St. Peter and Kasota are recharged by upland runoff from land used for row crop agriculture that infiltrates and moves through sandy and shallow 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 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).

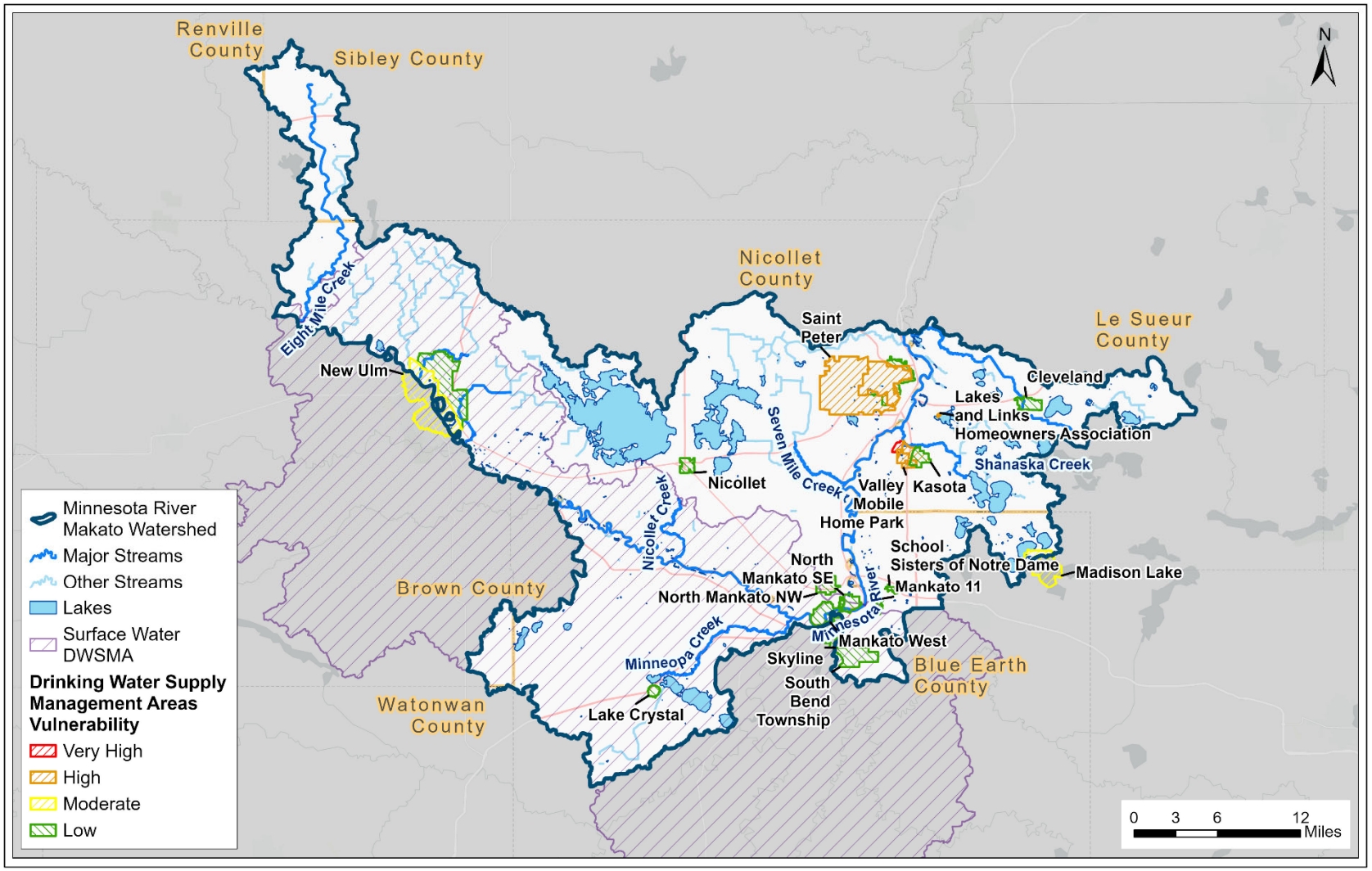


Figure 2-6: DWSMA vulnerability in the watershed.

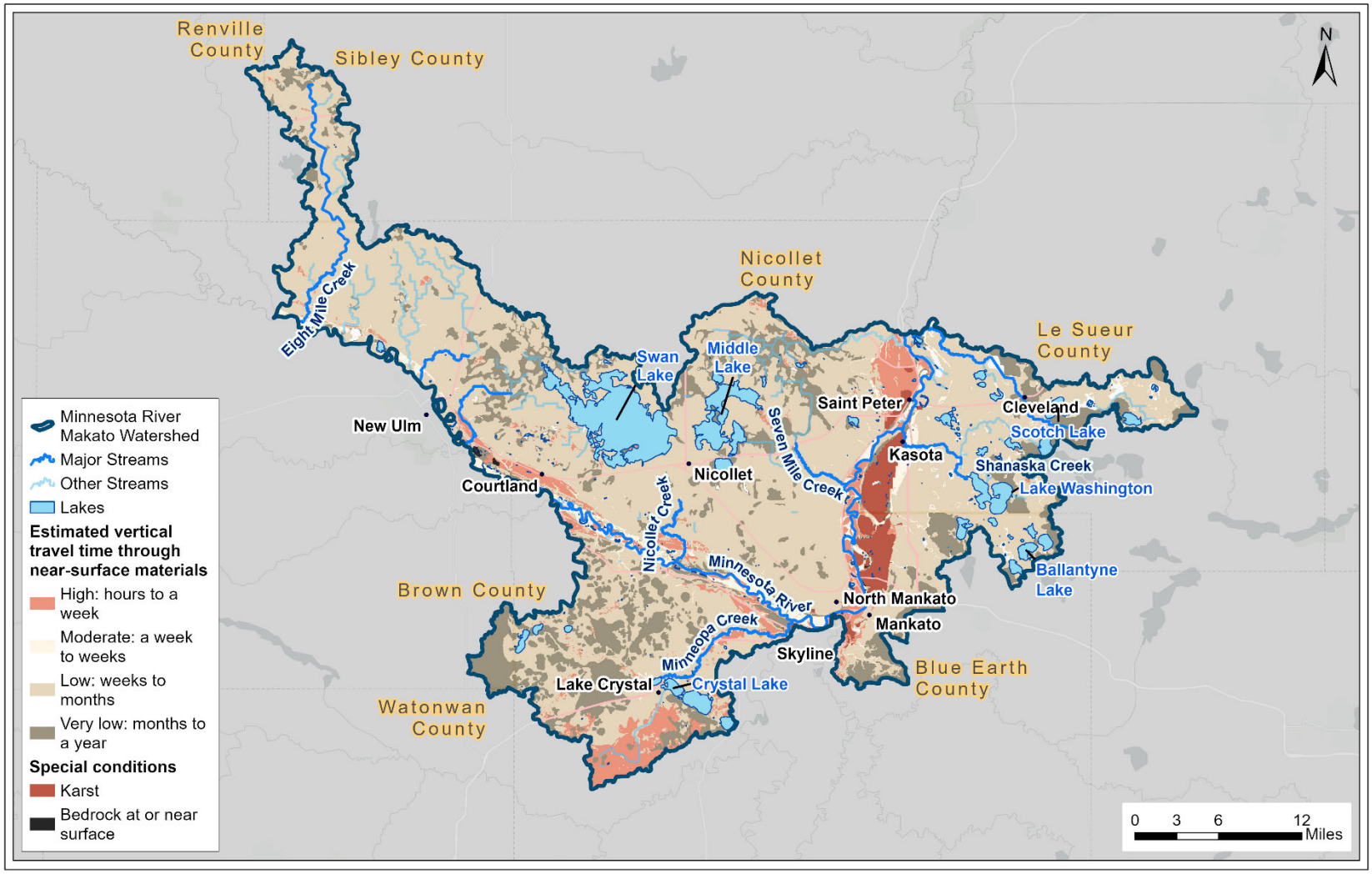


Figure 2-7: Pollution sensitivity in the watershed.

Urban Areas

Stormwater

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 municipal separate storm sewer systems (MS4s) in the watershed. MS4s 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. Non-MS4 municipalities include Cleveland, Courtland, Lake Crystal, Nicollet, and Kasota. These cities are small enough that a stormwater management plan is not required, but stormwater management is still important to reduce surface water contamination.

Photo: City of Mankato- Old Town, Minnesota River Valley Scenic Byway webpage

People

An estimated 82,000 people live within the watershed. Socioeconomic statistics for the watershed were estimated by weighing census data for Nicollet, Blue Earth, and Le Sueur Counties according to the percent of the watershed within those counties (US Census, 2022). An estimated 35% of the watershed population has a bachelor's degree, the median household income is $77,800, and the median age is 36. Each of these numbers are lower than the state average. The majority of the population is White, then Hispanic, Black, Asian, Indian or Alaska Native, and Native Hawaiian / Pacific Islander.

3. Priority Issues

3. Priority Issues

This **Priority Issues** plan section identifies issues affecting watershed resources and covers:

- Issue development
- Public input
- Implementation regions
- Priority Issues
- Emerging issues

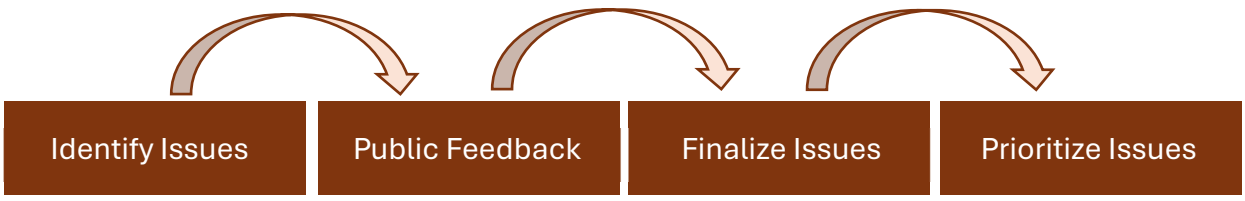
Issue Identification

This plan identifies actions that will be carried out over the next 10 years to address watershed natural resource issues. To focus efforts, issues affecting the watershed were identified and prioritized. An "issue" is generally defined as a problem, risk, or opportunity related to a resource. A "resource" is generally defined as a landscape feature that can be impacted by an issue, such as surface water, groundwater, habitat, or agricultural land.

A comprehensive list of issues impacting resources in the Minnesota River-Mankato Watershed was developed with Steering Committee input after review and consideration of the following:

- Agency reports: Watershed Restoration and Protection Strategies Report (WRAPS), Watershed Characterization Report, Stressor Identification Report
- Total Maximum Daily Loads (TMDLs): Minnesota River/Blue Earth River Total Suspended Solids TMDL, Minnesota River-Mankato Watershed TMDL
- County Water Plans: Blue Earth, Le Sueur, Nicollet, and Sibley
- 60-Day Letters (**Appendix C**) received from state agencies on this plan: Minnesota Pollution Control Agency (MPCA), Department of Natural Resources (MNDNR), Board of Water and Soil Resources (BWSR), Minnesota Department of Health (MDH)

After issues were identified, feedback from the public was solicited. Then issues were finalized and prioritized to focus efforts related to this plan.



Public Input

Photo: Voting for issues at the kickoff meeting

This plan relies on voluntary implementation. The issues described here affect residents throughout the watershed. For this reason, it was important to receive feedback from the public about issues that are important to them and provide them with an opportunity to comment on the planning process. This feedback was achieved through public kickoff meetings held on July 23 and July 30, 2024, in Nicollet and St. Peter, respectively. These meetings were attended by approximately 40 people. The goal of these meetings was to share information about the planning process and the purpose of a watershed plan, and provide opportunities to identify issues and resources most important to members of the community.

At the meetings, community members discussed issues facing their watershed, voted on resources most important to them using mock money, and were invited to take a survey. This same survey was also available online for one month for those that did not attend the meetings. In total, there were 75 responses to the public survey. Results of that survey, resource voting, and meeting discussions are summarized in **Appendix D**. One question on the survey asked participants to describe the Minnesota River-Mankato Watershed. The results are shown as a word cloud in **Figure 3-1** below:

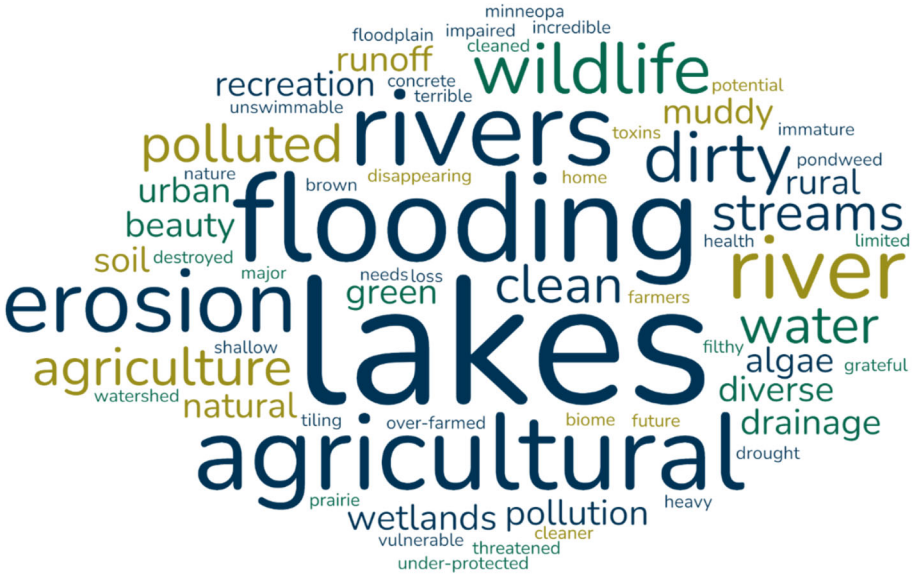


Figure 3-1: Survey responses to the question, "Using 4-5 words, what comes to mind when thinking of the watershed?"

Participants were also asked to choose up to five issues in the watershed that they care most about. This question was asked to help inform future issue prioritization efforts. Results from that question are summarized below in **Figure 3-2**. The most common answer was sediment, nutrients, and bacteria, followed by wetlands and drinking water protection. Additionally, when asked what specific resource was of the largest concern, the most common answer was the Minnesota River.

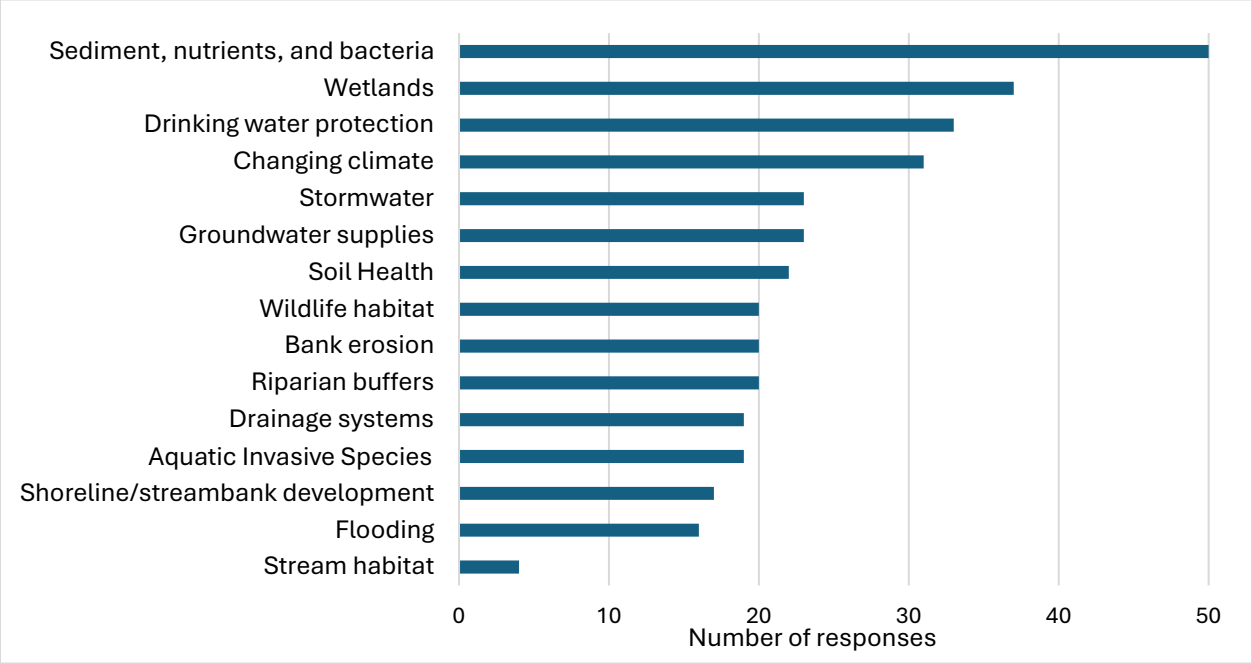


Figure 3-2: Survey responses to top issues/concerns in the watershed.

Resources

Ultimately, 16 issues were identified based on existing agency reports, county water plans, agency letters, and feedback from the public. These issues are summarized in this plan section. This is a large number of issues to manage without further organization; therefore, issues were placed into one of four resource categories intended to reflect the resource most affected by that issue.

Surface Water Quality

Drinking Water and Groundwater

Flood Damage Reduction and Hydrology

Land Use and Habitat

Implementation Regions

As introduced in **Section 2 – Land and Water Resources Narrative,** the Minnesota River-Mankato Watershed is a diverse area spanning over 370,000 acres. The issues impacting resources (and importance of those issues) can change throughout the watershed.

In recognition of this, local planning partners organized the watershed into four implementation regions based on Hydrologic Unit Code-10 boundaries: The Minnesota River Area, Swan-Sevenmile Area, Shanaska Creek Area, and Minneopa Creek Area (**Figure 3-3**). The creation of implementation regions keeps the focus on watershed-wide management, but allows issues, goals, and actions to be tailored to the area of the watershed where they matter the most. These implementation regions will be referenced throughout this Comprehensive Watershed Management Plan.

Issue Prioritization

While there are numerous issues impacting the watershed and all are important in some way, there are limits in time, staffing, and financial resources to accomplish everything in a 10-year plan. Part of the planning process is identifying select issues to direct staff capacity and funding moving forward into implementation. This plan placed the 16 identified issues into three priority groups: high, medium, and low.

- **High Priority:** Most important issues.
- **Medium Priority:** Important issues, but secondary priority to high priority issues.
- **Low Priority:** Not a focus of the plan but may be addressed by partners or with additional funding.

Issues were initially prioritized based on how prominent the issue was mentioned in existing agency reports and TMDLs, county water plans, agency letters, and responses from the public survey. Priority rankings of the issues were then reviewed and adjusted by the Steering and Policy Committees. This was done to better hone local priorities and address new developments such as historic flooding damage in 2024.

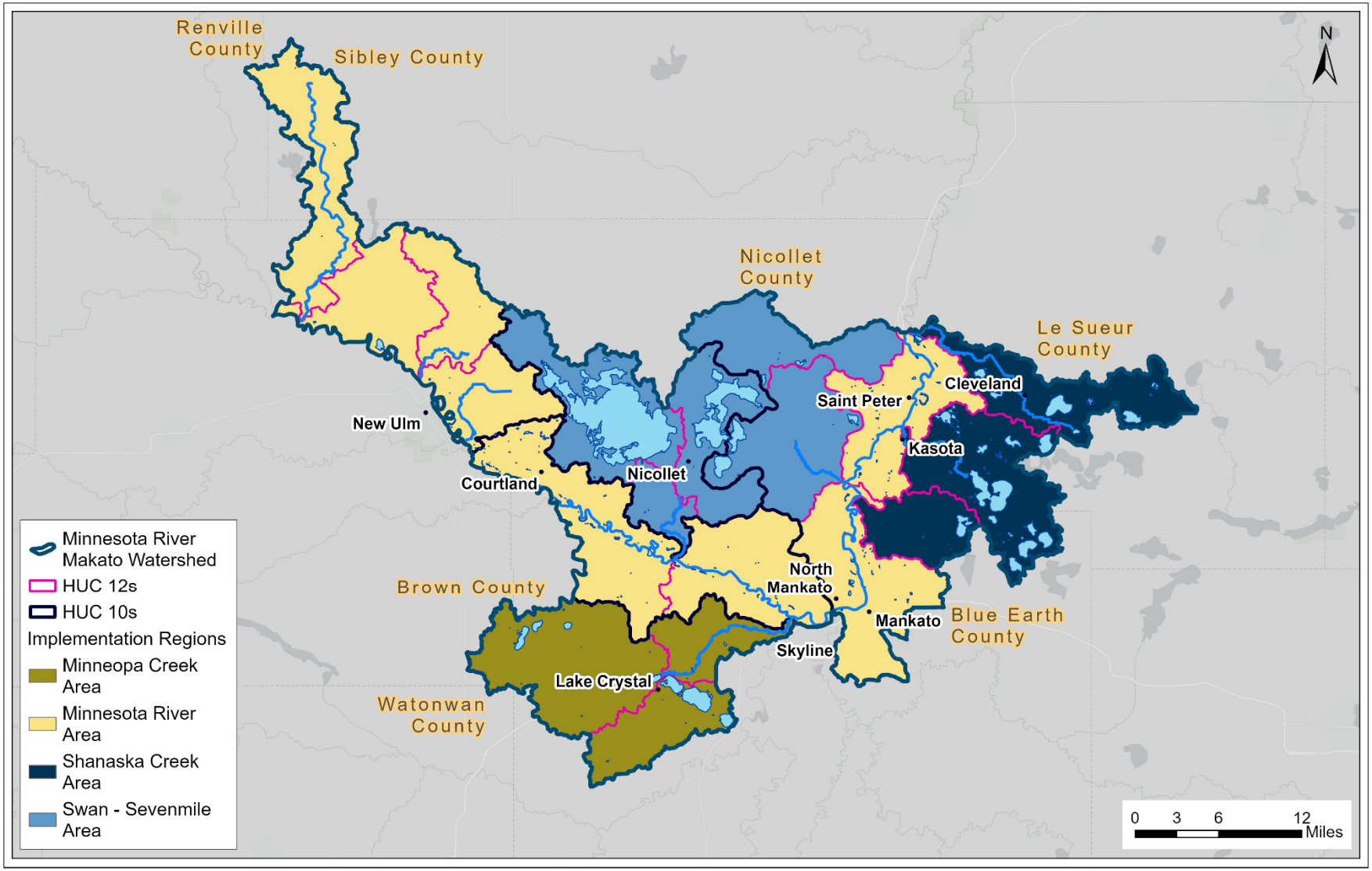


Figure 3-3: Implementation regions in the Minnesota River-Mankato Watershed.

Issue Priorities

High priority issues are the primary focus of the plan and each is addressed by at least one measurable goal in **Section 4 – Measurable Goals**. High priority issues are listed below in no order of priority. Note that addressing issues will be done in a way that minimizes public capital expenditure, specifically regarding water quality and flooding.

Table 3-1: High priority issues.

	Resource	Issue	Issue Statement
High Priority		Nutrient Loading	Nutrient loading (phosphorus and nitrogen) has led to habitat and recreation impairments from algae blooms.
		Sediment and Erosion	Excess sediment, largely from channel / ravine erosion and upland erosion, is the cause of numerous aquatic life impairments.
		Surface Water / Groundwater Interaction	A significant portion of the population obtains their drinking water from a groundwater source influenced by surface water, which makes contamination (especially with nitrate) more likely.
		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.
		Altered Hydrology	Altered hydrology due to changes in land use and drainage, combined with an increase in precipitation has led to flooding and high flow volume.
		Soil Health	Degraded soil health on productive land can lead to more erosive soils.*

** Soil health will be addressed watershed-wide, including in the Mankato surface water Drinking Water Supply Management Area (DWSMA).*

Photos: Soil health practices, Blue Earth SWCD

Medium priority issues are also a focus during implementation and are addressed by at least one measurable goal in **Section 4 – Measurable Goals**. Medium priority issues are listed below in no order of priority.

Table 3-2: Medium priority issues.

	Resource	Issue	Issue Statement
Medium Priority		Bacteria	Bacteria from livestock, human, and wildlife waste contribute to *E. coli* and fecal coliform impairments.
		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.
		Stormwater	Stormwater from developed areas contains salt, sediment, nutrients, fertilizer, and more that pollutes receiving waters.
		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.
		Invasive Species	The presence of aquatic and terrestrial invasive species degrades habitat quality and recreation opportunities.

Photo: Native flowers in easement, Le Sueur SWCD

Low priority issues are not specifically addressed through a measurable goal, but may be indirectly addressed through plan actions. Low priority issues are not unimportant, rather, they may be addressed by partner organizations, existing regulations, or as funding allows. Issues that were acknowledged through the issue development process but ended up as a low priority for implementation are listed below.

Table 3-3: Low priority issues.

Low Priority	Resource	Issue	Issue Statement
		**Groundwater Quantity**	Protecting groundwater supplies by increasing recharge and using water wisely is important to ensure future drinking water availability as well as adequate base flow to streams.
		**Stream Connectivity**	Natural and built barriers such as perched or improperly sized culverts limit stream connectivity, impeding fish passage.
		**Precipitation**	An increase in annual precipitation and changes to historic weather patterns impacts agricultural productivity, increases peak stream flows, and exceeds design of infrastructure.
		**Wildlife Habitat**	Historic wetlands, forest, and prairie have been lost, reducing available habitat and associated ecosystem benefits.
		**Riparian and Shoreline Areas**	Insufficient vegetation in riparian and shoreland areas decreases riparian and shoreline stability, increases water temperatures, and degrades aquatic habitat.

Emerging Issues and Planning Lenses

There are additional issues facing the watershed that are not a traditional issue as summarized in the previous section. This may be because it lacks data, is new or not fully understood, or does not fit into the One Watershed, One Plan issue definition. These issues include climate, environmental justice, and chloride.

Climate

Feedback from the public kickoff and survey included concern over heavy rains, which are becoming more common in Minnesota. Precipitation patterns are becoming more variable and have shifted in recent years to have less precipitation in early summer and more in the fall (MPCA, 2019a). Climate records going back to 1895 show an average increase in annual temperatures in the watershed of 0.24 °F per decade and an increase in annual precipitation by 0.20 inches per decade. Monthly rainfall has decreased by 0.02 inches per decade in June and increased by 0.04 inches per decade in October (MNDNR, 2024). Precipitation is included in the plan as a "low" priority issue, but climate is discussed as an emerging issue due to the broader issues and implications of a variable climate. In addition to changing rainfall patterns, temperatures are shifting as well. In a highly agricultural watershed, a stable climate protects livelihoods and the local economy.

Resiliency to climate impacts is the ability to withstand extremes like flooding, drought, or temperature. Resilience is an aspect of planning that is becoming increasingly popular, especially as extreme floods are occurring more often and causing significant damage. This plan was developed through a climate lens and will build resiliency to climate into plan actions where possible. BWSR provides a climate resiliency toolbox, which provides tools for partnership and science-based actions to build resiliency in multiple sectors that are included within this plan, such as in water planning, agricultural landscapes, and community outreach (BWSR Climate Resiliency Toolbox, n.d.).

Chloride

Concern over chloride in surface water is growing, as concentrations in streams and lakes have been increasing in recent decades due to road salt application. Road salt is applied to pavement as an anti-icer and de-icer to enhance winter driving and walking safety, but it does not degrade in the environment and thus is a source of salinity in runoff. Water softeners can also be a source of chloride in the environment.

The principal concern over the presence of chloride in the environment is in surface waters, where it is toxic to aquatic life at high concentrations. Road salt also corrodes infrastructure, is toxic to roadside vegetation, and is reaching groundwater in some locations. The Environmental Protection Agency set short-term and long-term chloride standard in freshwater, and the MPCA has begun to declare waters impaired for chloride. However, most Minnesota waterbodies have not been assessed for chloride impairments. No waterbodies in the watershed are impaired due to chloride, but this does not mean that chloride is not a pollutant of concern, especially near urban areas.

Photo: Mankato photo contest, Bridget Woller

MPCA offers Smart Salting training to road salt applicators and has educational materials available for watersheds. Many applicators have already completed Smart Salt training, and plan implementation will build on existing relationships to address chloride contamination.

Environmental Justice

Everyone in the Minnesota River-Mankato Watershed is affected by environmental issues, but historically marginalized and vulnerable groups can be disproportionately affected by pollution and access to natural spaces. The MPCA developed areas of concern based on areas where a high proportion of residents are in poverty, are people of color, have limited English proficiency, or are in federally recognized tribal land (**Figure 3-4**).

Environmental inequities can impact accessibility and public health. This plan was written with the principles and areas of environmental justice in mind, and implementation of the plan will also consider environmental justice in decision making and project implementation. Actions in **Section 5 – Targeted Implementation** include septic system upgrades and well sealings. These actions provide an opportunity to preferentially address low-income households through either a low-interest loan or cost-share programs.

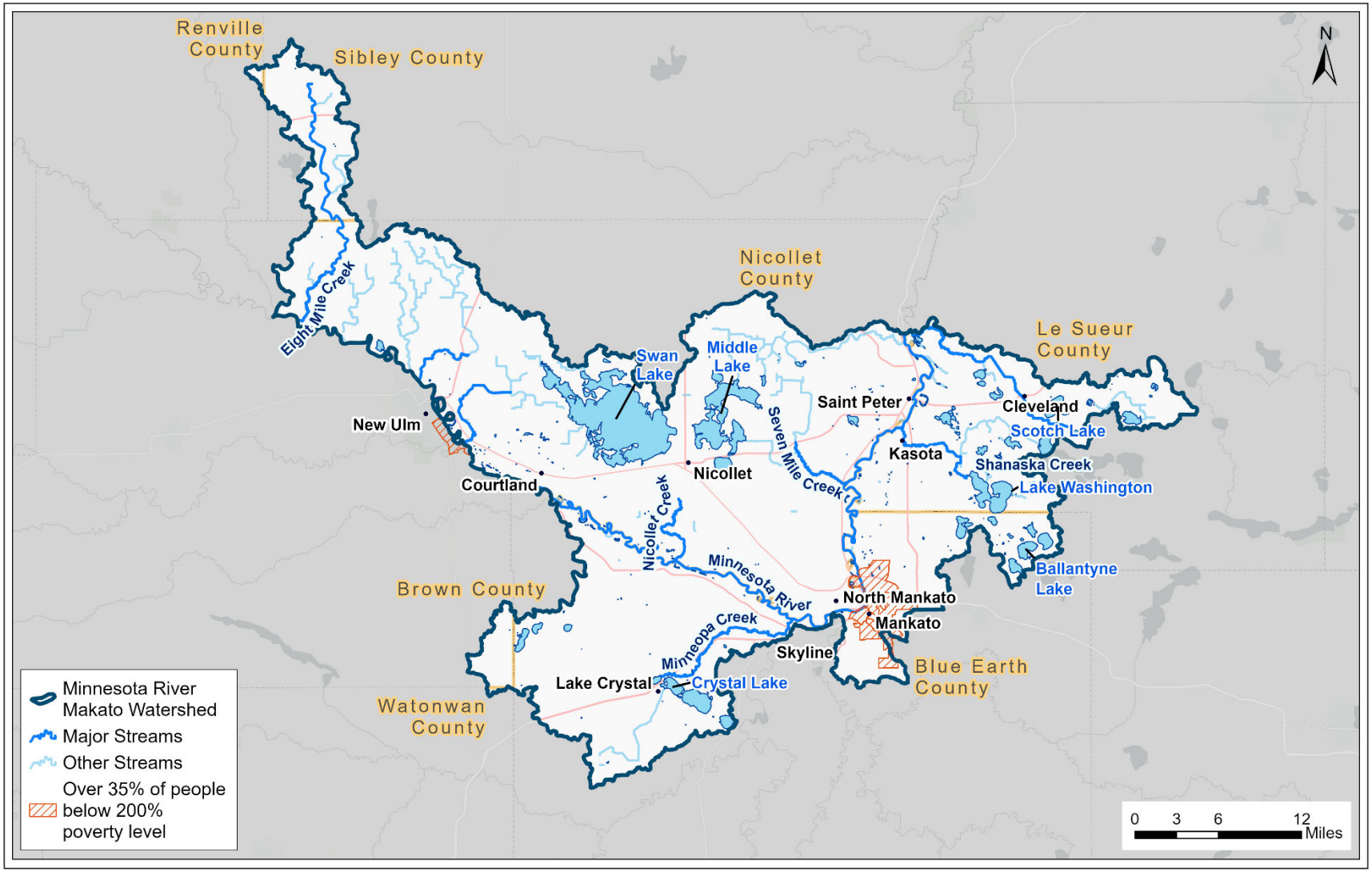


Figure 3-4: Environmental justice areas as defined by the MPCA in the Minnesota River-Mankato Watershed.

4. Measurable Goals

4. Measurable Goals

The **Measurable Goals** plan section identifies priority resources and areas. There are seven 10-year goals with desired future conditions to address the medium and high priority issues in **Section 3 – Priority Issues**.

- The 10-year goal is the key output of this section, and is displayed in the navy-blue boxes
- A list of priority lakes and streams was developed
- Focus area maps show where work should be targeted

Goals

Part of an effective plan is having quantifiable, measurable goals with a clear timeframe. Watershed goals include a measurable 10-year goal with a metric clarifying how progress towards the goal will be tracked. Additionally, a 'desired future condition' is stated, which is a long-term, idealistic goal the planning partners would like the resource condition to reach at some undetermined point in the future. Some goals address more than one priority issue, as shown in **Table 4-1**.

Each goal is described over two to three pages, with the issues being addressed, background information describing the issue and how the goal will improve the issue, and the goal information displayed to the right. The main goal this plan is working towards is the short-term (10-year) goal.

The goals each have a focus area map, which uses data to target where in the watershed efforts would make the biggest impact towards the goal. Where relevant, these maps show the high priority subwatersheds for prioritization.

See **Section 5 – Targeted Implementation** for actions that make progress towards goals.

Short-term Goal:

A quantifiable change expected in a resource in 10-years

Desired Future Condition

The long-term goal, a hoped-for condition of a resource at an undetermined point in the future

Stacked Benefits

Recognized secondary benefits of work towards the short-term goal

Table 4-1: Goal summary.

Goal Name	Priority Issue(s) Addressed	10-Year Goal
Nutrients and Bacteria	• Nutrient Loading • Bacteria	Reduce total phosphorus by **3,150 lbs/year** (or 1.4%) and total nitrogen by **60,748 lbs/year** (or 1.1%) Implement **10 manure management practices or plans** and address **220 noncompliant septic systems**
Sediment and Erosion	• Sediment and Erosion	Reduce sediment loading by **314 tons/year** (or 1.7%) from upland sources Stabilize or enhance **2,640 linear feet** of lake shoreline, ravines, or streambanks
Groundwater / Surface Water Interaction	• Surface Water / Groundwater Interaction • Groundwater Quality	Protect or treat **395 acres** of vulnerable groundwater Drinking Water Supply Management Areas (DWSMAs); Protect or treat **2,575 acres** of vulnerable surface water DWSMAs Seal **100 wells** Conduct **10 outreach** events
Water Storage, Altered Hydrology, and Flood Damage Reduction	• Loss of Water Storage • Altered Hydrology • Flooding	Add **619 ac-ft** of water storage to the landscape
Stormwater	• Stormwater	Reduce total phosphorus (TP) by **30 lbs/year** and total nitrogen (TN) by **480 lbs/year** through treating **200 acres** of municipal land with best management practices
Soil Health	• Soil Health	Implement soil health practices (e.g. cover crops, tillage management) on **3,960 acres**
Invasive Species	• Invasive Species	Prevent the spread of invasive species through **5 outreach and education efforts**

Resource Prioritization

Each goal has a focus map showing where the goal will be prioritized. See **Appendix E** for what geospatial data went into each map. However, watershed-wide lake and stream priority resources were also set (**Figure 4-1**). Priority resources were developed based on committee input and nearly or barely impaired waters as listed in the Watershed Restoration and Protection Strategy (WRAPS) report. Of the priority resources, 'Tier 1' resources will be the focus during implementation. 'Tier 2' resources are acknowledged as locally important but not a primary focus of the plan.

Tier 1 priority resources include:

- Crystal Lake (Blue Earth County)
- Lake Ballantyne (Blue Earth County)
- Lake Emily (Le Sueur County)
- Lake Washington (Le Sueur County)
- Minneopa Creek
- Swan Lake (Nicollet County)

Tier 2 priority resources include:

- Duck Lake (Blue Earth County)
- Duck Lake (Nicollet County)
- Indian Creek
- Lake Hallett (Nicollet County)
- Loon Lake (Blue Earth County)
- Nicollet Creek
- Seven Mile Creek
- Shanaska Creek
- St. Peter Trout Ponds (Le Sueur County)

In addition to these resources, unique and rare features such as calcareous fens will also be prioritized for protection efforts wherever practical.

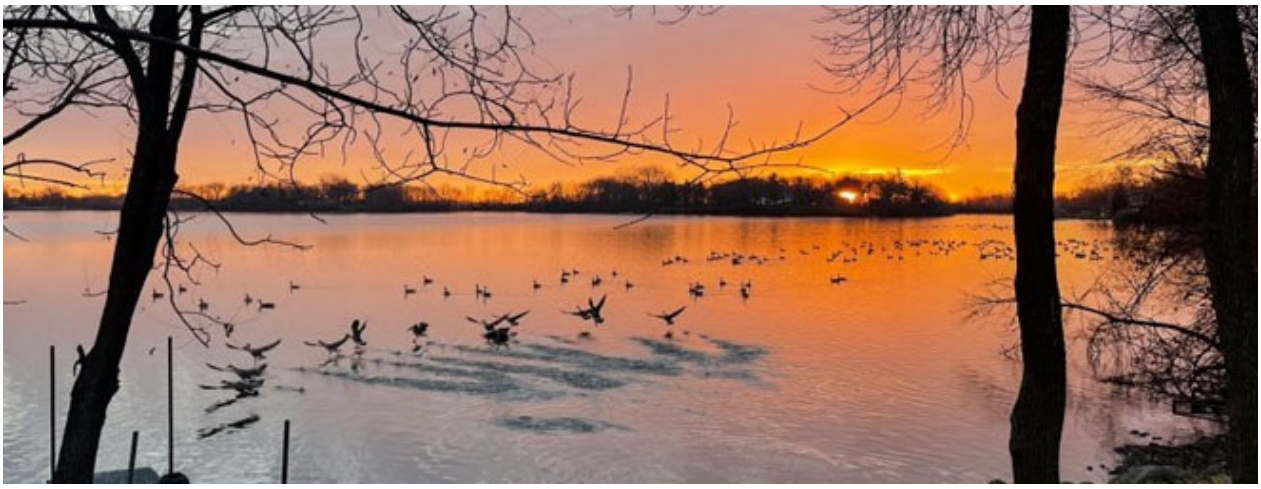


Photo: Lake Crystal, Lake Crystal city webpage

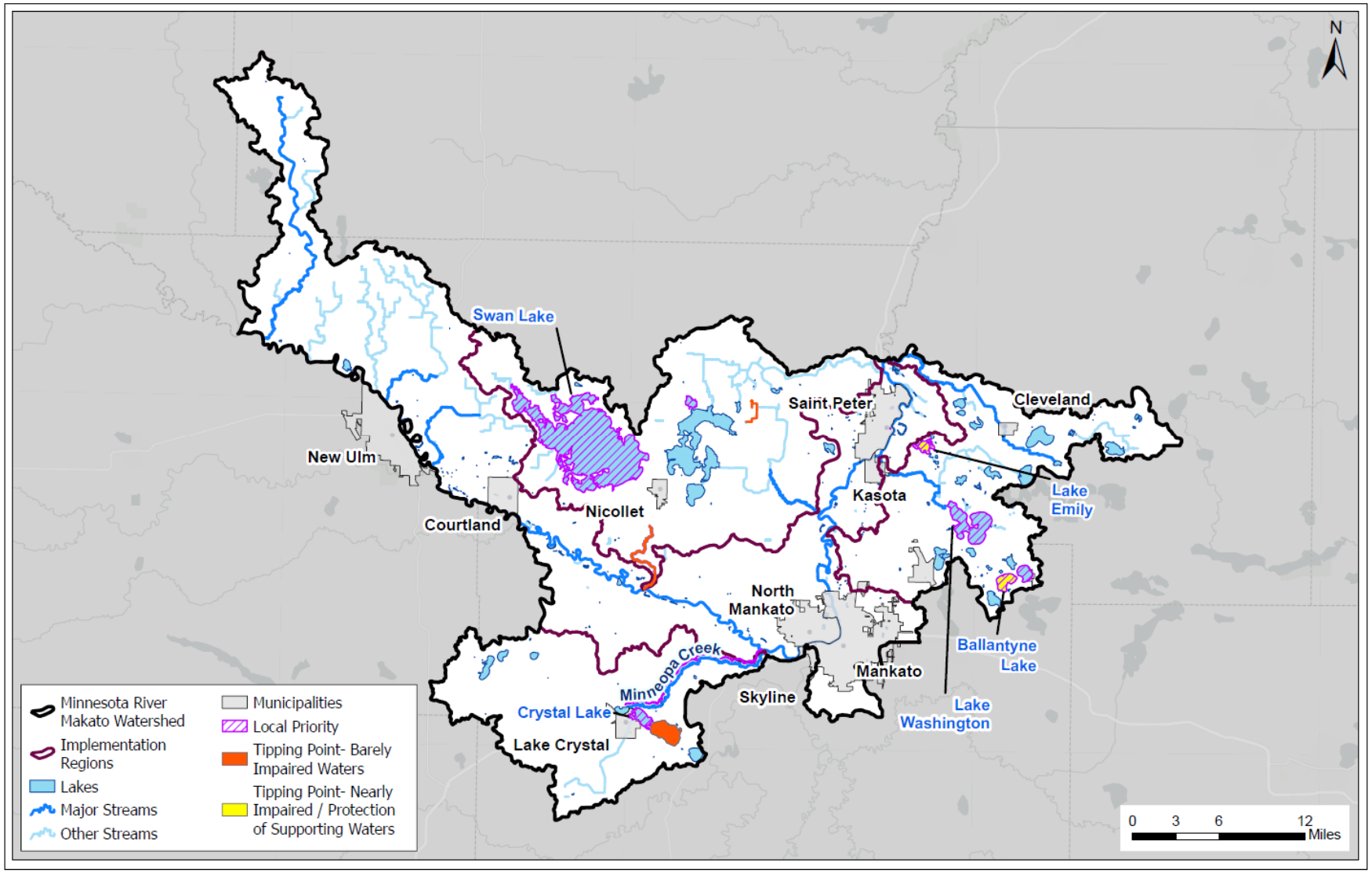


Figure 4-1: Watershed-wide Tier 1 priority resources.

Nutrients and Bacteria

Addresses Issues

- Nutrient Loading (High Priority)
- Bacteria (Medium Priority)

Nutrients and bacteria are primary pollutants of concern in surface waters due to their impacts to aquatic life and recreation. In the watershed, nine of the 10 impaired lakes are impaired due to nutrients, along with reaches of the Minnesota River and Seven Mile Creek. Human activities have greatly increased nutrient loading in the watershed. Phosphorus is identified as a stressor to eutrophication and nitrate as a stressor to aquatic life (MPCA, 2019a). The largest source of each of these is estimated to be from agricultural land (crop surface runoff for phosphorus and drainage tile for nitrogen) (MPCA, 2020). This plan's short-term goal for nutrient loading is to reduce total phosphorus by 3,150 lbs/year (or 1.4%) and total nitrogen by 60,748 lbs/year (or 1.1%). This was determined based on what is realistic in a 10-year timeframe from implementation of urban and agricultural BMPs modeled in Hydrological Simulation Program – FORTRAN (HSPF). The desired future condition goal aligns with watershed-wide goals specified in the Minnesota River-Mankato WRAPS.

There are 13 bacteria impairments on watershed streams. The presence of *E. coli* in surface waters can be an indicator of fecal contamination, threatening recreational quality and safety. The largest source of bacteria in the watershed is estimated to be runoff from cropland due to manure (MPCA, 2020). Smaller sources include natural environmental propagation, septic systems, wastewater treatment plants, and pastures and feedlots. Implementation of 10 manure management practices or plans and upgrading 220 noncompliant septic systems will reduce bacteria loading in the watershed.

Short-term Goal

- Reduce TP by **3,150 lbs/year** (or 1.4%) and TN by **60,748 lbs/year** (or 1.1%)
- Implement **10 manure management practices or plans** and address **220 noncompliant septic systems**

Metric: lbs/year of TP and TN, # practices/plans and septic upgrades

Desired Future Condition

- Total phosphorus reduced by 50%; Total nitrogen reduced by 60%
- No bacteria impairments

Stacked Benefits

- Reduced risk of algae blooms
- Improved soil health
- Improved recreation
- Improved habitat

Nutrients and Bacteria: Focus Map

Practices and initiatives aimed at reducing nutrient loading will be prioritized to areas contributing to priority resources (local priority and tipping point waterbodies), as well as “high” and “medium” priority subwatersheds (**Figure 4-2)**. These subwatersheds have the highest total phosphorus and total nitrogen loads estimated by the HSPF model, or they contain priority resources or vulnerable DWSMAs.

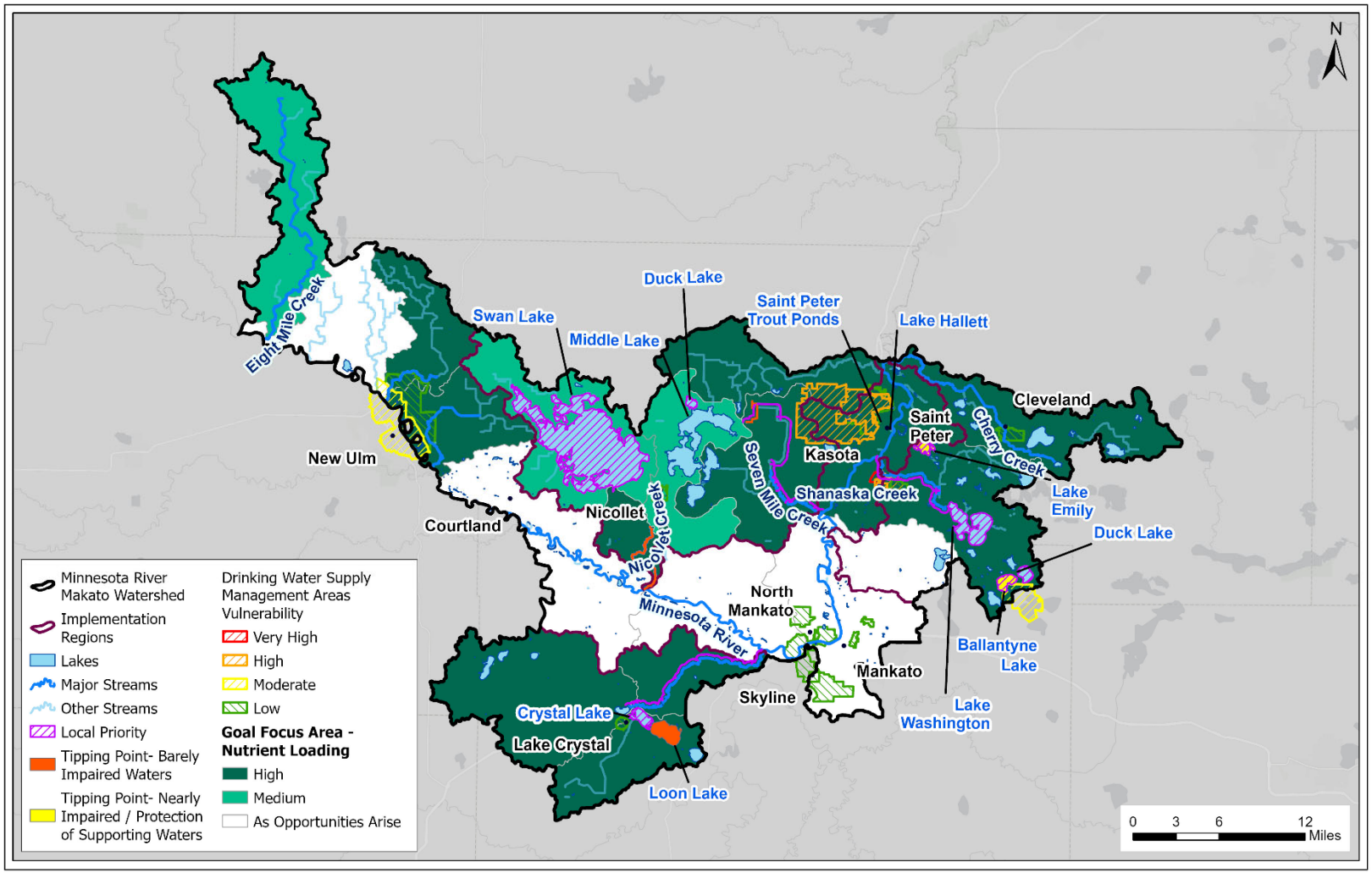


Figure 4-2: Nutrients and bacteria focus areas.

Sediment and Erosion

Addresses Issues

- Sediment and Erosion (High Priority)

There are ten stream reaches impaired for turbidity in the watershed and one impaired for Total Suspended Solids (TSS). Turbidity is a measure of water clarity and TSS includes sediment and other material suspended in water. Turbidity is a stressor to aquatic life in the watershed (MPCA, 2019a). Most sediment loading is from channel or ravine erosion, and a smaller source is upland sediment loss from fields (**Figure 4-3**) (MPCA, 2020).

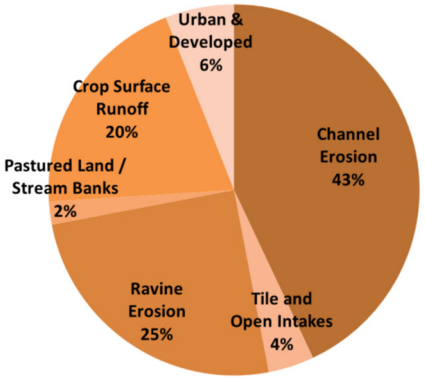


Figure 4-3: Sources of TSS in the watershed (MPCA, 2020).

While some streambank and ravine erosion is natural, the altered hydrology of the watershed has contributed excess erosion. Ravine erosion occurs with drops in elevation leading to or along a stream. Overland runoff is accelerated due to urban and agricultural drainage practices, and this increase in overland volume leads to ravine erosion. Channel erosion includes bank, bed, and bluff erosion adjacent or within the stream. High flows due to less upland water storage, unstable banks with poor riparian vegetation, and straightened stream channels all contribute to excess channel erosion.

This plan's short-term goal for sediment and erosion is to reduce upland sediment loading by 314 tons / year (or 1.7%). As second goal is to stabilize or enhance 2,640 linear feet of lake shoreline, streambanks, or ravines. These goals are based on what is realistic in a 10-year timeframe from implementation of urban BMPs, agricultural BMPs, and stabilization efforts. This percentage load reduction was determined by comparing the goal to existing loads, as estimated by HSPF. Additionally, phosphorus and pesticides bind to sediment so a reduction in sediment loading can also reduce other contaminants.

Short-term Goal

- Reduce sediment loading by **314 tons/year** (or 1.7%) from upland sources
- Stabilize / enhance **2,640 linear feet** of lake shoreline, ravines, or streambanks

Metric: tons/year sediment; linear feet stabilized

Desired Future Condition

- Sediment is reduced by 50% in areas with sediment impairments or stressors

Stacked Benefits

- Improved aquatic habitat
- Increased soil health
- Reduced phosphorus loading

Sediment and Erosion: Focus Maps

There are two focus maps for the Sediment and Erosion goal - one showing areas of upland erosion, and another showing near-channel erosion (data from HSPF). Practices to address upland sources of sediment and erosion goal will be focused in areas contributing to priority resources and "high" and "medium" priority subwatersheds shown in **Figure 4-4**.

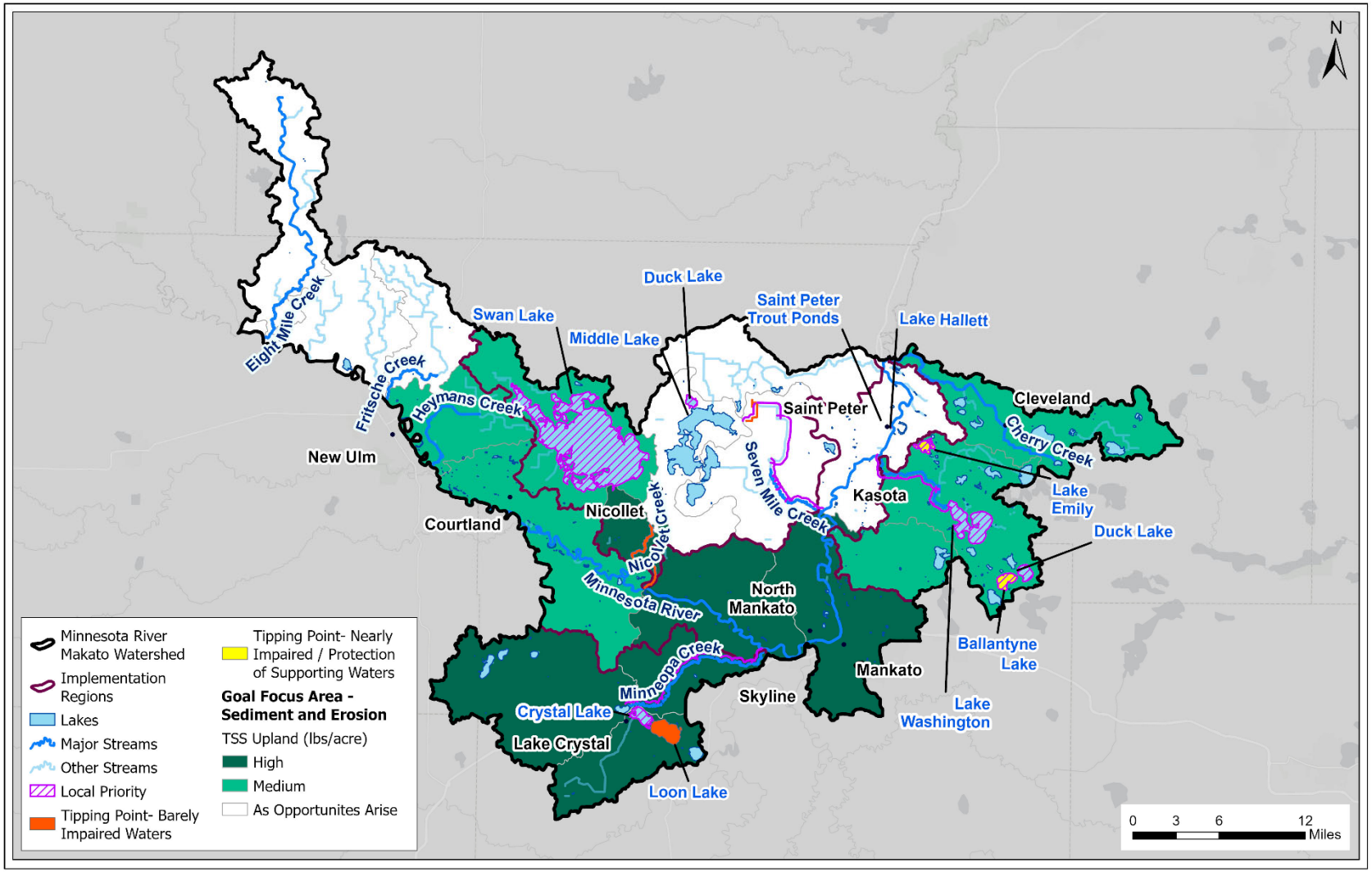


Figure 4-4: Sediment and erosion focus areas: Upland erosion.

Sediment and Erosion: Focus Maps (continued…)

Efforts to address near- or in-channel sources of sediment will be focused in “high” and “medium” priority subwatersheds shown in **Figure 4-5**. These areas have the most sediment coming from bed and bank erosion, as estimated by HSPF.

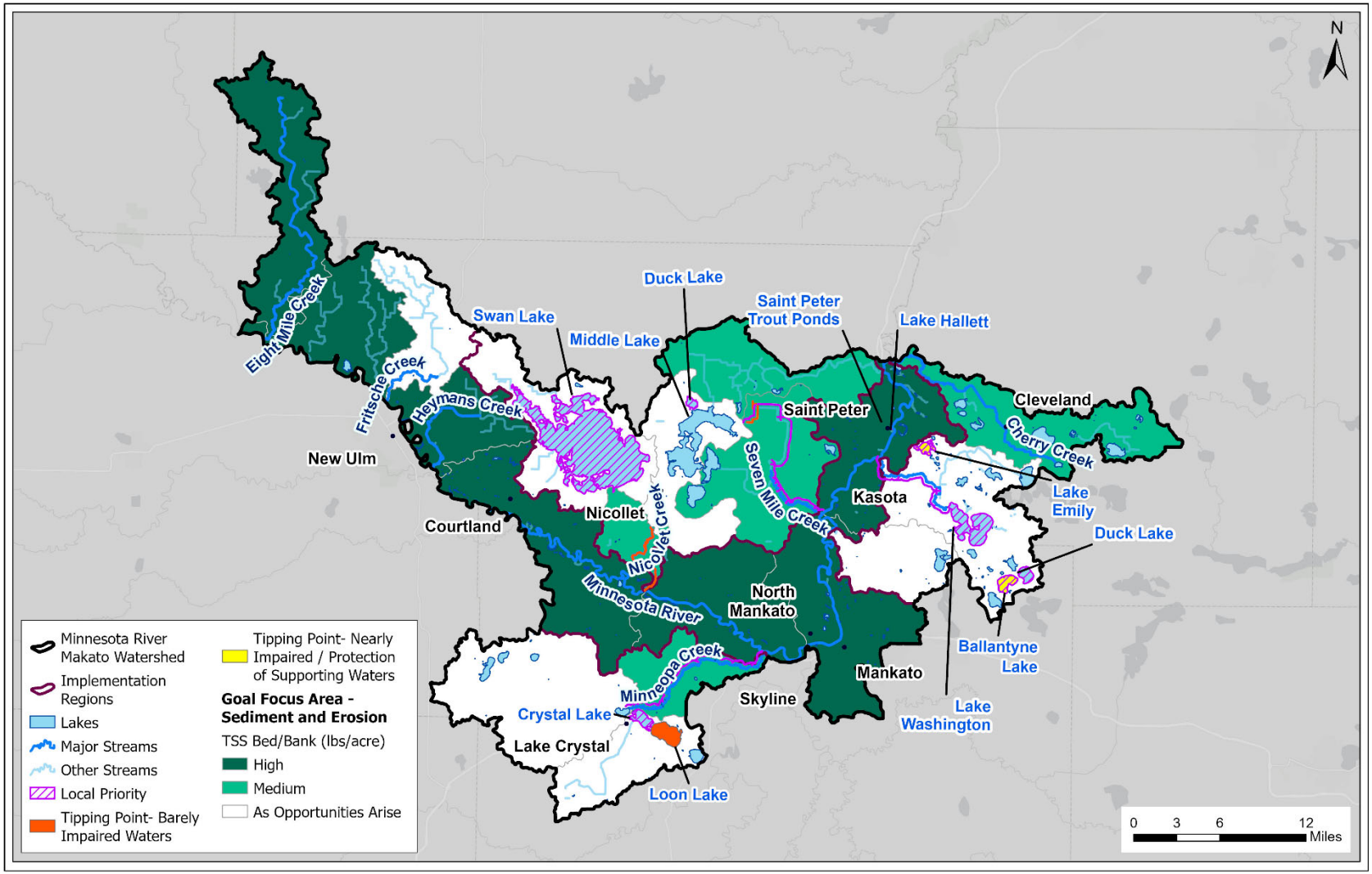


Figure 4-5: Sediment and erosion focus areas: Near-channel erosion.

Groundwater Quality / Surface Water Interaction

Addresses Issues

- Surface Water / Groundwater Interaction (High Priority)
- Groundwater Quality (Medium Priority)

The groundwater goal has multiple metrics, including protection or treatment of land in vulnerable groundwater-focused and surface water DWSMAs to reduce surface influence of groundwater, sealing 100 wells, and conducting 10 outreach events. The city of Kasota has a very highly vulnerable DWSMA, and St. Peter and Mankato (DSWMA-Surface Water) have highly vulnerable DWSMAs which mean they are at risk from surface contamination quickly impacting their drinking water. Various factors contribute to the highly vulnerable nature of the drinking water for these communities within the watershed, including highly permeable sandy soils, shallow soils over karst geology with an overland flow contribution area, and in the case of Mankato, being directly under the influence of surface waters including the Minnesota River. Protection and treatment of land in vulnerable DWMSAs encapsulates a variety of projects or practices that either increase groundwater recharge or reduce contaminant that reach groundwater, such as nutrient management, conservation easements, or manure BMPs (see the MDA Nitrogen Fertilizer Management Plan or MPCA Nutrient Reduction Strategy for specific practices).

Unused and unsealed wells are a potential source of groundwater contamination, as the abandoned well can act as a conduit that allows runoff or waste to travel into groundwater supplies. In addition to sealing 100 wells, holding well testing clinics will help landowners with wells surpassing standards to understand their water quality and pursue solutions to contamination. Specific groundwater contaminants of concern are arsenic and nitrate. About 15% of the watershed's private wells sampled exceeded the arsenic drinking water standard, and 8% of wells exceeded the nitrate standard (MDH, 2024). Arsenic is naturally occurring, and the only way to reduce it is to install filtration systems in homes. Nitrate can be from human or livestock waste, or fertilizer application.

Short-term Goal

- Protect or treat **395 acres** of vulnerable groundwater DWSMAs
- Protect or treat **2,575 acres** of vulnerable surface water DWSMAs
- Seal **100 wells**
- Conduct **10 outreach events**

Metric: # of acres, wells sealed, and outreach events

Desired Future Condition

- All groundwater meets drinking water standards

Stacked Benefits

- Improved health & safety
- Increased recharge
- Protection of non-community public water supplies

Groundwater Quality / Surface Water Interaction: Focus Map

Actions to address the groundwater goals will be focused in dark green areas shown in **Figure 4-6**. The pollution sensitivity of near-surface materials, presence of DWSMAs, and private well nitrate test results were used in the focus area development. Areas with karst topography will be a focus for education on outreach initiatives.

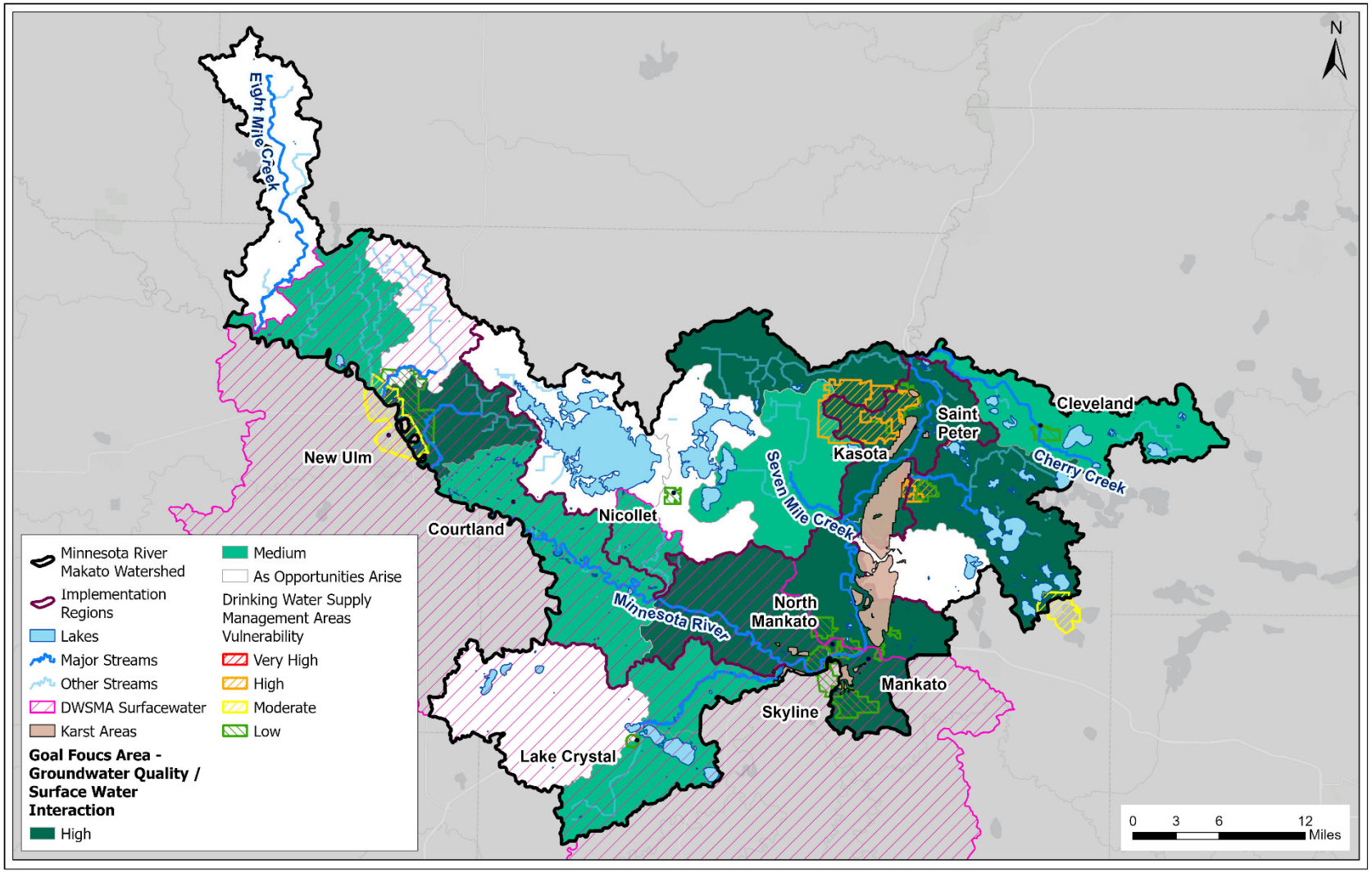


Figure 4-6: Groundwater focus areas.

Water Storage, Altered Hydrology, and Flood Damage Reduction

Addresses Issues

- Loss of Water Storage (High Priority)
- Altered Hydrology (High Priority)
- Flooding (Medium Priority)

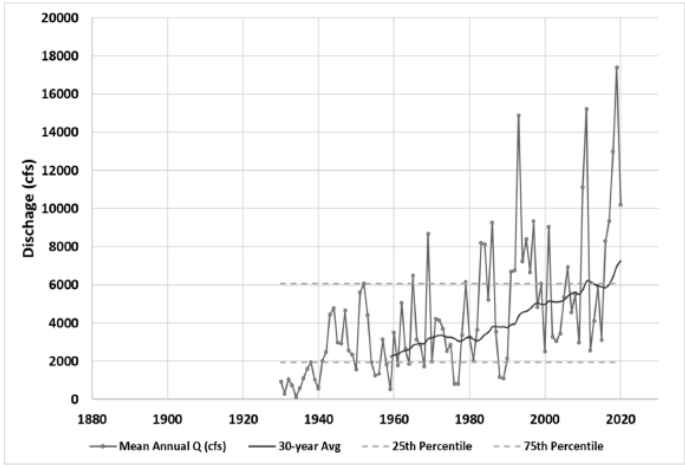


Figure 4-7. Annual discharge of the Minnesota River in Mankato from the Evaluation of Hydrologic Change.

"Altered hydrology" generally consists of changes in the magnitude, timing, duration, and frequency of stream flows. The drainage of wetlands, creation of tile drainage and ditches, loss in perennial cover, and decrease in soil water storage all contribute to the altered hydrologic regimes seen in watershed flow (MNDNR, 2023; **Figure 4-7**). This plan's short-term goal is focused on adding 619 acre-feet of water storage to the landscape through implementation of planned Capital Improvement Projects, which add also address floodplain and stream connectivity issues through projects such as wetland enhancement or lake inlet projects (see **Section 5- Targeted Implementation**). Additional projects including but not limited to wetland restorations, impoundments, and multi-purpose drainage management can contribute to the short-term goal and desired future condition (**Appendix F**). It will also reduce flooding and make progress towards the WRAPS 25% reduction in peak and annual river flow goal.

Southern Minnesota experienced devastating flooding in 2024. The watershed has seen a 137% increase in flood duration, 129% in the rate of flood rise, and increases in all flow stages when compared to conditions before 1983 (MNDNR, 2023). A lack in water storage and changed land uses combined with an increase in annual precipitation and heavier rainfalls have worsened flooding. Adding water storage will reduce ravine and channel erosion (see Sediment and Erosion goal on **Page 4-7** for near-channel sources) through reduced overland flows and peak flows, as well as increasing groundwater recharge.

Short-term Goal

- Add **619 ac-ft** of water storage to the landscape

Metric: Ac-ft of storage

Desired Future Condition

- An additional 38,600 ac-ft of storage is implemented to mitigate impacts of altered hydrology

Stacked Benefits

- Improved aquatic habitat
- Reduced streambank erosion
- Decreased infrastructure/property damage

Water Storage, Altered Hydrology, and Flood Damage Reduction: Focus Map

The dark green areas on the **Figure 4-8** show where efforts to add water storage will be focused. The focus areas were prioritized based on presence of Federal Emergency Management Agency 100-year floodplains, restorable wetlands, streams stressed by altered hydrology, and local knowledge of priority storage opportunities. The Greenprint section of the Blue Earth County Water Plan will be referred to during implementation as a targeting resource specific to Blue Earth County.

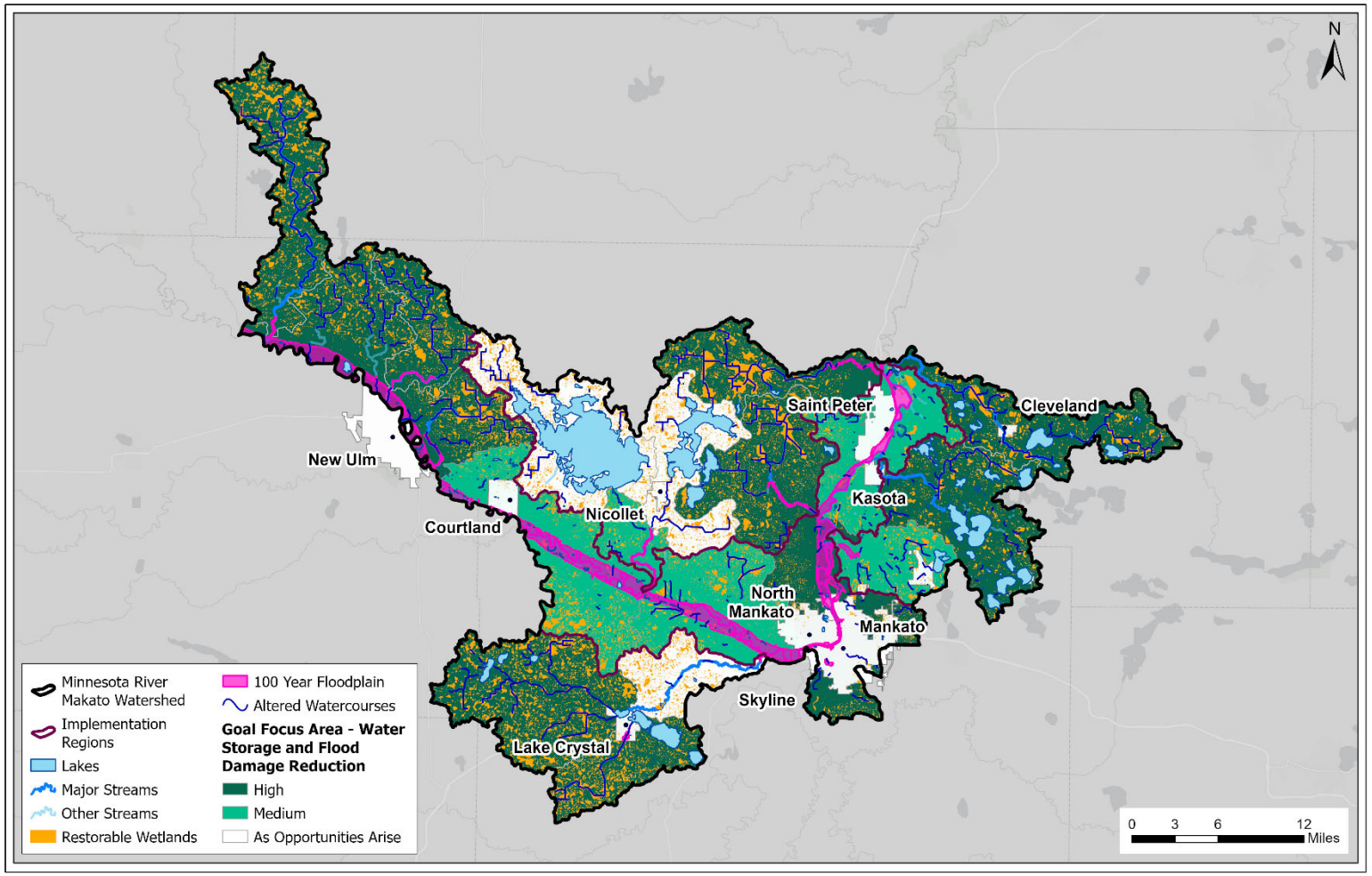


Figure 4-8: Water storage, altered hydrology, and flood damage reduction focus areas.

Stormwater

Addresses Issues

- Stormwater (Medium Priority)

Photo: Hiniker Pond, City of Mankato

As rain falls or snow melts on natural lands, water infiltrates through soils. However, the construction of impervious surfaces in developed lands blocks the soil from being able to infiltrate water. The resulting stormwater runoff is an issue of concern for both water quality and quantity. As stormwater moves over pavement and into any storm system, it picks up sediment, nutrients, bacteria, chloride, trash, and other contaminants along the way. Stormwater is discharged into surface waters without treatment; thus, it is important to implement stormwater BMPs and to protect and restore surface waterbodies both within urban areas (e.g. Hiniker Pond in Mankato, Lake Hallett in St. Peter) as well as downstream.

Pollutants in stormwater can come from animal waste, yard waste, leaves, road salt, and oil or grease from vehicles. MS4s in the watershed are required to implement BMPs to reduce stormwater pollution and volume as well as hold education and outreach events. However, there are still many opportunities to improve stormwater quality in all municipalities (MS4s and non-MS4 cities). The goal of treating 200 acres will be met through establishment of stormwater BMPs such as detention basins in municipalities beyond what is required by MS4 permitting. This will reduce nutrient loading and make progress towards the individual urban waterbody Total Maximum Daily Load (TMDL) reduction goals (averaged in the Desired Future Condition). A summary of these TMDL targets is included in **Appendix G**.

Short-term Goal:

- Reduce TP by **30 lbs/year** and TN by **480 lbs/year** through treating **200 acres** of municipal land (MS4s and non-MS4 cities) with BMPs

Metric: Number of acres treated

Desired Future Condition

- TMDL reductions are achieved (average 75% reduction in TN and 70% reduction TP) in urban waterbodies

Stacked Benefits

- Improved surface water quality
- Increased water storage

Stormwater: Focus Map

The stormwater goal will focus in all municipal areas regardless of if they are MS4 cities or non-MS4 cities (**Figure 4-9**). The watershed has several large cities.

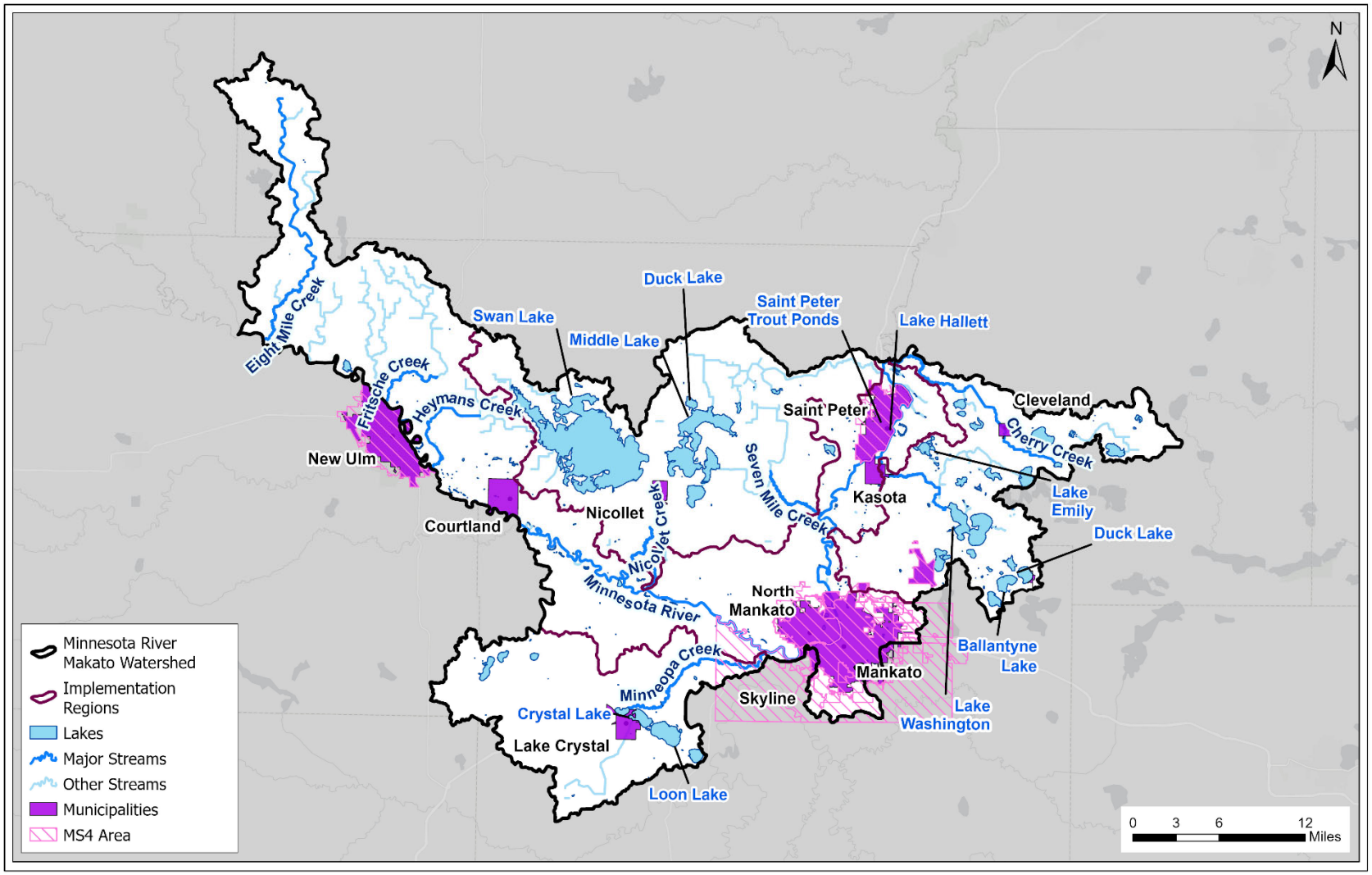


Figure 4-9: Stormwater focus areas.

Soil Health

Addresses Issues

- Soil Health (High Priority)

Photo: Cover crops, Le Sueur SWCD

Soil health in the watershed, and all agricultural Midwest, has been degraded through decades of monocultures, a lack of residue, and practices that did not maintain soil quality. Now, there is more understanding of the importance of soil and the benefits of maintaining soil health for crops. Healthy soils store water, provide stability for roots, cycle nutrients, and degrade pollutants.

Given that 70% of the land in the watershed is used for agriculture, enhancing soil health is a vital aspect of watershed management. The Natural Resource Conservation Service defines soil health as maximizing soil cover, living roots and biodiversity, and minimizing soil disturbance. Adoption of practices such as conservation tillage, cover crops, and diverse crop rotations limits soil disturbance and maximizes soil cover, improving the natural properties of the soil. The short-term goal of adding soil health practices on 3,960 acres will provide water storage and increased groundwater recharge while enhancing soil health. These acres can be the same acres that make progress towards nutrient and sediment goals. An additional drinking water protection benefit is achieved through soil health practices on the Mankato DWSMA-Surface Water.

Short-term Goal

- Implement soil health practices (e.g. cover crops, tillage management, nutrient management) on **3,960 acres**

Metric: Number of acres

Desired Future Condition

- All cropland in the watershed is managed with soil health principles and practices

Stacked Benefits

- Increased water storage due to higher rates of infiltration
- Groundwater recharge
- Carbon dioxide sequestration
- Reduced nutrient and sediment loading due to less surface runoff

Soil Health: Focus Map

Soil health is important for all agricultural areas in the watershed. “High” priority subwatersheds, shown in dark green in **Figure 4-10,** are especially important for soil health due to comparatively large HSPF upland sediment yields or presence of priority resources or vulnerable DWSMAs.

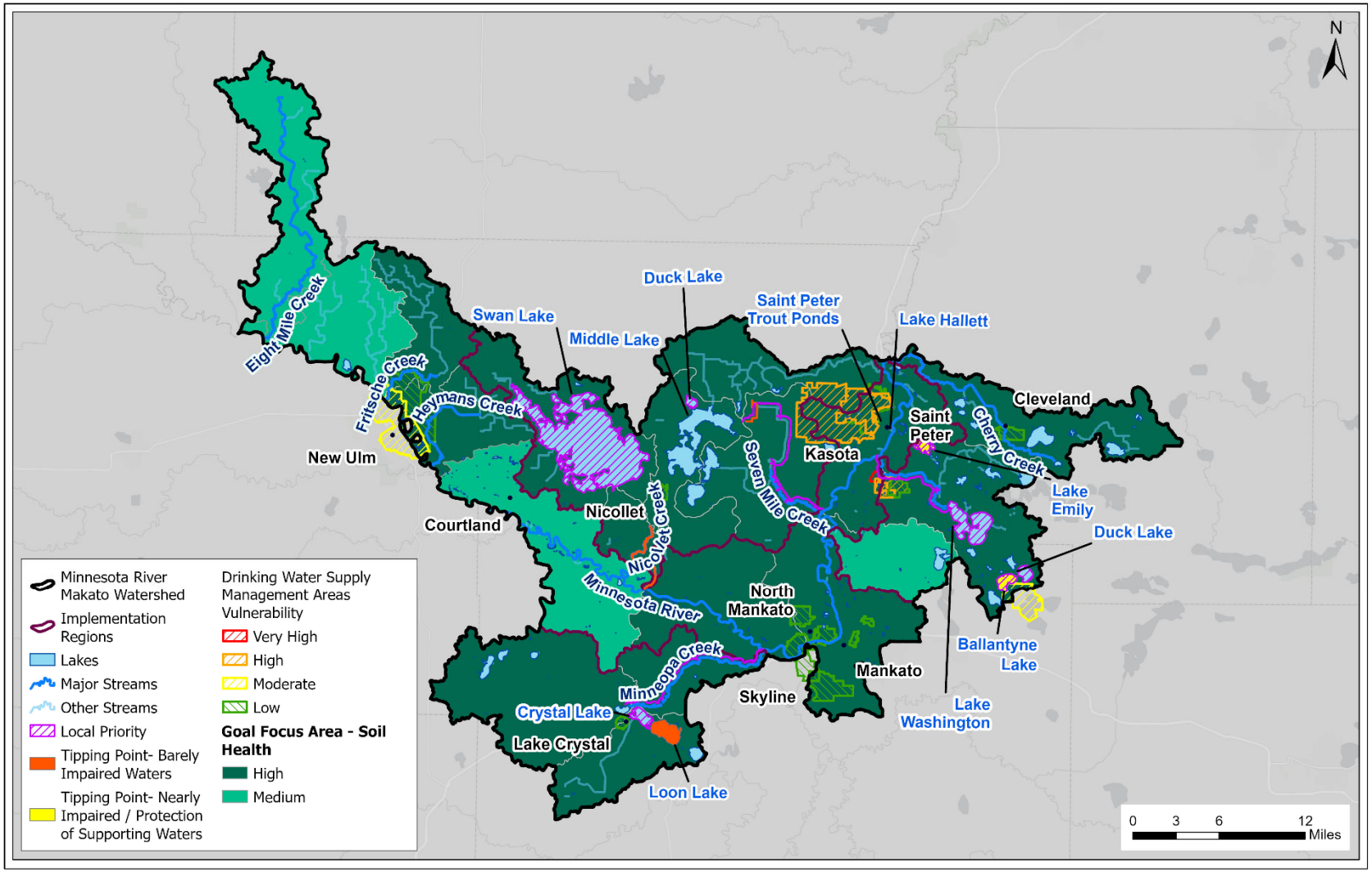


Figure 4-10: Soil health focus areas.

Invasive Species

Addresses Issues

- Invasive Species (Medium Priority)

Invasive species can be both terrestrial and aquatic. Aquatic invasive species (AIS) found in and around the watershed include Eurasian watermilfoil, zebra mussels, and carp. Curly leaf pondweed is also present, although curly leaf has been in the watershed for decades. There are several lakes just east of the watershed with Eurasian watermilfoil. Preventing the spread of this into other watershed lakes is a priority. Examples of terrestrial invasive species in the area include buckthorn, emerald ash borer, and soybean aphid. Both terrestrial and aquatic invasive species can outcompete native species, replacing their role in the ecosystem. In aquatic environments, this can often result in undesirable impacts to water quality and recreation. In terrestrial environments, this can lead to more diseased trees, a less successful crop, and decreased wildlife habitat.

Invasive species can be introduced via accidental spread of species from one area to another from vehicles (e.g. boats), firewood, or equipment. Once established, invasive species are very challenging to eradicate. Therefore, invasive species efforts largely focus on preventing the spread. Watershed counties, the Department of Natural Resources, and Minnesota Department of Agriculture are primary entities involved in aquatic and terrestrial invasive species education, observation, and prevention.

Photo: Eurasian watermilfoil, UMN

Infested waters include Lake Ballentyne and the Minnesota River. An up-to-date inventory and map is available through the MNDNR Infested Waters List

Short-term Goal

- Prevent the spread of invasive species through **5 education and outreach efforts**

Metric: Number of events

Desired Future Condition

- No new invasive species are introduced to the watershed

Stacked Benefits

- Improved recreation
- Improved aquatic habitat
- Improved terrestrial habitat

Invasive Species: Focus Map

Resources near existing observations of AIS will be the "high" priority focus of the Invasive Species prevention goal. Terrestrial invasive species are also shown and are a "medium" priority focus (**Figure 4-11**).

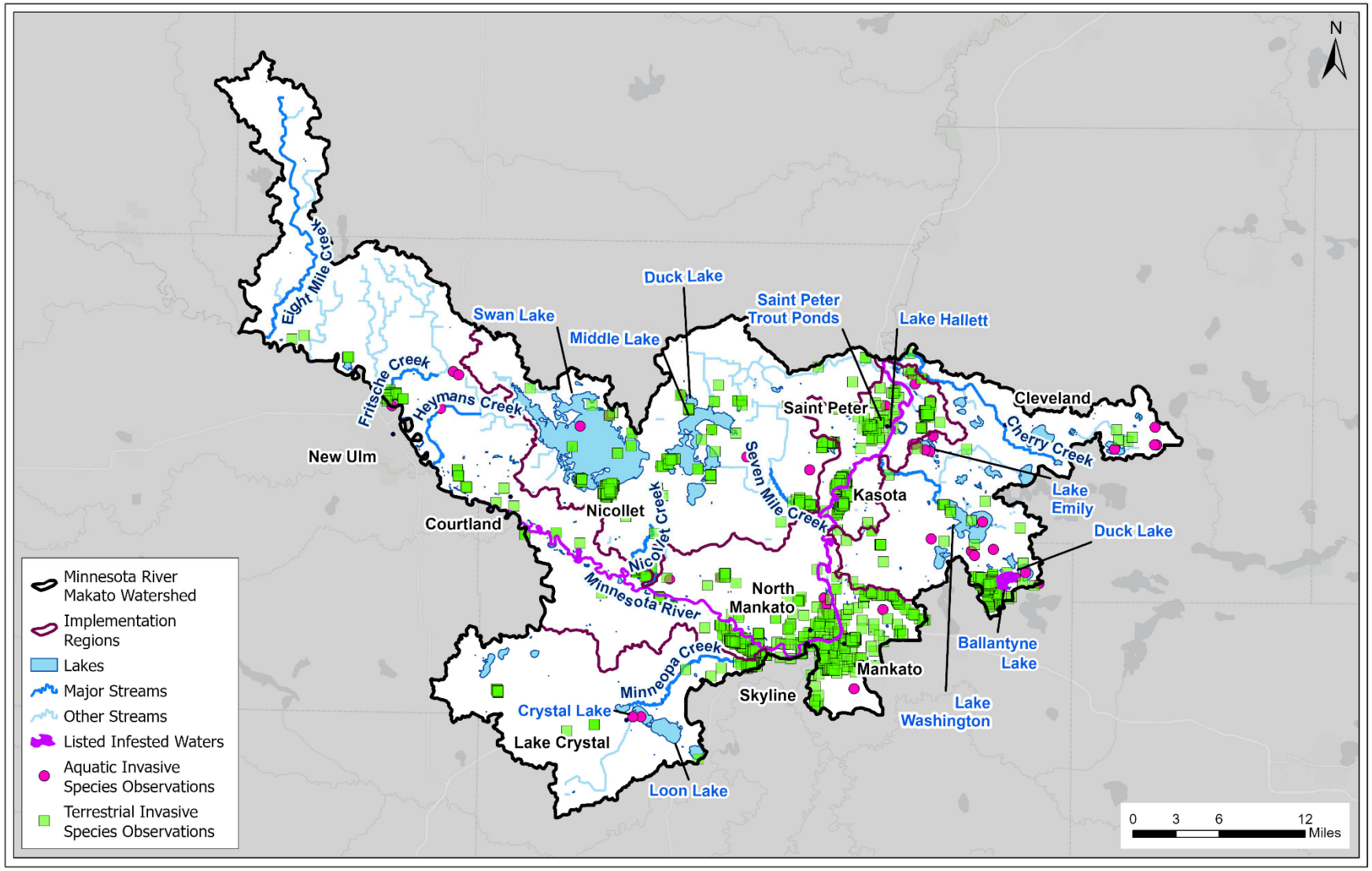


Figure 4-11: Invasive species focus areas.

5. Targeted Implementation

5. Targeted Implementation

The **Targeted Implementation** plan section sets actions planned from 2026-2036 to address priority issues and measurable goals. Actions span conservation practices, protection and restoration, education and outreach, and research.

- Each action has a trackable output that will be used to assess progress
- Focus area maps show where work should be targeted
- Actions are organized into eight tables:
    - Four watershed-wide tables:
        - Projects and Practices
        - Education and Outreach
        - Research and Data Gaps
        - Capital Improvement Projects (CIPs)
    - Four tables breaking down the Projects and Practices at each Implementation Region scale

The Comprehensive Watershed Management Plan (CWMP) is active from 2026-2036. In this time, the actions will be carried out to address the priority issues in **Section 3 – Priority Issues** and make progress towards measurable goals in **Section 4 – Measurable Goals**. This section describes what will be done during CWMP implementation. Multiple action tables contain detailed information on each activity planned during implementation.

The following information is listed for each action:

- An action description,
- Focus area,
- Measurable output for tracking purposes,
- Which goal(s) are impacted by this action,
- The entity responsible for carrying out the action,
- An estimated timeframe,
- Estimated cost

Actions were developed through review of goals in the Watershed Restoration and Protection Strategy (WRAPS) report, planned actions in neighboring watersheds, and Advisory and Steering Committee input. The action tables show a long list of actions that local and state partners will work together to implement. Implementation partners will track the measurable output of each action, such as the number of acres of a practice or

number of events held. More detail on assessing implementation progress is described in **Section 6 – Implementation Programs**.

Funding

The actions planned in this CWMP are ambitious, but are not random; they build on a foundation of completed work. Work done in the watershed using state or federal funds is reported to the Minnesota Pollution Control Agency (MPCA), giving planning partners an idea of the type and extent of projects that have been adopted in the Minnesota River-Mankato Watershed. This is highlighted on the MPCA's Healthier Watersheds webpage, where the following has been reported as completed between 2014 to 2023:

- 101 wells decommissioned,
- 62 acres forage and biomass planting,
- 21 nutrient management plans,
- 1,185 acres of conservation cover crop rotation,
- 908 feet streambank and shoreline protection,
- 48 grade stabilization structures,
- 13,140 acres no-till,
- 94 Water and Sediment Control Basins (WASCOBs),
- 35,209 acres managed for nutrient management,
- 18,214 acres of cover crops,
- 2,127 acres of conservation cover

Photo: No-till field, Le Sueur SWCD

With this approved CWMP, the Minnesota River-Mankato Watershed implementation partnership will be eligible for formula-based Watershed-Based Implementation Funding (WBIF) from the Board of Water and Soil Resources (BWSR). This plan along with WBIF will provide direction and resources to build on the work that has already been accomplished to further improve water resources. WBIF is estimated to be about $350,000 per year.

Making progress toward goals is dependent on many factors. One of these factors is the amount of reliable funding, as more actions can be implemented with more resources. As such, each action in the action table is identified as "Local" or "Partner/Federal" costs. Local costs include those received by soil and water conservation districts (SWCDs), cities, or counties on an annual basis. A description of local and partner funding is included in **Section 7 – Plan Administration and Coordination**.

The most predictable "baseline" sources of funding in the Minnesota-River Mankato Watershed are existing state and local sources (detailed more in **Section 7 – Plan Administration and Coordination**). During implementation, the planning partners in the Minnesota River-Mankato Watershed will be eligible to receive additional state funding. As one example, with this approved and adopted CWMP, partners are eligible to receive WBIF through BWSR. In recognition of this, an assumed $350,000 annually has been added to baseline sources of funding to develop a realistic estimate of local and state funds available to implement this plan. This is referred to as Local Implementation Funding.

Local governments in the Minnesota River-Mankato Watershed recognize that to make progress towards all plan goals, some actions will be pursued or funded by partnering entities (e.g., MPCA, Department of Natural Resources (MNDNR), United States Fish and Wildlife Service), with federal dollars (e.g., Conservation Resource Program [CRP], Conservation Reserve Enhancement Program [CREP]), or other competitive funding programs. These actions are included in the action tables, highlighting that funding will come from partnering entities or federal, competitive dollars. It's also acknowledged that some progress towards plan goals will likely be made independently of local implementation efforts through projects and conservation practices done by landowners without local government assistance.

Cornflower, Le Sueur SWCD

Plan Programs

Each action will occur through one of five plan programs – Projects and Practices, Education and Outreach, Research and Data Gaps, Capital Improvements, and Local Controls. **Section 6 – Implementation Programs** describes plan programs in detail. **Figure 5-1** summarizes these programs. The watershed-wide action tables are split into a Projects and Practices table, Education and Outreach table, and Research and Data Gaps table. Actions within the Projects and Practices program are further planned on the implementation region scale to better target actions to where they are most needed and effective.

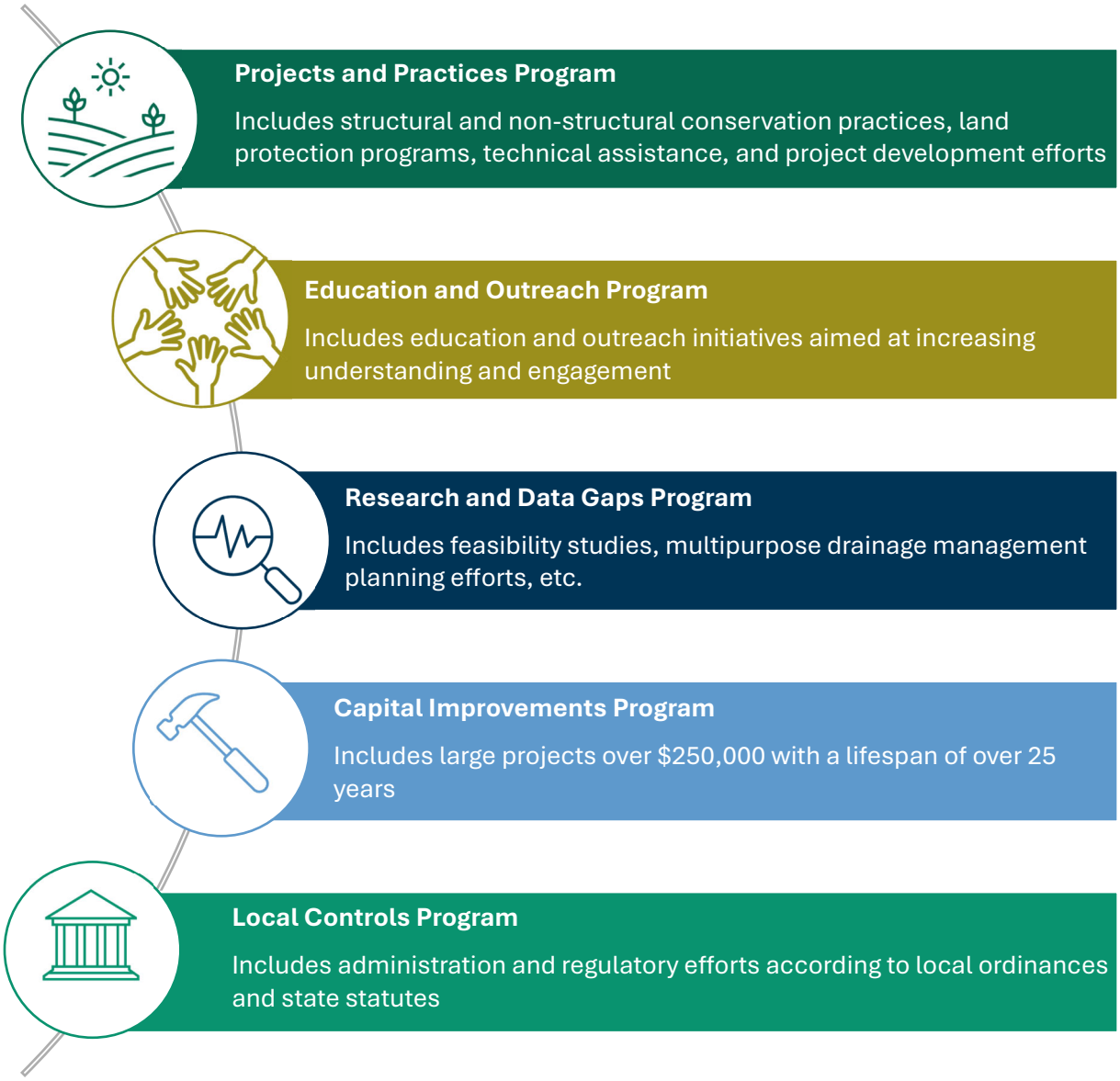


Figure 5-1: Implementation programs in the Minnesota River-Mankato Watershed.

Targeting Implementation

Targeting: Implementation Regions

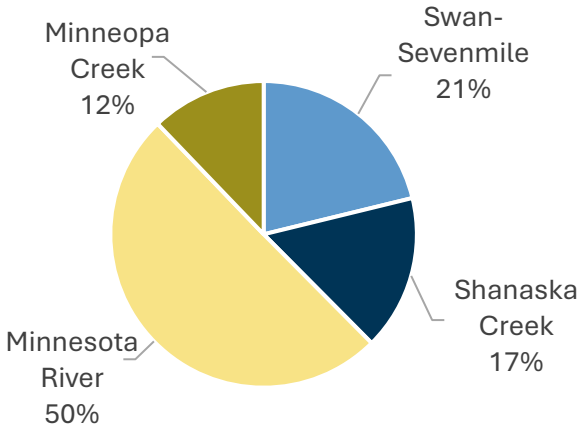
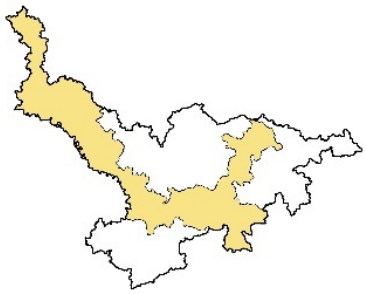


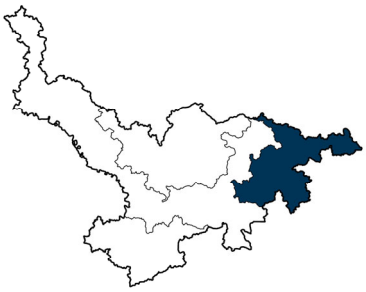
Figure 5-2: Projects & Practices funding distribution.

The Minnesota River-Mankato Watershed spans seven counties and covers over 350,000 acres. Given the sizable area, the watershed was split into four implementation regions to better target issues and actions (see **Figure 3-3**): Minneopa Creek, Minnesota River, Shanaska Creek, and Swan-Sevenmile Creek Implementation Regions. Watershed-wide Projects and Practices are distributed between implementation regions based on the prevalence of goal focus subwatersheds in **Section 4 – Measurable Goals**. **Figure 5-2** shows the breakdown of funding across implementation regions. Half of the local budget is planned for the Minnesota River Implementation Region, which aligns with the percentage of the watershed it spans.

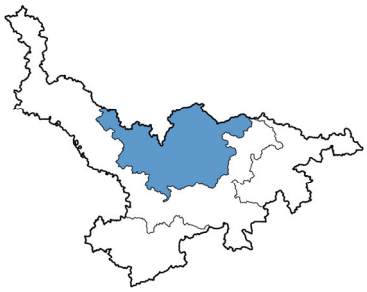
Minneopa Creek Implementation Region



Minnesota River Implementation Region



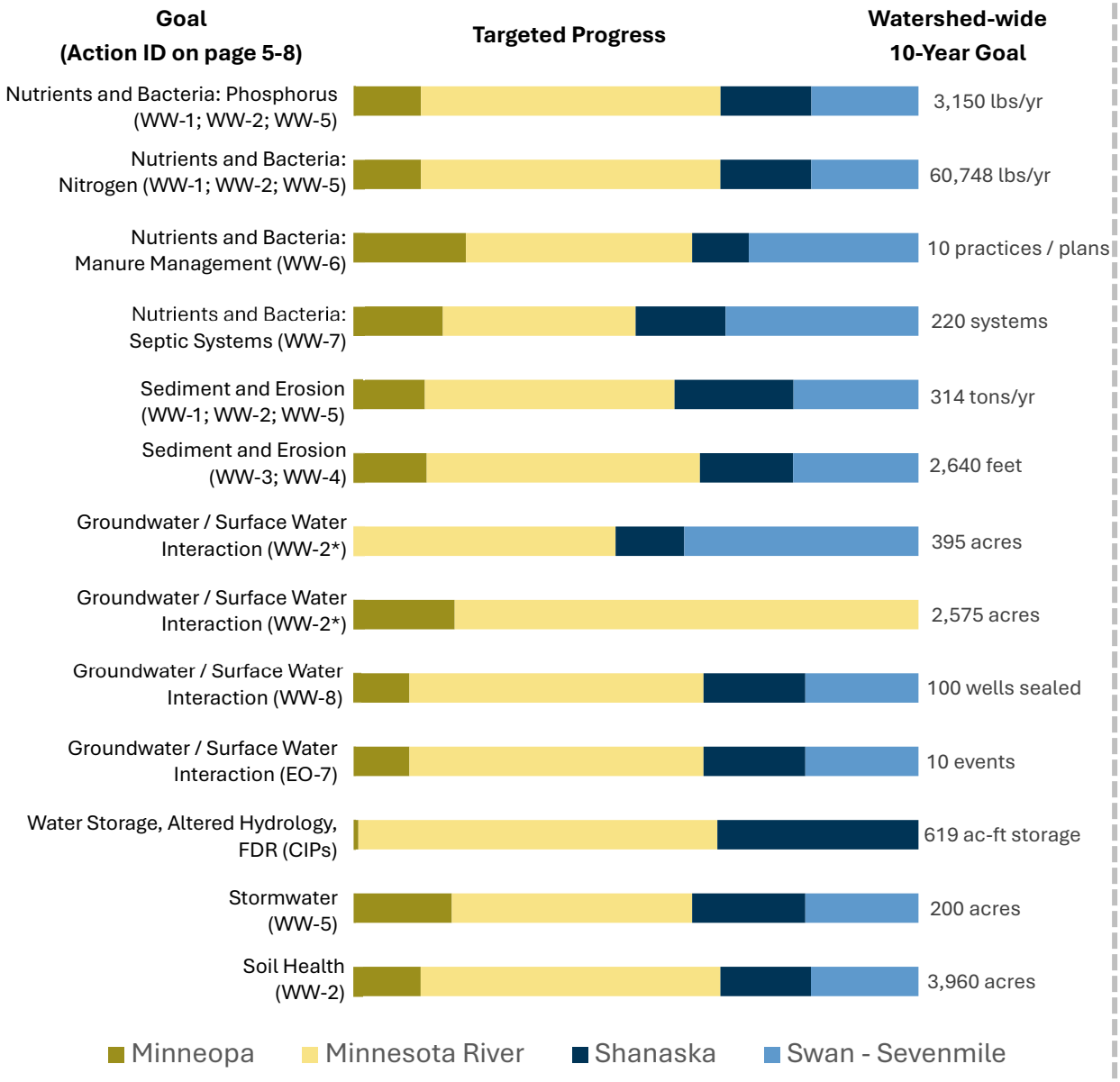
Shanaska Creek Implementation Region



Swan – Sevenmile Creek Implementation Region

Table 5-2 shows watershed-wide Projects and Practices. The watershed-wide actions are inclusive of actions in the implementation region tables. Some of these actions make progress towards the 10-year goals in **Section 4 – Measurable Goals**, which are visualized in the milestone chart below.

The milestone chart shows where progress towards each goal in **Section 4 – Measurable Goals** will be made, along with the applicable action or actions that will accomplish the goal. Focusing actions in implementation regions ensures impactful, cost-effective projects.



*WW-2 has an output goal of 3,960 acres of soil health practices. Of this, 395 acres is intended to be implemented in vulnerable groundwater focused DWSMAs, and 2,575 acres in surface water DWSMAs to meet the Groundwater Quality / Surface Water Interaction Goals

Modeling: HSPF

The Hydrologic Simulation Program – FORTRAN (HSPF) Scenario Application Model (SAM) is a watershed model that was utilized to inform CWMP short-term goals and action outputs. The model estimates existing sediment and nutrient loads and the cost and water quality benefits of implementing best management practices (BMPs). Modeled BMPs include cropland (grassed waterways, WASCOBs, wetland restorations, and soil health practices) and urban BMPs. Planning partners acknowledged these BMPs are used for modeling purposes and implementation is not limited to these BMPs.

Three scenarios were developed from HSPF SAM. The implementation scenario utilized to set goals and actions used the available Local Implementation Funding budget. The load reductions achieved from this scenario are shown in **Table 5-1**, and are a 1-2% reduction from existing loads.

Table 5-1: HSPF Implementation Scenario.

Parameter	Landscape Load	Load reduction	Percent reduction
Sediment (tons/yr)	18,518	314	1.7%
Nitrogen (lbs/yr)	5,470,253	60,748	1.1%
Phosphorus (lbs/yr)	219,850	3,150	1.4%

Two other implementation scenarios were modeled to understand what would be needed to reach MPCA load reduction goals and what is possible in the watershed. In the WRAPS report, MPCA set 10-year targets of 12% reduction in sediment, 10% reduction in nitrogen, and 10% reduction in phosphorus load (MPCA, 2020). HSPF SAM estimates an investment of over $20,000,000 over the 10 years of this plan to achieve these load reductions, which is eight times the amount of funding planning partners estimated to be accessible.

A third scenario was developed to model load reductions if 80% of cropland and 20% of city area had BMPs. This resulted in a 41% sediment, 27% nitrogen, and 35% phosphorus load reduction. A summary of HSPF implementation scenarios is included in **Appendix H**.

It is important to acknowledge that implementation may vary from planned or modeled actions for a variety of reasons. All CWMP actions are voluntary, meaning the education and outreach portion of this plan will be essential to support implementation of other projects and practices. Additionally, it is noted that progress towards plan goals may be made independently of formal implementation, as projects and practices can be done by landowners without local government involvement or funding.

Table 5-2. Projects and Practices: Watershed-Wide

Actions in this table are repeated in implementation region-specific action tables throughout this section.

ID	Action	Focus Area	10-Year Output	Progress Towards Goals*							Responsible Entity (bold = lead)	Timeline					10-Year Local Cost	Partner / Federal Cost
				Nutrients and Bacteria	Sediment and Erosion	Groundwater / Surface Water	Water Storage, Altered Hydrology, FDR **	Stormwater	Soil Health	Invasive Species		2026-2027	2028-2029	2030-2031	2032-2033	2034-2036		
WW-1	**Multi-Benefit Agricultural BMPs** e.g. grassed waterways, WASCOBs, riparian buffers, filter strips, side water inlets, terraces, grade stabilizations, drainage water management†	Nutrients and Bacteria; Sediment and Erosion; Groundwater; and Water Storage Focus Areas	186 tons/yr sediment, 40,330 lbs/yr nitrogen, and 2,088 lbs/yr phosphorus reduction (3,960 acres treated)	●	●	●	○				**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$1,366,900	
WW-2	**Soil Health and Recharge Conservation Practices** e.g., cover crops, perennial crops, crop rotation, reduced tillage, winter cover, nutrient management, pasture management	Soil Health Focus Areas	3,960 acres treated; 112 tons/yr sediment, 19,938 lbs/yr nitrogen, and 1,032 lbs/yr phosphorus reduction	●	●	●	○		●		**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$772,600	
WW-3	**Lake Shoreline Stabilization** Stabilize or enhance shorelines of priority lakes, with a preference for natural lakeshore restorations	Priority Lakes	1,320 feet (0.25 mile)	○	●		○				**SWCD**, **Counties,** MNDNR	✓	✓	✓	✓	✓	$132,000	$264,000
WW-4	**Ravine or Streambank Stabilization** Vegetation enhancement and/or engineered management with a preference for native vegetation enhancement on streambanks, bluffs, ravines, and public ditches to reduce erosion	Priority Streams; Sediment and Erosion-Near Channel Focus Areas	1,320 feet (0.25 mile)	○	●		○				**SWCD**, **Counties**, MNDNR, Townships	✓	✓	✓	✓	✓	$264,000	
WW-5	**Urban Stormwater BMPs** e.g. raingardens, stormwater detention ponds, bioswales, green stormwater infrastructure	Stormwater Focus Areas	10 projects (equivalent of 200 acres treated); 16 tons/yr sediment, 480 lbs/yr nitrogen, and 30 lbs/yr phosphorus reduction	●	●		○	●			**SWCD, Cities**, NRCS, BWSR, MPCA	✓	✓	✓	✓	✓	$223,800	
WW-6	**Manure Management** Feedlot management practices (e.g., open lot improvements, manure pit improvements, manure management plans)	Nutrients and Bacteria Focus Areas	10 practices / plans	○		○					**SWCD**, **Counties**, MPCA, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$75,000	
WW-7	**Septic Systems** Upgrade/replace noncompliant systems	Nutrients and Bacteria Focus Areas	220 systems addressed	○		○					**Counties**, **SWCD**, MPCA, BWSR	✓	✓	✓	✓	✓	$100,000	$4,000,000
WW-8	**Seal Unused or Abandoned Wells** Cost share to well owners	Watershed-Wide	100 wells			●					**Counties**, **SWCD**, Cities, MDH, BWSR	✓	✓	✓	✓	✓	$300,000	
WW-9	**Land Protection** Provide incentive or cost-share to enroll or re-enroll land in temporary or permanent easements such as CRP, etc. for wildlife, pollinator, water storage, and DWSMA protection.	Water Storage Focus Areas, DWSMAs	375 acres cost share / incentivized	○	○	○	○				**SWCD**, NRCS, BWSR, MNDNR	✓	✓	✓	✓	✓	$75,000	$937,500
WW-10	**Wetland Restoration** Provide incentives or cost-share for wetland restoration	Water Storage Focus Areas	20 local acres cost share/ incentivized; 180 acres by partners	○	○	○	○				**Counties, SWCD**, MNDNR, NRCS	✓	✓	✓	✓	✓	$200,000	$1,800,000
WW-11	**Aquatic Invasive Species (AIS) Prevention and Management** County program with state aid	Invasive Species Focus Areas	Continue current program‡	○						●	**Counties, SWCD**, MNDNR	✓	✓	✓	✓	✓	Local staff time	
WW-12	**Terrestrial Invasive Species (TIS) Prevention and Management** Emerald Ash Borer (EAB), buckthorn, noxious weeds, etc.	Invasive Species Focus Areas	Continue current program							●	**Counties, SWCD, MDA**, MNDNR	✓	✓	✓	✓	✓	Local staff time	
																	$3,509,300	**$7,001,500**

*Solid circle = direct progress towards goal. Outline = indirect progress towards goal

**FDR = Flood Damage Reduction

†Drainage water management could include water storage, two-stage ditches, rock riffles, or other practices that make projects toward plan goals

‡Contingent upon state program and/or external funding sources

Table 5-3. Education and Outreach: Watershed-Wide

ID	Action	Focus Area	10-Year Output	Progress Towards Goals*							Responsible Entity (bold = lead)	Timeline					10-Year Local Cost
				Nutrients and Bacteria	Sediment and Erosion	Groundwater / Surface Water	Water Storage, Altered Hydrology, FDR **	Stormwater	Soil Health	Invasive Species		2026-2027	2028-2029	2030-2031	2032-2033	2034-2036	
EO-1	Continue and expand watershed education and outreach programming in each jurisdictional area	Watershed-Wide	Annual Meeting	○	○	○	○	○	○	○	**SWCD, Counties,** NRCS, BWSR, MDA, MPCA	✓	✓	✓	✓	✓	$5,496,000
EO -2	Promote the Ag Water Quality Certification Program	Watershed-Wide	Landowners reached	○	○	○			○		**MDA**, SWCD	✓	✓	✓	✓	✓	Included in staff time
EO -3	Connect with drainage inspectors to gain a deeper understanding of drainage system condition and operations and identify opportunities for multi-benefit solutions as part of repair or improvement proceedings	Watershed-Wide	Annual Meeting if needed				○				**Counties,** SWCD, MNDNR	✓	✓	✓	✓	✓	$5,000
EO -4	Develop an outreach campaign directed at shoreline property owners and local government policymakers to stabilize / enhance shorelines	Watershed-Wide	10 mailings or online communications distributed to landowners	○	○						**SWCD**, Counties, Cities, MNDNR	✓	✓	✓	✓	✓	$10,000
EO -5	Reach out to landowners for education on septic compliance	Watershed-Wide	10 mailings or online communications distributed to landowners	○							**MDH**, Counties, SWCD, MPCA	✓	✓	✓	✓	✓	$10,000
EO -6	Host events, teach citizens how to use reporting software, partner with University of Minnesota (UMN) Extension, work with MNDNR on AIS funding and biocontrol.	Watershed-Wide	5 workshops							●	**County**, MNDNR, UMN	✓	✓	✓	✓	✓	$50,000
EO -7	Inform private well owners of local drinking water quality and educate them on well testing and wellhead protection. Host a well testing clinic or outreach event for: arsenic, lead, manganese, nitrate, coliform bacteria	Groundwater Focus Areas	10 events/ clinics	○		●					**MDH**, Counties, SWCD, MPCA	✓	✓	✓	✓	✓	$40,000
EO -8	Conduct stormwater outreach which could include: • Education on spill management, leaks, and illicit discharge • Tours of facilities and flows • Education on what a separate storm system is • Highlight how one large BMP may treat an entire small community • Programs like Adopt a Drain, Lake to Legume, Rake the Lake	Watershed-Wide	5 education days or mailings	○	○			○			**Cities**, SWCD, MNDNR, MPCA	✓	✓	✓	✓	✓	$50,000
EO -9	Cities to establish a staff member with the responsibility to build partnerships with neighboring governmental and community organizations	Watershed-wide	Staff identified	○	○	○	○	○	○	○	**Cities**	✓					$5,000
EO -10	Build or expand existing partnerships and promote enrollment in land protection programs (CREP, RIM)	Watershed-Wide	10 mailings or online communications distributed to landowners	○	○	○			○	○	**SWCD**, BWSR	✓	✓	✓	✓	✓	$10,000
																	$5,676,000

*Solid circle = direct progress towards goal. Outline = indirect progress towards goal

**FDR = Flood Damage Reduction

Table 5-4. Research and Data Gaps: Watershed-Wide

ID	Action	Focus Area	10-Year Output	Progress Towards Goals*							Responsible Entity (bold = lead)	Timeline					10-Year Local Cost
				Nutrients and Bacteria	Sediment and Erosion	Groundwater / Surface Water	Water Storage, Altered Hydrology, FDR **	Stormwater	Soil Health	Invasive Species		2026-2027	2028-2029	2030-2031	2032-2033	2034-2036	
RDG-1	Continue and expand surface water monitoring efforts to understand water quality, trends, emerging contaminants, and impacts of conservation action	Watershed-Wide	Annual Coordination meeting	○	○	○	○	○	○		**Counties, SWCD**, MPCA, MNDNR, Lake Associations	✓	✓	✓	✓	✓	$20,000
RDG -2	Complete hydrologic modeling to better prioritize areas in the watershed best for storage to reduce peak flows and impacts of altered hydrology	Watershed-Wide	Modeling completed	○	○		○	○			**MNDNR**, Counties		✓				$100,000
RDG -3	Complete feasibility analyses for potential storage projects	Watershed-Wide	5 feasibility studies completed	○	○		○				**Counties, SWCD**, MNDNR		✓				$50,000
RDG -4	Conduct multi-purpose drainage management planning and engage in early coordination	Watershed-Wide	Plans completed for 5 ditches	○	○		○				**Counties, SWCD,** MDH, MNDNR	✓					$60,000
RDG -5	Inventory drainage system to identify systems in most need of maintenance or repair	Watershed-Wide	Inventory completed	○	○		○				**Counties**, SWCD	✓					$20,000
RDG -6	Inventory and prioritize non-compliant septic systems with a focus on lakeshore systems	Watershed-Wide	Inventory completed	○							**Counties**, MPCA	✓					$100,000
RDG -7	Field verify MNDNR-inventoried barriers such as dams, culverts, weirs, or other structures impeding flow or habitat connectivity to prioritize enhancements	Watershed-Wide	All MNDNR barriers verified				○				**MNDNR**, Counties	✓					$20,000
RDG -8	Conduct an inventory of unsealed wells, considering factors such as vacant lots and contamination susceptibility	Watershed-Wide	Inventory completed			○					**Counties**, SWCD, MDH	✓					$40,000
RDG -9	Identify available funding and willing landowners for prioritizing wetland restorations, including near lakes.	Watershed-Wide	1 funding source and 10 landowners identified				○	○			**MNDNR**, Counties, SWCD		✓				$10,000
RDG -10	Complete lake subwatershed assessments to protect priority lakes	Watershed-wide	2 assessments completed	○	○						**SWCD**, Counties, MNDNR, MPCA			✓			$50,000
RDG-11	Complete study to identify sources of stream erosion	Watershed-wide	1 study completed	○	○						**SWCD**, Counties, MNDNR			✓			$75,000
RDG-12	Internal loading feasibility studies	Watershed-wide	1 feasibility study completed	○							**SWCD**, Counties, MPCA				✓		$10,000
RDG-13	Research and develop new in-lake treatment technology	Crystal Lake	Research completed	○							**Counties, SWCD**, MNDNR				✓		$5,000
																	$560,000

*Solid circle = direct progress towards goal. Outline = indirect progress towards goal

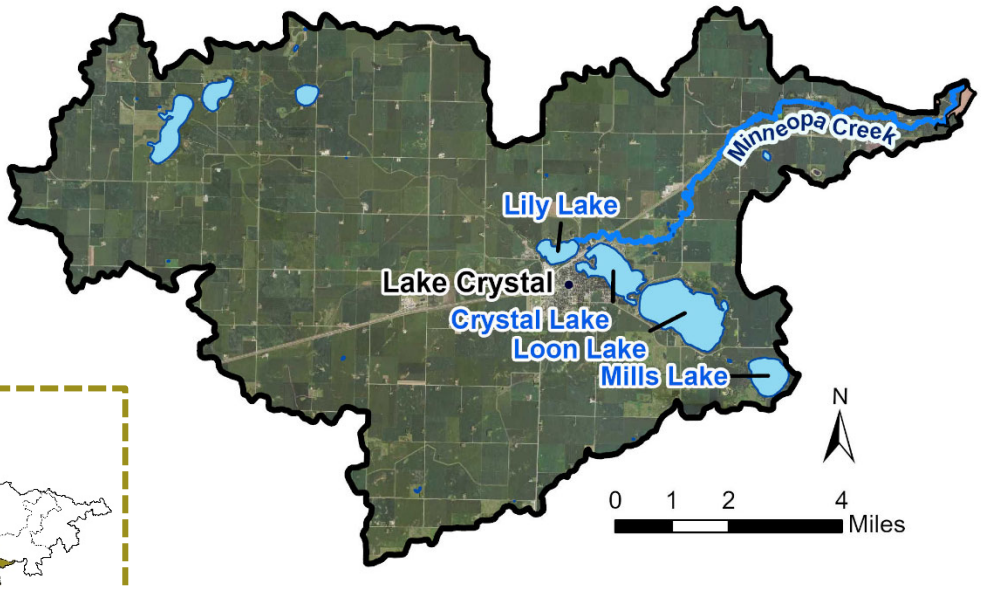
**FDR = Flood Damage Reduction

Table 5-5. Capital Improvement Projects: Watershed Wide

The Capital Improvement Projects (CIP) Action Table summarizes the actions pertaining to the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features. CIPs require external funding. They will be implemented through the CIP Implementation Program, described further in **Section 6—Implementation Programs**. Dam removals and modifications are potential CIPs that could be done during implementation if opportunities arise, with fish passage and connectivity in mind.

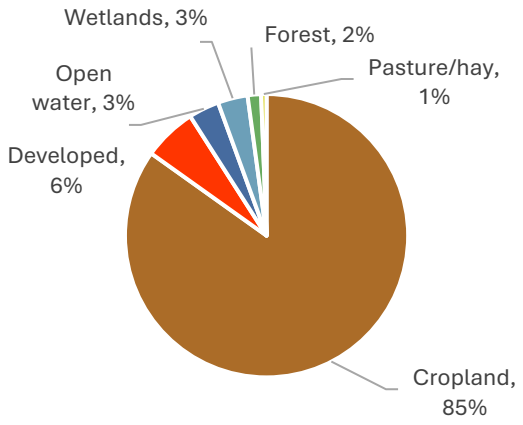
Project Title	Description	Acre-Feet Storage (volume of water stored, if applicable)	Lead Entity	Information Source	Years Start / End	Status	Cost
Newman Storage Pond	Extend the City of Lake Crystal's existing basin with a sediment trap, add a weir and two culverts. Project size is approximately two acres.	6 ac-ft	Crystal Waters Project and City of Lake Crystal	Crystal Waters Project and City of Lake Crystal	Proposed	Planning Stage	$320,000
Kaveny/Hinton Watershed Wetland Enhancement	Large wetland enhancement for areas draining into Lake Washington on the northeast side of Bakers Bay. This includes replacement of a failed control structure, grading, easements and seeding.	170 ac-ft	Le Sueur SWCD	Lake Washington Improvement Association	2026 to 2028	Feasibility Stage	$500,000
Lake Washington In-Lake Treatment	Alum treatment for phosphorus in Lake Washington based on past monitoring to reduce seasonal algae blooms	N/A	Le Sueur SWCD	Lake Washington Improvement Association	2026 to 2027	Report and Monitoring Stage	$250,000
Lake Washington Alternate Intake Treatments	Lake Washington has many untreated inlets from agricultural lands into the lake. Proposed WASCOBs, riprap, and sediment basins	50 ac-ft	Le Sueur SWCD	Lake Washington Improvement Association	2026 to 2028	Feasibility Stage	$250,000
Brown St. Storm Basin	Construct a regional stormwater basin for treatment prior to discharge to Minnesota River	3 ac-ft	City of Saint Peter	City of St. Peter	2029	Planning Stage	$500,000
Traverse Green – Greenway	Create greenway to handle and treat runoff from agricultural lands before water infiltrates drinking water aquifer	80 ac-ft	City of Saint Peter	City of St. Peter	2026-2036	Planning Stage	$600,000
Walnut Street Flood Mitigation	Acquire properties on S. Front & Walnut Streets to mitigate flood damages	N/A	City of Saint Peter	City of St. Peter	2030	Planning Stage	$800,000
St. Peter DWSMA Wetland	Create wetland in St. Peter DWSMA to store and treat nitrate contaminated water before entering aquifer	100 ac-ft	Nicollet SWCD	Stormwater Resiliency Plan	2026-2036	Planning Stage	$1,000,000
Southeast Water Quality Project	A wetland restoration to mitigate existing water quality issues associated with the southeast watershed. Reduce discharges of sediments and nutrients such as nitrogen and phosphorus into the Minnesota River.	210 ac-ft	City of Mankato	City of Mankato	Proposed	Planning Stage	$6,600,000

Minneopa Creek Implementation Region: Overview



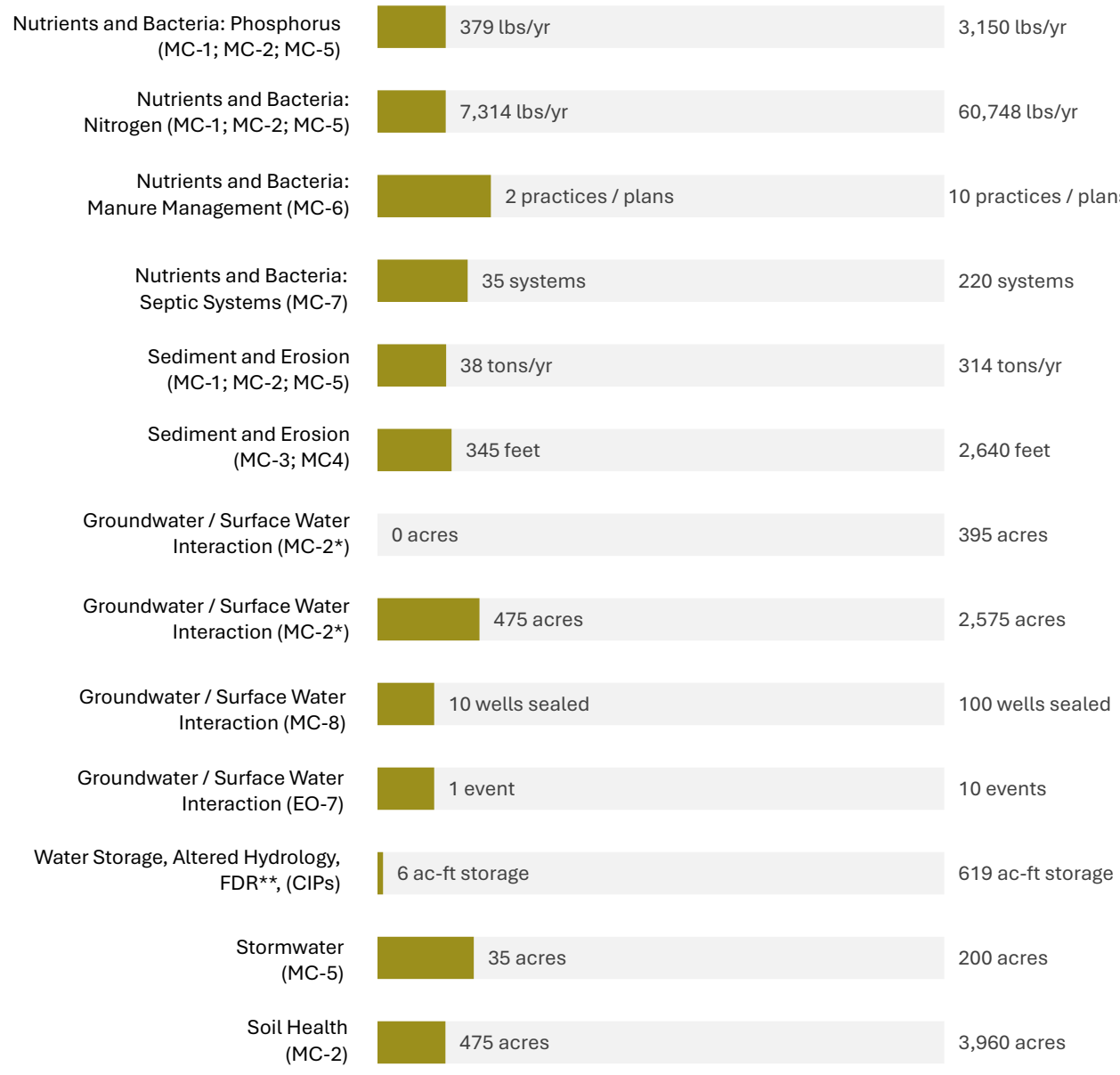
The Minneopa Creek Implementation Region:

- Covers 15% of the watershed area
- Largely in Blue Earth County, but also in Brown and Watonwan Counties
- Contains the city of Lake Crystal
- Contains Crystal Lake and Loon Lake
- The largest percentage of this region is agricultural land at 85%, and the next largest portion of land use is developed land (6%)



Minneopa Creek Implementation Region: Milestone Chart

The milestone chart shows where progress towards each goal in **Section 4 – Measurable Goals** will be made, along with the applicable action or actions that will accomplish the goal.



*Since there is no cropland in vulnerable groundwater DWSMAs in this Implementation Region, no progress will be made towards protection of groundwater DWSMAs. Protection of surface water DSWMAs will be done through the soil health action.

**FDR = Flood Damage Reduction

Minneopa Creek Implementation Region: Focus Areas

The Minneopa Implementation Region is fully within the Mankato highly vulnerable surface water DWSMA and contains local priority waterbodies Minneopa Creek and Crystal Lake. Loon Lake is a barely impaired lake, making it a restoration priority.

Implementation partners are encouraged to look for opportunities that impact resources and areas shown on the map, as targeting actions here will make the biggest impact on improving resources.

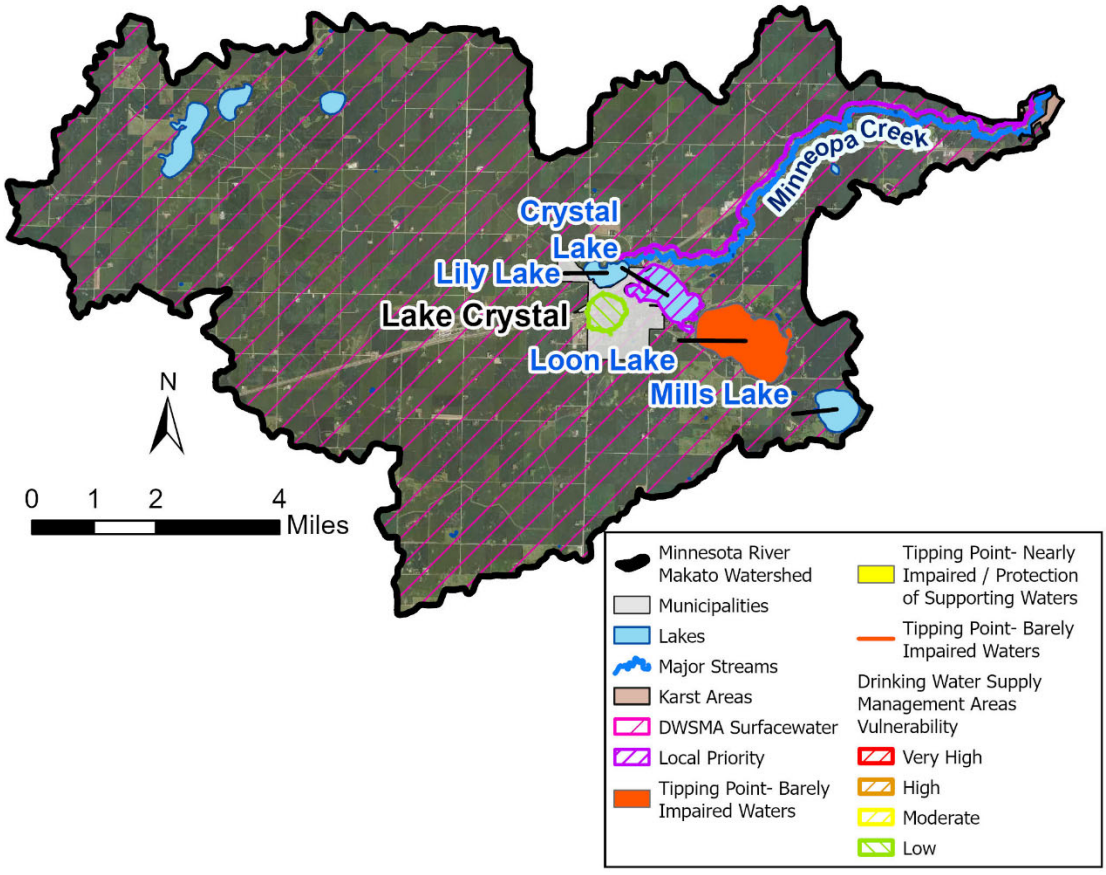


Table 5-6. Minneopa Creek Implementation Region Action Table

ID	Action	Focus Area	10-Year Output	Progress Towards Goals*							Responsible Entity (bold = lead)	Timeline					10-Year Local Cost	Partner / Federal Cost
				Nutrients and Bacteria	Sediment and Erosion	Groundwater / Surface Water	Water Storage, Altered Hydrology, FDR **	Stormwater	Soil Health	Invasive Species		2026-2027	2028-2029	2030-2031	2032-2033	2034-2036		
MC-1	**Multi-Benefit Agricultural BMPs** e.g. grassed waterways, WASCOBs, riparian buffers, filter strips, side water inlets, terraces, grade stabilizations, drainage water management†	Nutrients and Bacteria; Sediment and Erosion; Groundwater; and Water Storage Focus Areas	22 tons/yr sediment, 4,838 lbs/yr nitrogen, and 250 lbs/yr phosphorus reduction (475 acres treated)	●	●	●	○				**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$164,000	
MC -2	**Soil Health and Recharge Conservation Practices** e.g., cover crops, perennial crops, crop rotation, reduced tillage, winter cover, nutrient management, pasture management	Soil Health Focus Areas	475 acres treated; 13 tons/yr sediment, 2,392 lbs/yr nitrogen, and 124 lbs/yr phosphorus reduction	●	●	●	○		●		**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$92,750	
MC -3	**Lake Shoreline Stabilization** Stabilize or enhance shorelines of priority lakes, with a preference for natural lakeshore restorations	Priority Lakes	225 feet (0.04 mile)	○	●		○				**SWCD**, **Counties,** MNDNR	✓	✓	✓	✓	✓	$22,500	$45,000
MC -4	**Ravine or Streambank Stabilization** Vegetation enhancement and/or engineered management with a preference for native vegetation enhancement on streambanks, bluffs, ravines, and public ditches to reduce erosion	Priority Streams; Sediment and Erosion- Near Channel Focus Areas	120 feet (0.02 mile)	○	●		○				**SWCD**, **Counties**, MNDNR, Townships	✓	✓	✓	✓	✓	$24,000	
MC -5	**Urban Stormwater BMPs** e.g. raingardens, stormwater detention ponds, bioswales, green stormwater infrastructure	Stormwater Focus Areas	2 projects (equivalent of 35 acres treated); 3 tons/yr sediment, 84 lbs/yr nitrogen, and 5 lbs/yr phosphorus reduction	●	●		○	●			**SWCD, Cities**, NRCS, BWSR, MPCA	✓	✓				$39,300	
MC -6	**Manure Management** Feedlot management practices (e.g., open lot improvements, manure pit improvements, manure management plans)	Nutrients and Bacteria Focus Areas	2 practices / plans	○		○					**SWCD**, **Counties**, MPCA, NRCS, BWSR, MDA	✓	✓				$15,000	
MC -7	**Septic Systems** Upgrade/replace noncompliant systems	Nutrients and Bacteria Focus Areas	35 systems addressed	○		○					**Counties**, **SWCD**, MPCA, BWSR	✓	✓	✓	✓	✓	$25,000	$1,000,000
MC -8	**Seal Unused or Abandoned Wells** Cost share to well owners	Watershed-Wide	10 wells			●					**Counties**, **SWCD**, Cities, MDH, BWSR	✓	✓	✓	✓	✓	$30,000	
MC -9	**Land Protection** Provide incentive or cost-share to enroll or re-enroll land in temporary or permanent easements such as CRP, etc. for wildlife, pollinator, water storage, and DWSMA protection.	Water Storage Focus Areas, DWSMAs	63 acres cost share / incentivized	○	○	○	○				**SWCD**, NRCS, BWSR, MNDNR	✓	✓	✓	✓	✓	$12,600	$157,500
MC -10	**Wetland Restoration** Provide incentives or cost-share for wetland restoration	Water Storage Focus Areas	20 acres by partners	○	○	○	○				**Counties, SWCD**, MNDNR, NRCS	✓	✓	✓	✓	✓	$0	$200,000
MC -11	**AIS Prevention and Management** County program with state aid	Invasive Species Focus Areas	Continue current program‡	○						●	**Counties, SWCD**, MNDNR	✓	✓	✓	✓	✓	Local staff time	
MC -12	**TIS Prevention and Management** EAB, buckthorn, noxious weeds, etc.	Invasive Species Focus Areas	Continue current program							●	**Counties, SWCD, MDA**, MNDNR	✓	✓	✓	✓	✓	Local staff time	
																	$425,150	**$1,402,500**

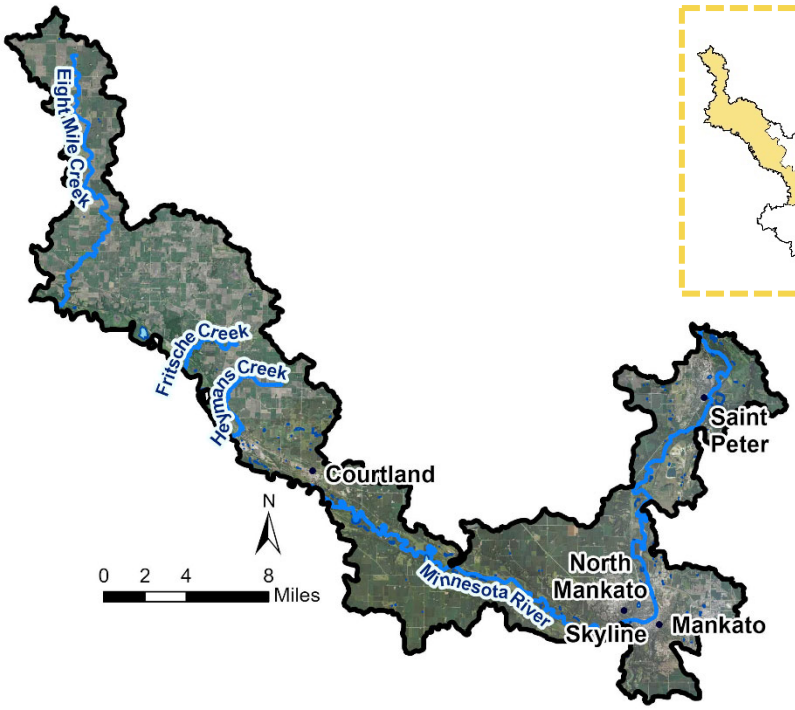
*Solid circle = direct progress towards goal. Outline = indirect progress towards goal

**FDR = Flood Damage Reduction

†Drainage water management could include water storage, two-stage ditches, rock riffles, or other practices that make projects toward plan goals

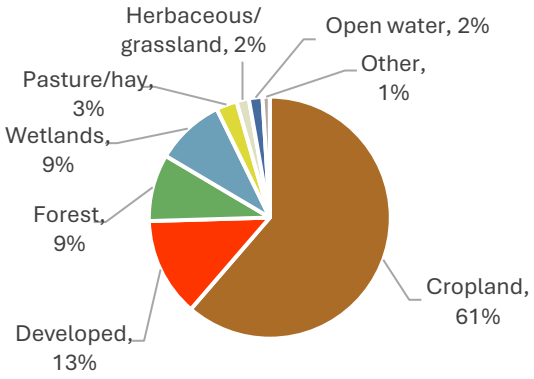
‡Contingent upon state program and/or external funding sources

Minnesota River Implementation Region: Overview



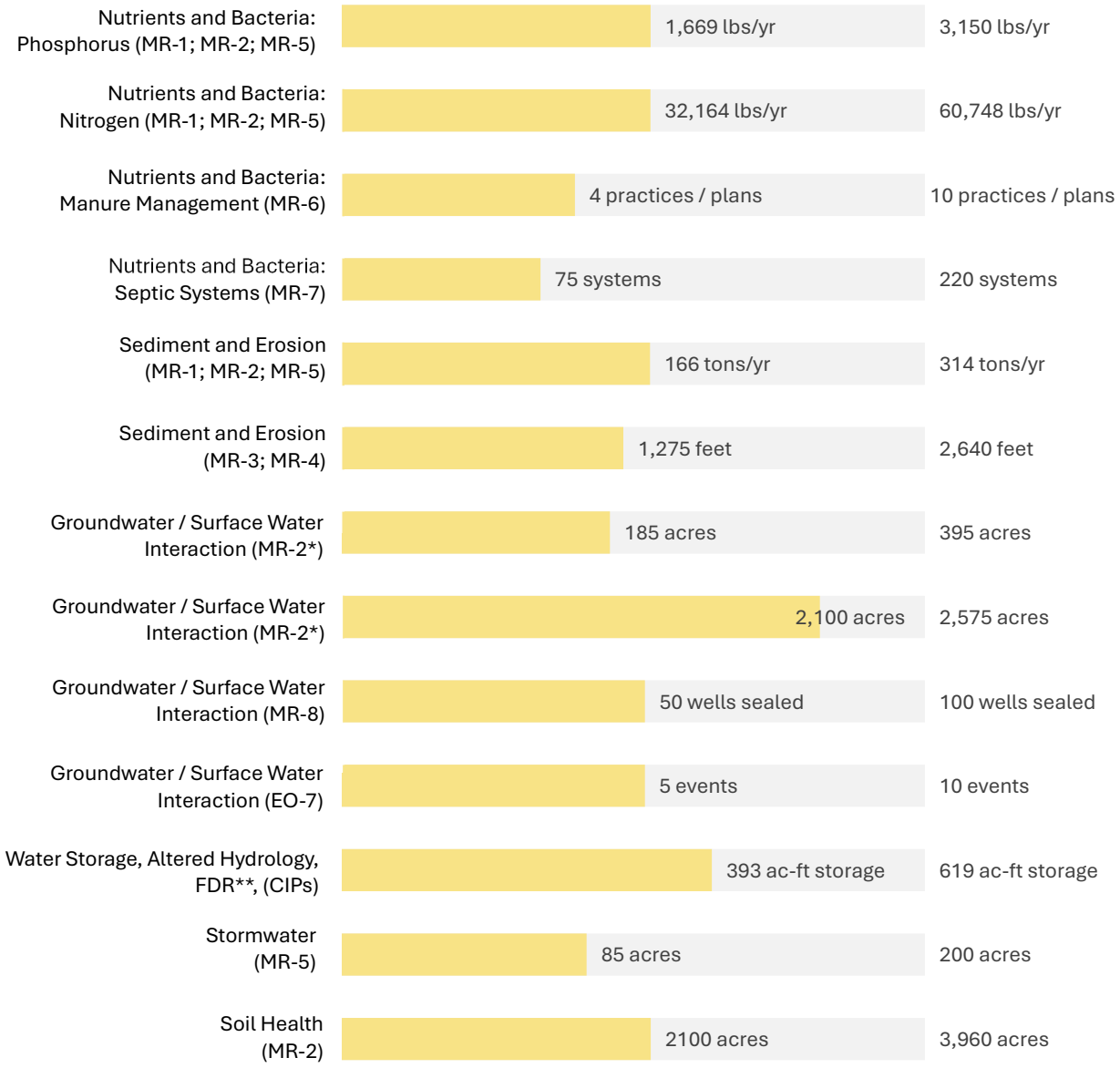
The Minnesota River Implementation Region:

- Is the largest Implementation Region, at 45% of the watershed area
- Largely in Nicollet County, but also in Blue Earth, Le Sueur, Sibley, and Renville Counties
- Contains the cities of Courtland, Mankato, North Mankato, Kasota, and St. Peter
- Contains Spring Lake and Lake Hallett
- 13% of this region is developed due to Mankato and St. Peter. At 61% cropland, this region has the smallest portion of agricultural land.



Minnesota River Implementation Region: Milestone Chart

The milestone chart shows where progress towards each goal in **Section 4 – Measurable Goals** will be made, along with the applicable action or actions that will accomplish the goal.



* MR -2 has an output of 2,100 acres of soil health practices, all of which also meets the Groundwater Quality / Surface Water Interaction Goal of surface water DWSMA treatment or protection. 185 acres of groundwater DWSMA protection may be inclusive of the 2,100 acres.

**FDR = Flood Damage Reduction

Minnesota River Implementation Region: Focus Areas

The Minnesota River Implementation Region is partially within a surface water DWSMA. There are two highly vulnerable DWSMAs within the implementation region, near Saint Peter and Kasota. One medium-vulnerability DWSMA is within New Ulm.

Implementation partners are encouraged to look for opportunities that impact resources and areas shown on the map, as targeting actions here will make the biggest impact on improving resources.

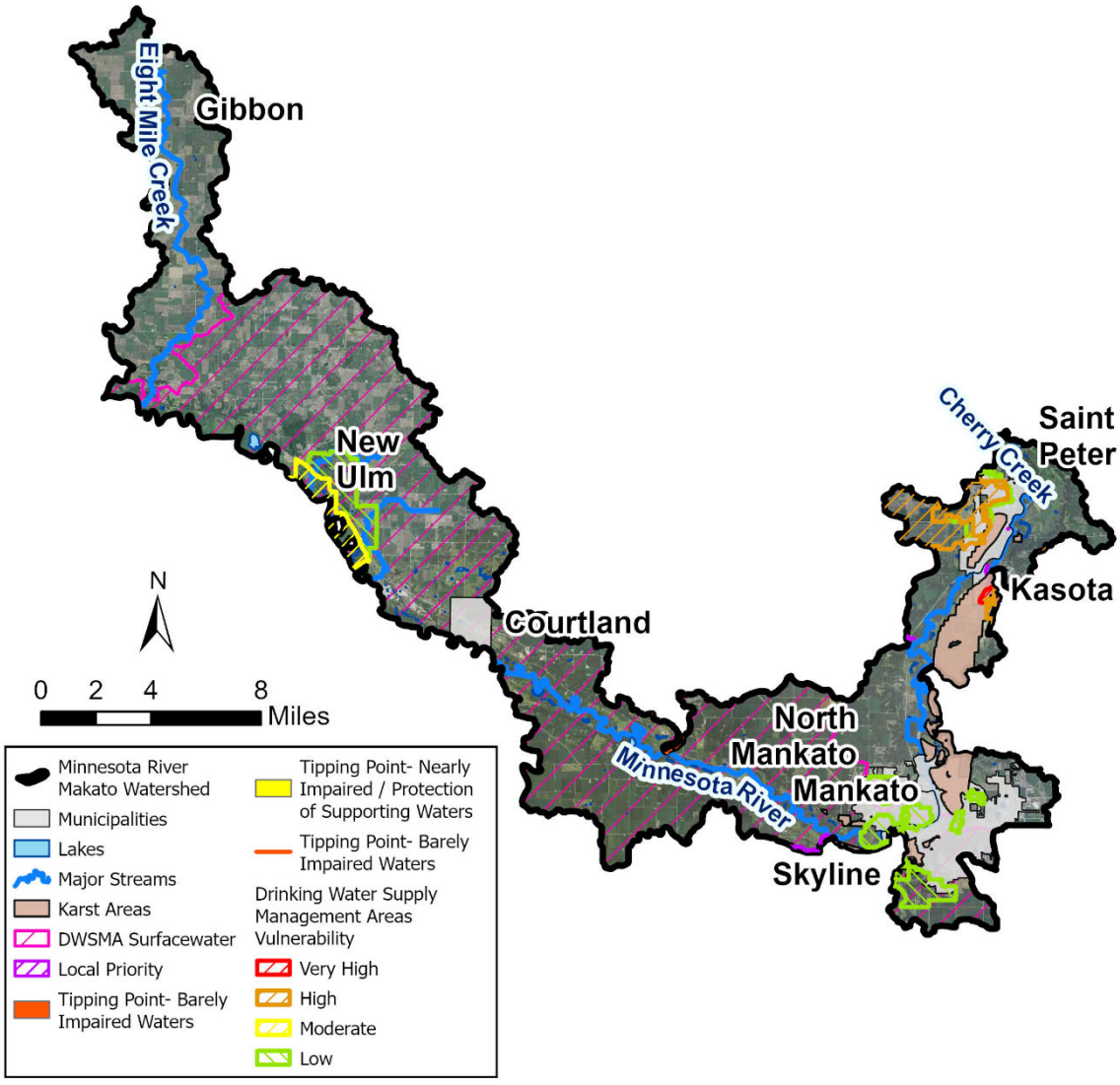


Table 5-7. Minnesota River Implementation Region Action Table

ID	Action	Focus Area	10-Year Output	Progress Towards Goals*							Responsible Entity (bold = lead)	Timeline					10-Year Local Cost	Partner / Federal Cost
				Nutrients and Bacteria	Sediment and Erosion	Groundwater / Surface Water	Water Storage, Altered Hydrology, FDR **	Stormwater	Soil Health	Invasive Species		2026-2027	2028-2029	2030-2031	2032-2033	2034-2036		
MR-1	**Multi-Benefit Agricultural BMPs** e.g. grassed waterways, WASCOBs, riparian buffers, filter strips, side water inlets, terraces, grade stabilizations, drainage water management†	Nutrients and Bacteria; Sediment and Erosion; Groundwater; and Water Storage Focus Areas	99 tons/yr sediment, 21,387 lbs/yr nitrogen, and 1,108 lbs/yr phosphorus reduction (2,100 acres treated)	●	●	●	○				**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$724,700	
MR -2	**Soil Health and Recharge Conservation Practices** e.g., cover crops, perennial crops, crop rotation, reduced tillage, winter cover, nutrient management, pasture management	Soil Health Focus Areas	2,100 acres treated; 60 tons/yr sediment, 10,573 lbs/yr nitrogen, and 546 lbs/yr phosphorus reduction	●	●	●	○		●		**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$409,600	
MR -3	**Lake Shoreline Stabilization** Stabilize or enhance shorelines of priority lakes, with a preference for natural lakeshore restorations	Priority Lakes	555 feet (0.11 mile)	○	●		○				**SWCD**, **Counties,** MNDNR	✓	✓	✓	✓	✓	$55,500	$111,000
MR -4	**Ravine or Streambank Stabilization** Vegetation enhancement and/or engineered management with a preference for native vegetation enhancement on streambanks, bluffs, ravines, and public ditches to reduce erosion	Priority Streams; Sediment and Erosion- Near Channel Focus Areas	720 feet (0.14 mile)	○	●		○				**SWCD**, **Counties**, MNDNR, Townships	✓	✓	✓	✓	✓	$144,000	
MR -5	**Urban Stormwater BMPs** e.g. raingardens, stormwater detention ponds, bioswales, green stormwater infrastructure	Stormwater Focus Areas	4 projects (equivalent of 85 acres treated); 7 tons/yr sediment, 204 lbs/yr nitrogen, and 13 lbs/yr phosphorus reduction	●	●		○	●			**SWCD, Cities**, NRCS, BWSR, MPCA		✓	✓			$95,000	
MR -6	**Manure Management** Feedlot management practices (e.g., open lot improvements, manure pit improvements, manure management plans)	Nutrients and Bacteria Focus Areas	4 practices / plans	○		○					**SWCD**, **Counties**, MPCA, NRCS, BWSR, MDA	✓	✓	✓			$30,000	
MR -7	**Septic Systems** Upgrade/replace noncompliant systems	Nutrients and Bacteria Focus Areas	75 systems addressed	○		○					**Counties**, **SWCD**, MPCA, BWSR	✓	✓	✓	✓	✓	$25,000	$1,000,000
MR -8	**Seal Unused or Abandoned Wells** Cost share to well owners	Watershed-Wide	50 wells			●					**Counties**, **SWCD**, Cities, MDH, BWSR	✓	✓	✓	✓	✓	$150,000	
MR -9	**Land Protection** Provide incentive or cost-share to enroll or re-enroll land in temporary or permanent easements such as CRP, etc. for wildlife, pollinator, water storage, and DWSMA protection.	Water Storage Focus Areas, DWSMAs	158 acres cost share / incentivized	○	○	○	○				**SWCD**, NRCS, BWSR, MNDNR	✓	✓	✓	✓	✓	$31,600	$395,000
MR -10	**Wetland Restoration** Provide incentives or cost-share for wetland restoration	Water Storage Focus Areas	10 local acres cost share/ incentivized; 90 acres by partners	○	○	○	○				**Counties, SWCD**, MNDNR, NRCS	✓	✓	✓	✓	✓	$100,000	$900,000
MR -11	**AIS Prevention and Management** County program with state aid	Invasive Species Focus Areas	Continue current program‡	○						●	**Counties, SWCD**, MNDNR	✓	✓	✓	✓	✓	Local staff time	
MR -12	**TIS Prevention and Management** EAB, buckthorn, noxious weeds, etc.	Invasive Species Focus Areas	Continue current program							●	**Counties, SWCD, MDA,** MNDNR	✓	✓	✓	✓	✓	Local staff time	
																	$1,765,400	**$2,406,000**

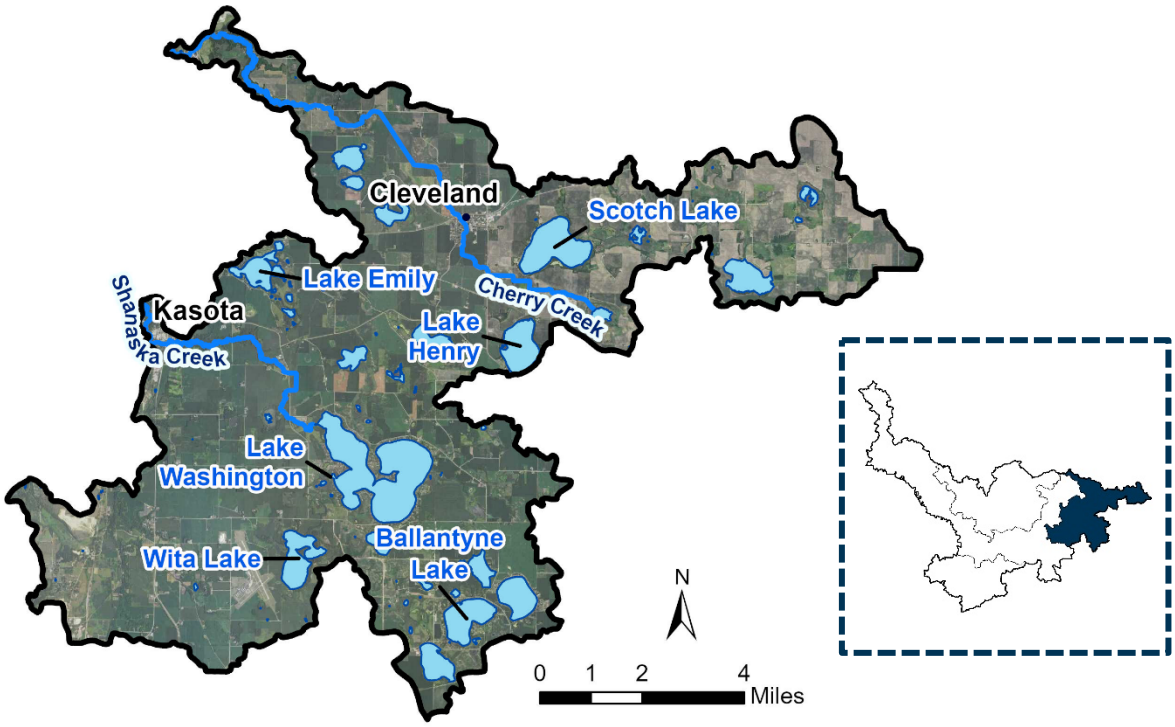
*Solid circle = direct progress towards goal. Outline = indirect progress towards goal

**FDR = Flood Damage Reduction

†Drainage water management could include water storage, two-stage ditches, rock riffles, or other practices that make projects toward plan goals

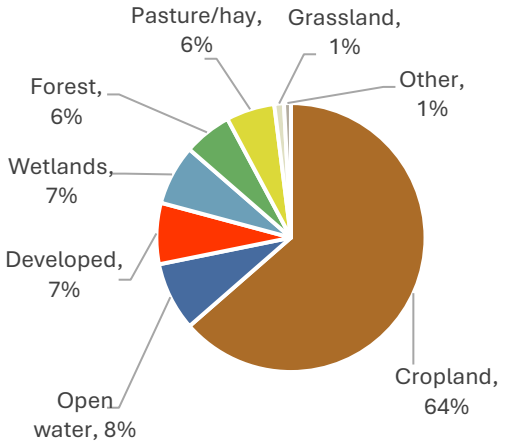
‡Contingent upon state program and/or external funding sources

Shanaska Creek Implementation Region: Overview



The Shanaska Creek Implementation Region:

- Covers 15% of the watershed area
- Largely in Le Sueur County, but also in Blue Earth County
- Contains the city of Cleveland and part of Mankato
- Contains 25 public water basins, including Washington, Wita, Scotch, and Ballantyne
- 8% of this implementation region is open water.



Shanaska Creek Implementation Region: Milestone Chart

The milestone chart shows where progress towards each goal in **Section 4 – Measurable Goals** will be made, along with the applicable action or actions that will accomplish the goal.

Goal (Action ID on page 5-23)	Targeted Progress	Watershed-wide 10-Year Goal
Nutrients and Bacteria: Phosphorus (SC-1; SC-2; SC-5)	506 lbs/yr	3,150 lbs/yr
Nutrients and Bacteria: Nitrogen (SC-1; SC-2; SC-5)	9,760 lbs/yr	60,748 lbs/yr
Nutrients and Bacteria: Manure Management (SC-6)	1 practices / plans	10 practices / plans
Nutrients and Bacteria: Septic Systems (SC-7)	35 systems	220 systems
Sediment and Erosion (SC-1; SC-2; SC-5)	51 tons/yr	314 tons/yr
Sediment and Erosion (SC-3; SC-4)	435 feet	2,640 feet
Groundwater / Surface Water Interaction (SC-2*)	50 acres	395 acres
Groundwater / Surface Water Interaction (SC-2*)	0 acres	2,575 acres
Groundwater / Surface Water Interaction (SC-8)	20 wells sealed	100 wells sealed
Groundwater / Surface Water Interaction (EO-7)	2 events	10 events
Water Storage, Altered Hydrology, FDR**, (CIPs)	220 ac-ft storage	619 ac-ft storage
Stormwater (SC-5)	40 acres	200 acres
Soil Health (SC-2)	635 acres	3,960 acres

* SC -2 has an output of 635 acres of soil health practices, 50 acres of this is intended to meet the Groundwater Quality / Surface Water Interaction goal for protection of groundwater DWSMAs.
**FDR = Flood Damage Reduction

Shanaska Creek Implementation Region: Focus Areas

The Shanaska Creek Implementation Region has two lakes (Lake Emily and Ballantyne Lake) that are identified as nearly impaired or important for protection of supporting waters. There is one highly vulnerable DWSMA located near Kasota. Shanaska Creek, Ballantyne Lake, Lake Emily, Duck Lake, and Lake Washington are all local priority waters. There is an area of karst geology in the southwest portion of the implementation region, an important consideration for surface contamination of groundwater.

Implementation partners are encouraged to look for opportunities that impact resources and areas shown on the map, as targeting actions here will make the biggest impact on improving resources.

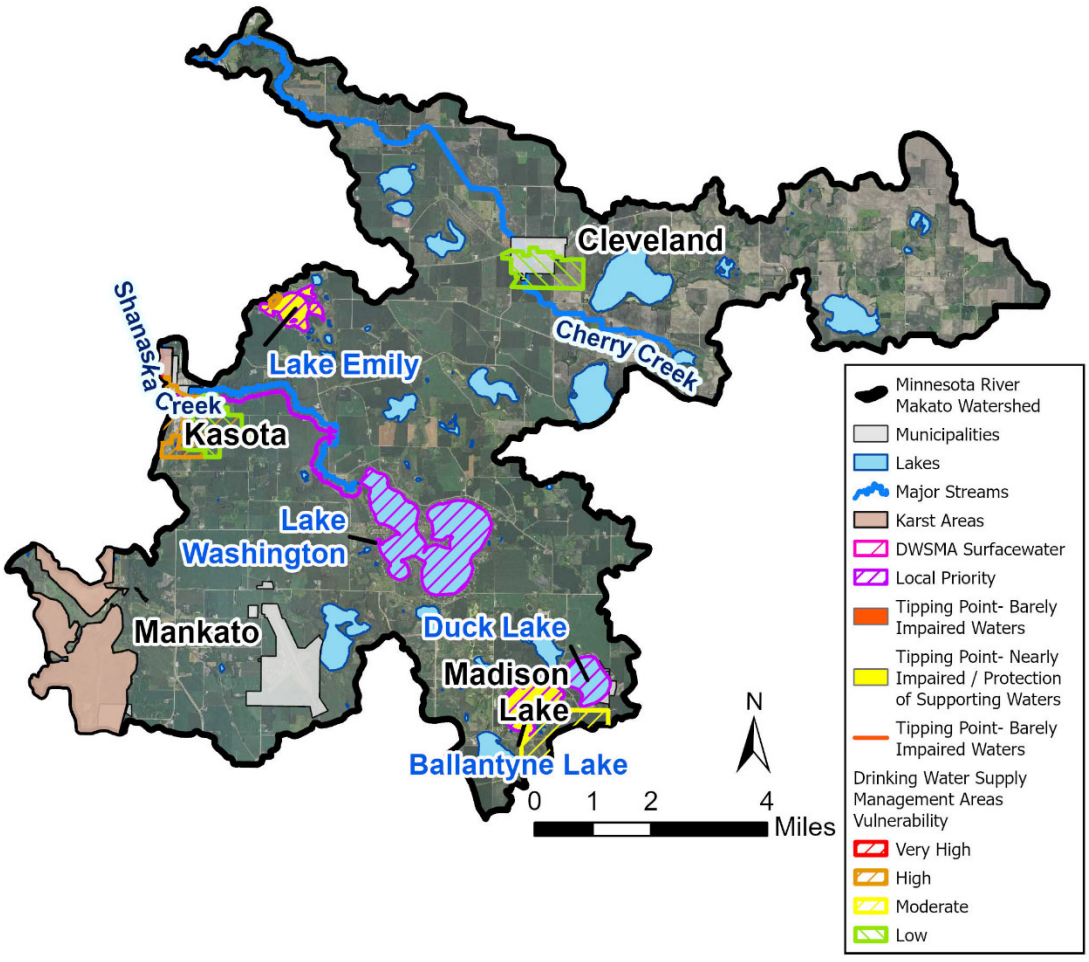


Table 5-8. Shanaska Creek Implementation Region Action Table

ID	Action	Focus Area	10-Year Output	Progress Towards Goals*							Responsible Entity (bold = lead)	Timeline					10-Year Local Cost	Partner / Federal Cost
				Nutrients and Bacteria	Sediment and Erosion	Groundwater / Surface Water	Water Storage, Altered Hydrology, FDR **	Stormwater	Soil Health	Invasive Species		2026-2027	2028-2029	2030-2031	2032-2033	2034-2036		
SC-1	**Multi-Benefit Agricultural BMPs** e.g. grassed waterways, WASCOBs, riparian buffers, filter strips, side water inlets, terraces, grade stabilizations, drainage water management†	Nutrients and Bacteria; Sediment and Erosion; Groundwater; and Water Storage Focus Areas	30 tons/yr sediment, 6,467 lbs/yr nitrogen, and 335 lbs/yr phosphorus reduction (635 acres treated)	●	●	●	○				**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$219,200	
SC -2	**Soil Health and Recharge Conservation Practices** e.g., cover crops, perennial crops, crop rotation, reduced tillage, winter cover, nutrient management, pasture management	Soil Health Focus Areas	635 acres treated; 18 tons/yr sediment, 3,197 lbs/yr nitrogen, and 165 lbs/yr phosphorus reduction	●	●	●	○		●		**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$124,000	
SC -3	**Lake Shoreline Stabilization** Stabilize or enhance shorelines of priority lakes, with a preference for natural lakeshore restorations	Priority Lakes	265 feet (0.05 mile)	○	●		○				**SWCD**, **Counties,** MNDNR	✓	✓	✓	✓	✓	$26,500	$53,000
SC -4	**Ravine or Streambank Stabilization** Vegetation enhancement and/or engineered management with a preference for native vegetation enhancement on streambanks, bluffs, ravines, and public ditches to reduce erosion	Priority Streams; Sediment and Erosion- Near Channel Focus Areas	170 feet (0.03 mile)	○	●		○				**SWCD**, **Counties**, MNDNR, Townships	✓	✓	✓	✓	✓	$34,000	
SC -5	**Urban Stormwater BMPs** e.g. raingardens, stormwater detention ponds, bioswales, green stormwater infrastructure	Stormwater Focus Areas	2 projects (equivalent of 40 acres treated); 3 tons/yr sediment, 96 lbs/yr nitrogen, and 6 lbs/yr phosphorus reduction	●	●		○	●			**SWCD, Cities**, NRCS, BWSR, MPCA				✓	✓	$44,750	
SC -6	**Manure Management** Feedlot management practices (e.g., open lot improvements, manure pit improvements, manure management plans)	Nutrients and Bacteria Focus Areas	1 practice or plan	○		○					**SWCD**, **Counties**, MPCA, NRCS, BWSR, MDA				✓		$7,500	
SC -7	**Septic Systems** Upgrade/replace noncompliant systems	Nutrients and Bacteria Focus Areas	35 systems addressed	○		○					**Counties**, **SWCD**, MPCA, BWSR	✓	✓	✓	✓	✓	$25,000	$1,000,000
SC -8	**Seal Unused or Abandoned Wells** Cost share to well owners	Watershed-Wide	20 wells			●					**Counties**, **SWCD**, Cities, MDH, BWSR	✓	✓	✓	✓	✓	$60,000	
SC -9	**Land Protection** Provide incentive or cost-share to enroll or re-enroll land in temporary or permanent easements such as CRP, etc. for wildlife, pollinator, water storage, and DWSMA protection.	Water Storage Focus Areas, DWSMAs	75 acres cost share / incentivized	○	○	○	○				**SWCD**, NRCS, BWSR, MNDNR	✓	✓	✓	✓	✓	$15,000	$187,500
SC -10	**Wetland Restoration** Provide incentives or cost-share for wetland restoration	Water Storage Focus Areas	5 local acres cost share/ incentivized; 30 acres by partners	○	○	○	○				**Counties, SWCD**, MNDNR, NRCS	✓	✓	✓	✓	✓	$50,000	$300,000
SC -11	**AIS Prevention and Management** County program with state aid	Invasive Species Focus Areas	Continue current program‡	○						●	**Counties, SWCD**, MNDNR	✓	✓	✓	✓	✓	Local staff time	
SC -12	**TIS Prevention and Management** EAB, buckthorn, noxious weeds, etc.	Invasive Species Focus Areas	Continue current program							●	**Counties, SWCD, MDA,** MNDNR	✓	✓	✓	✓	✓	Local staff time	
																	$605,950	**$1,540,500**

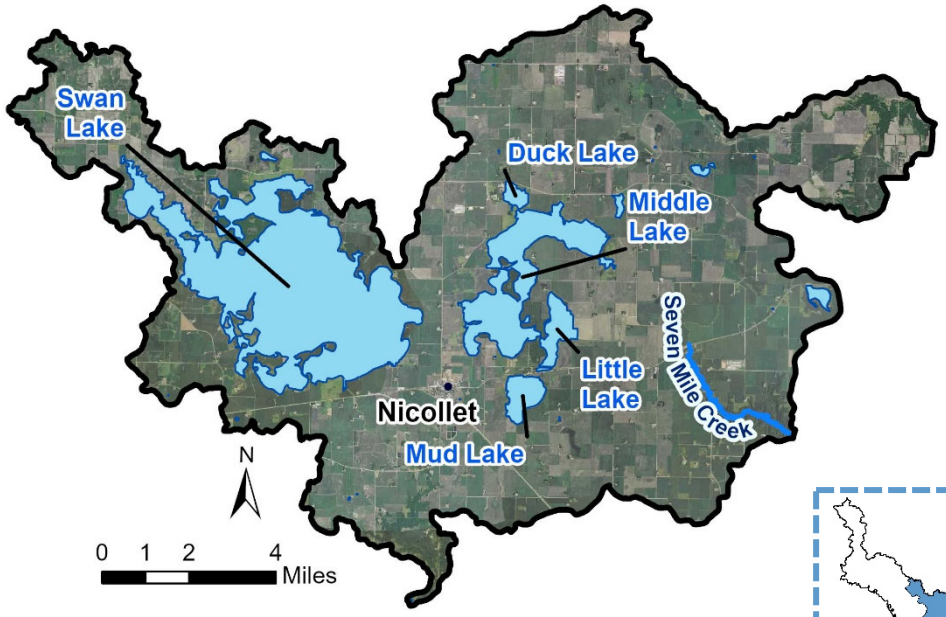
*Solid circle = direct progress towards goal. Outline = indirect progress towards goal

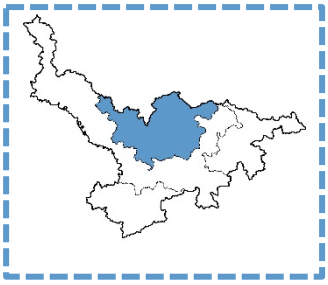
**FDR = Flood Damage Reduction

†Drainage water management could include water storage, two-stage ditches, rock riffles, or other practices that make projects toward plan goals

‡Contingent upon state program and/or external funding sources

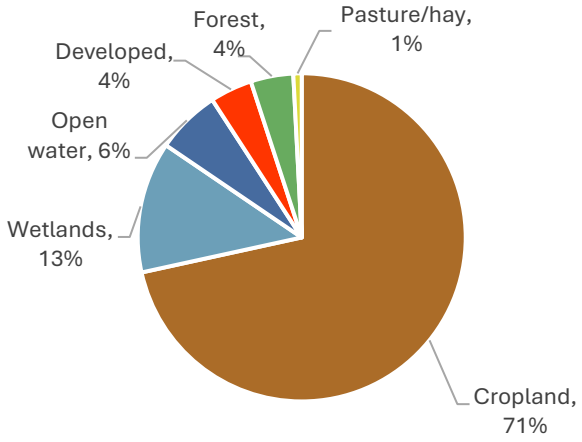
Swan-Sevenmile Creek Implementation Region: Overview





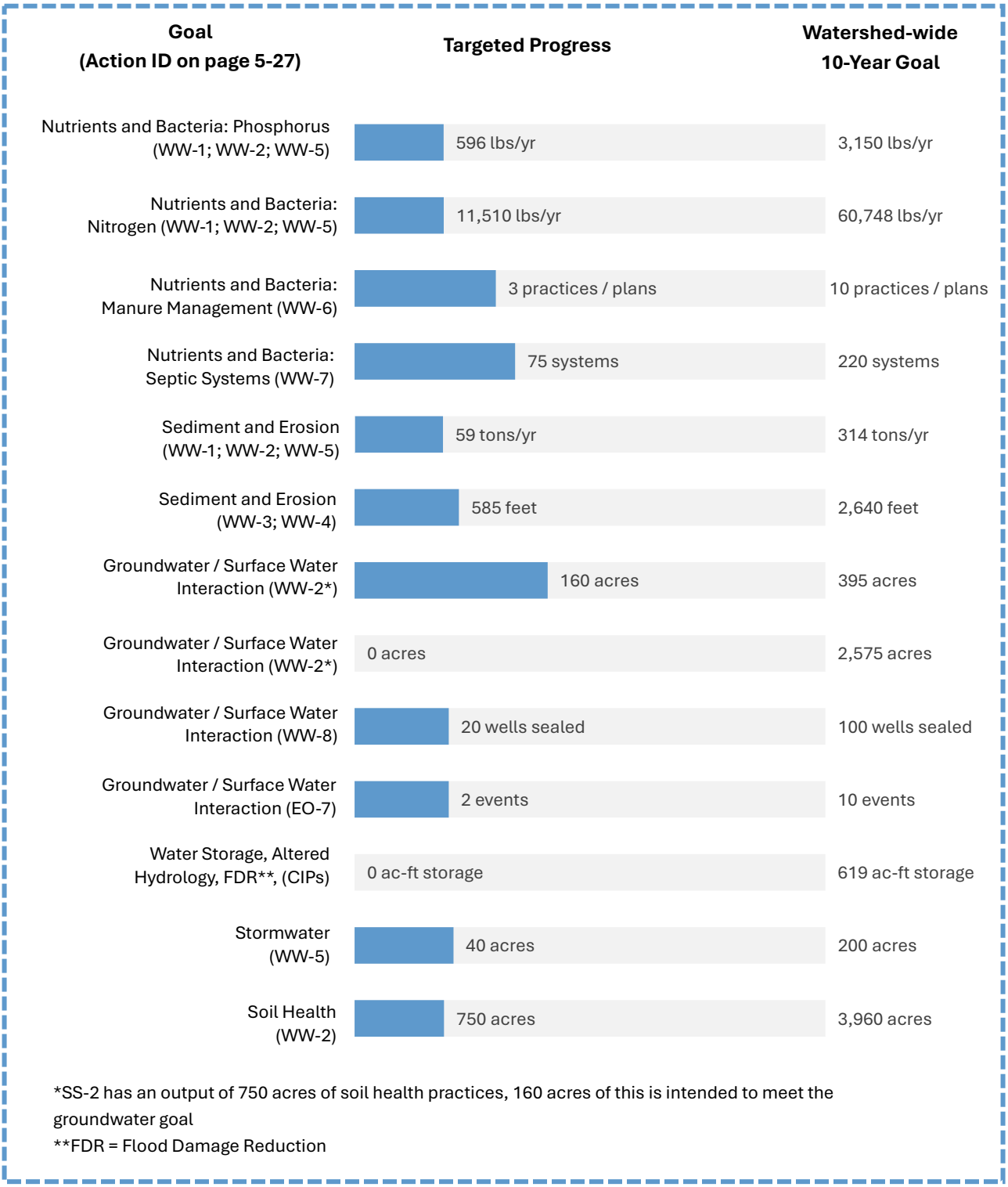
The Swan-Sevenmile Creek Implementation Region:

- Covers 25% of the watershed area
- Within Nicollet County
- Contains the city of Nicollet
- Contains Swan, Middle, Peterson, Duck, Little, Mud, Horseshoe, Oak Leaf, and Erikson Lakes
- Supports cold-water resources such as Seven-Mile Creek
- A notable 13% of this implementation region is wetlands and 6% of the land area is open water.



Swan-Sevenmile Implementation Region: Milestone Chart

The milestone chart shows where progress towards each goal in **Section 4 – Measurable Goals** will be made, along with the applicable action or actions that will accomplish the goal.



*SS-2 has an output of 750 acres of soil health practices, 160 acres of this is intended to meet the groundwater goal

**FDR = Flood Damage Reduction

Swan-Sevenmile Creek Implementation Region: Focus Areas

The Swan-Sevenmile Creek Implementation Region has a small portion within a surface water DWSMA near Nicollet. Seven Mile Creek, Swan Lake and Duck Lake are all local priority waters. There are two highly vulnerable DWSMAs near Saint Peter.

Implementation partners are encouraged to look for opportunities that impact resources and areas shown on the map, as targeting actions here will make the biggest impact on improving resources.

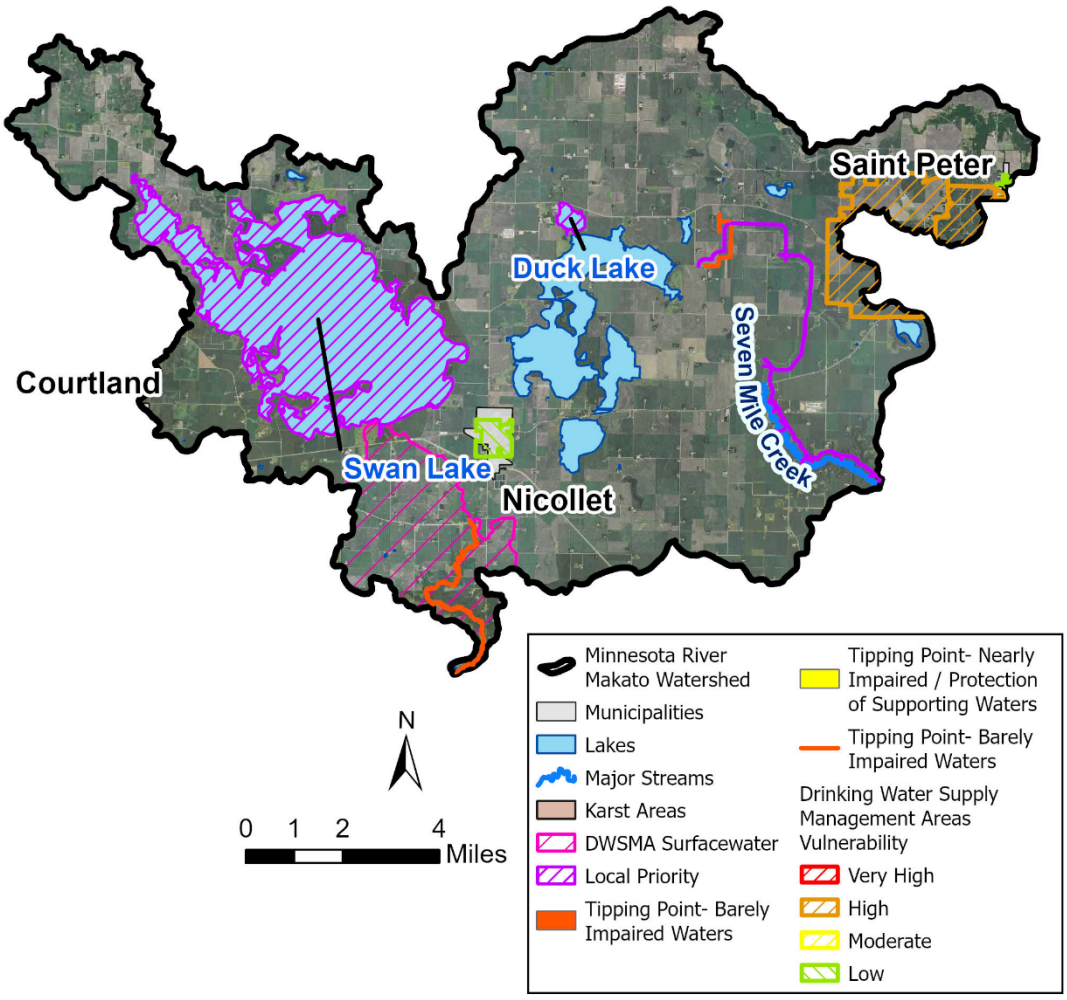


Table 5-9. Swan – Sevenmile Implementation Region Action Table

ID	Action	Focus Area	10-Year Output	Progress Towards Goals*							Responsible Entity (bold = lead)	Timeline					10-Year Local Cost	Partner / Federal Cost
				Nutrients and Bacteria	Sediment and Erosion	Groundwater / Surface Water	Water Storage, Altered Hydrology, FDR **	Stormwater	Soil Health	Invasive Species		2026-2027	2028-2029	2030-2031	2032-2033	2034-2036		
SS-1	**Multi-Benefit Agricultural BMPs** e.g. grassed waterways, WASCOBs, riparian buffers, filter strips, side water inlets, terraces, grade stabilizations, drainage water management†	Nutrients and Bacteria; Sediment and Erosion; Groundwater; and Water Storage Focus Areas	35 tons/yr sediment, 7,638 lbs/yr nitrogen, and 395 lbs/yr phosphorus reduction (750 acres treated)	●	●	●	○				**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$259,000	
SS -2	**Soil Health and Recharge Conservation Practices** e.g., cover crops, perennial crops, crop rotation, reduced tillage, winter cover, nutrient management, pasture management	Soil Health Focus Areas	750 acres treated; 21 tons/yr sediment, 3,776 lbs/yr nitrogen, and 195 lbs/yr phosphorus reduction	●	●	●	○		●		**SWCD**, NRCS, BWSR, MDA	✓	✓	✓	✓	✓	$146,250	
SS -3	**Lake Shoreline Stabilization** Stabilize or enhance shorelines of priority lakes, with a preference for natural lakeshore restorations	Priority Lakes	275 feet (0.05 mile)	○	●		○				**SWCD**, **Counties,** MNDNR	✓	✓	✓	✓	✓	$27,500	$55,000
SS -4	**Ravine or Streambank Stabilization** Vegetation enhancement and/or engineered management with a preference for native vegetation enhancement on streambanks, bluffs, ravines, and public ditches to reduce erosion	Priority Streams; Sediment and Erosion- Near Channel Focus Areas	310 feet (0.06 mile)	○	●		○				**SWCD**, **Counties**, MNDNR, Townships	✓	✓	✓	✓	✓	$62,000	
SS -5	**Urban Stormwater BMPs** e.g. raingardens, stormwater detention ponds, bioswales, green stormwater infrastructure	Stormwater Focus Areas	2 projects (equivalent of 40 acres treated); 3 tons/yr sediment, 96 lbs/yr nitrogen, and 6 lbs/yr phosphorus reduction	●	●		○	●			**SWCD, Cities**, NRCS, BWSR, MPCA				✓	✓	$44,750	
SS -6	**Manure Management** Feedlot management practices (e.g., open lot improvements, manure pit improvements, manure management plans)	Nutrients and Bacteria Focus Areas	3 practices / plans	○		○					**SWCD**, **Counties**, MPCA, NRCS, BWSR, MDA			✓	✓	✓	$22,500	
SS -7	**Septic Systems** Upgrade/replace noncompliant systems	Nutrients and Bacteria Focus Areas	75 systems addressed	○		○					**Counties**, **SWCD**, MPCA, BWSR	✓	✓	✓	✓	✓	$25,000	$1,000,000
SS -8	**Seal Unused or Abandoned Wells** Cost share to well owners	Watershed-Wide	20 wells			●					**Counties**, **SWCD**, Cities, MDH, BWSR	✓	✓	✓	✓	✓	$60,000	
SS -9	**Land Protection** Provide incentive or cost-share to enroll or re-enroll land in temporary or permanent easements such as CRP, etc. for wildlife, pollinator, water storage, and DWSMA protection.	Water Storage Focus Areas, DWSMAs	79 acres cost share / incentivized	○	○	○	○				**SWCD**, NRCS, BWSR, MNDNR	✓	✓	✓	✓	✓	$15,800	$197,500
SS -10	**Wetland Restoration** Provide incentives or cost-share for wetland restoration	Water Storage Focus Areas	5 local acres cost share/ incentivized; 40 acres by partners	○	○	○	○				**Counties, SWCD**, MNDNR, NRCS	✓	✓	✓	✓	✓	$50,000	$400,000
SS -11	**AIS Prevention and Management** County program with state aid	Invasive Species Focus Areas	Continue current program‡	○						●	**Counties, SWCD**, MNDNR	✓	✓	✓	✓	✓	Local staff time	
SS -12	**TIS Prevention and Management** EAB, buckthorn, noxious weeds, etc.	Invasive Species Focus Areas	Continue current program							●	**Counties, SWCD, MDA,** MNDNR	✓	✓	✓	✓	✓	Local staff time	
																	$712,800	**$1,652,500**

*Solid circle = direct progress towards goal. Outline = indirect progress towards goal

**FDR = Flood Damage Reduction

†Drainage water management could include water storage, two-stage ditches, rock riffles, or other practices that make projects toward plan goals

‡Contingent upon state program and/or external funding sources

Funding

The intent of this plan is to make progress towards plan goals with available baseline funding and WBIF, and assumes that these funding sources will continue. It is recognized that some actions are not feasible without partner or federal funding. The local 10-year cost is given for each action and summarized in **Table 5-10**. The expected local 10-year cost for plan implementation is $22,018,300, or about $2,202,000 annually.

Table 5-10: Implementation Funding Overview.

Program	Local 10-year Cost	Partner 10-Year Cost
Projects and Practices	$3,509,300	$7,001,500
Project Development	$2,178,000	N/A
Technical Assistance	$2,003,000	N/A
Research and Data Gaps	$560,000	N/A
Education and Outreach	$5,676,000	N/A
Local Controls	$5,273,000	N/A
Capital Improvements	$1,825,000	$8,995,000
Operations and Maintenance	$574,000	N/A
Plan Administration	$420,000	N/A
Total	**$ 22,018,300**	**$15,996,500**

The Minnesota River – Mankato Partnership anticipates a Local Implementation Funding budget of $2,090,600 annually, or $20,906,000 over the 10-year plan (for more details, see Section 7—Plan Administration and Coordination). **This means that to meet plan goals, the Partnership estimates needing an additional $111,230 per year, or $1,112,300 over the 10-year plan.**

Photo: Wetland, Le Sueur SWCD

6. Implementation Programs

6. Implementation Programs

This plan will be implemented through five implementation programs: Projects and Practices, Education and Outreach, Research and Data Gaps, Capital Improvements, and Local Controls. These programs are summarized visually below (**Figure 6-1**) and will be further discussed throughout this plan section.

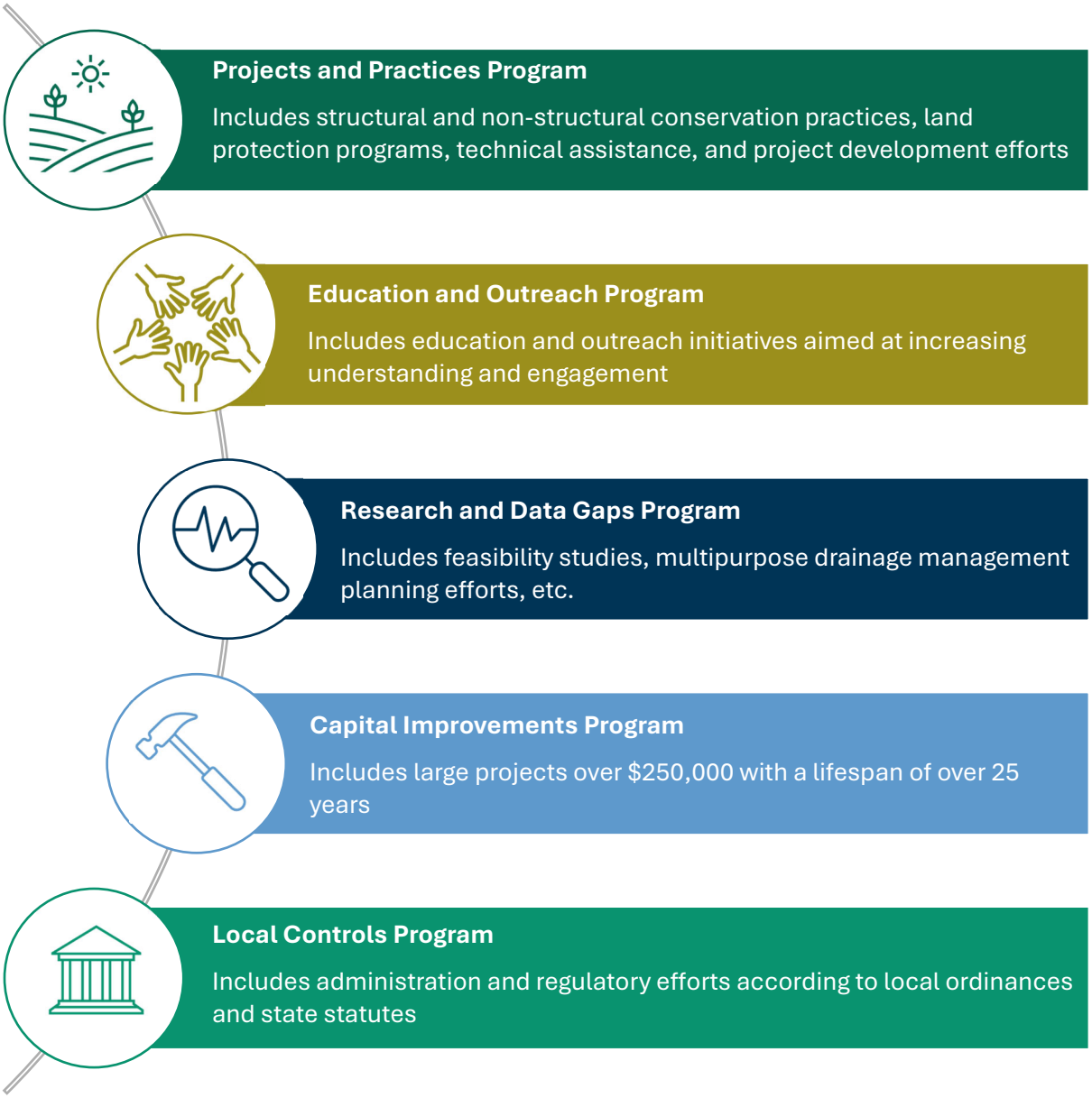


Figure 6-1: Implementation programs in the Minnesota River-Mankato Watershed.

Projects and Practices

The Projects and Practices Implementation Program deals with actions related to landscape planning, design, and implementation of conservation practices. It also funds the protection and restoration of land. The program assists landowners in implementing voluntary actions through cost share, technical assistance, tax exemption, conservation easement, incentives, or land acquisition, and is funded by local, state, and/or federal dollars.

During implementation, local planning partners will create decision-making processes, such as a ranking and scoring sheet that ranks 'best' projects based on priority location and benefits to resources. This method can then be used to select projects and practices for funding. A grant policy document will also be developed to specify funding categories and how much funding practices may receive. This will be completed in conjunction with the local Policy Committee. Funding will be preferentially given to projects and practices identified within the action tables and in priority areas. Future plan amendments may be suggested, consistent with the priority issues and goals established in this plan (more details in **Section 7 – Plan Administration and Coordination**).

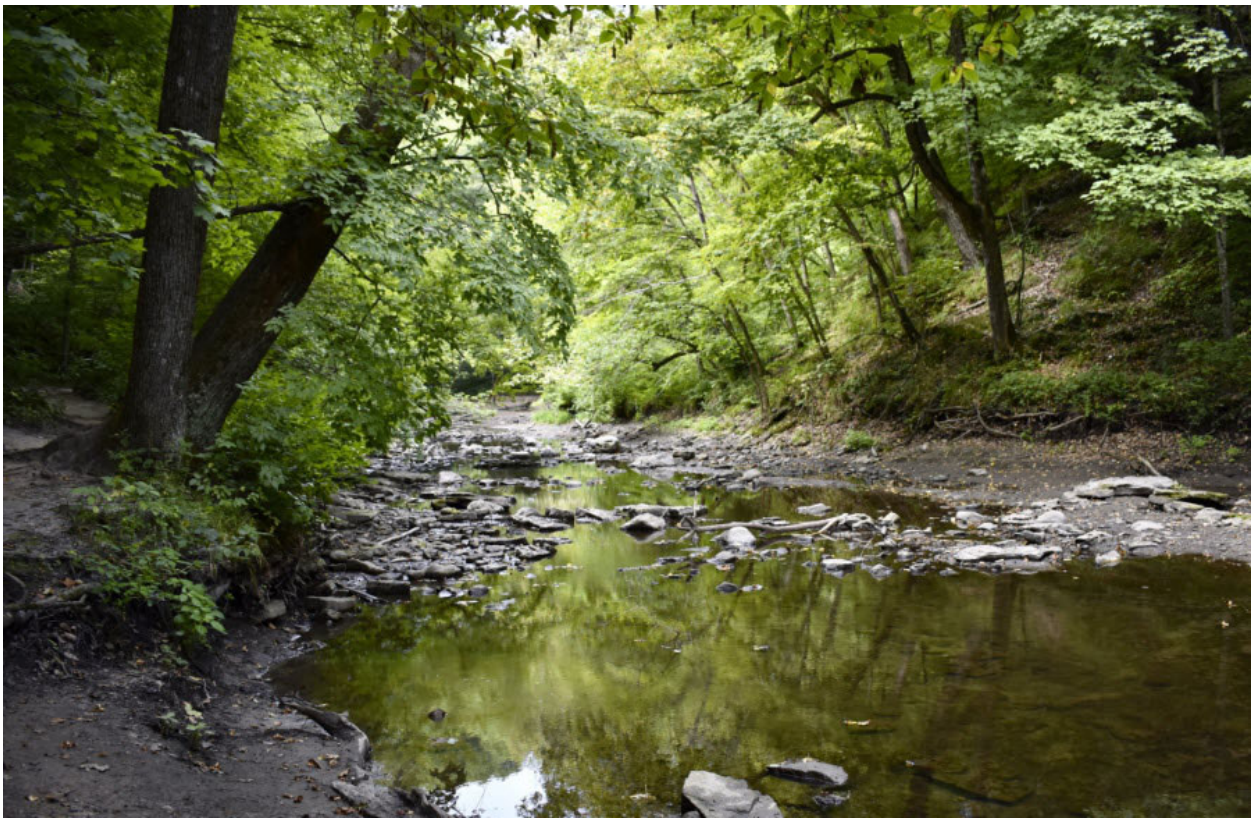


Photo: Minneopa State Park, Minnesota River Valley Scenic Byway webpage

Cost-Share Programs

Cost-share programs are available at the local, state, and federal level to financially assist landowners with the cost of installing a project or practice that achieves natural resource benefits. Projects and practices can be structural (i.e., grassed waterways, controlled drainage) or nonstructural (i.e., nutrient management, cover crops, conservation tillage).

Operations and maintenance of cost-share projects will be required, as regular on-site inspections and maintenance will ensure the project's continued function and success. Procedures and guidance in BWSR's Grants Administration Manual must be followed, including designation of a technical assistance provider with the appliable credentials for design, construction, and inspection. Lifespan and inspections schedules differ practice-to-practice. Operations and maintenance will be the responsibility of the project owner.

Land Protection

Land protection programs maintain existing acres within the watershed through temporary set-aside programs or land rental. Land protection can be temporary or permanent easements. There are many state-, federal-, partner-funded, and other perpetual easements of value in the plan area. One example of a temporary protection program is the Conservation Reserve Program (CRP).

CRP is a land conservation program administered by the Farm Service Agency (FSA). In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. Contracts for land enrolled in CRP are 10-15 years in length. Land enrolled in CRP and similar protection programs produce numerous environmental benefits including a reduction in runoff, erosion, and nutrients.

The BWSR Reinvest in Minnesota (RIM) 1W1P program provides funding for permanent land protection in CWMP priority areas. This could be an option to meet implementation action WW-9 (land protection). Applications are eligible if they protect, restore, or enhance habitat, and do one or more of the following: 1) contribute to a measurable goal, 2) be located in a priority area, and/or 3) address an issue or implementation action in a CWMP. Specific benefits and location of the projects are ranked to determine the grant award and projects will be considered for these in the planning stage. Projects implemented within priority areas and / or that address CWMP plan issues and goals make the Partnership more competitive in this grant application and others.

Drainage

As highlighted throughout this plan, public drainage systems are prevalent throughout much of the plan area. Drainage authorities help coordinate implementing the action tables to make progress towards plan goals. Based on this arrangement, drainage authorities could access implementation funds to adopt drainage actions in the action tables during 103D and 103E processes and procedures when the opportunity arises within the planning area. 103B.335 (special taxing district) also allows for these types of projects. Use of implementation funds is intended for additional drainage projects with a primary benefit of improving water quality. Requirements under 103E Drainage Law are not eligible for WBIF funds. See annual WBIF Policy for guidance on what is eligible.

Education and Outreach

The actions needed to implement this plan are voluntary and require the willing participation of landowners. As such, public participation and engagement are essential for successful implementation. The Education and Outreach Implementation Program funds actions to increase engagement and understanding, and address conservation barriers. The program builds on a foundation of engagement activities already occurring in the watershed through individual partners. This work is expected to continue during plan implementation with a focus on impacting priority resources. Examples of current education and outreach efforts in the Minnesota River-Mankato Watershed include:

Youth Engagement

- Earth Day events
- 4H camps
- Envirothon events

Landowner Engagement

- Field days
- Demonstrations
- Workshops tailored to landowners, i.e., lakeshore stabilization, drinking water testing, and soil health testing

General

- Direct mailings and social media posts
- AIS outreach

Photo: Downtown St. Peter, City of St. Peter

Research and Data Gaps

The Research and Data Gaps Program funds actions that close data gaps to allow for effective and more informed implementation. The program also funds ongoing monitoring efforts aimed at tracking resource conditions and impacts of conservation action.

Currently, a variety of monitoring programs are carried out by multiple agencies and local organizations (**Table 6-1**). Data from monitoring efforts were essential in understanding the current conditions of watershed surface water, groundwater, and habitat, and were used to develop the goals in this plan.

Table 6-1: Summary of ongoing water quality and quantity monitoring programs.
Key: **RS** = rivers and streams, **L** = lakes, **W** = wetlands, and **GW** = groundwater

Parameters	Minnesota Pollution Control Agency (MPCA)	Department of Natural Resources (MNDNR)	Minnesota Department of Health (MDH)	Minnesota Department of Agriculture (MDA)	County, Soil and Water Conservation District (SWCD)
Nutrients	**RS, L, W**	**RS, L**		**RS, GW, L**	**RS, GW, L**
Suspended Solids	**RS, L, W**	**RS**		**RS, L**	**RS**
Productivity	**RS, L**	**RS**			**L**
Pesticides				**RS, L, W, GW**	
Bacteria	**RS, L**		**GW**		**RS**
Biology	**RS, L, W**	**RS, L**		**RS, L**	
Water level/Flow	**RS, L**	**RS, L, GW**			**RS**
Algal Toxins	**L**				
Invasive Species		**RS, L**			**L**
Fish Contaminants	**RS, L**	**L**			
Chlorides	**RS, L, W**	**RS**	**RS, L, GW**		
Sulfates	**RS, L, W**	**RS, L**	**RS, L, GW**		

Source: BWSR

As summarized in Table **6-1**, ongoing surface water monitoring programs are led by local and state entities. Between the MPCA, local entities, and volunteers (through the Volunteer Lake Monitoring Program and Volunteer Stream Monitoring Program), streams and lakes throughout the watershed were monitored and findings were shared in the Minnesota River-

Mankato Watershed Restoration and Protection Strategy (WRAPS) report. Other agencies responsible for stream gauging in the watershed are MPCA, MNDNR, MDA, and the federal United States Geological Survey. Five Watershed Pollutant Load Monitoring Network sites within the watershed are benchmark monitoring sites for MPCA. Results from these networks and other ongoing tracking and monitoring programs can be used to document measurable water quality and quantity changes resulting from implementation activities (**Table 6-2**).

Examples of research and data gap actions included in this plan are:

- Completing a feasibility study for potential storage projects,
- Conducting a multi-purpose drainage management plan,
- Completing a study to identify sources of stream erosion, and
- Completing lake subwatershed assessments to protect priority lakes.

A full list of research and data gap actions is included in **Section 5 – Targeted Implementation.**

Table 6-2: Data levels used to track implementation progress.

Level	Description	Watershed Application
 Tracking	Tracking the number of practices or acres treated by actions.	Outputs are listed for actions in the action tables. Projects will be reported in eLINK.
 Estimating	Using lower resolution calculators and tools to give a sense of the collective impacts of projects.	Hydrological Simulation Program – FORTRAN (HSPF) – Scenario Application Model
 Modeling	Incorporating landscape factors and project information to predict future conditions.	HSPF
 Measuring	Using field-collected information to assess the condition of the water.	WRAPS Cycle 2 in 2024 and 2027
 Proving	Having enough data to compare with standards and decide if a resource is improved.	MPCA impaired waters list update in 2026, 2028, 2030, 2032. Implementation partner annual work planning.

Ongoing monitoring efforts also track groundwater supply quantity and quality trends. Current programs include MDA's township testing, MPCA's Ambient Groundwater Monitoring Program, MNDNR's high capacity permitting program, and the MNDNR Observation Well Network. These programs have provided valuable information but are not yet extensive enough to fully assess the state of groundwater in the region.

Participating local government units (LGUs) recognize that project funds are limited and requests for information, tracking, evaluation, and assessment are activities that require staff time and office resources, resulting in a reduction of funds available for projects. Outside of projects through watershed-based implementation funds, each LGU will be responsible for providing assessment, tracking, evaluation, and reporting data for their own organization's activities. The Research and Data Gaps Program will be collaborative (especially where efforts cross administrative boundaries), with Partnership entities sharing services wherever possible.

Photo: Red Jacket Valley, Greater Mankato webpage

Capital Improvements

A capital improvement is defined as a major non-recurring expenditure for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features. The life expectancy of these projects is generally at least 25 years. Some capital improvements are beyond the 'normal' financial means of the Partnership, often exceeding $250,000, and are unlikely to be constructed without external funding.

Proposed capital improvements are shown in **Section 5 – Targeted Implementation**. Members of the Policy Committee or the Partnership's individual and representative Boards may discuss the means and methods for funding new capital improvements with potential funding partners. Capital improvement projects (CIPs) completed through this plan will be operated and maintained by the owner of the project for its lifespan. Signage for completed projects is encouraged to acknowledge larger projects and funding sources to the public.

Photo: Crystal Lake Boat Landing, City of Lake Crystal

Operations and Maintenance

Entities within the plan area are engaged in the inspection, operation, and maintenance of CIPs, stormwater infrastructure, public works, facilities, natural and artificial watercourses, and legal drainage systems. The operation and maintenance of natural watercourses, legal drainage systems, impoundments, and small dams will continue under the regular operations and maintenance plans of the entities that have jurisdiction over these systems.


Photo: Kasota Prairie SNA, Minnesota River Valley Scenic Byway webpage

Local Controls

Some plan issues can be addressed in part through local ordinances and administration of statutory responsibilities. In many cases, local ordinances have been adopted to conform to (or exceed) the standards and requirements of the state statutes. The responsibility for implementing these programs will remain with the respective counties or appointed LGUs.

Participating counties are encouraged to meet and discuss ordinances and notify each other of proposed ordinance amendments. These entities may also review local ordinances that are most relevant to the plan's issues, goals, and actions. They will look for similarities and differences in local regulatory administration to identify local successes and identify future changes needed to make progress towards goals. A comparison of how local ordinances are used to administer statutory responsibilities most relevant to the issues, goals, and actions in this plan is provided in **Appendix B**.

Aquatic Invasive Species

The spread of Aquatic Invasive Species (AIS) can be reduced by management and education. The MNDNR oversees AIS enforcement. Counties receive grants for AIS programs and SWCDs partner with counties for AIS outreach and education programs.

Buffers

In 2015, Minnesota enacted legislation requiring buffers of perennial vegetation of an average of 50 feet with a minimum of 30 feet on public waters and 16.5 feet for public drainage systems. This program is overseen by BWSR and implemented at the county level. Each county has an ordinance for buffer management. SWCDs are responsible for compliance checks and initial landowner conversations, but BWSR, counties, or watershed districts can serve as the enforcement entity.

Construction Erosion Control

Temporary construction erosion control is the practice of preventing and/or reducing the movement of sediment from a site during construction. All construction projects should follow construction best management practices, but projects disturbing one acre or more of land will require a National Pollutant Discharge Elimination System (NPDES) Permit and Stormwater Pollution Prevention Plan from the MPCA.

Comprehensive Land Use Plans

Counties are responsible for land use planning, which is administered through local zoning ordinances. Each county and many cities have adopted comprehensive land use plans. Many LGUs in the watershed overlap in land and resource management, resulting in the need for shared goals and strategies. A sample of comprehensive land use plans in the watershed is listed in **Table 6-3**.

Table 6-3: Example list of local comprehensive land use plans.

LGU	
Blue Earth County	Blue Earth County Land Use Plan (2018)
Le Sueur County	Le Sueur County Land Use Plan (2007, Update Fall 2025)
Nicollet County	Nicollet County Comprehensive Plan (2021)

Feedlots

MPCA rules govern the collection, transportation, storage, processing, and land application of animal manure and other livestock operation wastes. Blue Earth, Le Sueur, and Nicollet Counties are delegated to administer the MPCA feedlot program.

Floodplain Management

Floodplain zoning regulations manage development in the floodplain to minimize loss of life and property, disruption to government services and the local economy, and interruption of transportation. The MNDNR has current flood maps on their website. All counties in the watershed have floodplain ordinances.

Hazard Management

Hazard mitigation may be defined as any action taken to eliminate or reduce the future risk to human life and property from natural and human-caused hazards. Climate change adaptation also plays a part in hazard management. These requirements direct the state to administer cost-sharing. Each county has a Hazard Mitigation Plan.

Public Drainage Systems

Minnesota Drainage Law (Statute 103E) enables multiple landowners to collectively construct, improve, and repair drainage systems across property boundaries and governmental boundaries. These drainage systems can be open ditches and/or subsurface tile. Drainage systems have their own laws and requirements that LGUs must uphold. These ditches are managed by the county for the benefit of the landowners. Counties maintain the public drainage systems (tile drainage and ditches) and repair failing drainage systems when necessary. Counties should follow criteria outlined in Statute §103E.015 for early consideration and coordination of multipurpose drainage management.

Shoreland Management

Minnesota has shoreland management rules that are administered by the MNDNR. LGUs are required to have land use controls that protect shorelands along lakes and rivers, and they can adopt stricter ordinances than the state government requires, if desired. Each county in the watershed has approved shoreland management ordinances.

Subsurface Sewage Treatment Systems

Each county has SSTS (subsurface sewage treatment system, or septic system) ordinances. SSTS are often noncompliant with ordinances for failing to treat waste. Maintenance and upgrades of SSTS will be important for reducing bacteria and nutrient loads. Low interest loans and low-income grants are available from counties for replacements or upgrades.

Solid Waste Management

Solid waste management in Minnesota is managed at the county level and includes programs related to mixed municipal solid waste, industrial waste, and non-landfill programs such as recycling to include paper, plastics, metal, tires, electronics, appliances, and other recyclable items. Each county in the watershed has approved solid waste management ordinances.

Wastewater

Managing wastewater is an important aspect of urban communities. There are 21 permitted facilities discharging wastewater in the Minnesota River Mankato HUC-8. Municipal wastewater treatment is the responsibility of the city or county owner, but MPCA regulates NPDES discharges from permitted facilities.

Wetland Conservation Act

The Minnesota Legislature passed the Wetland Conservation Act (WCA) in 1991, which requires no net loss of wetlands. It aims to increase the quantity and quality of wetlands that provide numerous ecological and economic benefits to Minnesotans. LGUs are responsible for administering the WCA, which includes regulating and educating landowners. The SWCD is the WCA LGU for Le Sueur County. In Blue Earth and Nicollet counties, the County is the WCA LGU.

Wellhead Protection

The purpose of the Wellhead Protection Program is to prevent contamination of public drinking water supplies by identifying water supply recharge areas and implementing management practices for potential pollution sources found within those areas. The MDH is responsible for statewide administration. The program has since expanded to conduct Source Water Assessments and Surface Water Intake Protection Plans for public water supply systems that rely on surface water as a drinking water source.

7. Plan Administration and Coordination

7. Plan Administration and Coordination

This plan will be implemented through a Joint Powers Collaborative (JPC). Entities involved in the JPC include the Counties and Soil and Water Conservation Districts (SWCDs) of Blue Earth, Le Sueur, and Nicollet, and the cities of Lake Crystal, North Mankato, Mankato, and Saint Peter.

Decision Making

Implementation will require increased capacity, funding, and coordination from current levels. Successful implementation will depend on continuing and building on partnerships in the watershed with landowners, planning partners, state agencies, and organizations.

Three committees serve this plan during implementation:

- **Policy Committee**: As established in the JPC, the Policy Committee is comprised of elected and appointed board members from the participating entities.
- **Steering Committee**: Comprised of local staff from the participating entities (with their respective alternates) and state agencies, with input from local stakeholders.
- **Advisory Committee**: Comprised of state agency and other local professionals or stakeholders, this committee will advise the Steering Committee as needed.

Figure 7-1 outlines the probable roles and functions of the Steering and Policy Committees during implementation. Expectations are that the roles of each committee will shift and change focus during implementation. Fiscal and administrative duties may be assigned to a member local government unit (LGU) through a Policy Committee decision as outlined in the formal agreement. The Steering Committee will annually revisit the responsibilities for annual work planning and serving as the fiscal agent and/ or coordinator.

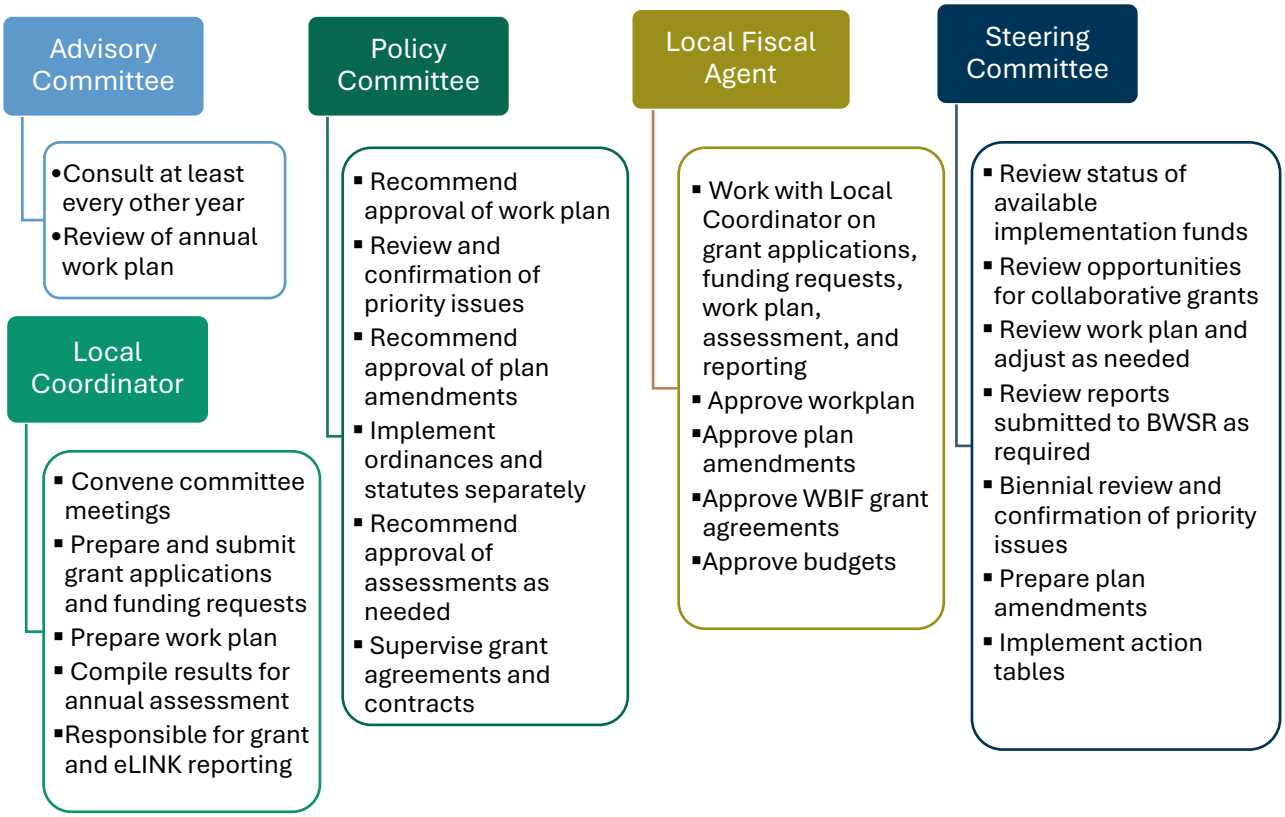


Figure 7-1: Roles for plan implementation.

Collaboration

Between Planning Partners

Although collaboration informally and formally is encouraged, mandatory participation is not required by this plan. LGUs who adopt this Comprehensive Watershed Management Plan (CWMP) can choose whether to approve or participate in future formal implementation agreements. The benefits of successful collaboration between planning partners will ultimately result in additional water quality benefits, including consistent implementation of actions watershed-wide, increased likelihood of funding, and resource efficiencies gained. The Partnership will pursue opportunities for collaboration with fellow planning partners to gain administrative and program efficiencies, pursue collaborative grants, and provide technical assistance. The Partnership will also review similarities and differences in local regulatory administration to identify successes as well as future changes needed to make progress towards the goals outlined in this plan. However, there are costs associated with collaboration — for example, increased meeting and travel time; increased tracking, assessment, evaluation, and reporting requirements; a decrease of efficiency when actions must be coordinated in concert with 10 separately governed organizations, and possible increases to project completion timelines.

With Other Units of Government

The Partnership will continue coordination and cooperation with other governmental units. This cooperation and coordination occurs both at the local level and at the state/federal level. At the state/federal level, coordination between the Partnership and agencies such as the Board of Water and Soil Resources (BWSR), US Army Corps of Engineers, Department of Natural Resources (MNDNR), Minnesota Department of Health (MDH), Minnesota Department of Agriculture (MDA), and the Minnesota Pollution Control Agency (MPCA) are mandated through legislative and permit requirements. Local coordination between the Partnership and comparable units of government, such as municipalities, city councils, township boards, and county boards are a practical necessity to facilitate watershed-wide activities. Intergovernmental coordination and communication are essential for the Partnership to perform its required functions. The Partnership will continue to foster an environment that enhances coordination and cooperation to the maximum extent possible throughout plan implementation.

With Others

Plan partners expect to continue and build on existing collaboration with others, including non-governmental organizations, while implementing this plan. Many of these existing collaborations are aimed to increase habitat and recreational opportunities within the plan area, while providing education and outreach opportunities.

Photo: Minnesota River, City of Mankato

Funding

As introduced previously, this plan recognizes and includes three funding levels (**Table 7-1**). Baseline funding is based on the estimated annual revenue and expenditures for plan participants combined and allocated to the plan area based on the percentage of each county's land area in the watershed. Baseline includes local and state funding and is broken down in **Table 7-2**. Federal sources of funding from Natural Resource Conservation Service (NRCS) like Environmental Quality Incentives Program (EQIP) and Conservation Resource Program (CRP) are not included in baseline funding estimates.

Table 7-1: Funding overview.

Type	Estimated Annual Average	Estimated 10-Year Total
Baseline	$1,704,300	$17,043,000
Local Implementation Funding (inclusive of baseline)	$2,090,600	$20,906,000
Partner / Federal Funding	$1,599,650	$15,996,500

Table 7-2: Estimated sources of baseline funding for the Minnesota River-Mankato Watershed. Amounts are for 10 years and are estimated from the historical amounts.

Implementation Program	Local	State	Total
Projects and Practices	$2,312,000	$1,579,000	$3,891,000
Research and Data Gaps	$0	$84,000	$84,000
Education and Outreach	$0	$5,571,000	$5,571,000
Local Controls	$3,326,000	$1,947,000	$5,273,000
Capital Improvements	$1,650,000	$0	$1,650,000
Operations and Maintenance	$574,000	$0	$574,000
Total	**$7,862,000**	**$9,181,000**	**$17,043,000**

Partner and federal funding will be needed to close the gap between available Local Implementation Funding ($20,906,000; Table 7-1) and total local 10-year cost of implementing the plan ($22,018,300; see Table 5-10).

Local Funding

Local revenue is defined as money derived from either the local property tax base or in-kind services of any personnel funded from the local tax base. Examples include local levy, county allocations, and local match dollars (see Local Funding Authorities in **Appendix I**).

Local funds will be used for locally focused programs where opportunities for state and federal funding are lacking because of misalignment of a program's purpose with state or federal objectives. These funds will also be used for matching grants.

Photo: Native plant, Le Sueur SWCD

State Funding

State funding includes all funds derived from the State tax base. Examples of state funding include conservation delivery, soil health cost share, Conservation Contracts, Competitive Clean Water Fund Grants, and SWCD Aid. Watershed-Based Implementation Funding (WBIF) is also anticipated to be a large source of state funding during implementation.

The planning Partnership may apply as an entity for collaborative grants, which may be competitive or non-competitive. The assumption is that future base support for implementation will be provided to the watershed as formula-based WBIF grants. Where the purpose of an implementation program aligns with the objectives of various state, local, non-profit, or private programs, these dollars will be used to help fund the implementation programs described by this plan.

Federal Funding

Federal funding includes all funds derived from the Federal tax base. Federal funding like EQIP and CRP are important components of implementing this plan, but are not calculated as part of the baseline estimate. Partnerships with federal agencies are an important resource for ensuring implementation success. An opportunity may exist to leverage state dollars through some form of federal program. Where the purpose of an implementation program aligns with the objectives of various federal agencies, federal dollars will be used to help fund the implementation programs described by this plan. For example, the NRCS will likely provide support for agricultural conservation practices, while the Farm Service Agency (FSA) may provide land-retirement program funds such as CRP.

Additional Funding

The Local Implementation Funding budget is not enough to implement the action tables. As such, the success of implementing the plan will depend on collaboratively sought competitive state, federal, and private grant dollars, and increased capacity to implement the plan.

Plan participants may pursue grant opportunities collaboratively or individually to fund implementation. Implementation partners will pursue grants in collaboration with other LGUs and/or state agencies where possible to make grant applications more competitive. **Section 5** action tables are organized by implementation program. **Table 7-3** shows the state and federal grants that can be applied for under each program. Cross-referencing the **Section 5** action tables to the applicable grants that fall under that program (either Projects and Practices, CIPs, Research and Data Gaps, or Education and Outreach) is a useful tool for potential implementation revenue.

Several non-governmental funding sources may also provide technical assistance and fiscal resources to implement the plan. Private sector companies, including those specifically engaged in agribusiness, are often overlooked as a potential source of funding for implementation. Some agribusiness companies are providing technical or financial implementation support because they are interested in agricultural sustainability and carbon market benefits. This plan could be used to explore whether the resource benefits arising from implementation have monetary value and therefore provide access to funding from the private sector.

Table 7-3: Example funding sources for the watershed. Note: List is not all-inclusive.

Program / Grant		Primary Assistance	Projects and Practices	CIPs	Research and Data Gaps	Ed. and Outreach
Federal Programs / Grants						
NRCS	Conservation Innovation Grant	Financial	•			
	Conservation Stewardship Program	Financial	•			
	Regional Conservation Partnership Program	Financial	•	•		
	EQIP	Financial	•			
	Agricultural Conservation Easement Program	Easement	•			
FSA	CRP	Easement	•	•		
	Farmable Wetlands Program	Easement	•			
	Grasslands Reserve Program	Easement	•			
	Wetland Reserve Program	Easement	•	•		

Program / Grant		Primary Assistance	Projects and Practices	CIPs	Research and Data Gaps	Ed. and Outreach
FSA/ USDA	Source Water Protection Program	Technical				•
USFWS	Partners for Fish and Wildlife Program	Financial/ Technical	•			
	Grassland Easements (Working Lands)	Financial/ Technical	•			
	Wetland Easements (Working Lands)	Financial/ Technical	•			
FEMA	Hazard Mitigation Grant Program	Financial	•	•	•	
	Pre-Disaster Mitigation	Financial	•	•		
	Flood Mitigation Assistance	Financial	•	•		
	Risk Mapping, Assessment, and Planning	Technical	•	•		
EPA	Water Pollution Control Program Grants (Section 106)	Financial				•
	State Revolving Fund	Loan	•			
	Drinking Water State Revolving Fund	Loan	•			
	Section 319 Grant Program	Financial	•		•	•
NACD	Technical Assistance Grants	Financial/ Technical	•	•	•	•
State Programs / Grants						
LSOHF	Lessard-Sams Outdoor Heritage Fund (LSOHF)	Financial	•	•	•	•
MNDNR	Aquatic Invasive Species Control Grant Program	Financial/ Technical	•			•
	Conservation Partners Legacy Grant Program	Financial	•	•		
	Pheasant Habitat Improvement Program	Financial	•			
	Flood Hazard Mitigation Grant Assistance	Financial	•	•	•	•
	Forest Stewardship Program	Technical	•			
	Aquatic Management Area Program	Acquisitions	•			
	Wetland Tax Exemption Program	Financial	•			
BWSR	Clean Water Fund Competitive Grants	Financial	•	•		•
	Erosion Control and Water Management Program	Financial	•			
	SWCD Aid	Financial	•		•	•
	Natural Resources Block Grant	Financial	•			•
	Reinvest in Minnesota (RIM)	Financial	•	•		•
	WBIF	Financial	•		•	•
MPCA	Surface Water Assessment Grants	Financial			•	•
	Clean Water Partnership	Loan	•	•		

Program / Grant		Primary Assistance	Projects and Practices	CIPs	Research and Data Gaps	Ed. and Outreach
	WRAPS Clean Water Fund	Technical			•	•
MDH	Source Water Protection Grant Program	Financial	•	•	•	•
	Public and Private Well Sealing Grant Program	Financial	•		•	
MDA	Agriculture Best Management Practices Loan Program	Financial	•			
	Minnesota Agricultural Water Quality Certification Program	Financial / Technical	•			•
	Nutrient Management Initiative	Financial	•			
	Soil Health Financial Assistance Program Grant	Financial	•			
Other Funding Sources						
Pheasants Forever		Financial/ Technical	•	•	•	•
Ducks Unlimited		Financial/ Technical	•	•	•	•
The Nature Conservancy		Financial	•	•	•	•
Minnesota Land Trust		Financial	•	•	•	•

Photo: Minnesota River, MNDNR

Plan participants may pursue grant opportunities collaboratively or individually to fund the action table's implementation. Four example collaborative partner grant opportunities (relevant as of 2024) are presented on the following page and are intended to demonstrate how plan goals and actions can connect to these opportunities.

Watershed Based Implementation Funding Grant

BWSR has formula-based WBIF grant funds available upon implementation of this CWMP. WBIF is estimated at $350,000 per year at the time of plan writing.

- WBIF will be used to fund actions within each goal.

WBIF is anticipated to be a large source of state funding during implementation, however, WBIF alone will not be adequate to implement all actions in this plan.

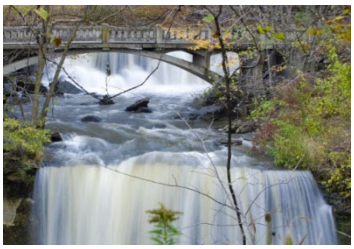
Soil Health Grants

BWSR has Clean Water Fund and delivery grants to support soil health practices for SCWDs, municipalities and counties.

- Directly connects to the "Sediment and Erosion" and "Soil Health" goals and actions.

Water Quality and Storage Grants

The Water Quality and Storage Grant Program is a pilot program through BWSR, through which municipalities, SWCDs, or joint powers with a water management plan may receive funding for water storage projects.



- Directly connects to "Water Storage, Altered Hydrology, and Flood Damage Reduction" goal and actions.

Climate Resiliency

MPCA has climate-planning grants for communities to improve stormwater or wastewater system resilience, reduce flood risk, and adapt community services, ordinances, or spaces.

- Directly connects to “Water Storage” and “Stormwater” goal and actions.

RIM Integrating Clean Water and Habitat (1W1P)

BWSR expanded the RIM conservation easement program to create a subset of the program that specifically is for easements that contribute to One Watershed, One Plan (1W1P) plan goals.

- Directly connects to land protection actions.

Work Planning

Local Funding

Work planning is envisioned to align priority issues, funds, and roles and responsibilities for implementation. A work plan will be developed by the fiscal agent and/or coordinator based on the action tables. The work plan will be reviewed by the Steering Committee (and the Advisory Committee will receive an offer to review) annually and adjusted to align with grant requests and changes identified through self-assessments. In addition, new issues may emerge and/or new monitoring data, models, or research may become available. The work plan will then be presented as needed to the Policy Committee. The intent of these work plans will be to maintain collaborative progress toward completing the action tables.

State Funding Request

The Steering Committee will collaboratively develop, review, and submit a WBIF funding request to BWSR. This request will be submitted to and ultimately approved by the Policy Committee before submitting it to BWSR. The request will be developed based on information in the action tables and any adjustments made through self-assessments.

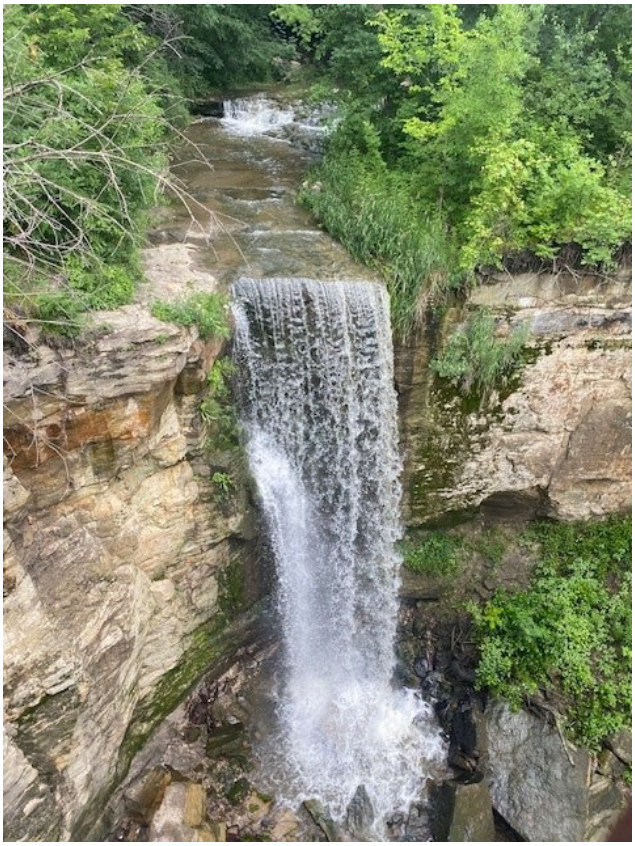


Photo: Minnemishinona Falls; Credit: Jill Sackett Eberhart

Assessments

The Steering Committee will provide the Policy Committee with an annual update on the progress of the plan's implementation. During this annual review process, feedback will be solicited from the boards and Policy Committee. This feedback will be presented by the fiscal agent and/or coordinator to the Policy Committee to set the coming year's priorities for achieving the plan's goals and to decide on the direction for collaborative grant submittals. In addition, this feedback will be documented and incorporated into annual and five-year evaluations.

Mid-Point Evaluation

This plan has a 10-year life cycle beginning in 2026. To meet statutory requirements, this plan will be updated and/or revised every 10 years. Over the course of the plan life cycle, progress towards reaching goals and completing the implementation schedule may vary. In addition, new issues may emerge and/or new monitoring data, models, or research may become available. As such, at every midpoint of a plan life cycle, an evaluation will be done to determine if the current course of action is sufficient to reach the goals of the plan or if a change is necessary.

Reporting

LGUs currently have a variety of reporting requirements related to their activities, programs, and grants or have those that are required by statute. A number of these reporting requirements will remain the LGUs' responsibility. However, reporting related to grants and programs developed collaboratively and administered under this plan (including WBIF) will be reported by the fiscal agent and/or coordinator. The fiscal agent and/or coordinator is responsible for submitting all required reports and completing annual reporting requirements for this plan as required by state law and policy.

Plan Amendments

The CWMP is effective through 2036 per the BWSR order approving it. Activities described in this plan are voluntary, not prescriptive, and are meant to allow flexibility in implementation. Amendments to this CWMP will follow the most current BWSR 1W1P Operating Procedures. This provision for flexibility includes changes to the activities.

During the time this plan is in effect, it is likely that new data giving a better understanding of watershed issues and solutions will be generated. Administrative authorities, state policies, and resource concerns may also change. New information, significant changes to the projects, programs, or funding in the plan, or the potential impact of emerging concerns and issues may require activities to be added to the plan. Amendments may be proposed by member LGUs. If revisions are required or requested, the plan amendment initiation process will follow Joint Powers Collaborative bylaws.

Photo: Minneopa State Park, Minnesota River Valley Scenic Byway webpage

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