



Watonwan River  
Comprehensive  
Watershed  
Management  
Plan



# Watonwan Comprehensive Watershed Management Plan

Prepared for the Watonwan River  
Planning Partnership by  
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## GLOSSARY

*Many of the definitions below were adapted from the Cannon River Comprehensive Watershed Management Plan developed through the Minnesota Board of Soil and Water Resource's One Watershed, One Plan program (2020; available online at: <http://www.dakotaswcd.org/lw1p.html>).*

**Alternative Management Tools** – The Minnesota Department of Agriculture has developed a list of example activities that can be used by farmers in areas that are vulnerable to nitrate contamination to reduce nitrate leaching into groundwater. The information can be accessed online (<https://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan/nitrogenmgmt/amts>)

**Aquifer** – A body of permeable rock that can contain or transmit groundwater.

**Baseflow** – Sustained flow of a stream in the absence of direct runoff. Natural base flow is sustained largely by groundwater discharges.

**Best Management Practice** – Structural and non-structural practices and methods that can be used in both agricultural and urban settings that decrease runoff, erosion, and pollutants and improve water quality, soil health, and land use activities.

**Calcareous Fen** – A rare and distinctive wetland characterized by a substrate of non-acidic peat and dependent on a constant supply of cold, oxygen-poor groundwater rich in calcium and magnesium bicarbonates.

**Contaminants** – Substances that, when accidentally or deliberately introduced into the environment, may have the potential to harm living organisms, including people, wildlife and plants.

**Dissolved Oxygen** – The level of free, non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water.

**Drainage Authority** – The board or joint county drainage authority having jurisdiction over a drainage system or project (Minn. Stat. § 103E.005, Subd. 9). Pursuant to Minn. Stat. § 103D.625, the managers of a watershed district established pursuant to Minn. Stat. 103D shall take over a joint county or county drainage system within the watershed district and the right to maintain and repair the drainage system if directed by a joint county drainage authority or a county board.

**E. coli** – *Escherichia coli* (abbreviated as *E. coli*) is a fecal coliform bacteria that comes from human and animal waste. The Environmental Protection Agency (EPA) uses *E. coli* measurements to determine whether fresh water is safe for recreation.

**eLINK** – Web-based conservation and grants tracking system hosted by the Board of Water and Soil Resources.

**Flooding** – The Federal Emergency Management Agency defines a flood as a general and temporary condition where two or more acres of normally dry land or two or more properties are inundated by water or mudflow (Federal Emergency Management Agency, 2016).

**Geomorphology** – The study of the processes responsible for the shape and form, or morphology, of watercourses; describes the processes whereby sediment (e.g., silt, sand, gravel) and water are transported from the headwaters of a watershed to its mouth.

**Groundwater** – Water located below ground in the spaces present in soil and bedrock.

**Groundwater Recharge** – Water infiltrating through the ground surface to become groundwater.

Hydrology – The movement of water. Often used in reference to water movement as runoff over the soil after a rainfall event as it contributes to surface water bodies.

Hydrologic & Hydraulic Model – A continuous simulation computer model that predicts natural (hydrologic) and artificial (hydraulic) flow paths, volumes, and rates in a defined area of land.

Impervious Surfaces – Surfaces that severely restrict the movement of water through the surface of the earth and into the soil below. Impervious surface typically refers to man-made surfaces such as non-porous asphalt or concrete roadways, buildings, and heavily compacted soils.

Index of Biotic Integrity (IBI) – The IBI is a biological assessment tool that provides a framework for translating biological community data into information regarding ecological integrity (“the capability of supporting and maintaining a balanced, integrated, functional organization comparable to that of the natural habitat of the region”, Frey 1977). It utilizes a variety of attributes (“metrics”) of the biological community, each of which responds in a predictable way to anthropogenic disturbance. The metrics are based on ecological traits of the organisms present at a given site, represent different aspects of ecological structure and function, and are scored numerically to quantify the deviation of the site from least-disturbed conditions. When the individual metric scores are summed together, the composite IBI score characterizes biological integrity (Karr et al 1986).

Infiltration – A process by which water in the ground surface enters the soil.

Invasive Species – Organisms not endemic to a geographic location they often displace native species and have the potential to cause environmental change.

Low-Impact Development – A stormwater management strategy that seeks to mitigate the impacts of increased urban runoff and stormwater pollution by managing it as close to its source as possible. It comprises a set of site design approaches and small-scale stormwater management practices that promote the use of natural systems for infiltration and evapotranspiration, and rainwater harvesting.

Macroinvertebrate – Organisms without backbones, which are visible to the naked eye without the aid of a microscope. Aquatic macroinvertebrates live on, under, and around rocks and sediment on the bottom of lakes, rivers and streams.

Measurable Goal – A statement of intended accomplishment for each priority issue. Goals are meant to be simply stated and achievable, can be quantitative or qualitative, long or short-term, and are meant to be measurable through the implementation of actions to attain a desired outcome.

Multipurpose Drainage Management – the use of various practices and designs to achieve multiple water management purposes (e.g. improve water quality and aquatic habitat) and goals, including drainage

Nitrate – A negatively charged compound (NO<sub>3</sub><sup>-</sup>) that is water soluble, available for plant uptake, and a product of both organic matter and synthetic fertilizer.

Pathogens – a bacterium, virus, or other microorganism that can cause disease.

Peak flows – Term typically used to define the characteristic high flow period of a stream or river.

Pollutant – Any substance, as in chemicals or waste products, that renders the air, soil, water, or other natural resource harmful or unsuitable for a specific purpose.

Priority Issue – Issues categorized, through the prioritization process (Section 4), as Priority Tier 1 issues. Priority issues will be the focus of this comprehensive plan.

Public Drainage Systems – A system of ditch or tile, or both, to drain property, including laterals, improvements, and improvements of outlets, established and constructed by a drainage authority. "Drainage system" includes the improvement of a natural waterway used in the construction of a drainage system and any part of a flood control plan proposed by the United States or its agencies in the drainage system (Minn. Stat. § 103E.005, Subd. 12.).

Public Water Suppliers – Entities that provide water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year.

Radionuclides – An atom that has excess nuclear energy, making it unstable.

Resource Category – A resource category, or "resource" is defined as a natural, economic, educational, biotic, aesthetic, land, or similar asset. Resources are generally considered something that can be managed, and are generally broad, such as surface water, groundwater, or education and outreach.

Resource Concern – A resource concern, or "concern" is defined as a physical, biological, chemical, geological or social subset or component of a resource. For example, the resource "surface water" can be further refined into several components, including streams and rivers, lakes, and wetlands.

Resource Issue – A resource issue, or "issue" affecting a concern is defined as a factor, stressor, or difficulty resulting in an adverse consequence for a concern. A concern can have one or many issues. For instance, nitrate-nitrogen causing the contamination of drinking water supply could be an issue (e.g. nitrate-nitrogen) affecting a concern (e.g. drinking water supplies).

Riparian – A vegetated ecosystem alongside a waterbody; characteristically have a high-water table and are subject to periodic flooding.

Runoff – Water from rain, snow melt, or irrigation that flows over the land surface.

Safe Drinking Water Act (SDWA) – The federal law that protects public drinking water supplies throughout the nation. Under the SDWA, EPA sets standards for drinking water quality and, with its partners, implements various technical and financial programs to ensure drinking water safety.

Soil Health – as defined by the Natural Resource Conservation Service, also referred to as soil quality, is the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans.

Stream Channel – A natural waterway, formed by fluvial processes, that conveys running water.

Stream Connectivity – The term used to define the longitudinal connection a stream has along its length and the lateral connection a stream has with its floodplain and adjacent uplands.

Total Maximum Daily Load – The total amount of a pollutant or nutrient that a water body can receive and still meet state water quality standards. Total maximum daily load also refers to the process of allocating pollutant loadings among point and nonpoint sources.

Total Phosphorus – A measure of the amount of all phosphorus found in a water column, including particulate, dissolved, organic and inorganic forms.

Total Suspended Solids - A measure of the amount of particulate material in suspension in a water column.

Turbidity - The cloudiness of the water that is caused by large numbers of individual particles that are generally invisible to the naked eye.

Wellhead Protection Plan - A plan developed to prevent contaminants from entering wells.

## Watowan Watershed Comprehensive Water Management Plan Acronyms

1W1P – One Watershed, One Plan

ACOE – Army Corps of Engineers

AIS – Aquatic Invasive Species

AUID – Assessment Unit Identification Number

BMP – Best Management Practice

BWSR – Board of Water and Soil Resources

DWSMA – Drinking Water Supply Management Area

EPA – Environmental Protection Agency

EQIP – Environmental Quality Incentives Program

FEMA – Federal Emergency Management Agency

GRAPS – Groundwater Restoration and Protection Strategies

HSPF – Hydrologic Simulation Program--Fortran

HUC – Hydrologic Unit Code

LGU – Local Government Unit

MDA – Minnesota Department of Agriculture

MDH – Minnesota Department of Health

DNR – Minnesota Department of Natural Resources

MnDOT Minnesota Department of Transportation

MPCA – Minnesota Pollution Control Agency

NGO – Non-Governmental Organization

NRCS – Natural Resources Conservation Service

NOAA – National Oceanic and Atmospheric Administration

PF – Pheasants Forever

PTMApp – Prioritize, Target, Measure Application

SNA – Scientific and Natural Areas

SOM – Soil Organic Matter

SSTS – Subsurface Sewage Treatment Systems

SWCD – Soil and Water Conservation District

TMDL – Total Maximum Daily Load

TNC – The Nature Conservancy

TN – Total Nitrogen

TP – Total Phosphorus

TSS – Total Suspended Solids

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

WASCOB – Water and Sediment Control Basin

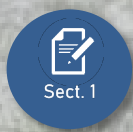
WPA – Wellhead Protection Area

WRCWMP – Watonwan River Comprehensive Water Management Plan

WRW – Watonwan River Watershed

WWPP – Watonwan Watershed Planning Partnership





# I. Executive Summary

## SECTION 1.0 EXECUTIVE SUMMARY

### 1.1 Watowan Watershed Background

The Watowan River Comprehensive Watershed Management Plan (WRCWMP), developed through the One Watershed, One Plan (1W1P) program represents an evolution from traditional, county-based water planning to watershed-based planning. The 1W1P program is a statewide effort which combines local entities that would otherwise have separate local plans into one combined planning effort to address resource issues considered most important during the planning process. In the Watowan River Watershed (WRW), this brings six counties and six soil and water conservation districts (SWCD) together to develop one cohesive, comprehensive, and implementation-focused water planning document.

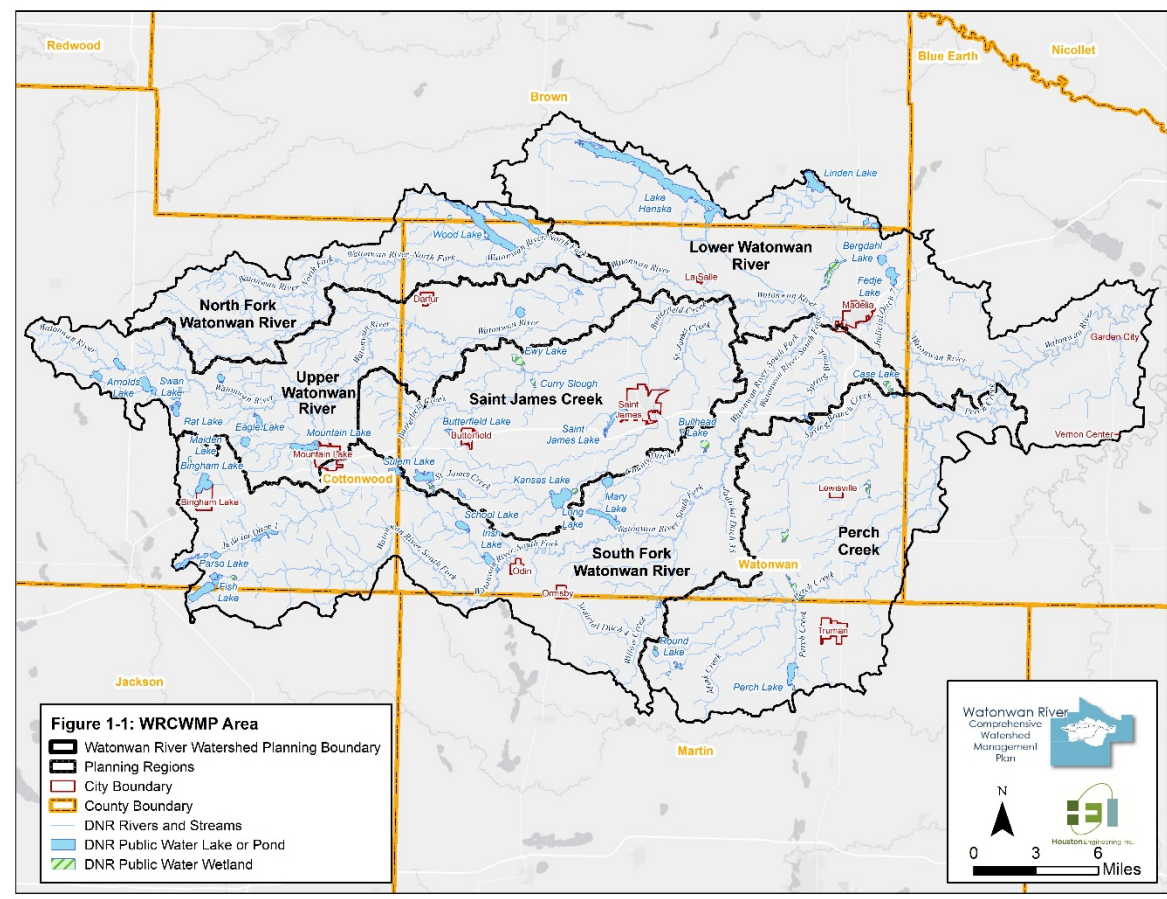
The WRW 1W1P process is intended to result in a more unified, effective, and science-based approach to address resources that are most important locally. The information contained within this plan came from a compilation of existing local water management plans, studies, reports, models, scientific data, and state strategy documents. This comprehensive plan addresses more than just surface water management (rivers, streams, lakes, and agricultural drainage systems), but also considers land stewardship (urban, rural, and riparian/shoreland stewardship), groundwater, and local knowledge base and public awareness. There are a wide variety of actions included in the plan's targeted implementation schedule, aimed to protect and improve these resources and make progress towards stated goals.

The WRCWMP area is located in south central Minnesota and covers 873 square miles. The plan area is within Blue Earth (11%), Brown (6%), Cottonwood (23%), Jackson (1%), Martin (9%), and Watowan (50%) counties (Table 1-1) (Figure 1-1).

**Table 1-1: Counties comprising the WRCWMP area.**

County	Square Miles	Acreage	Percentage of Plan Area
Blue Earth	92	58,882	11%
Brown	55	35,272	6%
Cottonwood	197	126,230	23%
Jackson	10	6,218	1%
Martin	81	52,016	9%
Watowan	438	280,346	50%

**Figure 1-1: Watowan River Watershed and HUC 10 planning regions.**

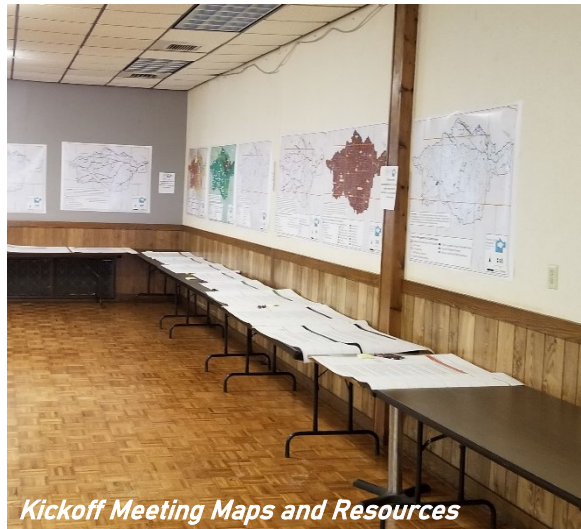


The Watowan Watershed Planning Partnership (WWPP) includes all local planning partners primarily involved in developing the WRCWMP. The WWPP developed through a Memorandum of Agreement (MOA) (Appendix A) adopted by the governing boards of the participating entities:

- ✈ The counties of Blue Earth, Brown, Cottonwood, Jackson, Martin, and Watowan through their respective County Board of Commissioners; and
- ✈ The SWCDs of Blue Earth, Brown, Cottonwood, Jackson, Martin, and Watowan through their respective SWCD Board of Supervisors.

The plan area is comprised of six planning regions. These planning regions mirror the United States Geological Survey (USGS) Hydrologic Unit Code (HUC) 10 watershed boundaries. Planning regions boundaries allow the WWPP to account for differences in the types of issues, measurable goals, and implementation actions that are needed across the entire Watershed.

## 1.2 Prioritization of Issues



*Kickoff Meeting Maps and Resources*

As described by the Minnesota Board of Board of Water and Soil Resources (BWSR) 1W1P policy, this plan is not expected to address all identified issues during its ten-year lifespan. This plan does not “reject” any identified issues, but rather places issues into a prioritization structure based on importance or impact to resources in the watershed.

Priority tiers are used to guide creation of measurable goals aimed at addressing priority issues (Section 5), and the timeline and aggressiveness of implementation within the targeted implementation schedule (Section 6).

During plan development, participants followed a thorough and rigorous process to prioritize issues within Tables 1-2 and 1-3. Issues were prioritized by soliciting stakeholder and public input on which issues were most important to them based on how they interact with


resources in the watershed and through input from local subject matter experts. To begin the prioritization process, a public kickoff meeting was hosted by members of the WWPP on January 28, 2019 at the St. James American Legion. Approximately 100 people attended the kickoff meeting.





Watershed issues identified as Tier 1 were determined to be plan priorities and will be assigned a measurable goal and will be considered the focus for initial 10-year implementation efforts. Tier 2 issues were not designated as a priority, measurable goals were not established for these issues, and actions were not included in the targeted implementation schedule to directly address these issues.

### Tier 1 Priority Issues

Priority issues indicate the highest expressed preference during the issue prioritization process and were confirmed as the highest priority by the Policy Committee (Table 1-2). Each of these issues will have a measurable goal established to address it.

**Table 1-2: Tier 1 Priority issues**

Resource Concern	Issue Number	Priority Issue Statement
 <b>Surface Water</b>		
Agricultural Drainage Systems	SW.1.1	Level of Multipurpose Drainage Management utility to reduce downstream peak flows and flooding, reduce erosion and sedimentation, and protect or improve water quality.
	SW.1.2	Lack of conservation practices on drainage systems.
Lakes	SW.2.1	Elevated nutrients and sediment in lakes.
	SW.2.2	Management of lake levels and associated watershed flow conveyance.
Rivers and Streams	SW.3.1	Elevated nutrients and sediment in rivers and streams.
	SW.3.2	Elevated bacteria levels in rivers and streams.
	SW.3.3	Loss of lateral and longitudinal floodplain access and connectivity.




	SW.3.4	Streambank, ravine, and bluff erosion.
Wetlands	SW.4.1	Loss of wetland functions in watershed.
Surface Runoff and Flooding	SW.5.1	Land use changes leading to loss of vegetative cover and field residue.
	SW.5.2	Land use changes leading to the loss of natural storage.
	SW.5.3	Level of watershed and community resilience to extreme weather events.
 <b>Groundwater</b>		
Groundwater Quality	GW.1.1	Elevated levels of nitrates in groundwater.
	GW.1.2	Contaminants in groundwater.
Groundwater Quantity	GW.2.1	Groundwater use and loss of recharge.
 <b>Habitat and Recreation</b>		
Aquatic Habitat	HR.1.1	Aquatic and riparian habitat loss from development and flow variability.
	HR.1.2	Aquatic habitat loss from bank erosion and channel instability in creeks, streams, and rivers.
	HR.1.3	Aquatic invasive and nuisance species and their impacts.
Terrestrial Habitat	HR.2.1	Terrestrial habitat fragmentation and loss.
	HR.2.2	Terrestrial invasive and nuisance species and their impacts.
Recreation	HR.3.1	The lack of recreational access and connectivity to natural resources and communities within the watershed.
 <b>Local Knowledge Base</b>		
Public Awareness	LKB.1.1	Level of landowner awareness and understanding of Best Management Practices (BMPs) for environmental conservation.
	LKB.1.2	Level of public awareness and knowledge of issues and potential implementation roadblocks associated with surface water, groundwater, habitat and recreation, and land stewardship.
 <b>Land Stewardship</b>		
Urban Stewardship	LS.1.1	The impact of impervious surfaces on stormwater runoff and associated impacts on surface water.
	LS.1.2	Ensuring adequate management of wastewater treatment facilities and systems.
Rural Stewardship	LS.2.1	The need to increase soil health and its impact on agricultural productivity and natural resources.
	LS.2.2	Subsurface Sewage Treatment Systems (SSTS) and their potential to contaminate groundwater and degrade surface water.
	LS.2.3	Addressing inadequate manure management.
Riparian and Shoreland Stewardship	LS.3.1	Level of riparian and shoreland natural resource management.

*\*Multipurpose Drainage Management, according to BWSR, is the use of various practices and designs to achieve multiple water management purposes and goals, including drainage. These purposes include beneficial use, flood control, water quality, drainage, and wildlife habitat (terrestrial and aquatic).*

## Tier 2 Issues

Tier 2 issues are lower priorities than Tier 1 (Table 1-3). These issues received a lower proportion of marks at the public kickoff meeting and were not elevated based on local subject matter expertise. These issues were confirmed by the Policy Committee as having a lower priority at this time. Measurable goals will not be established for these issues.

**Table 1-3: Tier 2 Issues**

Resource Concern	Issue Number	Issue Statement
 <b>Surface Water</b>		
Lakes	SW.2.3	Shoreland instability as it relates to erosion and impacts on surface water quality.
Rivers and Streams	SW.3.5	Elevated concentrations of suspended solids, and sediment approaching (protection) or exceeding (restoration) water quality standards for aquatic life, which can lead to aquatic life impairments.
	SW.3.6	Elevated concentrations of bacteria approaching (protection) or exceeding (restoration) water quality standards which can lead to aquatic recreation impairments.
	SW.3.7	Reduced concentrations of dissolved oxygen approaching (protection) or below (restoration) tolerable levels that can affect the diversity of quality of aquatic life.
Wetlands	SW.4.2	Protect, enhance, and restore wetlands to provide nutrient treatment functions.
	SW.4.3	Protect, enhance, and restore wetlands to provide recreation opportunities.
 <b>Groundwater</b>		
Groundwater Quality	GW.1.3	Elevated levels of bacteria in groundwater.
Groundwater Quantity	GW.2.2	Potential droughts will place additional demands on domestic water supply.
	GW.2.3	Nitrate nitrogen in surficial sands and recharge of buried sands and bedrock aquifers.
	GW.2.4	Growing trend of ethanol production may stress ground and surface water supplies during periods of drought.
	GW.2.5	Gravel mining and its impacts on groundwater recharge.
	GW.2.6	Limited amount and extent of aquifers in the watershed to supply groundwater.
 <b>Habitat and Recreation</b>		
Aquatic Habitat	HR.1.4	Lack of hydrologic connectivity as the primary stressor on bio-impaired surface waters.
	HR.1.5	Lack of in-stream habitat as a primary stressor on bio-impaired surface waters.
	HR.1.6	Protection and restoration of declining and at-risk aquatic species.
Terrestrial Habitat	HR.2.3	Inadequate riparian cover and connectivity and its impact on terrestrial species habitat.
	HR.2.4	Invasive species and their impacts on high quality areas of native vegetation.

	HR.2.5	Planned and prioritized areas for structural and natural resources protection.
	HR.2.6	Protection and restoration of declining and at-risk terrestrial species.
 <b>Local Knowledge Base</b>		
Public Awareness	LKB.1.3	The need for greater understanding and awareness of water issues, like drainage, erosion, fertilizer use, prescription and non-prescription drug disposal, and household hazardous waste disposal, by the general public.
	LKB.1.4	The efficient and effective use of fertilizers and pesticides and its impact on surface and groundwater quality.
Monitoring and Data Collection	LKB.2.1	Lack of high-quality digital elevation data.
	LKB.2.2	The need for expanded monitoring of lakes and streams through MPCA Citizen monitoring programs.
 <b>Management, Coordination, and Funding</b>		
Planning and Coordination	MCF.1.1	Need to update floodplain maps and zoning areas to reflect most recent Flood Insurance Rate Maps.
	MCF.1.2	The need for increased coordination on Flood Damage Reduction goals.
	MCF.1.3	The need for water quality management to mitigate impacts to shoreland in lakes and closed basin areas.
	MCF.1.4	Coordination is needed among LGUs administering the Wetland Conservation Act.
 <b>Land Stewardship</b>		
Urban Stewardship	LS.1.3	Stormwater and its impacts on urban flooding.
	LS.1.4	The need to preserve the riparian corridor in urban areas for flood mitigation and habitat preservation.
	LS.1.5	The need for mosquito control in urban areas.
Rural Stewardship	LS.2.4	Land use changes, development, increases in irrigated agricultural production and its impacts on runoff and erosion.
	LS.2.5	Direct access of cattle to Watonwan River and tributaries is causing loss of habitat, increased nutrient, sediment, and bacteria transport that disrupt habitat for fish and macroinvertebrates and may potentially threaten human health.
Riparian and Shoreland Stewardship	LS.3.2	Shoreland development pressures leading to increased sediment and nutrient loadings, habitat loss, wetland loss, and degradation.
	LS.3.3	The need for updated shoreland rules and enforcement of existing regulations.

### 1.3 Establishment of Measurable Goals

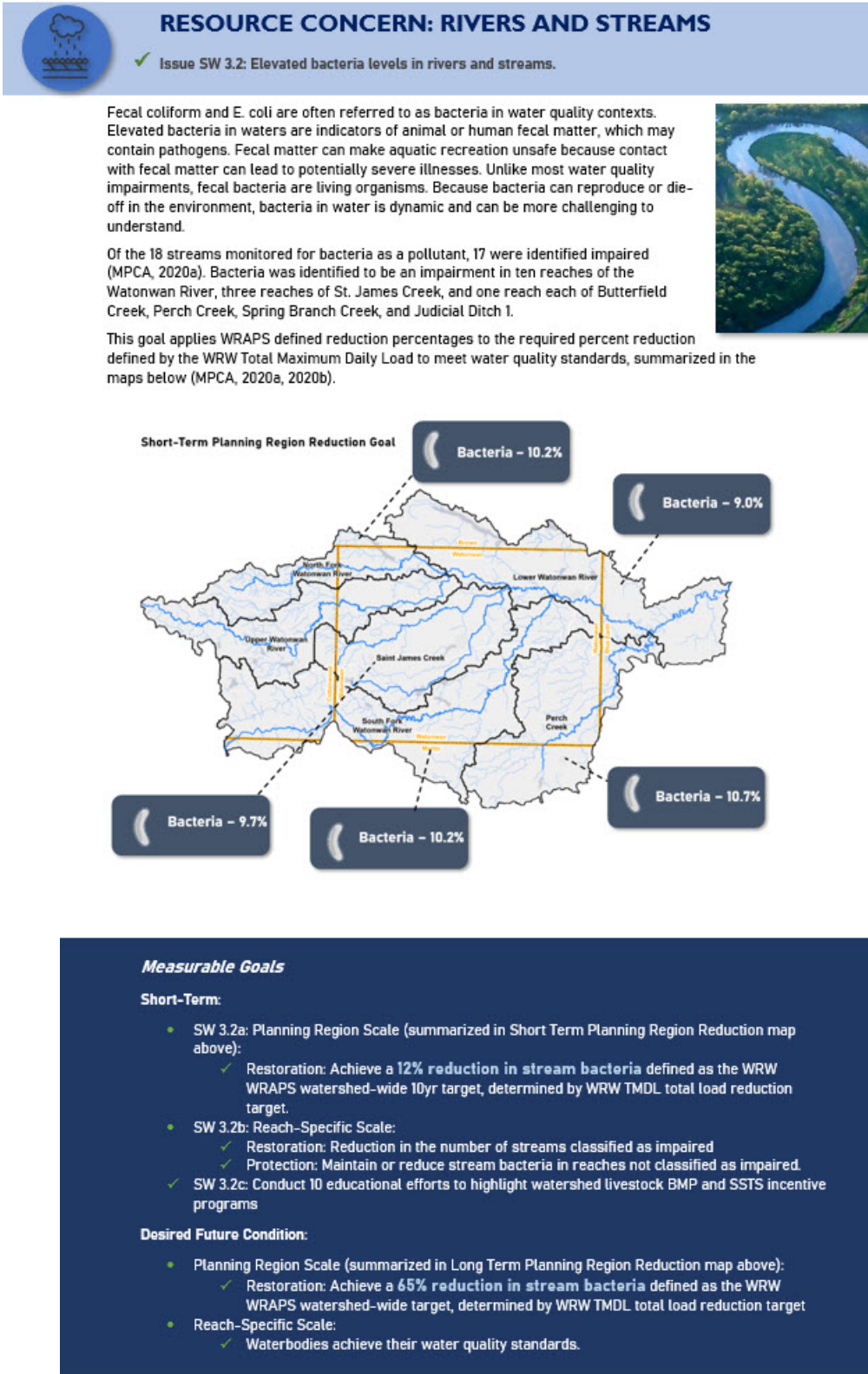
Short and long-term measurable goals are presented for each Tier 1 priority issue established in Section 4. A variety of information was used to develop goals, including:

- ✦ Goals from the Watowan River Watershed Restoration and Protection Strategies report (WRAPS; Appendix B) and the Watowan River Watershed Groundwater Restoration and Protection Strategies Report (GRAPS; Appendix C);
- ✦ Results from the Prioritize, Target, and Measure Application (PTMApp);
- ✦ Input from Advisory and Policy Committee members; and
- ✦ The knowledge of local water and resource managers provided by the Steering Team.

Measurable goals for Tier 1 priority issues are organized into chapters by resource. Each resource chapter contains a cover page summarizing which resource concerns will be addressed, and the planning region priority for the resource. Because the WRW is large and issues impact certain areas more than others, this plan prioritizes measurable goals for each resource (surface water, groundwater, and habitat resources) at the planning region scale. The weighting criteria for prioritization consist of data from PTMApp, input from the Steering Team and Advisory Committee, the WRAPS, and the GRAPS. Prioritization criteria and relation to measurable goals is shown in Appendix D. An example of a measurable goal is provided in Figure 1-2 on the following page. For a full list of plan measurable goals, see Section 5.



**Figure 1-2: Example measurable goal from the WRCWMP Section 5.**



## 1.4 Targeted Implementation

The Targeted Implementation Schedule is presented in Section 6. Here, implementation actions are established under the following implementation program categories:

- ✦ Structural and Management Practices Cost-Share Incentive Program;
- ✦ Education and Outreach Implementation Program;
- ✦ Research and Monitoring Implementation Program;
- ✦ Regulatory and Administration Program;
- ✦ Capital Improvements Implementation Program; and
- ✦ Operations and Maintenance

The ability to achieve measurable goals, and the speed at which they are realized, largely depends on the amount of funding available for implementation, as well as the staffing and capacity of the partners working on actions to make progress towards the goal. If more funds are available, more actions within the targeted implementation schedule can be implemented and more progress can be made toward goals. The amount of funding for implementing this plan is uncertain, presenting a challenge for planning purposes. To address this challenge, three funding levels are provided in this plan.

- ✦ **Baseline Funding:** The Baseline Funding scenario provides the 10-yr budget and assumes plan funding will remain similar to current funding focused on water issues within the plan area. Baseline Funding was determined by defining the annual budgets of the WWPP entities and allocating by percent of area each county has in the watershed. Actions included in this scenario are the highest priority for implementation. Ten years of funding is assumed to be \$6,811,000 to maintain an existing level of implementation within the WRW.
- ✦ **Enhanced Funding:** The Enhanced Funding scenario provides an alternate 10-yr budget, including ten years of baseline annual funding with additional funding from Clean Water Fund dollars (Watershed Based Implementation Funding (WBIF)). Actions included in this scenario are second highest priority for implementation. Ten years of Enhanced Funding is assumed to equal \$3,373,750. Assuming WBIF is consistently available over the 10-year life cycle of this plan, the amount of implementation dollars available for WRW implementation efforts will be Baseline funds plus Enhanced funds.
- ✦ **Collaborative Efforts and Competitive Funding:** Collaborative Efforts and Competitive Funding values in Table 1-4 (following page) indicate the amount of additional funding needed to complete plan actions that cannot be completed with only Baseline and Enhanced Funding. That is, to implement all Research and Monitoring and Capital Improvement related actions, more money will need to be leveraged by the group than is available with Baseline and Enhanced Funding levels combined. The *(formal name to be determined pending formal agreement)* plans to pursue competitive grant funding and other alternative funding sources to support these actions.

Table 1-4 provides the estimated costs for implementing actions in the plan for the three funding levels. Costs are also included for Operations and Maintenance of natural and artificial waterways at or near their current expenditure level. This plan assumes local, state, and/or federal fiscal support of regulation and enforcement remains unchanged and includes funding for plan administration costs.

**Table 1-4: Total Watershed Funding Allocations per Implementation Program.**

	\$ Baseline Funding	\$\$ Enhanced Funding	\$\$\$ Collaborative Efforts and Competitive Funding
	Est. 10-year Baseline Budget	Est. 10-year Additional Funding Needs	Est. 10-year Budget Shortfall
	Est. 10-Year Cost	Est. 10-Year Additional Funding	Est. 10-Year Additional Funding
<b>Implementation Program</b>			
Structural and Management Practices Cost-Share Incentive Program	\$215,000	\$2,685,000	N/A
Education and Outreach Implementation Program	\$352,000	\$240,000	N/A
Research and Monitoring Implementation Program	\$79,000	\$78,750	\$388,750
Regulatory Administration Implementation Program	\$685,000	\$0	N/A
Capital Improvements Implementation Program	\$180,000	\$370,000	\$7,475,000
<b>Additional Expenses</b>			
<i>Operations and Maintenance</i>	\$5,300,000	\$0	N/A
Total	\$6,811,000	\$3,373,750	\$7,863,750
Cumulative Total	\$6,811,000	\$10,184,750	\$18,048,500

Total watershed Structural and Management Cost-Share Incentive Program funding was distributed among the six planning regions based on local expertise and a GIS-based ranking criteria guidance by Issue Category (Appendix D). Percent budget allocations to individual planning regions is illustrated in Table 1-5. Each planning region's overall funding was then divided between management practices (40% of overall structural and management and practices budget), structural projects (40%), and easements (20%).

**Table 1-5: Total percent of Structural and Management Cost-Budget by Planning Region.**

Planning Region	% Budget
Lower Watowan River	20
North Fork Watowan River	10
Perch Creek	10
Saint James Creek	25
South Fork Watowan River	20
Upper Watowan River	15
Total	100

Actions that summarize projects and practices are planning region specific. The who, what, when, where, and cost of each action dealing with projects and practices are described in an implementation profile for each planning region. An example excerpt profile is shown for the Lower Watowan River in Figure 1-3

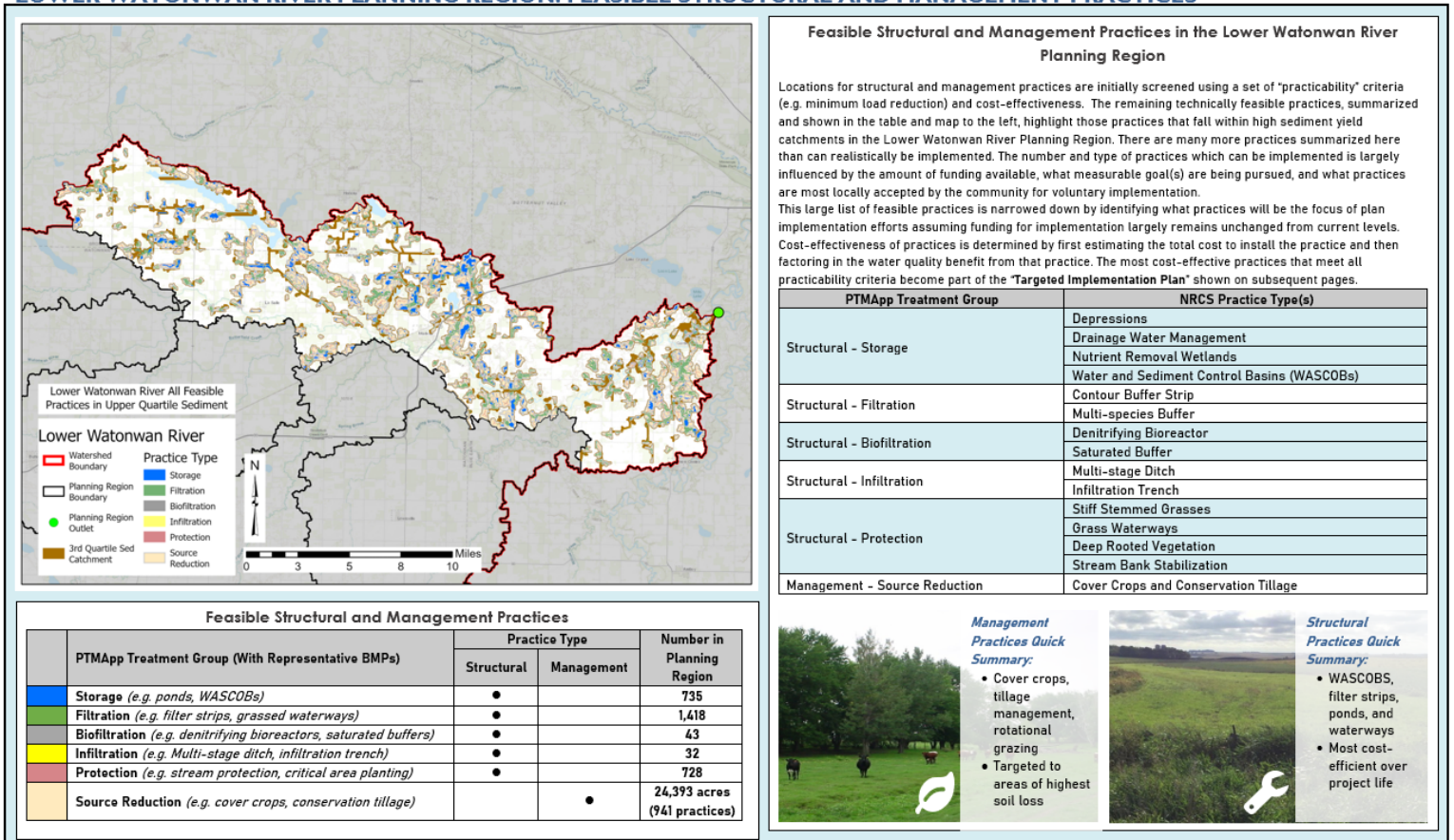
(following page).

The Prioritize, Target, and Measure Application (PTMApp) was used to prioritize and target possible locations of upland structural and field management conservation practices in each planning region. The WRW PTMApp implementation approach was designed to select the most cost-effective structural projects for removing sediment, total phosphorus, and total nitrogen until the cost of projects equaled what planning partners are anticipating from the Watershed-Based Initiative Funding (WBIF) on projects within each planning region (Enhanced Funding Level).

The types, numbers, cost, and locations of projects and practices shown will inevitably shift during plan implementation due to a variety of factors, including landowner willingness and field verification. As such, an investment guide was also developed for this plan to provide a guide for evaluating if potential alternative projects and practices provide a cost-effective solution for making progress towards goals.

**Figure 1-3: Example excerpt from the Lower Watowan River planning region implementation profile.**

**LOWER WATOWAN RIVER PLANNING REGION: FEASIBLE STRUCTURAL AND MANAGEMENT PRACTICES**



The rest of the targeted implementation actions were developed to be watershed wide. Table 1-6 supplies a summary of the implementation actions for the rest of the implementation programs. Each action was created to support one, or multiple goals from Section 5 of this plan. In addition, an example action is supplied for each implementation program. Table 1-6 is meant to summarize the expected level of activity within each program. All of the individual actions are provided in Section 6.

**Table 1-6: Anticipated roles for WRCWMP implementation.**

Implementation Program	Number of Goal-Related Actions	Example Action
Education and Outreach Implementation Program	34	EO-29: Promote the implementation of whole-farm and nutrient management practices to improve farm profitability and reduce nitrogen loss.
Research and Monitoring Implementation Program	21	RM-14: Identify needed improvements to infrastructure relative to public accesses, trails, road maintenance, and signage to promote and increase use of publicly-owned lands.
Regulatory Administration Implementation Program	14	R-12: Adhere to Minnesota Statutes and Rules pertaining to invasive species (Minnesota Statute 84D and Minnesota Rules 6216) and the Noxious Weed Law (Minnesota Statutes Sections 18.76 to 18.91).
Capital Improvements Implementation Program	6	CI-6: Address failing culverts and fish barriers through engagement with county public works, townships and private landowners to accurately size bridges and culverts.
Operations and Maintenance Implementation Program	6	OM-6: Encourage and promote low-impact development techniques and methods.

## 1.5 Roles and Responsibilities of Participating Local Governments

The WWPP divided into three committees for purposes of drafting this plan: The Policy Committee, the Advisory Committee, and the Steering Team. The make-up and roles of these committees is expected to shift to three new committees during implementation: The Policy Committee, the WRW Technical Committee, and Greater Blue Earth River Basin Alliance (GBERBA) Staff. During implementation, these committees will be collectively referred to as the Watonwan River Watershed Partnership (WRWP).

Presented below (Table 1-7) are the probable roles and functions of the WRWP committees. The WRWP fiscal and administrative duties will be assigned to a planning entity through a Policy Committee decision as outlined in the formal agreement. Responsibilities for annual work planning and serving as the central fiscal agent will be revisited by the WRWP on an annual basis.

Initially, the WRWP anticipates use of a Watershed Coordinator housed within the watershed whose role will be to administer implementation of the plan. Technical Service Areas (TSAs) and GBERBA will be utilized as available. Throughout implementation, each local government will annually evaluate the need for additional technical or administrative assistance to implement the plan.

**Table 1-7: Anticipated roles for WRCWMP implementation.**

Committee Name	Description	Primary Implementation Role/Functions
Policy Committee (Fiscal Agent)	Same as planning Policy Committee (one County Commissioner and one SWCD Board Supervisor appointed from each of the participating counties and SWCDs in the watershed).	<ul style="list-style-type: none"> <li>• Approve the annual local workplan and any associated revisions</li> <li>• Approve grant workplan(s) and review/approve grant revisions and amendments</li> <li>• Review and approve priority issues and projects</li> </ul>
WRW Technical Committee	Same as planning Steering Team (local SWCD and county staff, regional BWSR staff) with state agency representation.	<ul style="list-style-type: none"> <li>• Prepare annual local workplan</li> <li>• Prepare grant workplan(s)</li> <li>• Pursue funding opportunities for WRCWMP implementation</li> <li>• Review and confirm priority issues and projects</li> </ul>
GBERBA Staff	This organization was not formally part of plan development. However, many of their members were part of the planning Steering Team and Policy Committee.	<ul style="list-style-type: none"> <li>• Submit annual local workplan</li> <li>• Submit grant applications, workplans, and funding requests</li> <li>• Coordinate annual local workplan</li> <li>• Coordinate grant workplans</li> </ul>



**2.**

## **Plan Introduction**

## SECTION 2.0 PLAN INTRODUCTION

### 2.1 Plan Overview

The Watowan River Comprehensive Watershed Management Plan (WRCWMP), developed through the One Watershed, One Plan (1W1P) program represents an evolution from traditional, county-based water planning to watershed-based planning. The 1W1P program is a statewide effort which combines local entities that would otherwise have separate local plans into one combined planning effort to address resource issues considered most important during the planning process. In the Watowan River Watershed (WRW), this brings six counties and six soil and water conservation districts (SWCD) together to develop one cohesive, comprehensive, and implementation-focused water planning document.

The WRW 1W1P process is intended to result in a more unified, effective, and science-based approach to address resources that are most important locally. The information contained within this plan came from a compilation of existing local water management plans, studies, reports, models, scientific data, and state strategy documents. This comprehensive plan addresses more than just surface water management (rivers, streams, lakes, and agricultural drainage systems), but also considers land stewardship (urban, rural, and riparian/shoreland stewardship), groundwater, and local knowledge base and public awareness. There are a wide variety of actions included in the plan's targeted implementation schedule, aimed to protect and improve these resources and make progress towards stated goals.

This plan is organized into eight plan sections:

- ✦ *Section 1: Executive Summary* provides an overview of each section of the WRCWMP;
- ✦ *Section 2: Plan Introduction* contains background information about the WRCWMP development process;
- ✦ *Section 3: Land and Water Resources Narrative* is a summary of information that was used to help support plan content development;
- ✦ *Section 4: Identification and Prioritization of Resources and Issues* summarizes priorities that will be addressed within the lifespan of the plan;
- ✦ *Section 5: Measurable Goals* assigns measurable goals to each priority issue;
- ✦ *Section 6: Targeted Implementation Schedule*, contains the “to-do” list of the plan, which includes a description of actions, where and when actions will occur, who will implement the action, the cost of implementation, and how progress will be measured;
- ✦ *Section 7: Implementation Programs* describes the overarching implementation programs that will be used to fund and support actions included within the schedule; and lastly,
- ✦ *Section 8: Plan Administration and Coordination* defines the organizational structure for plan implementation.



The Watonwan Watershed Planning Partnership (WWPP) includes all local planning partners primarily involved in developing the WRCWMP. The WWPP was developed through a Memorandum of Agreement (MOA) (Appendix A) adopted by the governing boards of the participating entities:

- ✦ The counties of Blue Earth, Brown, Cottonwood, Jackson, Martin, and Watonwan through their respective County Board of Commissioners; and
- ✦ The SWCDs of Blue Earth, Brown, Cottonwood, Jackson, Martin, and Watonwan through their respective SWCD Board of Supervisors.



The WWPP subdivided into three local planning committees:

1. The Policy Committee (PC);
2. The Advisory Committee (AC); and
3. The Steering Team (ST).

The Policy Committee was made up of twelve members, including one County Commissioner and one SWCD Board Supervisor appointed from each of the participating counties and SWCDs in the watershed. Through a recommendation by the Policy Committee, the Watonwan County Board of Commissioners (MOA Fiscal Agent), contracted with Houston Engineering, Inc. (HEI) to assist with meeting facilitation for all committees, plan assessment, and plan writing. The Policy Committee made all final decisions about the content of the plan and its submittal to and approval by the Minnesota Board of Water and Soil Resources (BWSR). The Policy Committee retained ultimate responsibility for plan direction, decisions, and content. Further, the WRCWMP was locally adopted by each individual County and SWCD Board of Commissioners and Supervisors, respectively.

The Advisory Committee was composed of representatives from the state's main water agencies, representatives from agriculture, citizen stakeholders, and municipalities/townships, and members of the Steering Team (see Appendix E for a list of invited Advisory Committee participants). Advisory Committee members were expected to communicate plan-related activities and identify practical concerns during the plan development process. Members also served a role in speaking about the plan within the community and assisting the Policy Committee in ensuring a credible process.

The Steering Team was responsible for preparing the plan. The Steering Team was composed of local SWCD and county staff, regional BWSR staff, and consultant planning staff. The Steering Team was responsible for day-to-day decision-making in the planning process. In addition, members of the Steering Team were responsible for providing information needed for the planning process, reviewing and recommending draft plan information for Policy Committee approval, and assisting in plan development.

Lastly, the public played an essential role during the development of the WRCWMP. The public was engaged during the plan development process primarily through an initial public kickoff meeting, online issue prioritization survey, the final public hearing, and the planning website. The intent of the public kickoff meeting on January 28, 2019 was to ensure a complete list of resource issues and concerns was developed, and to gather information to support ranking issues impacting the community and the watershed. A 60-day public review period was concluded with public hearings that each County within the WRW was involved in hosting. An additional role of the public was to review and comment upon the final plan during the 60-day public comment period prior to its adoption.

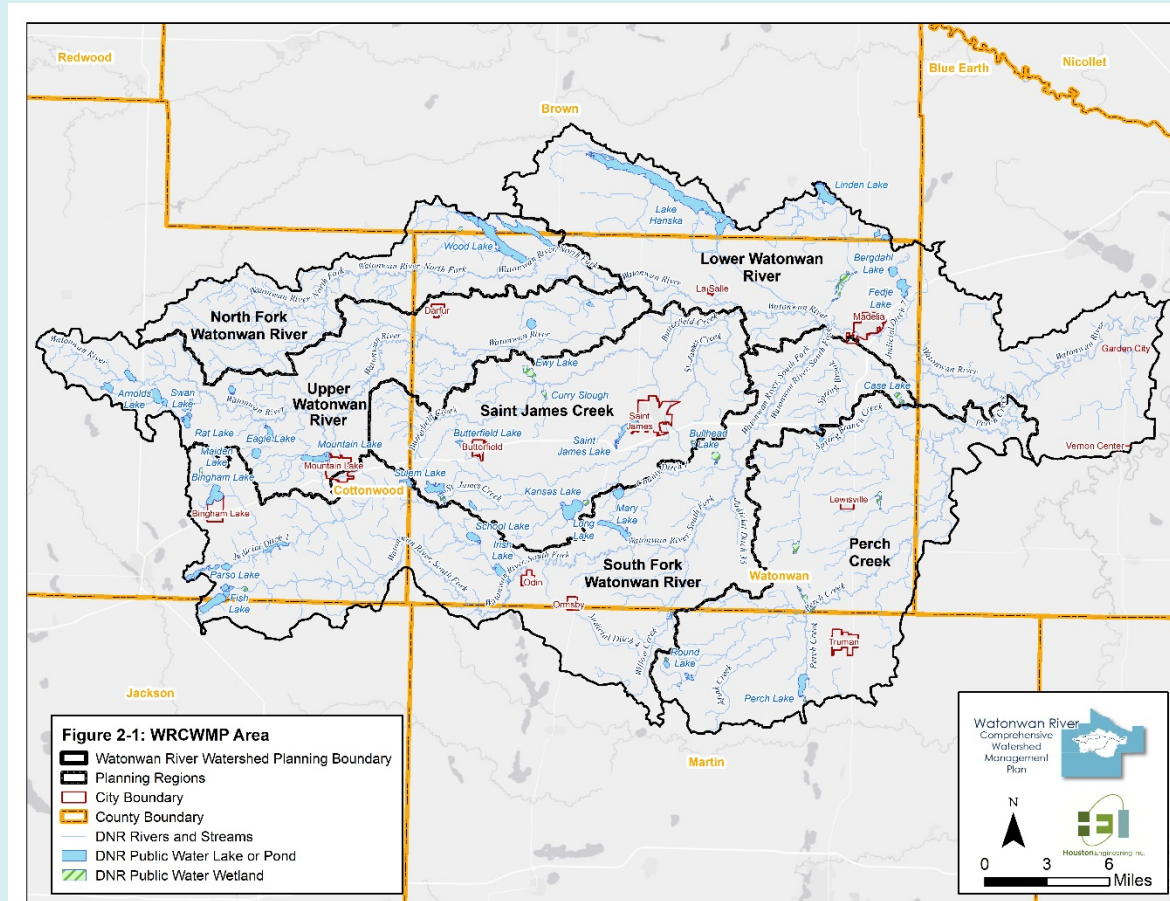
The WRCWMP Participation Plan (Appendix F) was developed to create a clear process for soliciting input and obtaining comments during plan development. Throughout plan development, comments received from the general public and local committees were documented and used to guide adjustments in plan content. Public comments from the 60-day review period were made available on the WRCWMP website ([www.co.watowan.mn.us/416/Watowan-Watershed](http://www.co.watowan.mn.us/416/Watowan-Watershed)).

Each participating county was responsible for initiating a local review and comment process that conformed to Minnesota Statutes Chapters 103B, including required public hearings. Upon completion of local review and comment and approval of the plan for submittal by a motion of each party under the MOA, the Policy Committee submitted the watershed-based plan jointly to BWSR for review and approval. The parties agreed to adopt and begin implementation of the plan within 120 days of receiving notice of state approval and provide notice of plan adoption pursuant to Minnesota Statutes Chapters 103B.

## 2.2 Watershed Overview

The WRCWMP area is in south central Minnesota and covers 873 square miles. The plan area is within Blue Earth (11%), Brown (6%), Cottonwood (23%), Jackson (1%), Martin (9%), and Watowan (50%) counties (Figure 2-1 and Table 2-1).

**Figure 2-1: Watowan River Watershed and HUC 10 planning regions.**



**Table 2-1: Counties comprising the WRCWMP area (square mileage and acreage totals indicate portion of County within the WRW).**

County	Square Miles	Acreage	Percentage of Plan Area
Blue Earth	92	58,882	11%
Brown	55	35,272	6%
Cottonwood	197	126,230	23%
Jackson	10	6,218	1%
Martin	81	52,016	9%
Watonwan	438	280,346	50%

The plan area is comprised of six planning regions (Figure 2-1 and Table 2-2). These planning regions mirror the United States Geological Survey (USGS) Hydrologic Unit Code (HUC) 10 watershed boundaries.

Planning regions boundaries allow the WWPP to account for differences in the types of issues, measurable goals, and implementation actions that are needed across the entire Watershed.

**Table 2-2: Planning regions within the WRCWMP area.**

Planning Region	Square Miles	Acreage	Percentage of Plan Area
Lower Watonwan River	187	120,149	22%
North Fork Watonwan River	76	48,503	9%
Perch Creek	150	95,806	17%
Saint James Creek	124	79,370	14%
South Fork Watonwan River	214	137,273	24%
Upper Watonwan River	122	77,863	14%
Total Plan Area	873	558,964	100%

Each planning region contains one or more important waterways that are tributaries to the Watonwan River. From the south working upstream, Perch Creek with its branches Spring Branch Creek and Mink Creek, the South Fork of the Watonwan River with its branches Willow Creek and Spring Brook, and Saint James Creek with its branch Butterfield Creek.

Furthest west are the upper reaches of the Watonwan River. From the north working downstream, is the North Fork of the Watonwan River flowing to the Lower Watonwan River. The Lower Watonwan River is the name for the most downstream reach of the Watonwan River before it outlets from the HUC 8 watershed northeast of Garden City to join up with the Blue Earth River to the south and east of the Rapidan Dam near 181st lane. Another 40 miles north, the Blue Earth River joins up with the Minnesota River coming from the northwest just before the river shifts course to travel north – northeast towards the Twin Cities. The entire WRCWMP area is contained within the Minnesota River Basin (HUC 070200).

The surface waters of the plan area consist of an intermingling of natural and altered watercourses and public and private drainage systems. There are also numerous hydrologically connected lakes within the plan area, including, to the south, Perch Lake, Long Lake (Watonwan County), Long Lake (Cottonwood County), Irish Lake, Kansas Lake as well as Rat Lake and Mountain Lake. To the north, connected lakes include Wood Lake and Wilson Lake. There are also several smaller waterbodies to the south, including Case Lake and Bullhead Lake, as well as two large lakes to the north – Linden Lake and Lake Hanska. The Land and Water Resources Narrative (Section 3) provides a review of the characteristics of the WRCWMP area.

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3.

**Land and Water  
Resources Narrative**

## SECTION 3.0 LAND AND WATER RESOURCES NARRATIVE

### 3.1 Topography, Soils, and General Geology

Soils in the WRW are primarily loamy glacial till with scattered lacustrine areas, potholes, outwash, and floodplains. It was formed during the Wisconsin glaciation in Minnesota with glacial till deposited from the Des Moines lobe. The landscape is level to gently undulating with relatively short slopes.



*Strip Tillage, Watowan Watershed*

Glacial till plains dominate the watershed with a mixture of clay, silt, sand, and gravel. In portions of the WRW, the now dry Glacial Lake Minnesota deposited a layer of clay on top of the glacial till (NRCS, 2015). In the eastern side of the watershed the geology shows a combination of till plains, glacial lake plains, and moraines, resulting in poorly drained soil and ultimately more tiling activity (NRCS, 2015) (MPCA, 2016).

The western half of the watershed lies primarily within the Blue Earth Till Plain. This portion of the landscape has a mixture of gently sloping (2-6%) well-drained loamy soils and nearly level (0-2%) poorly drained loamy soils. This region of the watershed contains extensive use of artificial drainage to remove ponded water from flat and depressional areas. Water erosion potential is moderate throughout much of the western half of the watershed. The water erosion potential for most of the eastern half of the watershed is considered low, as it is not bordered by streams, lakes, or drainage ditches (NRCS, 2015).

The western, southern, and eastern boundaries of the WRW consist of end moraines formed by the last glaciation period. Soils are predominantly loamy in texture, ranging from steep and well-drained to nearly level and poorly drained. Much of the landscape can be described as undulating to hilly (2-12%) and approximately a quarter of these lands are adjacent to streams and ditches. Fifty percent (50%) of the cropped lands within this region have a high potential for water erosion (NRCS, 2015). Soil quality within this region is susceptible to sheet and rill erosion which removes productive topsoil from agricultural and other lands and may result in sediment delivery to water.

Ravines are geologic and topographic features that are present within the watershed, though to a lesser degree than the nearby Blue Earth and Le Sueur Watersheds (Mulla, 2010). Ravines are steep, deep, incised gullies at the tips of a drainage channel network. Seeps may occur on steep or near-vertical slopes. Ravines connect the uplands to the river valleys and are often formed by ephemeral streams with only seasonal discharge. Erosion in ravines proceeds by a combination of fluvial and hillslope processes. Further, erosion from tile outlets at the head of ravines has the potential to expedite their progression. Channel incision and migration leads to over-steepened slopes and mass wasting.

### 3.2 Hydrogeology

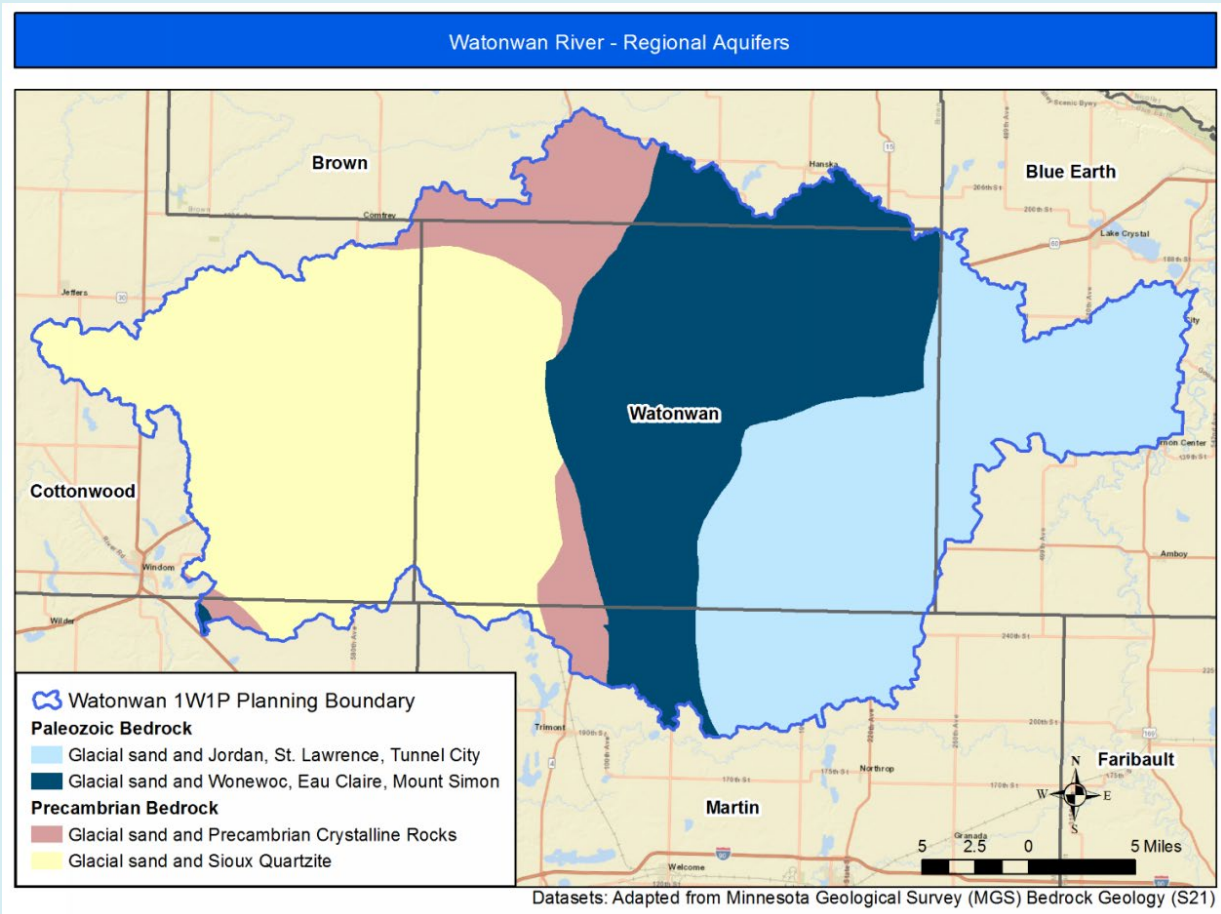
Geology in the WRW is the result of complex processes, which occurred from igneous, metamorphic, sedimentary, and glacial action that took place in the region over several geologic time periods (MDH, 2018). Figure 3-1 depicts a generalized map of aquifers in the watershed on the following page.

There are four major types of bedrock aquifers in the watershed (MDH, 2018) (Figure 3-1):

- ✦ Jordan, St. Lawrence, and Tunnel City aquifers are present in the eastern portion of the watershed in Watowan, Blue Earth, and Martin Counties
- ✦ Wonewoc, Eau Claire, and Mount Simon Sandstone aquifers are present through the center of the watershed primarily in Watowan County
- ✦ Precambrian Crystalline Rock is present in the northernmost portion of the watershed in Brown and Watowan Counties, and in limited extent in the southern half of the watershed, however, the overlying glacial material primarily serves as the aquifer material in these areas
- ✦ Sioux Quartzite aquifers are present in the western region of the watershed, in Cottonwood County and in the Western portion of Watowan County

Glacial outwash deposits in the watershed overlay bedrock aquifers. These outwash units form aquifers locally.

**Figure 3-1: Watowan River Watershed – Aquifers (GRAPS, p. 15).**



*Watowan River Watershed – Regional Aquifers: (1) Glacial sand and Jordan, St. Lawrence, Tunnel City, (2) Glacial sand and Wonewoc, Eau Claire, Mount Simon, (3) Glacial sand and Precambrian Crystalline Rocks, and (4) Glacial sand and Sioux Quartzite*

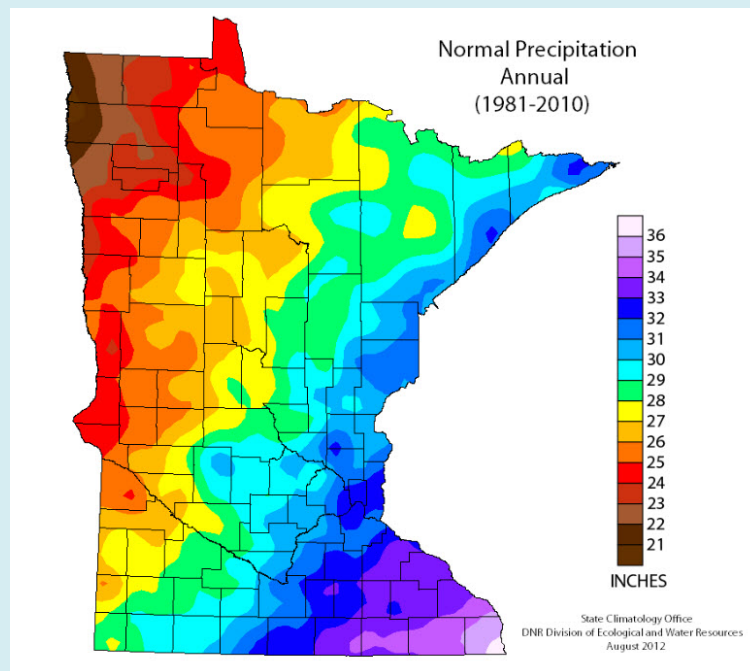
### 3.3 Precipitation

The climate within the planning area is continental, with cold dry winters and warm wet summers. Climatic records from the City of St. James have shown that temperatures over the last thirty years ranged from -30 degrees Fahrenheit (F) in January of 1970 to 105 degrees F in July of 1988. Average monthly temperatures from the same location have ranged from 14 degrees F in January to 73 degrees F in July over this same time period.

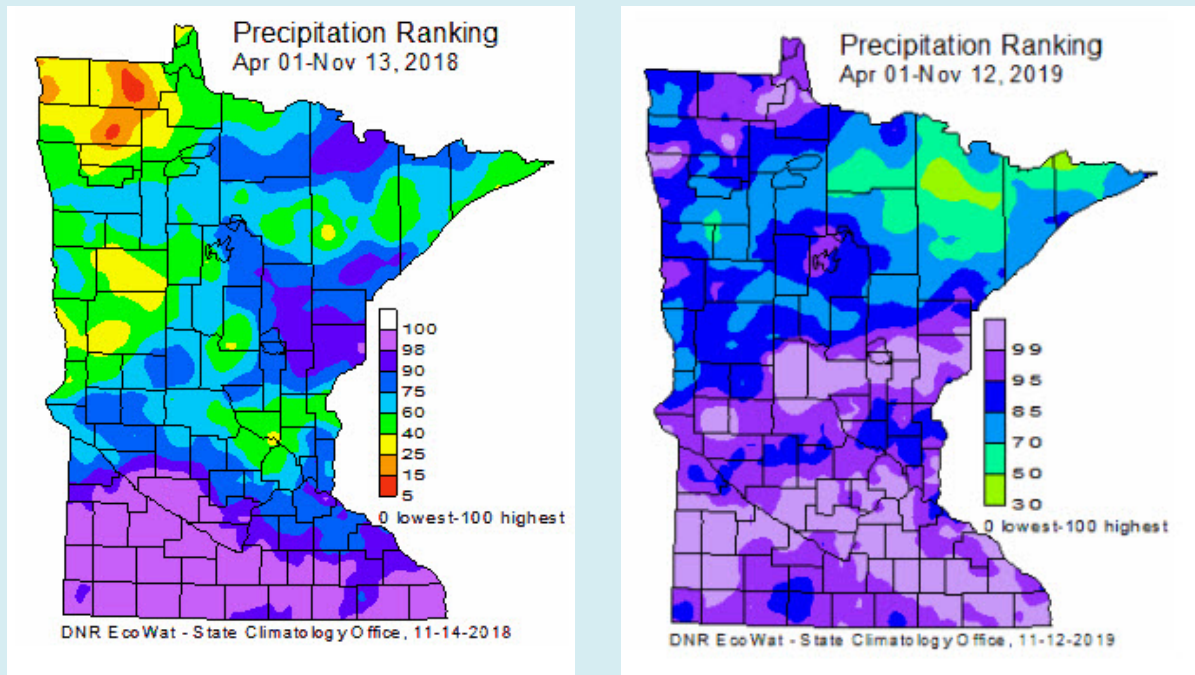
Annual precipitation (1981-2012) within the watershed ranges between 28 to 32 inches (Figure 3-2. Per the National Oceanic and Atmospheric Administration (NOAA) Precipitation-Frequency Atlas (Atlas 14), the 10 year, 24 hour rain event for St. James, Minnesota is 4.19 inches (NOAA, 2018).

Precipitation ranking data from the two most recent growing seasons (2018 and 2019) is presented in Figure 3-3 on the following page. This is noteworthy, as both years were wetter than 85-100% of previous years for WRW counties, indicating climate will likely continue to play a significant role in the management of watershed quantity and quality related issues.

**Figure 3-2: Minnesota Normal Annual Precipitation 1981-2010 (DNR, 2012).**



**Figure 3-3: Minnesota Growing Season Precipitation Rankings, 2018 and 2019 (DNR, 2018, 2019).**



### 3.4 Water Resources

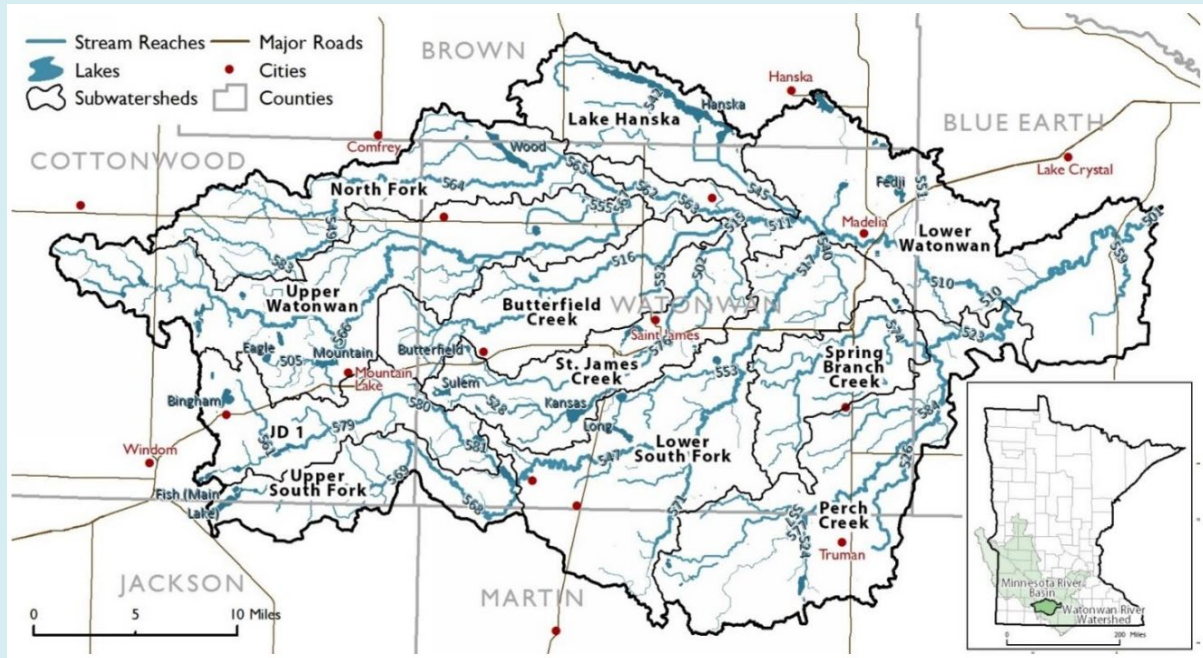
The Watowan River begins in central Cottonwood County and flows east for 113 miles into northern Watowan County. It reaches its confluence with the Blue Earth River about one mile south of the Rapidan Dam near Garden City, 8 miles southwest of Mankato. The total distance of the stream network is 1,074 miles, of which 685 miles are intermittent streams and 389 miles are perennial streams.

The WRW (HUC 07020010) drains approximately 558,964 acres of land into the Watowan River (Figure 3-4). Much of the river and its tributaries have been straightened and altered to accommodate drainage of farmland and flood reduction (MPCA, 2016). Wetlands and depressional areas have been altered and drained throughout much of the WRW for agricultural purposes. Higher flows in the area due to extensive drainage activities have led to increased erosion and higher sediment loads into surface water bodies. Addressing water quantity and quality related issues within the WRW will have positive impact to the downstream resources it drains to.





**Figure 3-4: Watowan River Watershed Drainage Area (WRAPS, p. 12).**



The Watowan River watershed drains approximately 558,964 acres from 6 different counties. The Watowan River watershed is one of the 13 major watersheds that comprise the Minnesota River basin. The stream line size in this image is used to indicate the estimated average stream flow, and stream reaches are labeled by the last three digits of the AUID (AUID-3). MPCAa WRAPS, 2020.

### 3.5 Surface Water Resources (Streams, Lakes, Wetlands, Public Waters, and Ditches)

The WRW is drained by three primary branches of the Watowan River (North Fork Watowan, South Fork Watowan, and Watowan rivers), and four minor tributaries to these branches (Butterfield, Saint James, Willow, and Perch creeks). Additional streams are listed in Table 3-1. Table 3-2 summarizes miles of public ditch by watershed county, calculated using DNR's buffer protection map. These values are only indicative of public drainage networks, and do not account for open and subsurface tiling systems that also contribute to the overall drainage of the watershed. Hydrology, connectivity, and geomorphology are three essential components of a healthy watershed. If any of these components depart from natural or stable conditions, one or more of the other components will be impacted and potentially have negative impacts on biology and water quality within the watershed. The soils and geology of the watershed have resulted in highly productive lands, but significant portions of the river and its tributaries have been straightened and altered to provide for drainage of farmland and flood reduction. In addition, enhanced drainage practices, fragmented riparian zones, and land use changes have resulted in an increase in flows and channel instability (DNR, 2014).

**Table 3-1: Streams within the Watowan River Watershed (Minnesota River Basin Data Center).**

Stream Name	Total Stream Miles	Total Perennial Stream Miles	Total Intermittent Stream Miles
Butterfield Creek	25.1	20.8	4.3
Elm Creek	2.4	2.4	0
Mink Creek	11.3	9.5	1.8
North Fork Watowan River	39.3	35.2	4.1
Perch Creek	37.3	37.3	0
South Fork Watowan River	72.6	69.9	2.7
Spring Branch Creek	18.1	4	14.1
Spring Brook	7.3	0	7.3
St. James Creek	26.9	20.1	6.8
Watowan River	113.2	103	10.2
Willow Creek	14.4	8.6	5.8

**Table 3-2: Miles of public drainage ditches within the Watowan River Watershed by county.**

County	Percentage of Plan Area	Miles of Public Drainage Ditches*
Blue Earth	11%	15
Brown	6%	30
Cottonwood	23%	17
Jackson	1%	0
Martin	9%	16
Watowan	50%	35

\*Mileage calculated using DNR's Buffer Protection Map

There are 36 named and 19 unnamed lakes within the WRW (Table 3-3). Some of these waters are designated Public Waters and are regulated by the Minnesota Department of Natural Resources (DNR). Lakes within WRW include Mountain Lake, Wood Lake, Lake Hanska, Fish Lake, Long Lake (both in Watowan and Cottonwood counties), Kansas Lake, and St. James Lake. Additional information about these lakes can be obtained through the Minnesota River Basin Data Center or Minnesota Department of Natural Resources LakeFinder.

In addition, the Watowan River Watershed has several wetlands and numerous historic wetlands that have the potential to be restored. Figure 4-10 illustrates this information as developed by the Minnesota National Wetland Inventory. These data suggest that approximately 4% of the watershed is currently wetlands that that approximately 93% of historic wetlands in the watershed have been loss.

**Table 3-3: Public Waters Inventory (Water Resources Center, Minnesota State University, Mankato, 2000).**

Name of Waterbody	County	Acres	Shoreland Class	PWI Class*
Arnolds Lake	Cottonwood	46.42	Natural Environment	P
Bartsch Lake	Cottonwood	63.64	Natural Environment	P
Bergdahl Lake	Watowan	96.21	Natural Environment	P
Bingham Lake	Cottonwood	270.42	General Development	P
Bullhead Lake	Watowan	80.38	Natural Environment	W
Butterfield Lake	Watowan	54.87	Natural Environment	P
Case Lake	Watowan	36.99	Natural Environment	W
Cottonwood Lake	Watowan	95.35	Natural Environment	P
Curry Slough	Watowan	21.70	Natural Environment	W
Eagle Lake	Cottonwood	105.08	Natural Environment	P
Emerson Lake	Watowan	399.78	Not in shoreland program	N
Ewy Lake	Watowan	82.80	Natural Environment	W
Fedje Lake	Watowan	187.11	Natural Environment	P
Fish Lake	Jackson	411.32	Recreational Development	P
Irish Lake	Watowan	169.86	Natural Environment	P
Kansas Lake	Watowan	392.88	Recreational Development	P
Lake Hanska	Brown	1,827.47	SL Mgt. Waters – Brown Co.	P
Linden Lake	Brown	271.13	SL Mgt. Waters – Brown Co.	P
Long Lake	Cottonwood	101.05	Natural Environment	P
Long Lake	Watowan	260.88	Recreational Development	P
Maiden Lake	Cottonwood	29.96	Natural Environment	W
Mary Lake	Watowan	124.68	Natural Environment	P
Mountain Lake	Cottonwood	236.69	Recreational Development	P
Mud Lake	Watowan	42.55	Natural Environment	P
Mulligan Marsh	Watowan	9.62	Multiple	P
Nelson Lake	Watowan	27.05	Not in shoreland program	N
Parso Lake	Cottonwood	113.87	Natural Environment	P
Perch Lake	Martin	172.81	Natural Environment	P
Rat Lake	Cottonwood	138.41	Natural Environment	P
Round Lake	Martin	42.37	Natural Environment	P
School Lake	Watowan	136.06	Natural Environment	P
St. James Lake	Watowan	244.47	Recreational Development	P
Sulem Lake	Watowan	185.14	Natural Environment	P
Swan Lake	Cottonwood	13.30	Natural Environment	P
Wilson Lake	Watowan	118.04	Natural Environment	W
Wood Lake	Watowan	608.31	Multiple	P
Total Acres		7,219		

\*P-Protected (Public Waters); W-Protected (Public Waters) Wetland; N-Not Protected Water or Wetland.

### 3.6 Groundwater Resources

Most of the information in this section is leveraged from the Watowan River Watershed Groundwater Restoration and Protection Strategies Report (GRAPS) (MDH, 2018). Groundwater is an important resource in the WRW. More than 51% of groundwater withdrawn is for public water supply use. In addition, groundwater accounts for 100% of the region's drinking water. It is important to make sure that adequate supplies of high-quality groundwater remain available for the region's residents, businesses, and natural resources.

Groundwater sources within the WRW vary according to the underlying geology. Aquifers and wells used for public water supplies vary widely. Some are very shallow and unprotected and can be easily contaminated by activities at the ground surface. Others are deeper or more protected by geologic materials; these tend to exhibit a low vulnerability to overlying land uses.

### Groundwater Withdrawals

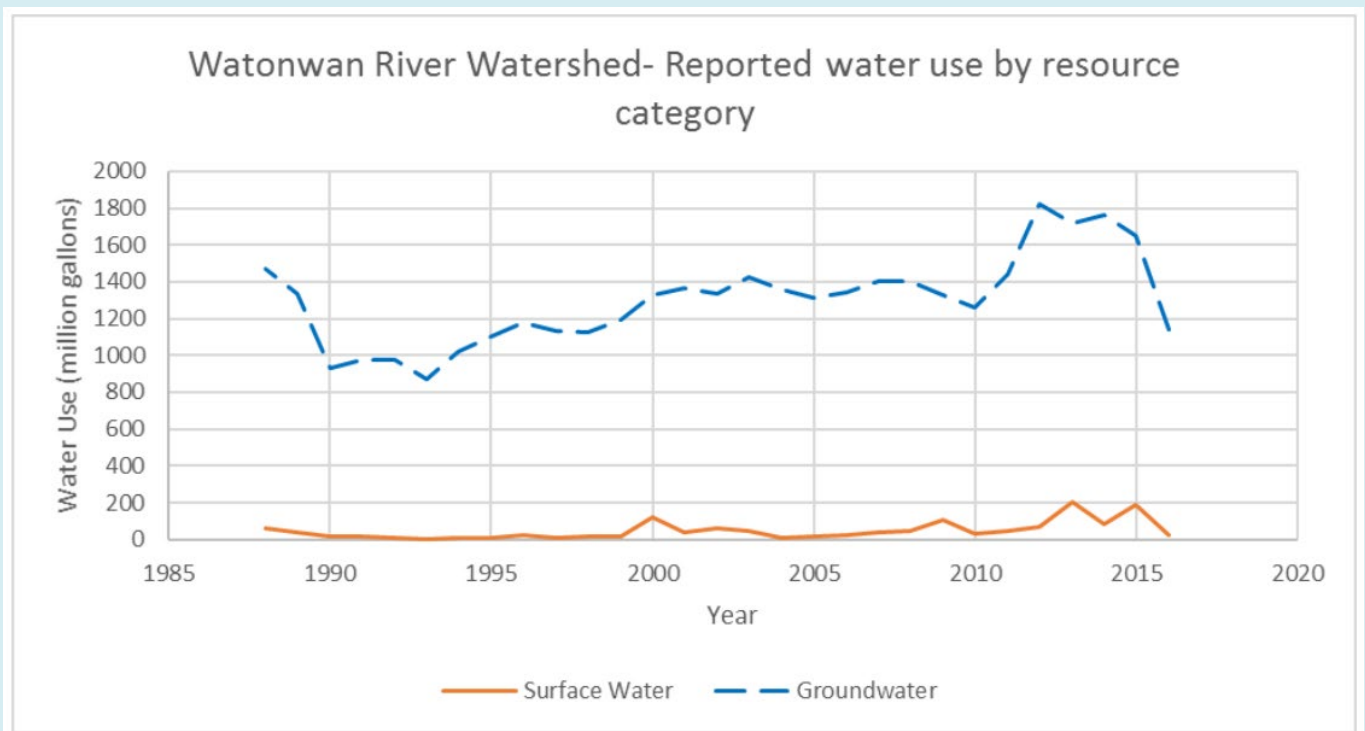
A Water Appropriation Permit (WAP) program is implemented by the DNR, requiring all water appropriators (surface or groundwater) withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. This provides the DNR with the ability to assess which aquifers are being used and for what purpose. The WAP exists to balance competing groundwater management objectives that include both development and protection of Minnesota’s water resources.

Most groundwater in the WRW is used for water supply. Agricultural irrigation is the second largest water user, followed by livestock watering and industrial processing. Other uses account for less than one percent of reported water use.

### Groundwater Use

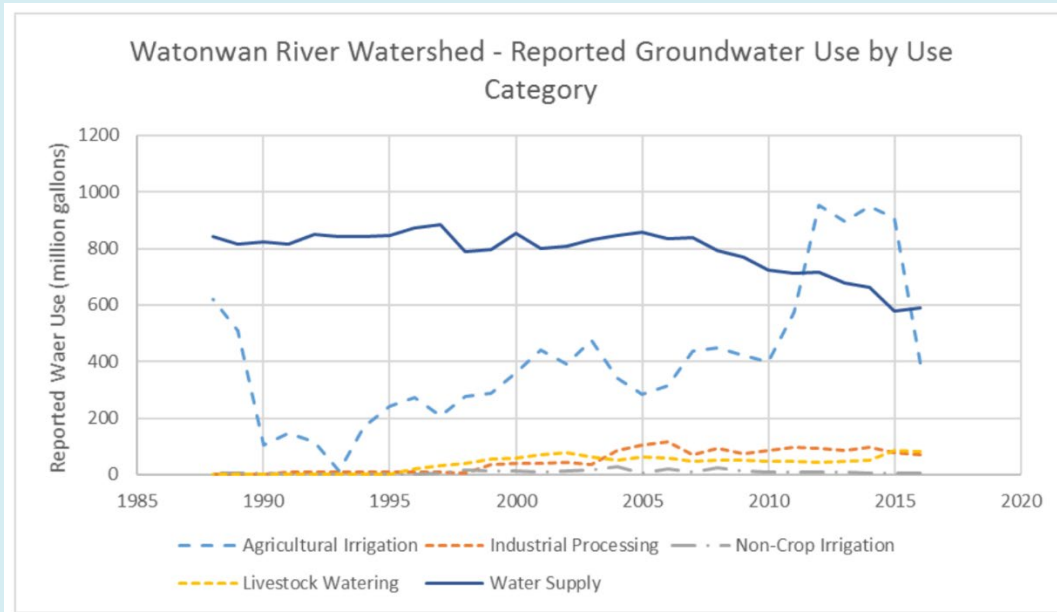
In most years, groundwater accounts for about 97 percent of reported water use (e.g. potable water, irrigation, etc.) according to Minnesota DNR Permitting and Reporting System (MPARS) data (Figure 3-5). Groundwater use totals between 870 and 1,760 million gallons per year and annual use has generally increased from 1990 to the present. Groundwater use for water supply (Figure 3-6, following page) has been mostly constant at 700 to 800 million gallons per year and has been reduced to about 580 million gallons in 2016. Groundwater use for agricultural irrigation has varied more and is highest during drought years in 1988 to 1989 and 2012 to 2015.

**Figure 3-5: Groundwater accounts for approximately 97% of water use in the Watonwan River Watershed (GRAPS, p. 24).**



Reported groundwater and surface water use. Groundwater accounts for about 97% of the total reported water use in the Watonwan Watershed.

**Figure 3-6: Reported Groundwater Use by Use Category (GRAPS, p. 25).**



*Water supply accounts for most groundwater use in most years. During the 2012 drought, agricultural irrigation was the biggest groundwater use.*

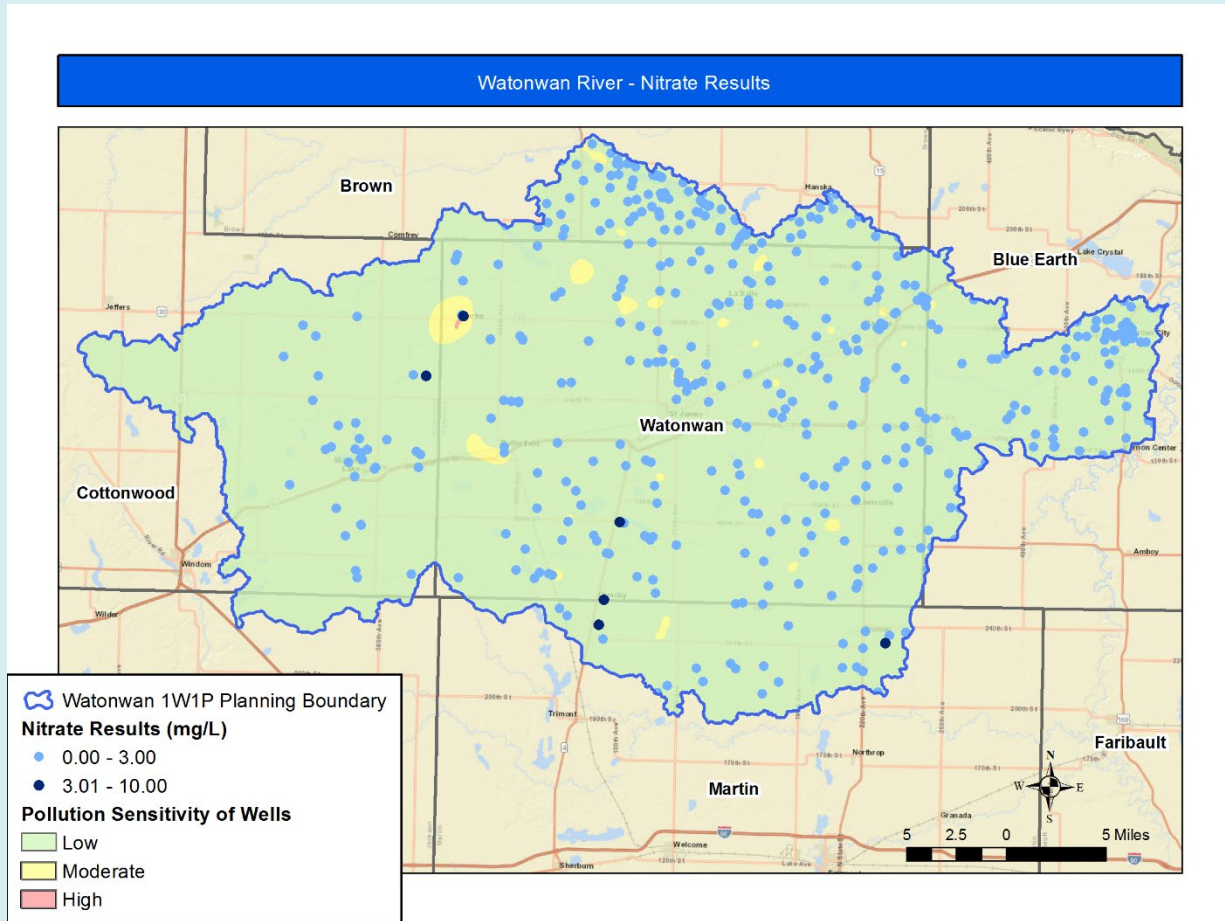
### Groundwater Issues and Concerns

Groundwater contamination, both naturally occurring and from human activity, is present in parts of the WRW, specifically:

- ✦ Arsenic – 47% of tested drinking water wells have elevated levels of arsenic with approximately 16% exceeding the Safe Drinking Water Act (SDWA) standard of 10 µg/L.
- ✦ Nitrate –
  - Based on Minnesota Department of Health data in 2019, none of the tested drinking water wells from the MDH database had levels at or above the SDWA standard of 10 mg/L, although shallow wells, less than 50 feet deep, had approximately 73% of samples exceeding the natural background levels of 3 mg/L, meaning groundwater quality is influenced by land use activities (Figure 3-7).
  - In 2016, an ambient Minnesota Department of Agriculture (MDA) monitoring well in Watonwan County recorded a nitrate result of 91.6 mg/L (GRAPS, p. 31). This exceedance observed once, has not recorded similar results since.
  - It is worthy to note that the WRW in part contributes water to the City of Mankato Ranney Wells which have seen higher levels of nitrates. These two wells are officially designated as “groundwater under the direct influence” of surface water. Due to the nitrate concentrations, the wells require blending with deeper groundwater. Highest concentrations occur in early spring and late fall.
  - Figure 3-8 shows MDA townships where private well were tested for Nitrate. This process began in 2018 as part of the Nitrogen Fertilizer Management plan (<https://www.mda.state.mn.us/township-testing-program>).
  - The MDA has completed vulnerability mapping for nitrate reaching groundwater. This information is included in Figure 3-8 and is based upon soils information and geological information (purple), and DWSMA with >or= 5.4mg/l (green). This map information will be used for the Groundwater Protection Rule (Minnesota Rule 1573).

- ✦ Pesticides - detected in both MDA monitoring wells, but not at concentrations above human-health based drinking water standards or reference values. In addition, the MDA pesticide testing of private well results are available for select townships on a County basis and should be released in 2021.
- ✦ Radionuclides - Elevated concentrations of naturally occurring radioactive radium occur within the bedrock Mt. Simon and Sioux Quartzite aquifers.
- ✦ Contaminated sites - Approximately 14% of all registered tanks are leaking chemicals into the environment and have the potential to cause localized groundwater pollution.

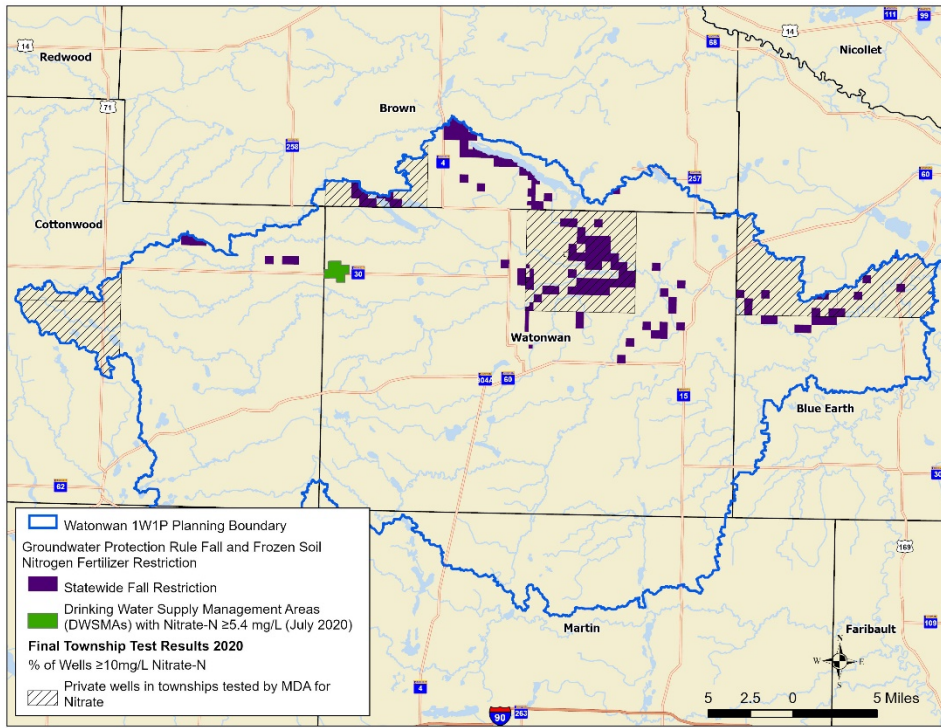
**Figure 3-7: Nitrate Monitoring Test Results from well testing along with pollution sensitivity from geologic information. None of the tested drinking water wells had levels at or above the SDWA standard of 10 mg/L - Watowan River Watershed**



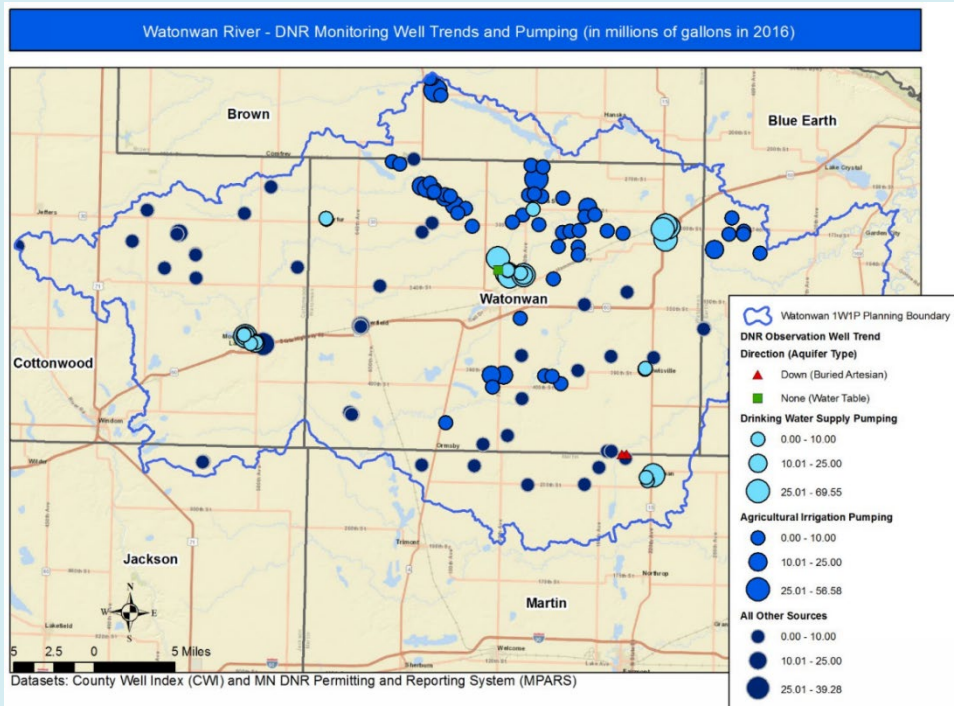
These contaminants can affect both private wells and public water systems when levels exceed drinking water standards. Some of the public water systems have water quality issues in their untreated source water that requires either blending or treating the water to meet SDWA standards. About 73% of the people living in the watershed get their drinking water from a public water supply system. Wellhead Protection Plans have been developed for most of the public water suppliers in the WRW and identify land use protections strategies for the approximately 33,255 acres in Drinking Water Supply Management Areas (DWSMAs). Additional information about this contamination and monitoring locations can be found in the GRAPS (MDH, 2018).

In Figure 3-9, the circles represent water use data. The colors of circles correspond to water use permits issued for public water supply, irrigation, and all remaining sources of water use. The size of the symbol indicates how many millions of gallons were reported as pumped in 2016.

**Figure 3-8:** MDA townships with private wells test for nitrate (crosshatching). Fall and frozen soil nitrogen fertilizer restrictions in vulnerable areas (purple) and DWSMAs with Nitrate levels above 5.4 mg/L (green).



**Figure 3-9:** DNR Monitoring Well Trends and Pumping – Watowan River Watershed (GRAPS, p. 46).



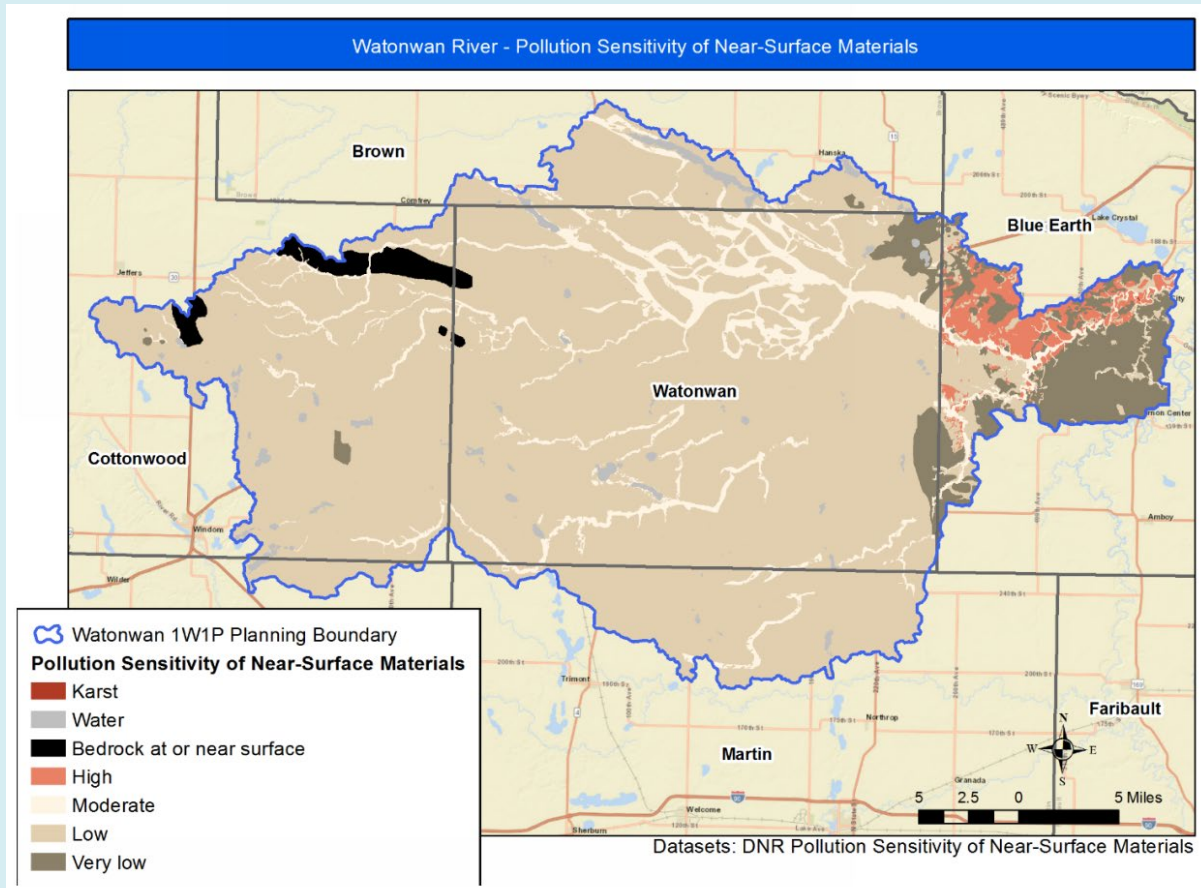
Water use by category type and location of Long-Term DNR Groundwater Level Monitoring Wells with enough water level measures to do a statistical trend analysis.

### Pollution Sensitivity

Understanding pollution sensitivity is important for prioritizing and targeting implementation efforts. Pollution sensitivity (also known as aquifer vulnerability or geologic sensitivity) refers to the time it takes recharge and contaminants at the ground surface to reach the underlying aquifer.

It is important to understand the target aquifer when assessing pollution sensitivity. Certain aquifers may be deeper and more geologically protected than water table aquifers, or surficial sand aquifers, in each area. Figure 3-10 on the following page depicts the pollution sensitivity of near-surface materials dataset developed by the DNR. This dataset only considers the top ten feet of soil and geologic material when assigning a sensitivity rating. This figure shows that the watershed has a mix of pollution sensitivity ratings based on surficial materials. While the predominant rating across the WRW is 'low', it is important to note that much of the Blue Earth County portion of the WRW is identified as highly sensitive to pollution. This portion of the watershed contributes to the City of Mankato's Ranney wells which have recently seen higher levels of nitrates. This is a key consideration for implementation of practices that serve multiple water resource benefits.

**Figure 3-10: Watowan River Watershed – Pollution Sensitivity of Near Surface Materials (GRAPS, p. 16).**





## Groundwater Connected Natural Features at Risk

The WRW boundary includes significant natural features, including surface waters that depend on groundwater to sustain them. Groundwater appropriations and land-use changes can impact the health of these natural resources. If groundwater quantity or quality is degraded, these resources are at risk. The following features are present within the WRW:

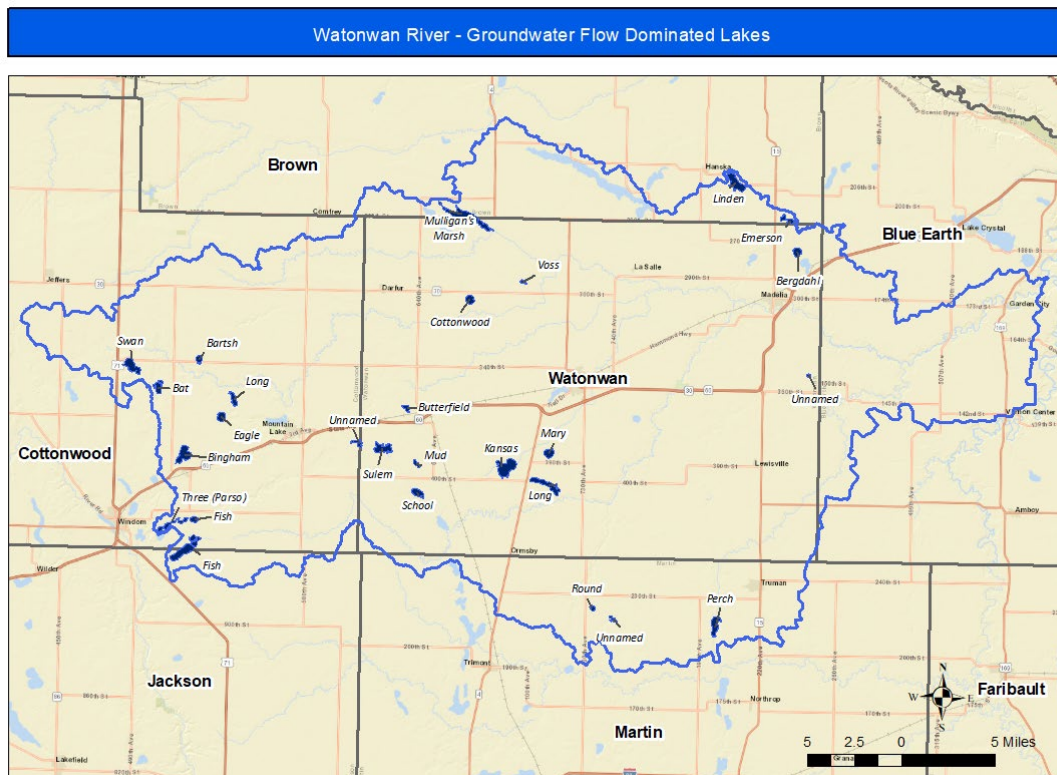
- ✦ Two designated calcareous fens: Delton 20 and Perch Creek WMA;
- ✦ Wetland complexes across the entire area;
- ✦ Lakes that may be susceptible to changing aquifer levels;
- ✦ Twenty-three kinds of native plant communities connected to groundwater; and
- ✦ Ten rare plant and animal species connected with groundwater that are listed as threatened or special concern (see Table 3-6).

## Groundwater Flow Dominated Lakes

All lakes are connected to groundwater, but the specific interaction between lake water and groundwater depends on the geology, topography, and volume of surface-water inflow and outflow associated with the lake.

Groundwater-dominant lakes are shown in Figure 3-11. Twenty-seven lakes in the WRW have a watershed to lake area ratio of 10 or less and are considered groundwater-dependent lakes. Large-scale groundwater pumping near a lake will likely have more impact on groundwater-dominated lakes than on surface water dominant lakes.

**Figure 3-11: Watowan River Watershed – Groundwater flow dominated lakes (GRAPS, p. 54).**



### 3.7 Water Quality and Quantity

The USGS collected stream data on the Watowan River from 1940-1946. The site was reestablished in 1976 and has been consistently operating since then. The river reached its flood record of 19,000 cubic feet per second (CFS) in 1965. More recently, the highest peak occurred on September 25, 2010, with flows reaching 16,100 CFS. The annual flow of the Watowan River has increased by roughly 50% over the last four decades, despite a slight decrease in annual precipitation (MPCAa, 2020). The effect of subsurface drainage is generally to increase baseflows (i.e., that portion of streamflow that is derived from seepage or shallow groundwater, as opposed to surface runoff), regardless of whether peak flows are increased or decreased (Schilling & Libra, 2003).

According to Local County Water Plans, flooding is an issue throughout WRW. Flooding results in damages to cropland, inadequate land treatment, and excessive channel erosion. In Watowan County, flooding occurs in all townships with varying amounts of damages. A total of 237,000 acres of farmland were affected in Watowan County during 1991 and 1993 due to flooding. Blue Earth County has recognized the floodplains in Sections of 22, 23, 24, 26, and 27 of Garden City Township. The Garden City townsite is also located in flood prone areas. The portion of the watershed located in Cottonwood County is classified as having high flood potential. Specific areas near Mountain lake, North Fork of Watowan River, South Fork of Watowan River and the mainstem of Watowan River are also prone to flooding (Water Resources Center, Minnesota State University, Mankato, 2000). Further, Federal Emergency Management Agency (FEMA) flood mapping efforts help to specifically define flood prone boundary areas.

The water quality of the waterbodies within the Watowan River Watershed have been studied, the results of which are summarized in the Watowan River Watershed Restoration and Protection Strategies (WRAPS) Report (MPCA, 2020). In addition, a watershed wide Total Maximum Daily Load (TMDL) study has been completed for the Watowan River Watershed. The TMDL documents the regulated pollutant sources and permitted wastewater discharges within the watershed and, for impaired water bodies, provides TMDL calculations. Both reports can be found online (<https://www.pca.state.mn.us/water/watersheds/watowan-river>) The TMDL and WRAPS reports also identify stressors causing aquatic life impairments. Figure 4.6 provides a map of impaired waters within the Watowan River Watershed.

The Watowan River feeds into the Blue Earth River, which is a source of drinking water for the City of Mankato. Mankato operates two shallow wells located in surficial sands aquifers near the Blue Earth and Minnesota River. The Ranney wells provide 61% of the total water volume for the City. These wells, called the Ranney collector wells, are not surface water wells. However, the Blue Earth and Minnesota Rivers do influence the shallow aquifers below the rivers and their banks. Nitrate concentrations in Mankato Ranney Wells and in the City of Darfur has reached levels of concern. These areas will be of focus to install nitrogen BMPs due to the mutual benefits of protecting drinking water supplies.

### 3.8 Stormwater Systems, Drainage Systems, and Control Structures

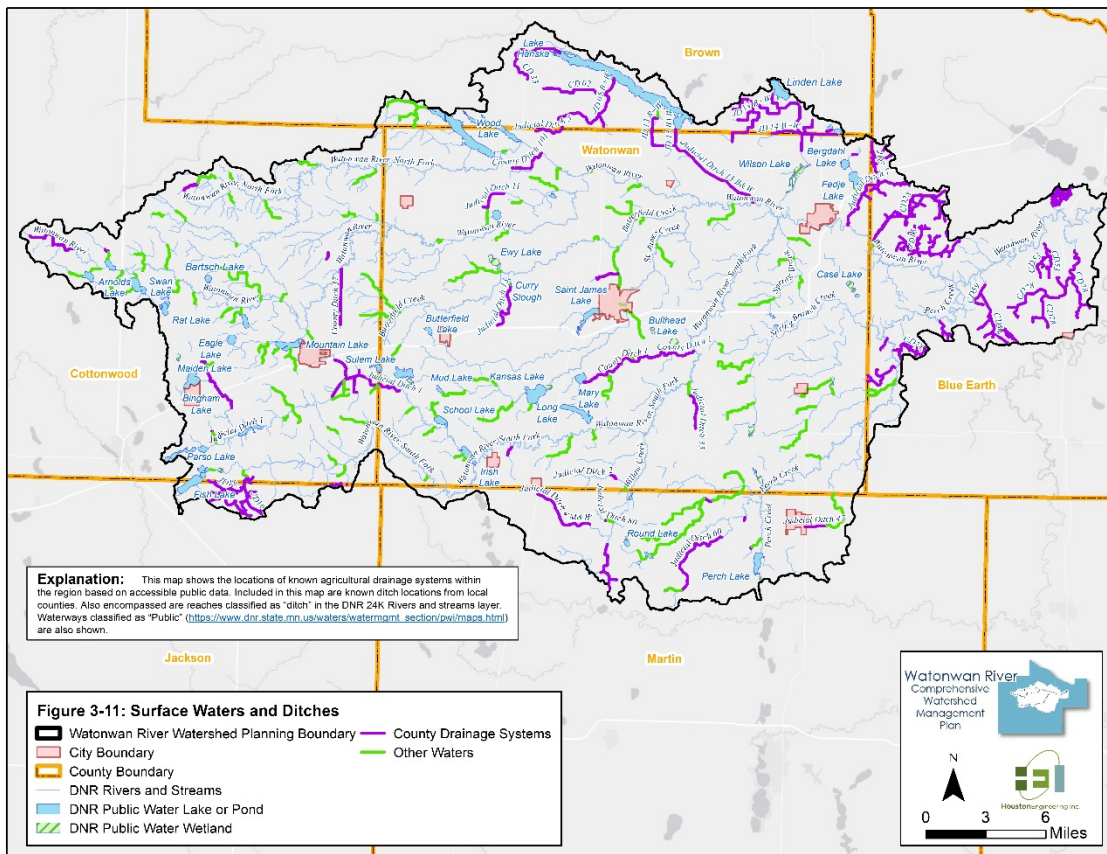
Low Impact Development (LID) along with Conservation Design are techniques used for managing urban and rural stormwater systems in developed areas. LID replicated natural filtration processes of a site's pre-development hydrology. There are no municipal separate stormwater sewer system (MS4) communities in the WRW. Conservation Design is a planning process that clusters development in a portion of a site so other areas remain in natural and/or agricultural use. Where appropriate, utilizing methods such as cluster development, along with regulatory controls, stewards' lands and builds resilient communities.

The watershed network is defined by the Watowan River and its major tributaries: North Fork of the Watowan River, South Fork of the Watowan River, St. James Creek, and Perch Creek; other smaller streams, public and private drainage systems, lakes, and wetlands complete the whole drainage network.

Total length of streams is 1,074 miles of which 685 miles are intermittent and 389 miles are perennial.

The planning area has a total of 331 stream crossings, either a bridge or culvert. There are 11 dams in the watershed; of those, two are considered by the DNR as potential barriers to fish passage. Seven of the dams are at lake outlets. Fish barriers exist on both the North Fork and South Fork of the Watonwan River. For example, there is a culvert on the Watonwan River in Nelson Township (township road 67) that is currently a barrier to fish passage. The 'Watonwan River Diversion' is a low head dam and water diversion structure positioned in the South Fork Watonwan River used to impound water to the level of a pump that transports water uphill to Long Lake (DNR, 2014). Figure 3-12 only contains information that was available across the entire watershed. There is subsurface drainage throughout the watershed that is not represented in this figure.

**Figure 3-12: Surface water and ditches in the WRW.**



### 3.9 Water-based Recreation Areas

According to the DNR Recreation Compass, there are many lakes with public boat access, waterfowl production areas (WPAs), wildlife management areas (WMAs), and aquatic management areas (AMAs) that provide public access to water related recreation. More information on specific resources can be found on the DNR's websites:

- ✈ DNR, Recreation Compass: <https://www.dnr.state.mn.us/maps/compass/index.html>
- ✈ DNR, LakeFinder: <https://www.dnr.state.mn.us/lakefind/index.html>
- ✈ DNR, Water Access Sites: <https://www.dnr.state.mn.us/lakefind/was/report.html>

The DNR lists part of the Watonwan River as a State Water Trail encouraging canoers and kayakers to enjoy

the nearly 30 miles of gentle currents of the Watowan River from Madelia to Garden City. The amenities associated with the water trail are described here:  
[https://files.dnr.state.mn.us/maps/canoe\\_routes/minnesota3.pdf](https://files.dnr.state.mn.us/maps/canoe_routes/minnesota3.pdf).

Fishing is a popular recreational activity in the watershed, with walleye often caught on the mainstem of the Watowan River (MPCA, 2016). There are many public parks in the watershed with water-based recreation as well. Additional public water access and fishing pier maps by county can be accessed here:  
[https://www.dnr.state.mn.us/water\\_access/counties.html](https://www.dnr.state.mn.us/water_access/counties.html).

### 3.10 Fish and Wildlife Habitat, Rare and Endangered Species

The WRCWMP area is located within the Minnesota River Prairie Subsection of the North Central Glaciated Plains Section of the Prairie Parkland Province. Presently, agriculture is the dominant land use. This subsection is the heart of the Minnesota Corn belt. Pre-settlement vegetation included tallgrass prairie, with many islands of wet prairie. Further, Big Woods extended throughout the WRW along stream banks and floodplains, as vegetation here was better protected from fire. Portions of the Big Stone Moraine supported dry and dry-mesic prairie. There were also dry gravel prairies on kames. Upland prairie species were common throughout most of this ecological subsection. Remnant stands of tallgrass prairie are now rare. Fire was the most common natural disturbance before settlement. Fire suppression has allowed woodlands to develop from what were originally oak openings of brush prairies. Other causes of disturbance are floods and tornadoes (DNR, 2018).

#### **Habitat**

Healthy terrestrial habitat helps to promote greater species diversity and abundance, more resilient ecosystems, and, subsequently, greater ecosystem services. Within the Watowan River Watershed, key factors associated with terrestrial habitat include:

- ✦ Habitat Loss – complete removal of a parcel of habitat
- ✦ Habitat degradation – habitat is still present, but the quality of the habitat has been substantially reduced
- ✦ Habitat fragmentation – the breakup of large contiguous or connected habitat into smaller disconnected parcels or fragments.

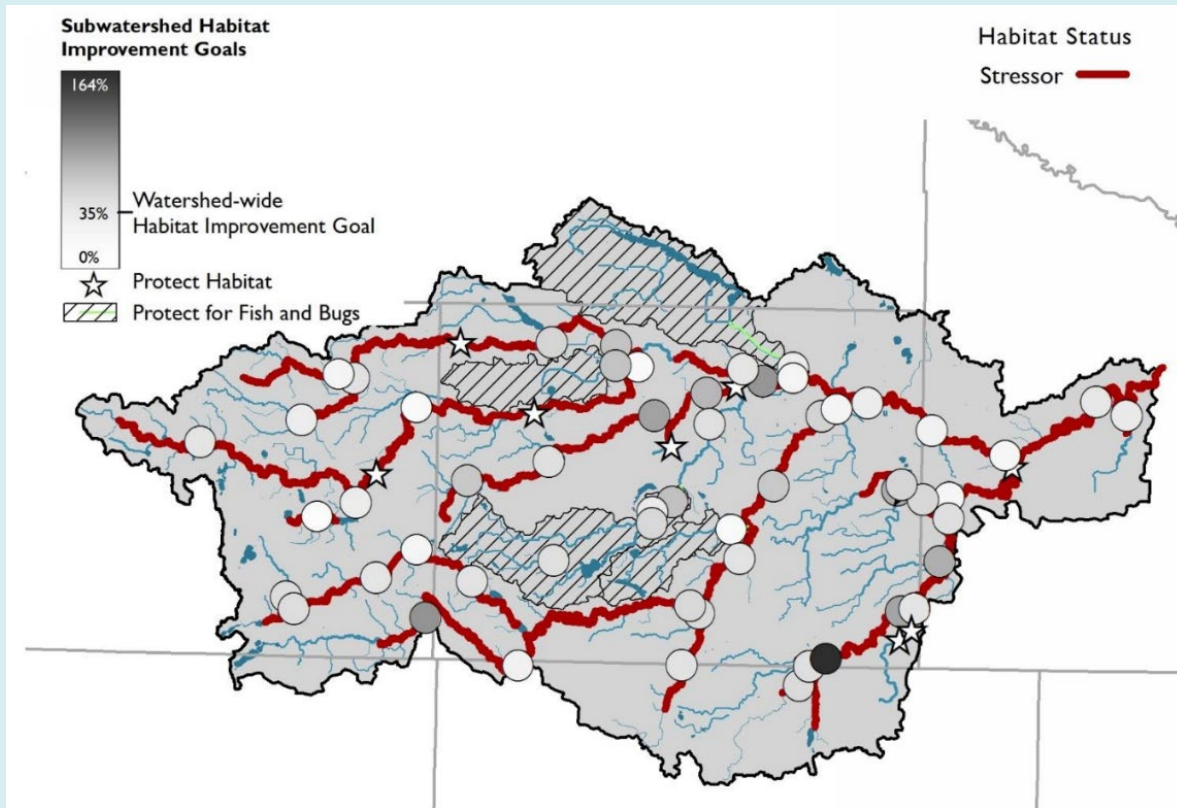


Aquatic Habitat, as identified in the Watowan River WRAPS (MPCAa, 2020), refers to the physical stream habitat. Important stream habitat components include: stream size and channel dimensions, channel gradient (slope), channel substrate, habitat complexity and cover, vegetation cover and structure in the riparian zone, and channel-riparian interactions. Degraded habitat reduces aquatic life's ability to feed, shelter, and reproduce, which results in altered behavior, increased mortality, and decreased populations. Other areas not identified in the WRAPS, specifically to bolster waterfowl production, include WMAs, WPAs, other wetlands, and some easements. See associated resource concern maps in Section 4 for more information, which includes data from the Minnesota Wildlife Action Plan (DNR, 2015).

Of the 30 bio-impaired stream reaches, degraded habitat was identified as a stressor in all 30 stream reaches. The MPCA Stream Habitat Assessment (MSHA; PCA, 2014) scores in the WRW range from 24-69 (Figure 3-13) with an average score of 50. The specific habitat issues identified in the WRW show a complex, interconnected set of factors that are driven by primarily a handful of stressors. Of the 30 stream reaches

stressed by lack of habitat, most showed some issues with land use, riparian vegetation, channel instability, and excess sediment (Table 3-5). Without an adequate riparian buffer, issues such as excessive flow – which causes stream instability and sediment issues – are magnified because the stream lacks the strength to resist erosion.

**Figure 3-13: Watowan River Watershed – Aquatic Habitat Improvement Goals prescribed in the WRAPS (MPCAA, 2020)**



The watershed-wide aquatic habitat goal for the Watowan River Watershed is to increase the average MSHA score in the watershed by 35%, from the current score of 50 (fair) to a score of >66. The relative amount of change needed at a point location is illustrated by the color of the dot: the darker the dot, the more improvement needed. Locations with good habitat scores, illustrated with stars, should be protected. (WRAPS, January 2020, p. 35)

**Table 3-4: Watonwan River Watershed habitat stressors (MPCAa, 2020)**

Stream	AUID	Flow Alteration	Degraded Riparian	Altered Channel	Bedded Sediment	Streambank Erosion	Lack of Cover
Watonwan River	501				x	x	?
Unnamed Creek	505		x	x	x		x
Watonwan River	510		x		x	x	x
Watonwan River	511				x	x	x
Butterfield Creek	516	x	x	x	x	x	x
Watonwan River	517	x	x		x	x	x
Perch Creek	523				?	x	x
Perch Creek	524		x		x	x	x
Unnamed Creek	526	x	x	x	x	?	x
Spring Brook	540			x	x	?	
Watonwan River	547	x			x	x	
Unnamed Creek	549	x	x	x		x	x
Unnamed Creek	552		x	x	?		x
Unnamed Creek	557	x		x	x	x	
County Ditch 78	559		x	x		x	x

Stream	AUID	Flow Alteration	Degraded Riparian	Altered Channel	Bedded Sediment	Streambank Erosion	Lack of Cover
Unnamed Creek	561	x	x	?	x	x	x
Watonwan Creek	563				x	x	
Watonwan Creek	564	x	x	x	x	x	
Watonwan Creek	565	x		x		x	
Watonwan Creek	566	x	x		x	x	
Watonwan Creek	567	x	x	x	x	x	x
Watonwan Creek	568	x	x		x	x	
Watonwan Creek	569	x	x	x	x	x	x
Willow Creek	571	x	x		x	x	x
Spring Branch Creek	574	x	x	x	x	x	x
Mink Creek	577	x	x	x	x	x	
Judicial Ditch 1	579	x	x	x	x	x	x
Judicial Ditch 1	580	x		x	x		x
Judicial Ditch 1	581	x	x	x	?	x	x
Unnamed Creek	583	x	x	x	x	x	x

x = likely source or driver    ? = unknown effect    <blank> = not likely source or driver

*The specific sources of lack of habitat were assessed for the Watonwan River Watershed in the Stressor ID report (WRAPS, January 2020, p. 34). Excessive flow alteration (altered hydrology) and degraded riparian areas are two driving factors contributing to other sources.*

In addition to streams, lakes are important habitat features within the WRW. The DNR Fisheries Lakes of Biological Significance (2015 GIS layer) identifies high quality lakes based on unique in-lake habitat features. Specifically, waterbodies noted for wildlife habitat include: Perch Creek provides Blanding's Turtle (endangered species) habitat; Lake Hanska is a designated wildlife lake; Bat Lake is in the 'outstanding' biological significance class with higher quality aquatic plant assemblages; Linden Lake and an unnamed wetland located East of Lewisville ranked as moderate with diverse bird life; and lastly, Kansas, Hanska, Bingham, and Fedji Lakes have opportunities to improve water fowl production.

### Rare Natural Features and High Value Resources

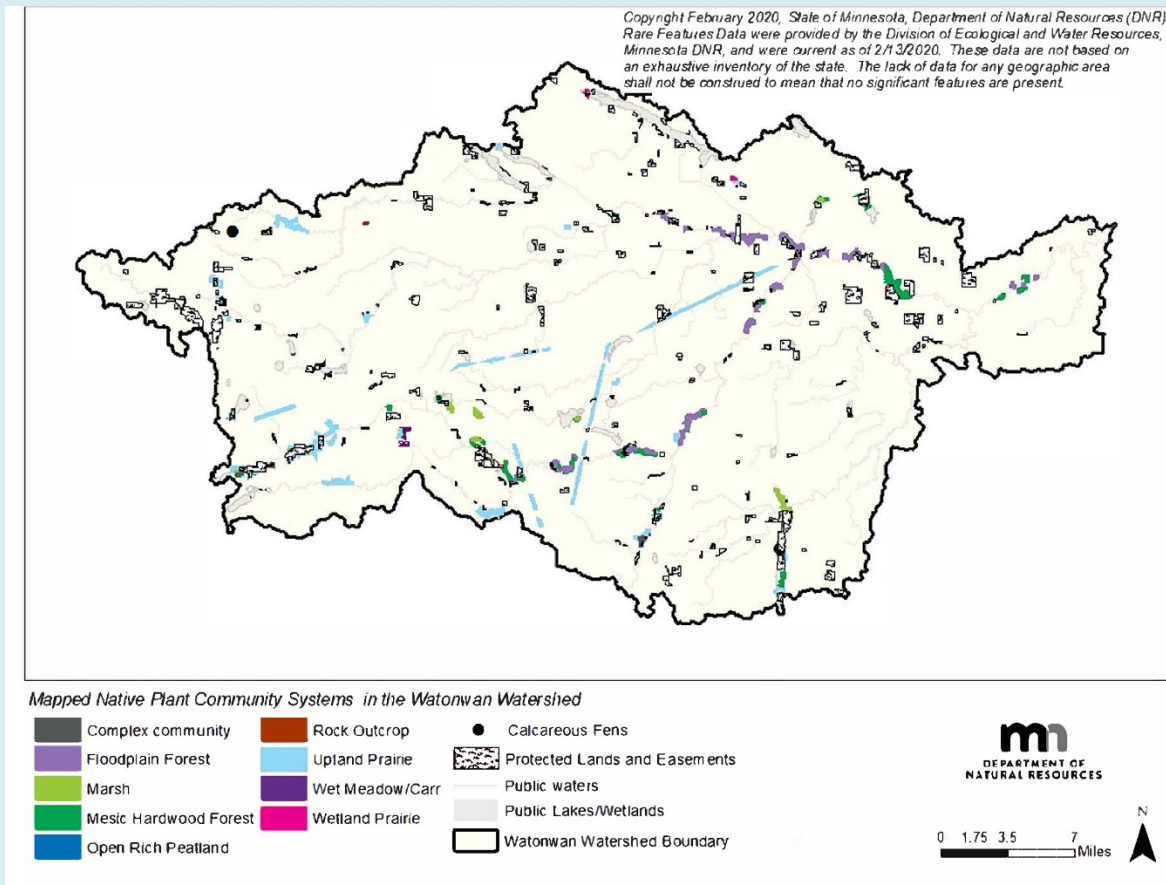
According to the DNR, *Minnesota River Prairie Subsection Profile*, there are 116 species in Greatest Conservation Need within the Minnesota River Prairie ecological subsection (DNR, 2018). There are 14 endangered and threatened species documented in the WRW (DNR 2018b, Appendix F). There are an additional 47 species that are in suspected decline and are listed as special concern, species of greatest conservation need, or non-listed species (DNR 2020, Appendix F). These species are often tied to native plant communities that may also be in decline. In addition, other species rely on these communities to provide migration or normal travel corridors. In the WRW there are clusters of rare species that primarily occur along the main branch of the Watonwan River and Perch Creek. Most documented species are either tied to upland prairie and grasslands or aquatic habitats like rivers, lakes, streams, and wetlands. Maintaining upland and lowland connections across the watershed is important for retaining these species and for achieving stream stability and good water quality. Prairie and wetland-non forest habitats are key habitats that support the species that naturally reside in this region. Managing invasive species, use of prescribed fire, grassland management, prairie protection and restoration, and wetland protection/enhancement/restoration would assist native prairie habitats and the species they support.

Rare features contribute to the health of the habitat and environment that surrounds us. Some even contribute directly to local economies in the form of recreation—including hunting/fishing, wildlife viewing, canoeing/kayaking, and camping. The DNR has a statutory responsibility to conserve rare features ([Minnesota Stat. 84.0895](#)). Rare features can include species of unique plants and animals as well as native plant

communities (habitats). Rare features are often key indicators of the health of our environment. When they decline, it is usually a signal that a natural process or element is not functioning well.

There are 23 kinds of native plant communities in the WRW. They range from dry and mesic prairies to marshes, seepage meadows, and floodplain forests. Figure 3-14 illustrates existing native plant communities. The WRW has lost many of its native plant communities so those that remain are a high priority for preservation in order to achieve watershed health. Dry and mesic prairies are the dominant remnant land cover with marshes and seepage meadows and floodplain forests tied for a close second. All the native plant communities that remain are considered critically imperiled, imperiled, or vulnerable to extirpation.

**Figure 3-14: Watonwan Watershed Native Plant Communities (Procured by DNR, 2020).**



Connections between wildlife species, native plant communities, lakes and wetland features are many and often complex. In order to conserve these features, a tiered approach should be used—preserving native communities, restoration and enhancement to create larger habitat networks, and incorporating best management practices such as soil health into the agricultural landscape. All three tiers can be implemented at the same time and focusing on these three levels of restoration and protection strategies maximizes conservation benefits. Remaining clusters of rare or sensitive natural features helps maintain high quality habitat while their scarcity elsewhere in the watershed signal the need for restoration or adaptive management. Maintaining and restoring biological diversity, abundance, and resiliency is a component of integrated watershed health. The more diverse an area is, the better chance it has at long-term health and self-sustainability. Over the years, there will be variations in invasive species pressure, soil conditions, and climate such as extreme drought or extreme moisture. Having a diversity of communities and species ensures that more of these will become established/adapted to these extremes and can therefore meet the ebb and flow of change.

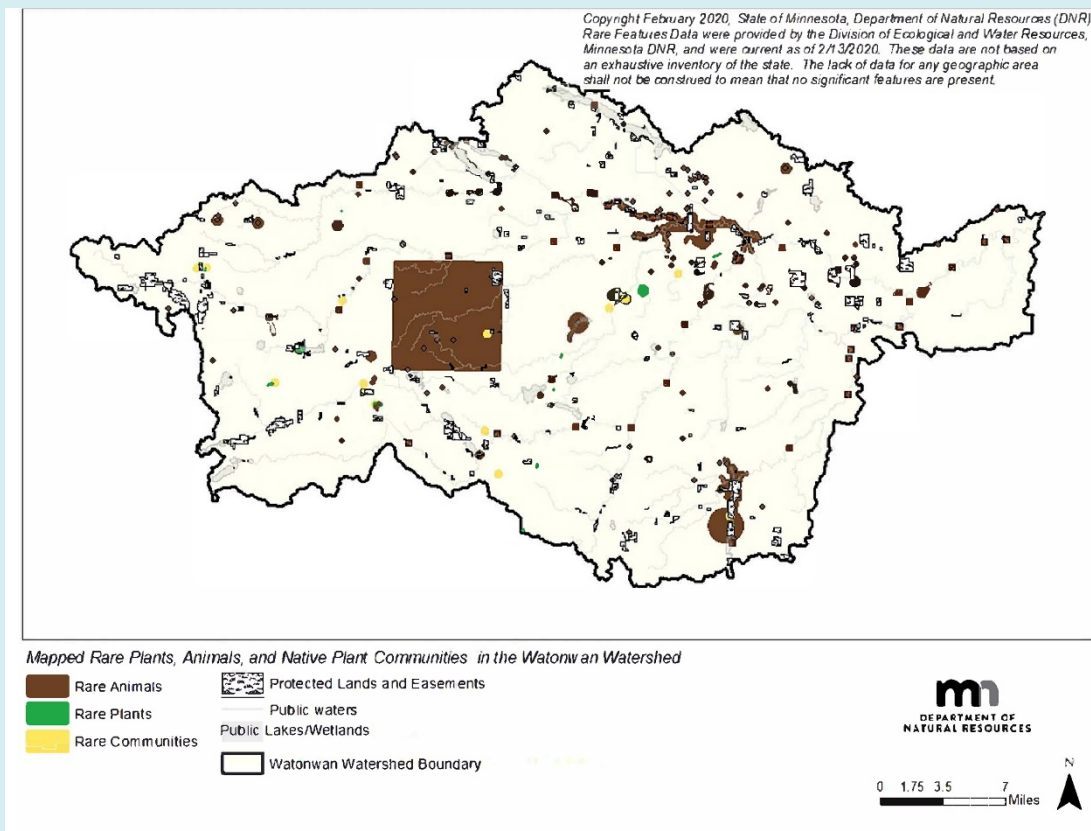
The WRW has concentrations of high value ecological features that primarily occur along the main and south branches of the Watonwan River, Perch Creek, Judicial Ditch 1 and their associated tributaries (Figure 3-14). The first two are identified as priority habitat networks in the Minnesota Wildlife Action Plan (2015-2025). The western lobe of the watershed also includes a priority area with a goal of establishing a prairie and wetland connected habitat corridor for the Minnesota Prairie Conservation Plan. These areas are hot spots in terms of conservation potential. There are opportunities to create a connected corridor of native and restored plant communities



building off of the existing Perch Creek, Younger Brothers, Little Swan, and Delft Wildlife Management Areas that occur along the Watowan River, Perch Creek, and the western lobe of the watershed. These communities, which include priority fish and wildlife habitat areas, wetland/upland complexes, and natural areas not only provide quality habitat, but sequester carbon, provide a home for rare species, contribute to clean water, and offer many recreational opportunities.

Further, there are two designated calcareous fens in the WRW (Delton 20 and Perch Creek WMA, Figure 3-15). Calcareous fens are rare and distinctive peat-accumulating wetlands. They depend on a constant supply of upwelling groundwater rich in calcium and other minerals. This calcium-rich environment supports highly diverse and unique rare plants that tolerate low oxygen conditions, calcium carbonate deposits, low nutrient availability, and relatively cold organic soils (peat)—the calcareous fen ecosystem. Because these types of wetlands are one of the rarest natural communities in the United States, they are specially protected from harm under Minnesota Statute (103G.223). Fens are connected to a larger groundwater system. They are good indicators of groundwater sustainability, contribute to improved water quality and ecological diversity, and are an invaluable part of Minnesota’s rich natural heritage. Once lost, these communities cannot be replaced.

**Figure 3-15: Watowan River Watershed – Rare Plants, Animals, and Native Plant Communities (Procured by DNR, 2020).**



### 3.11 Existing Land Uses and Anticipated Land Use Changes

Agriculture is the predominant land use within the watershed, accounting for approximately 87% of the land use. In general, corn/soybean rotations comprise nearly 93% of the cropped lands within the watershed. Land ownership is comprised of 97% private landowners; 2.08% state; 0.21% private major; and 0.09% federally owned lands (Greater Blue Earth River Basin Alliance, 2018).

Incorporated communities with all or part of the corporate limits in the WRW are the following:

- ✦ Bingham Lake – Cottonwood County
- ✦ Butterfield – Watowan County
- ✦ Darfur – Watowan County
- ✦ La Salle – Watowan County
- ✦ Lewisville – Watowan County
- ✦ Madelia – Watowan County
- ✦ Mountain Lake – Cottonwood County
- ✦ Odin – Watowan County
- ✦ Ormsby – Watowan County
- ✦ St. James – Watowan County
- ✦ Truman – Martin County
- ✦ Vernon Center – Blue Earth County

Unincorporated communities located in the WRW include, but are not limited to:

- ✦ Garden City – Blue Earth County
- ✦ Delft – Cottonwood County
- ✦ Godahl – Watowan County

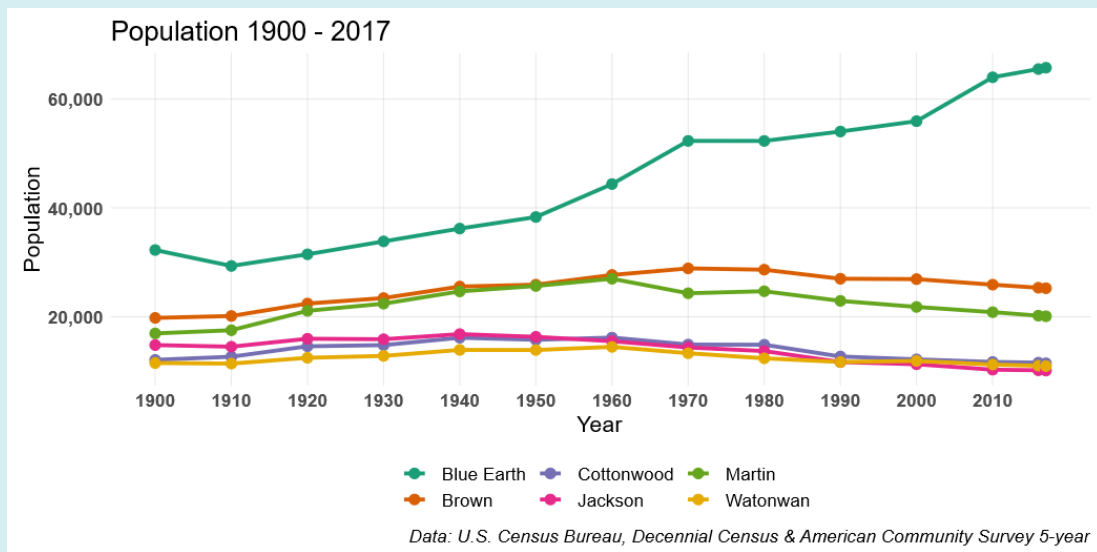
It is anticipated that land use will remain relatively consistent with current use during the implementation of the plan. Agricultural land use and the rural-urban landscapes will continue to develop. Due to the scope of this narrative, additional information can be found on the local jurisdiction’s (county, city, township) websites, as available.

### 3.12 Socioeconomic Information

According to the Minnesota Department of Administration, State Demographic Center, population statistics for each township, in whole or partially within the WRW are provided in Table 3-7. There is a total estimation of 8,443 individuals and 3,449 households within the plan watershed. Population trends from 1900 to 2017 for each county located within the watershed are provided below in Figure 3-16. A graphic showing the percentages of employment by industry type are provided by The Rural Atlas and included below (Figure 3-17).

The partners involved in the development of this plan reviewed the available data sources for describing socioeconomic information within the watershed. The steering committee decided that the information within this section most accurately represented the watershed, recognizing the complexities of socioeconomic information at a watershed scale.

**Figure 3-16: Population for each Census year, per County within the Watowan River Watershed.**



Population trends charts : The Rural Atlas – Chapter 1: People – Population for each census year, accessed Oct. 2019: [https://center-for-rural-policy.shinyapps.io/Rural\\_Atlas/](https://center-for-rural-policy.shinyapps.io/Rural_Atlas/).

**Table 3-5: Current populations within the Watowan River Watershed (Please note: Some populations within municipal/township borders may be outside of the watershed boundary)(MN State Demographic Center\*).**

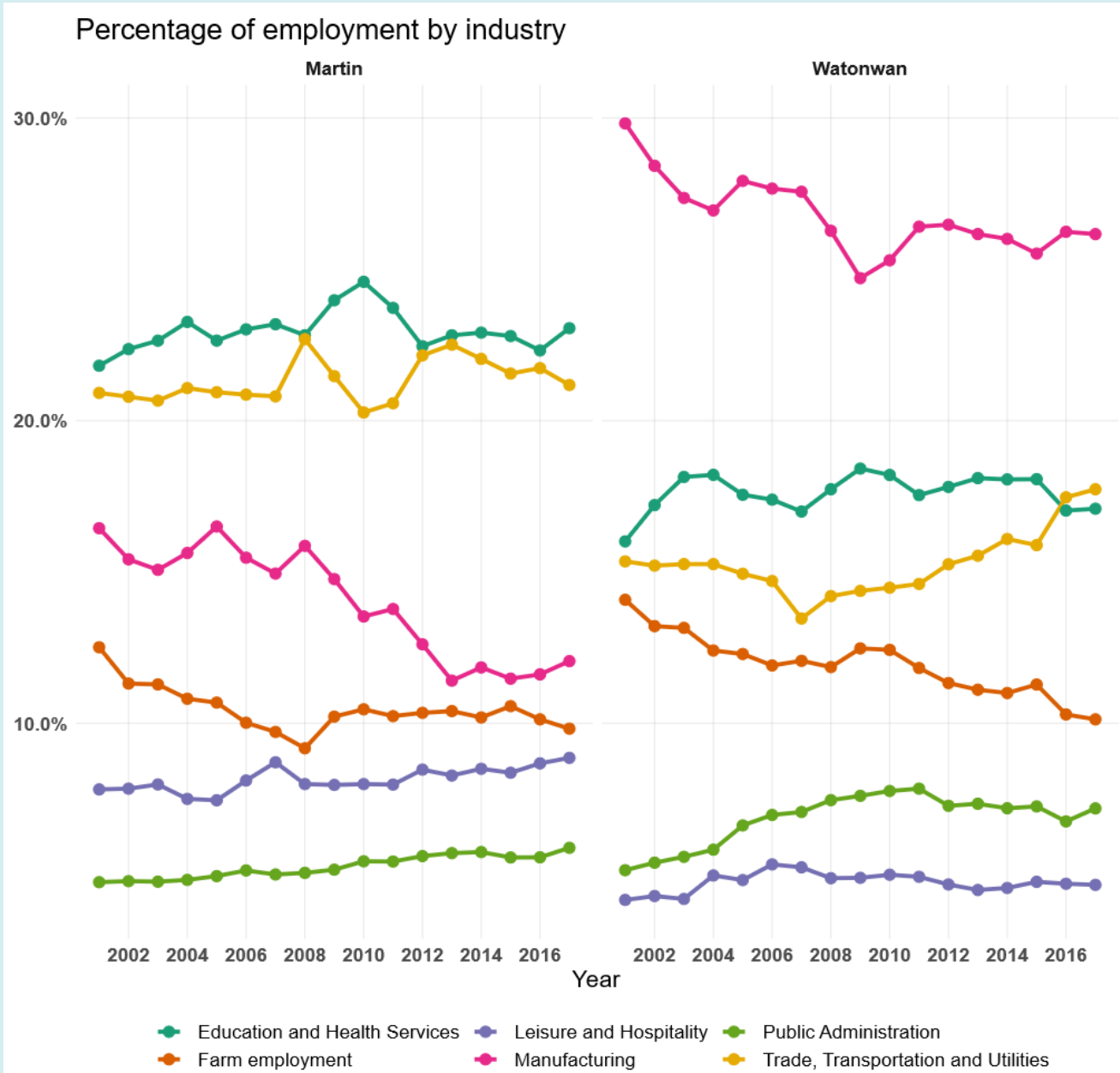
Municipalities and Townships within Watowan River Watershed	County	Population (2018)*	Households (2018)*
Ceresco TWP	Blue Earth	210	84
Garden City	Blue Earth	255**	-
Garden City TWP	Blue Earth	647	261
Lincoln TWP	Blue Earth	188	80
Pleasant Mound TWP	Blue Earth	195	88
Vernon Center	Blue Earth	303	122
Vernon Center TWP	Blue Earth	236	94
Albin TWP	Brown	329	126
Lake Hanska TWP	Brown	322	132
Linden TWP	Brown	276	108
Mulligan TWP	Brown	210	86
Amboy TWP	Cottonwood	150	66
Bingham Lake	Cottonwood	128	57
Carson TWP	Cottonwood	255	104
Dale TWP	Cottonwood	131	57
Delton TWP	Cottonwood	119	46
Lakeside TWP	Cottonwood	231	93
Midway TWP	Cottonwood	196	79
Mountain Lake	Cottonwood	2,108	854
Mountain Lake TWP	Cottonwood	371	98
Selma TWP	Cottonwood	176	76

Municipalities and Townships within Watowan River Watershed	County	Population (2018)*	Households (2018)*
Christiania TWP	Jackson	240	111
Kimball TWP	Jackson	123	47
Cedar TWP	Martin	205	87
Galena TWP	Martin	228	89
Ormsby (Partial)	Martin	57	27
Truman	Martin	1,058	468
Waverly TWP	Martin	189	75
Westford TWP	Martin	283	117
Adrian TWP	Watowan	132	66
Antrim TWP	Watowan	226	96
Butterfield	Watowan	572	218
Butterfield TWP	Watowan	205	90
Fieldon TWP	Watowan	202	85
Lewisville	Watowan	243	101
Long Lake TWP	Watowan	319	141
Madelia	Watowan	2,302	909
Madelia TWP	Watowan	334	130
Nelson TWP	Watowan	273	112
Odin	Watowan	103	54
Odin TWP	Watowan	151	65
Ormsby (Partial)	Watowan	70	37
Riverdale TWP	Watowan	281	123
Rosendale TWP	Watowan	291	121
St. James	Watowan	4,545	1,847
St. James TWP	Watowan	248	106
South Branch TWP	Watowan	271	110
Total		19,932	8,143

\*PopFinder for Cities and Townships, through the MN Department of Administration, State Demographic Center, accessed April 2020: <https://mn.gov/admin/demography/data-by-topic/population-data/our-estimates/pop-finder2.jsp>.

\*\*2010 US Census

**Figure 3-17: Percentage of employment by industry – Martin and Watowan Counties (The Rural Atlas).**



Bureau of Labor Statistics - Quarterly Census of Employment and Wages  
Bureau of Economic Analysis - Local Area Personal Income and Employment  
Note: Due to disclosure rules some industries may not have data points each year.

Source: The Rural Atlas, updated with 2017 census data, Chapter 2 – Economic Vitality, earnings per job decreasing in our more rural areas. Accessed Oct. 2019: <https://center-for-rural-policy.shinyapps.io/RuralAtlas/>.



# 4.

## Identification and Prioritization of Resource Categories, Concerns, and Issues

## SECTION 4.0 IDENTIFICATION AND PRIORITIZATION OF RESOURCE CATEGORIES, CONCERNS, AND ISSUES

According to the BWSR One Watershed, One Plan: Plan Content Requirements Version 2.0 (BWSR, 2018; Appendix G), the plan must contain:

- ✦ A summary of the issues and resource concerns identified from all sources for consideration in this section;
- ✦ The steps used to consider and prioritize the identified resources and issues; and
- ✦ A list of the agreed upon priority resources and issues for the watershed and a brief issue statement that describes the relevance of the issue for the planning area.

The outcome from these efforts is a targeted implementation schedule focused on achieving goals associated with the prioritized issues.

The following definitions are developed to establish a common language for communicating information within this plan section:

- ✦ **Prioritize** – Determining the relative importance and precedence of the resources and issues identified in this comprehensive watershed plan.
- ✦ **Resource Category** – or “resource” – A natural, economic, educational, biotic, aesthetic, land, or similar asset. Resources are generally considered something that can be managed, and are generally broad, such as surface water, groundwater, or education and outreach.
- ✦ **Resource Concern** – or “concern” – A physical, biological, chemical, geological, or social subset or component of a resource. For example, the resource “surface water” can be further refined into several components, including streams and rivers, lakes, and wetlands.
- ✦ **Resource Issue** – or “issue” – A factor, stressor, or difficulty resulting in an adverse consequence for a concern. A concern can have one or many issues. For instance, nitrate-nitrogen causing the contamination of drinking water supply could be an issue (e.g. nitrate-nitrogen) affecting a concern (e.g. drinking water supplies).

### 4.1 Identification and Summary of Resource Categories, Concerns, and Issues

The process for identifying and describing the resource categories, concerns, and issues included gathering and reviewing the following:

- ✦ Existing management plans, studies, reports, data, and other information; including those within the Watonwan River Watershed: Stressor Identification Report, Monitoring and Assessment Report, Watershed Restoration and Protection Strategies (WRAPS), Groundwater Restoration and Protection Strategies (GRAPS), Hydrology, Connectivity, and Geomorphology Assessment Report; existing Total Maximum Daily Load (TMDL) reports, the Minnesota River and Greater Blue Earth River Basin TMDL and TSS; existing county water plans, and similar documents (Appendix H);
- ✦ Comment letters provided by state agencies (Commenting entities and their responses can be viewed in Appendix I);
- ✦ Input from members of the Steering Team, Advisory Committee, Policy Committee, and the general public (public kickoff meeting and online survey); and

- ✦ The knowledge of local water and resource managers, including county and SWCD staff.

Resource categories, concerns, and issues were identified and inventoried within an “Issues Table,” prior to prioritization (Appendix J). This table illustrates how resource concerns are refinements of a resource category, and how multiple issues can impact each resource concern. The Issues Table was used to confirm that all issues impacting resources within the WRCWMP were identified prior to issue prioritization. Appendix J shows the complete list of all resource categories, concerns, and issues that were inventoried and considered for plan development.

Maps were developed for resource concerns and issues identified within the Issues Table when Geographic Information System (GIS) data was available. This mapping was done to tell a story of the watershed and its issues, geographically map where resource categories, concerns, and issues were located, and allow for the development of a targeted implementation schedule focused on specific locations of issues and resources on the landscape. For readability purposes, these maps are included at the end of this plan section (Figures 4-1 through 4-10).

The issue prioritization process and the resulting priority issues are provided in the following subsections.

## 4.2 Issue Prioritization Process

As described by BWSR policy, this plan is not expected to address all identified issues during its ten-year lifespan. This plan does not reject any identified issues, but rather places issues into a prioritization structure based on importance or impact to resources in the watershed.

Priority tiers are used to guide creation of measurable goals aimed at priority issues (Section 5), and the timeline and aggressiveness of implementation within the targeted implementation schedule (Section 6).

During plan development, participants followed a thorough and rigorous process to prioritize identified issues. Issues were prioritized by soliciting stakeholder and public input on which issues were most important to them and local subject matter expertise. To begin the prioritization process, a public kickoff meeting was hosted by the WWPP on January 28, 2019 to solicit feedback from diverse stakeholders. Approximately 100 people attended the kickoff meeting at the St. James American Legion.



*Public kickoff meeting, St. James, MN*

At the public kickoff meeting, participating stakeholders could place up to 10 sticker dots to express preference for the importance of one or more issues. A stakeholder could choose to place all 10 dots on a single issue or could spread out dots on up to 10 different issues. Attendees also had the opportunity to add issues which were not listed. At the public kickoff meeting, a total of 555 dots were placed. Input for each issue was tallied and sorted into priority levels based on total number of dots.



**Table 4-1: Issue prioritization structure for public participation.**

Priority Level	Public Priority Dot Threshold
High	11 and up
Medium	6-10
Low	0-5

The Steering Team used input received from the public kickoff meeting and kickoff survey, local expertise, and state agency comments to further sort issues into “High”, “Medium”, and “Low” priority levels (Table 4-1). Initially, issues were sorted into priority levels based solely on the number of dots tallied at the public kickoff meeting.

In addition, an online survey was developed and made available to the public. This online survey was used in recognition that some stakeholders may not have been able to attend the in-person public kickoff. This online survey served as an added tool for gather feedback from interested stakeholders on priority issues within the watershed (Appendix K).

Once this exercise was completed, the Steering Team increased priority levels for some issues based on the results of an online survey, local expertise, or state agency comment. The Steering Team did not decrease any issue’s priority level determined by public input.

Similar Medium and High priority level issues were grouped to generate issue statements, serving as the basis for measurable goal development (Appendix L). Plan issue statements were then reviewed by the Advisory Committee to refine language and ensure consensus on priority issues. The final list of priority issues was adjusted based on Advisory Committee input and presented to the Policy Committee for final approval on June 16, 2019.





### 4.3 Priority Issues


This plan establishes priority issues consistent with BWSR 1W1P Plan Content Requirements. While all issues are important and worthy of local management efforts, limited resources for implementing solutions are available and not all issues can be addressed within the timeframe of a ten-year plan. Therefore, issue priority levels (High, Medium, and Low) designate the timeline or aggressiveness of addressing issues with the plan. Those issues identified as High and Medium priority levels are classified as Tier 1 priority issues, are assigned measurable goals, and are the focus of initial implementation efforts (Table 4-2). Low priority level issues are classified as Tier 2 issues and are not directly addressed within this 10-year plan (Table 4-3).

#### **Tier 1 Priority Issues**

Priority issues (High and Medium priority levels) indicate the highest expressed preference during the issue prioritization process and were confirmed as the highest priority by the Policy Committee (Table 4-2).

**Table 4-2: Tier 1 priority issues.**



Resource Concern	Issue Number	Priority Issue Statement
 <b>Surface Water</b>		
Agricultural Drainage Systems	SW.1.1	Level of Multipurpose Drainage Management utility to reduce downstream peak flows and flooding, reduce erosion and sedimentation, and protect or improve water quality.
	SW.1.2	Lack of conservation practices on drainage systems.
Lakes	SW.2.1	Elevated nutrients and sediment in lakes.
	SW.2.2	Management of lake levels and associated watershed flow conveyance.
Rivers and Streams	SW.3.1	Elevated nutrients and sediment in rivers and streams.
	SW.3.2	Elevated bacteria levels in rivers and streams.
	SW.3.3	Loss of lateral and longitudinal floodplain access and connectivity.
	SW.3.4	Streambank, ravine, and bluff erosion.
Wetlands	SW.4.1	Loss of wetland functions in watershed.
Surface Runoff and Flooding	SW.5.1	Land use changes leading to loss of vegetative cover and field residue.
	SW.5.2	Land use changes leading to the loss of natural storage.
	SW.5.3	Level of watershed and community resilience to extreme weather events.
 <b>Groundwater</b>		
Groundwater Quality	GW.1.1	Elevated levels of nitrates in groundwater.
	GW.1.2	Contaminants in groundwater.
Groundwater Quantity	GW.2.1	Groundwater use and loss of recharge.
 <b>Habitat and Recreation</b>		
Aquatic Habitat	HR.1.1	Aquatic and riparian habitat loss from development and flow variability.
	HR.1.2	Aquatic habitat loss from bank erosion and channel instability in creeks, streams, and rivers.
	HR.1.3	Aquatic invasive and nuisance species and their impacts.
Terrestrial Habitat	HR.2.1	Terrestrial habitat fragmentation and loss
	HR.2.2	Terrestrial invasive and nuisance species and their impacts.
Recreation	HR.3.1	The lack of recreational access and connectivity to natural resources and communities within the watershed.
 <b>Local Knowledge Base</b>		
Public Awareness	LKB.1.1	Level of landowner awareness and understanding of Best Management Practices (BMPs) for environmental conservation.





	LKB.1.2	Level of public awareness and knowledge of issues and potential implementation roadblocks associated with surface water, groundwater, habitat and recreation, and land stewardship.
 <b>Land Stewardship</b>		
Urban Stewardship	LS.1.1	The impact of impervious surfaces on stormwater runoff and associated impacts on surface water.
	LS.1.2	Ensuring adequate management of wastewater treatment facilities and systems.
Rural Stewardship	LS.2.1	The need to increase soil health and its impact on agricultural productivity and natural resources.
	LS.2.2	Subsurface Sewage Treatment Systems (SSTS) and their potential to contaminate groundwater and degrade surface water.
	LS.2.3	Addressing inadequate manure management.
Riparian and Shoreland Stewardship	LS.3.1	Level of riparian and shoreland natural resource management.

### Tier 2 Issues

Tier 2 issues are lower priorities than Tier 1 (Table 4-3). These issues received a lower proportion of dots at the public kickoff meeting and were not elevated based on local subject matter expertise. These issues were confirmed by the Policy Committee as having a lower priority at this time.

**Table 4-3: Tier 2 issues.**

Resource Concern	Issue Number	Issue Statement
 <b>Surface Water</b>		
Lakes	SW.2.3	Shoreland instability as it relates to erosion and impacts on surface water quality.
Rivers and Streams	SW.3.5	Elevated concentrations of suspended solids, and sediment approaching (protection) or exceeding (restoration) water quality standards for aquatic life, which can lead to aquatic life impairments.
	SW.3.6	Elevated concentrations of bacteria approaching (protection) or exceeding (restoration) water quality standards which can lead to aquatic recreation impairments.
	SW.3.7	Reduced concentrations of dissolved oxygen approaching (protection) or below (restoration) tolerable levels that can affect the diversity of quality of aquatic life.
Wetlands	SW.4.2	Protect, enhance, and restore wetlands to provide nutrient treatment functions.
	SW.4.3	Protect, enhance, and restore wetlands to provide recreation opportunities.
 <b>Groundwater</b>		
Groundwater Quality	GW.1.3	Elevated levels of bacteria in groundwater.

Groundwater Quantity	GW.2.2	Potential droughts will place additional demands on domestic water supply.
	GW.2.3	Nitrate nitrogen in surficial sands and recharge of buried sands and bedrock aquifers.
	GW.2.4	Growing trend of ethanol production may stress ground and surface water supplies during periods of drought.
	GW.2.5	Gravel mining and its impacts on groundwater recharge.
	GW.2.6	Limited amount and extent of aquifers in the watershed to supply groundwater.
 <b>Habitat and Recreation</b>		
Aquatic Habitat	HR.1.4	Lack of hydrologic connectivity as the primary stressor on bio-impaired surface waters.
	HR.1.5	Lack of in-stream habitat as a primary stressor on bio-impaired surface waters.
	HR.1.6	Protection and restoration of declining and at-risk aquatic species.
Terrestrial Habitat	HR.2.3	Inadequate riparian cover and connectivity and its impact on terrestrial species habitat.
	HR.2.4	Invasive species and their impacts on high quality areas of native vegetation.
	HR.2.5	Planned and prioritized areas for structural and natural resources protection.
	HR.2.6	Protection and restoration of declining and at-risk terrestrial species.
 <b>Local Knowledge Base</b>		
Public Awareness	LKB.1.3	The need for greater understanding and awareness of water issues, like drainage, erosion, fertilizer use, prescription and non-prescription drug disposal, and household hazardous waste disposal, by the general public.
	LKB.1.4	The efficient and effective use of fertilizers and pesticides and its impact on surface and groundwater quality.
Monitoring and Data Collection	LKB.2.1	Lack of high-quality digital elevation data.
	LKB.2.2	The need for expanded monitoring of lakes and streams through MPCA Citizen monitoring programs.
 <b>Management, Coordination, and Funding</b>		
Planning and Coordination	MCF.1.1	Need to update floodplain maps and zoning areas to reflect most recent Flood Insurance Rate Maps.
	MCF.1.2	The need for increased coordination on Flood Damage Reduction goals.
	MCF.1.3	The need for water quality management to mitigate impacts to shoreland in lakes and closed basin areas.
	MCF.1.4	Coordination is needed among LGUs administering the Wetland Conservation Act.
 <b>Land Stewardship</b>		
Urban Stewardship	LS.1.3	Stormwater and its impacts on urban flooding.

	LS.1.4	The need to preserve the riparian corridor in urban areas for flood mitigation and habitat preservation.
	LS.1.5	The need for mosquito control in urban areas.
Rural Stewardship	LS.2.4	Land use changes, development, increases in irrigated agricultural production and its impacts on runoff and erosion.
	LS.2.5	Direct access of cattle to Watowan River and tributaries is causing loss of habitat, increased nutrient, sediment, and bacteria transport that disrupt habitat for fish and macroinvertebrates and may potentially threaten human health.
Riparian and Shoreland Stewardship	LS.3.2	Shoreland development pressures leading to increased sediment and nutrient loadings, habitat loss, wetland loss, and degradation.
	LS.3.3	The need for updated shoreland rules and enforcement of existing regulations.

The Policy Committee established this plan's priority issues, reflecting their responsibility in developing this plan. However, as many issues are interconnected, this plan will have benefits to some lower tier issues as well. For example, low dissolved oxygen levels in streams and rivers is a Tier 2 issue, meaning it will not have a measurable goal established to address it. Low oxygen levels in streams, though, is worsened by high sediment and nutrient loading. Reducing stream sediment and nutrient loading is a Tier 1 priority issue, so actions pursued in this plan to reduce sediment and nutrient delivery will also accrue benefits to the oxygen holding capacity of the water.

## 4.4 Emerging and Ongoing Issues

This section presents an assessment of reasonably foreseeable or “emerging” issues and issues that have persisted in the watershed over time due to their relative unpredictability. Emerging issues are those that lack detailed information, which are sometimes prominent in the media, and may affect the resources within the WRW at some time in the future.

The assessment of emerging issues has been compiled from a variety of sources including:

- A review of previous studies, reports, and scientific papers;
- The collective experience of staff and technical advisors; and
- Specific requests from the members of the WWPP.

The detail describing these issues varies depending on the source of the information. An emerging issue is described in greater detail when the source of information is a final scientific study or report. The amount of detail can be considerably less when the source of information is firsthand observation or previous experience with an issue. Therefore, many of the emerging issues are only generally described to indicate the lack of detailed information.

The identification of emerging and persistent issues affects the content of this plan. Action items are included within the targeted implementation schedule (Section 6) to provide better clarity about the technical data needed to address emerging issues. Emerging issues are expected to be periodically monitored by plan participants with respect to how they may affect plan implementation.

This section lays out a framework for addressing emerging issues during the lifespan of the plan. These issues include scientific and technical matters influencing the priority issues established by the plan;

potential administration and fiscal limitations and barriers for implementing actions identified within the targeted implementation schedule; and improved water and resource policy to aid with plan implementation.

## Scientific and Technical Emerging Issues

### Extreme Weather Events and Infrastructure Resilience

According to the National Climatic Data Center, Minnesota's average temperature has increased about one tenth of a degree every decade, from 1895 to 1970. Since 1970, the rise has been more dramatic, about a half a degree every decade. Several Tier 1 priority issues are associated with extreme weather and infrastructure resilience.

Precipitation has been increasing across the state as well. Minnesota has also seen an increase in the severity and frequency of storm events. Minnesota has seen a sharp increase in these events since 2000, with 2016 being the first year on record with two mega-rains in the state (DNR, 2017). Mega-rains are storm events where the precipitation exceeds the predicted normals for the state.

As the climate warms, ice-cover of lakes and streams may melt earlier. Some lakes in Minnesota are showing that over the past century, the average ice-out is occurring about a week earlier. In turn, earlier snowmelt runoff would cause stream flows to peak sooner in the spring, leading to baseflow conditions earlier in the year (MN State Climatology, 2017).

It is important to understand these changes in regional climatic trends because they impact water resources and their management as well as shifts in habitat and economics. Increased storm intensities result in increased soil erosion and increased runoff. These more frequent, intense precipitation events may increase flooding (MPCA, 2013).



This plan recognizes the potential implications of climate change by encouraging the use of updated design standards for water resource infrastructure, based on National Oceanic and Atmospheric Administration (NOAA) Atlas 14. Implementing concepts and approaching projects in such a way (e.g. the U.S. Army Corps of Engineers, *Engineering with Nature*) using an integrated, multi-purpose project approach to provide social and environmental benefits will be pivotal and necessary. Changing the framework of projects to consider a holistic and systematic view of the human and natural environments by implementing stewardship concepts in land management efforts which will benefit the resiliency of communities in the plan area.

### Contaminants of Emerging Concern

A contaminant can generally be defined as a substance in a place where it doesn't belong. According to the Minnesota Department of Health (MDH), contaminants of emerging concern are substances that have been released to, found in, or have the potential to enter Minnesota waters (groundwater or surface water) and do not have Minnesota human health-based guidance (how much of a substance is safe to drink), pose a real or perceived health threat, or have new or changing health or exposure information (MDH, 2016). Like extreme weather and infrastructure resilience, contaminants of emerging concern relate several Tier 1 priority issues.

In the last decade, national and statewide studies have revealed that many contaminants of emerging concern are found in the aquatic environment. They can include pharmaceuticals, pesticides, industrial effluents, personal care products that are washed down drains and processed by municipal wastewater treatment plants, and others (MDH, 2016). These contaminants are being found in Minnesota’s waters, in part because there are better methods for finding substances at lower levels, additional substances are being looked for, new substances are being used, and old substances are being used in new ways (MDH, 2016). There is a growing concern that even at low concentrations, these contaminants, or mixtures of them, may adversely affect fish, wildlife, ecosystems, and human health.

## ***Policy and Funding Emerging Issues***

### ***Funding for Plan Implementation***

Funding is one of the primary constraints for plan implementation. This plan shows that the ability to execute actions within the targeted implementation schedule and achieve the measurable goals requires more fiscal and staff resources at the local level than is available to the WWPP (Section 6). The WWPP is expected to carry more of the responsibility to implement state and federal goals (e.g., attaining water quality standards, implementing habitat initiatives, etc.). Any expectation that this group will achieve these common goals without additional funding is unreasonable. Moreover, much of the targeted implementation schedule in Section 6 assumes that non-competitive Watershed Based Implementation Funds will be available to support the implementation of this plan.

The targeted implementation schedule in this plan represents a coherent, comprehensive approach to mark progress towards measurable goals. Raising cost share dollars for state and federal grants is problematic due to lack of reliability when implementing components of this plan to address priority issues. Relying on competitive grants to achieve the measurable goals is unreasonable and makes success tenuous. Therefore, funding on a regular basis to implement the WRCWMP is needed.

### ***Effectively Delivering Conservation Programs***

Effectively delivering conservation programs is critical to the successful implementation of this plan. Both staff capacity and financial resources at the local level to implement conservation programs are limited. This plan recognizes the need to improve conservation delivery through implementation programs aimed to increase engagement with agricultural landowners, producers, lake shore owners, and citizens within the plan area.

### ***Administration and Enforcement of MN Rules and Statutes***

Administration and enforcement of Minnesota Administrative Rules and Statutes is an important aspect of managing and protecting the state’s water quality. Examples of these rules and statutes include, but are not limited to, the regulation of animal feedlots (Minnesota Administrative Rules Chapter 7020), and shoreland and floodplain management (Minnesota Administrative Rules Chapter 6120). Local governments provide for the administration and enforcement of these rules and statutes, however, there is commonly inconsistent administration and enforcement of these rules between jurisdictional boundaries.

Planning partners within the WRW recognize the value that consistent application of Minnesota Rules and Statutes can have on water quality and quantity at a major watershed scale. The plan addresses this emerging issue in the targeted implementation schedule, with actions that focus on identifying problem areas within the WRW, and the consistent application of existing rules and statutes within the entire plan area.

### ***Farm Law Legislation (National and International)***

Changes to international and national legislation has large ramifications on the types, magnitude, and profitability of crops produced in Minnesota. For example, legislation promoting corn growth for ethanol



production may impact the amount of corn and rotation of crops in an agricultural area. Conversely, legislation incentivizing production of alternative crops (i.e. switchgrass) for alternative fuels may also impact cropping practices. Types and productivity of crops may also be impacted by legislative changes to crop insurance support (i.e. the farm bill).

This plan recognizes the impact that national and international legislation has on local agricultural production and the producer’s economic vitality. The plan addresses this emerging issue by supporting standard practices for all producers (i.e. managing for good soil health) and is addressed throughout the plan by programs that encourage this.

**Renewable Energy Legislation (State and National)**

State and national renewable energy policy has the potential to affect the economies and land use patterns of counties with high potential capacities. Renewable energy sectors contributing from the counties within the WRW include wind energy production, solar photovoltaic capacity, and biofuels.

Paramount to the WRCWMP area will be ensuring that land use changes resulting from renewable energy policy initiatives balance the potential environmental risks of renewable energy production with the economic and environmental benefits the production of renewables could provide. Potential environmental risks include but are not limited to wetland impacts, fish and wildlife habitat fragmentation, aquifer depletion, and threats to avian species such as eagles and bats. This plan addresses the issue of concern through implementation programs that protect surface water resources and wildlife habitat.

**Process for Addressing Emerging Issues and Data Gaps**

Inevitably, issues emerge that lack enough data, research, or information. While a substantial effort was made to develop a comprehensive list of existing and emerging resource categories, concerns, and issues, it is possible that some issues were missed or that new issues emerge during the lifespan of the plan. Examples include the discovery of a new contaminant or aquatic invasive species within the WRW, or a change in the policies or administration of a member local government unit. Should an unanticipated issue emerge during the lifespan of the plan, the issue will be considered and addressed as necessary through annual evaluations and local work plan development (see Section 8). If the emerging issues are substantial enough, plan amendments will be considered based on procedures laid out in Section 8 of this plan.

Gaps in technical knowledge continually need to be closed. Rather than delaying planning or implementation actives when these gaps arise, the WWPP will consider these gaps during self-assessments and develop action(s) to address them on an as-needed basis. These actions(s) could be things such as specific implementation activities, support of additional research or data monitoring and collection, or increased education and outreach.

**4.5 Local Priority Issues**

This section highlights issues from the local government partners that may not fully align with the watershed wide Tier 1 (Table 4-2) and Tier 2 (Table 4-3) issues. The WWPP agreed that it was important for the partnering local governments to work on priority issues within their counties that may not be fully captured within this plan. Each partnering local government was able to draft a list of priority issues that were not fully captured within the watershed wide issues or strengthen the identification of the watershed wide issues within the respective jurisdictional boundaries.

**Blue Earth County Local Priorities**

The Blue Earth County Water Management Plan 2016-2026 priority issues are consistent with the Watowan River Comprehensive Watershed Plan priority issues. The Blue Earth County plan identifies





priority areas for wildlife habitat, wetland management, and groundwater. Priority areas were identified and mapped using science-based criteria and replicable methods. Blue Earth County, non-profit conservation organizations, and other partners will continue to use and build on these priority areas to guide voluntary implementation efforts and land use planning and management.

These local priority areas address the following nineteen actions in the Watowan River Comprehensive Watershed Management Plan:

**Table 4-4: Priority area actions**

Priority Area - Action
C1-4
RM-3
RM-5
RM-9
RM-13
RM-18
RM-19
EO-1
EO-4
EO-8
EO-13
EO-16
EO-27
EO-31
R-4
R-9
R-10
R-12
OM-3

**Wildlife and Natural Resources Priorities – Multiple Benefits – Greenprint**

The Blue Earth County Water Management Plan identified priority areas for natural resources protection, enhancement and restoration in a Greenprint and in a series of maps related to restoring wetland functions. The highest priority areas are interconnected ecological corridors and wetland complexes that provide multiple wildlife habitat and aquatic and natural resource benefits.

Landscape position and proximity and connectivity of habitats are important factors as many wildlife species rely on both aquatic and terrestrial habitat for all or part of the life cycle and are not limited to watershed boundaries. One example of the importance of proximity and connectivity for wildlife is waterfowl habitat that was used in the Blue Earth County Greenprint for mapping wetland complexes. Common to the Minnesota Working Lands Initiative and many other Minnesota conservation plans and programs is recognition that:

“The best waterfowl production habitat occurs within prairie habitat complexes 4–9 square miles in size where at least 20% of the area is wetland and 40% is grassland. At least one-half of the wetland acreage should be temporary or seasonal basins and ideally each complex will include one shallow lake over 50 acres. One-half of the grasslands should be under long-term protection.”

The Blue Earth County Greenprint is shown in Appendix M.

REFERENCE: Blue Earth County Water Management Plan – Greenprint – Pages 78-84.

**Wetlands and Wetland Functions**

Minnesota Statutes, Section 103B.3355, requires local public values of wetlands be determined based on the functions of wetlands. Minnesota Statutes, Section 103B.801, Subdivision 4, requires Comprehensive Watershed Management Plans to identify priority areas for wetland enhancement, restoration and establishment.

The public value of wetland functions is incorporated in the Greenprint. The Blue Earth County Water Management Plan also prioritized potentially restorable basins with potential to provide important wetland functions for nutrient treatment and water storage. Depending on landowner goals these potentially restorable basins may be not be fully restored but could be designed to provide important functions.

The Blue Earth County Water Management Plan potentially restorable basin priorities are in Appendix N.

REFERENCE: Blue Earth County Water Management Plan – Wetland Priorities – Pages 75-77 and 85-98.

The Blue Earth County Water Management Plan contains a classification system and prioritization framework to predetermine wetland functions and the local public value of wetlands in the county. Predetermining and classifying wetland functions and values establishes expectations for wetland protection. This function-based classification system can be used by the WCA local government unit (LGU) and technical evaluation panel (TEP) to evaluate the public value and associated functions of wetlands when considering applications and making decisions regarding wetland impact sequencing (impact minimization, avoidance and replacement) and the adequacy of proposed wetland replacement. Blue Earth County will continue to use this framework as described in the County water plan.

The Blue Earth County Water Management Plan wetland classification framework is in Appendix O.

REFERENCE: Blue Earth County Water Management Plan – Wetland Classification Framework – Pages 262-265 and Pages 273-274.



### ***Groundwater and Drinking Water***

The Blue Earth County Water Management Plan priority areas for groundwater were identified using the Geologic Atlas of Blue Earth County, Part B, published in 2016 by the MnDNR. The Minnesota DNR will ultimately update the geologic atlases in all areas of the state.

The Watowan River Comprehensive Watershed Plan displays maps of pollution sensitivity of near surface materials. The Geologic Atlas Part B shows pollution sensitivity of deeper, buried sands aquifers. The pollution sensitivity modeling process for buried aquifers provides a qualitative evaluation of recharge rate or flow of surface water into deeper aquifers. This mapping gives a good indication of areas at the surface that are worthy of protection.

Blue Earth County will continue to use groundwater pollution sensitivity and recharge mapping and the Geologic Atlas of Blue Earth County, Part B, to evaluation land use and voluntary implementation practices.

The Blue Earth County Water Management Plan groundwater pollution sensitivity and recharge priority maps are in Appendix P.

REFERENCE: Blue Earth County Water Management Plan – Groundwater Pollution Sensitivity Pages 49-50.

### ***Brown County Local Priorities***

Brown County and Brown Soil and Water Conservation District (SWCD) will continue to monitor and promote conservation practices and landowner best management practices in Lake Hanska and Wood Lake areas, because they have high value to local community members.

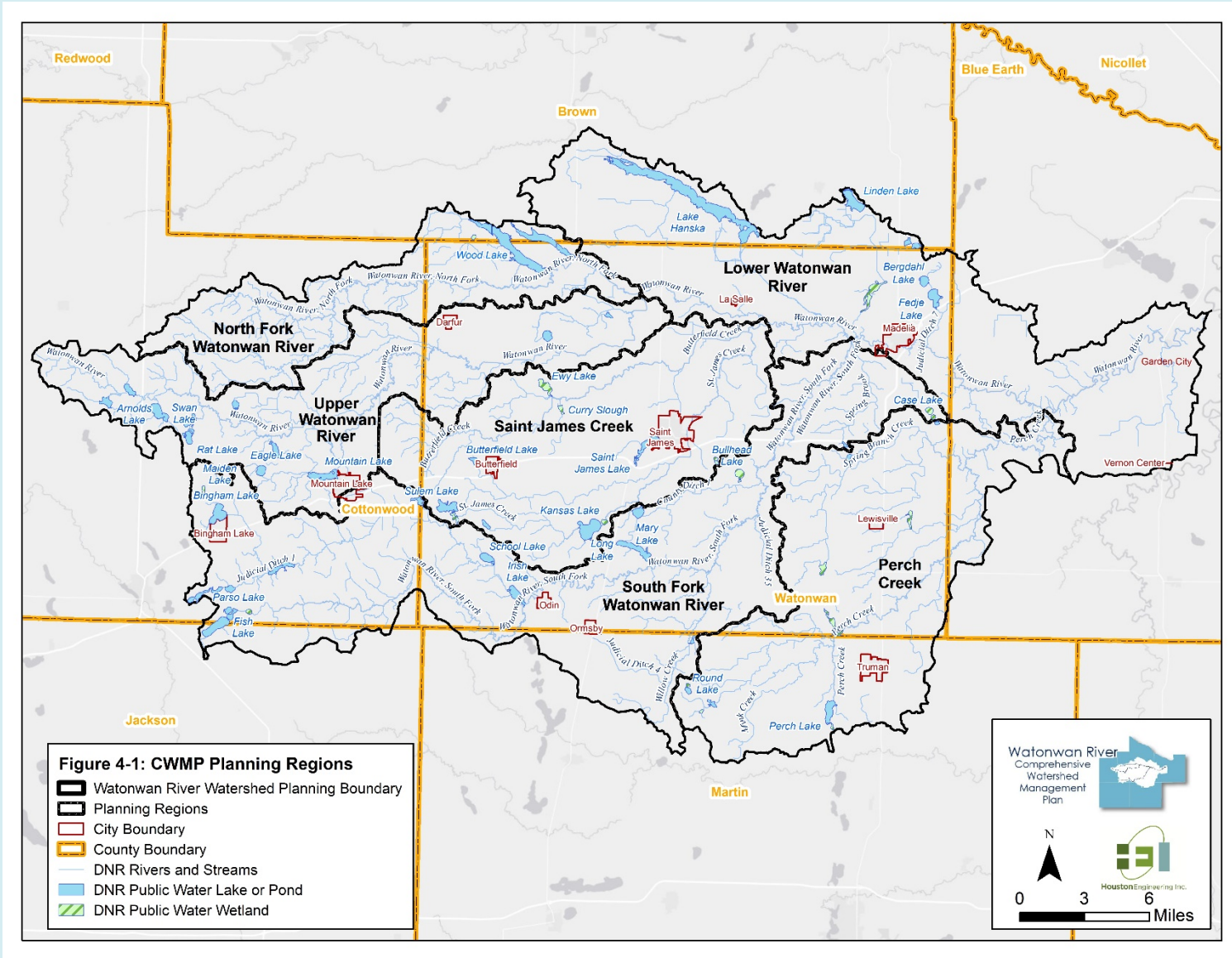
### ***Cottonwood County Local Priorities***

Cottonwood County and Cottonwood Soil and Water Conservation District (SWCD) will continue to prioritize the Mountain Lake and Red Rock Rural Water System Highly Vulnerable DWSMAs in Cottonwood County and out prominent lakes Bingham Lake, Fish Lake and Mountain Lake.

### ***Martin County Local Priorities***

Martin County and Martin Soil and Water Conservation District (SWCD) will continue to prioritize protection and restoration of declining and at-risk species in and around the Perch Creek WMA.

**Figure 4-1: WRCWMP Planning Regions.**



**Figure 4-2: Groundwater Recharge Potential in the WRW.**

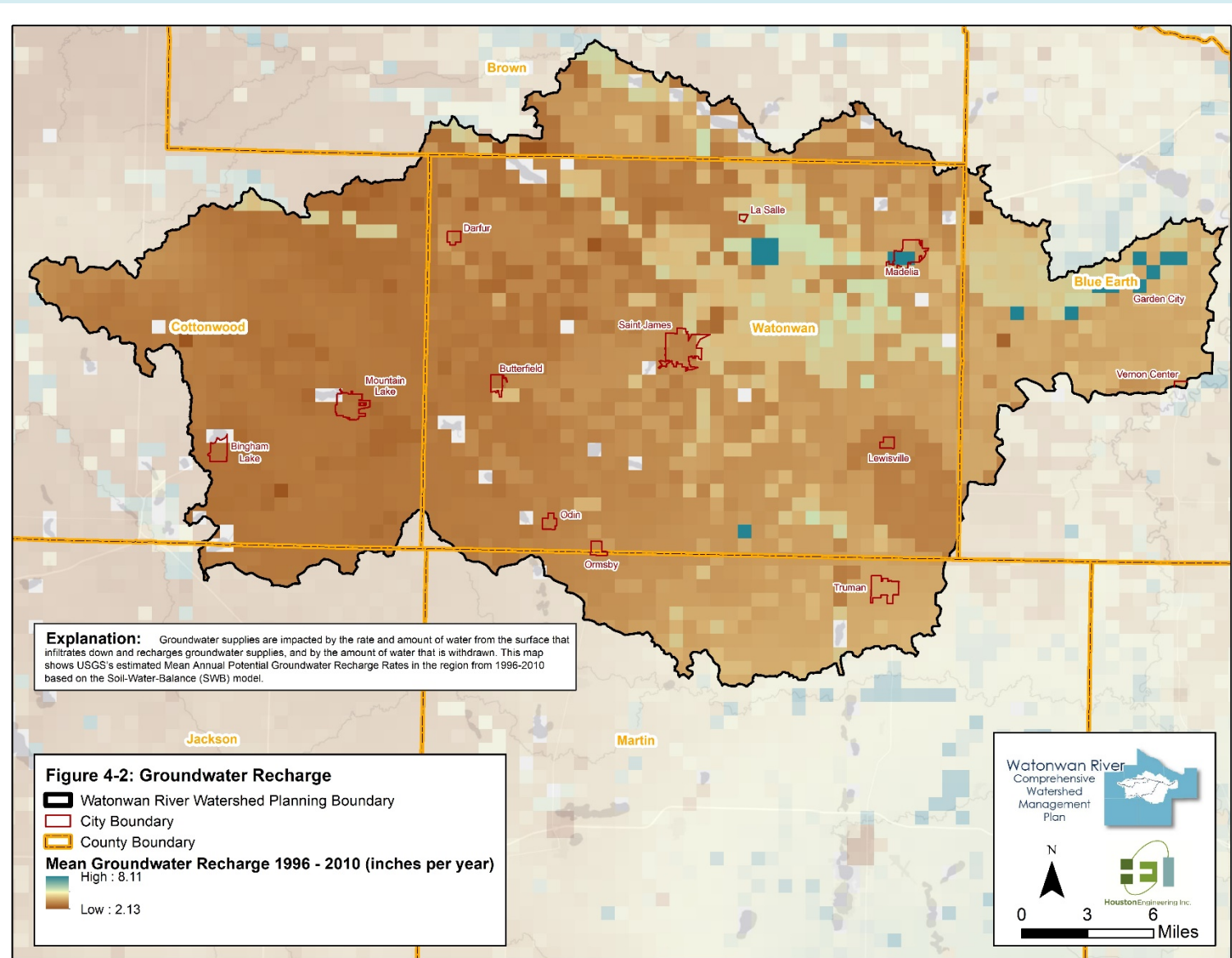


Figure 4-3: Groundwater Vulnerability in the WRW.

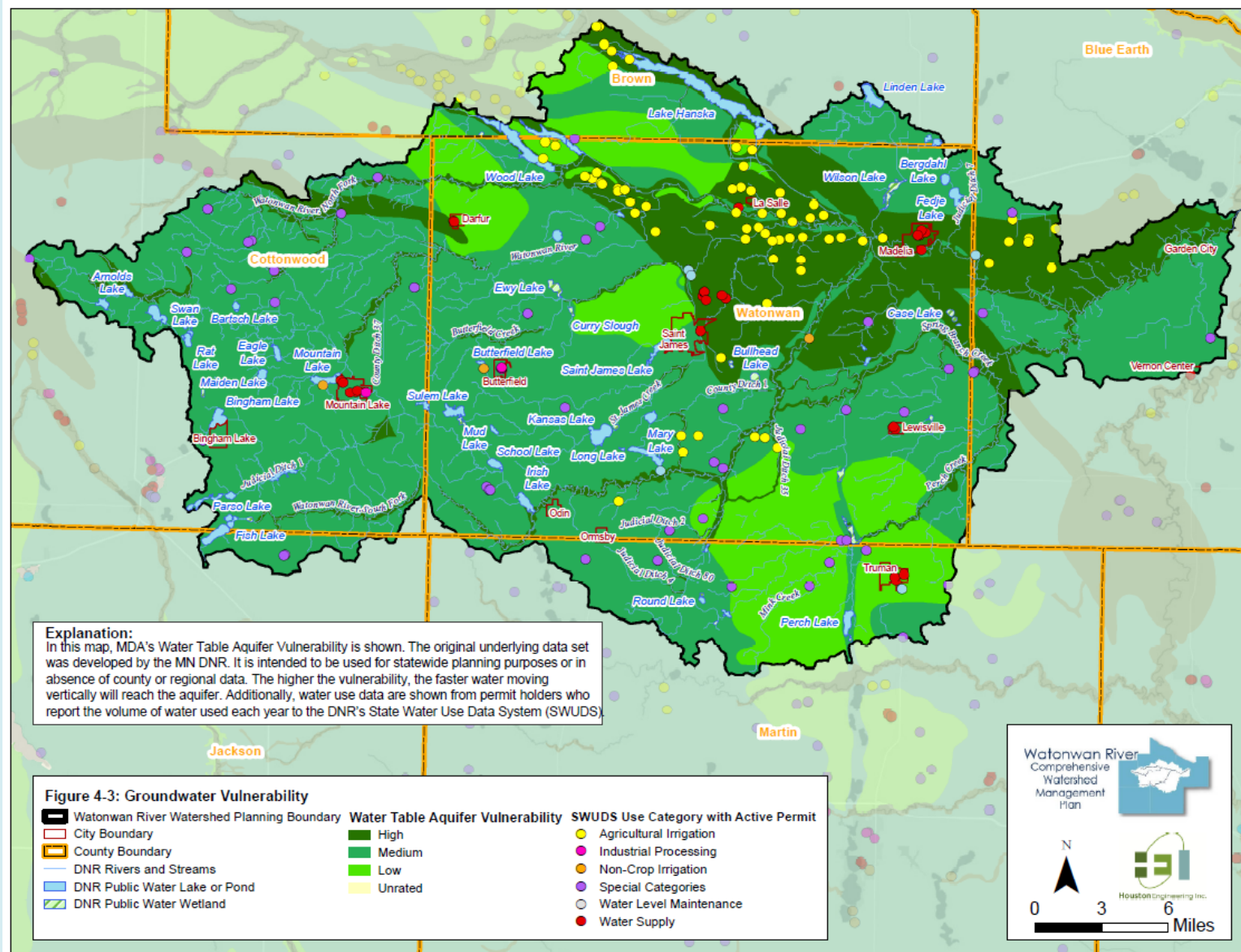
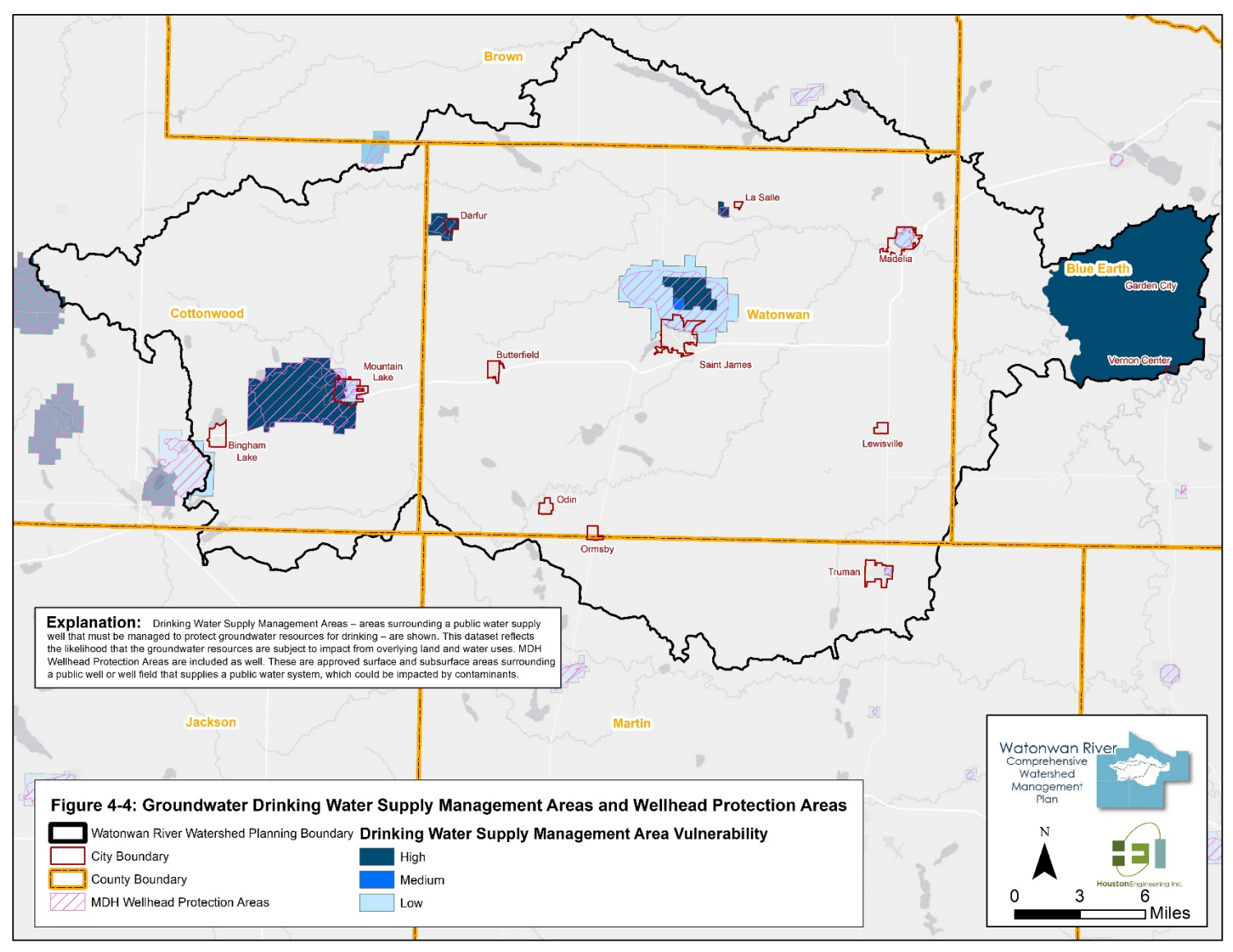
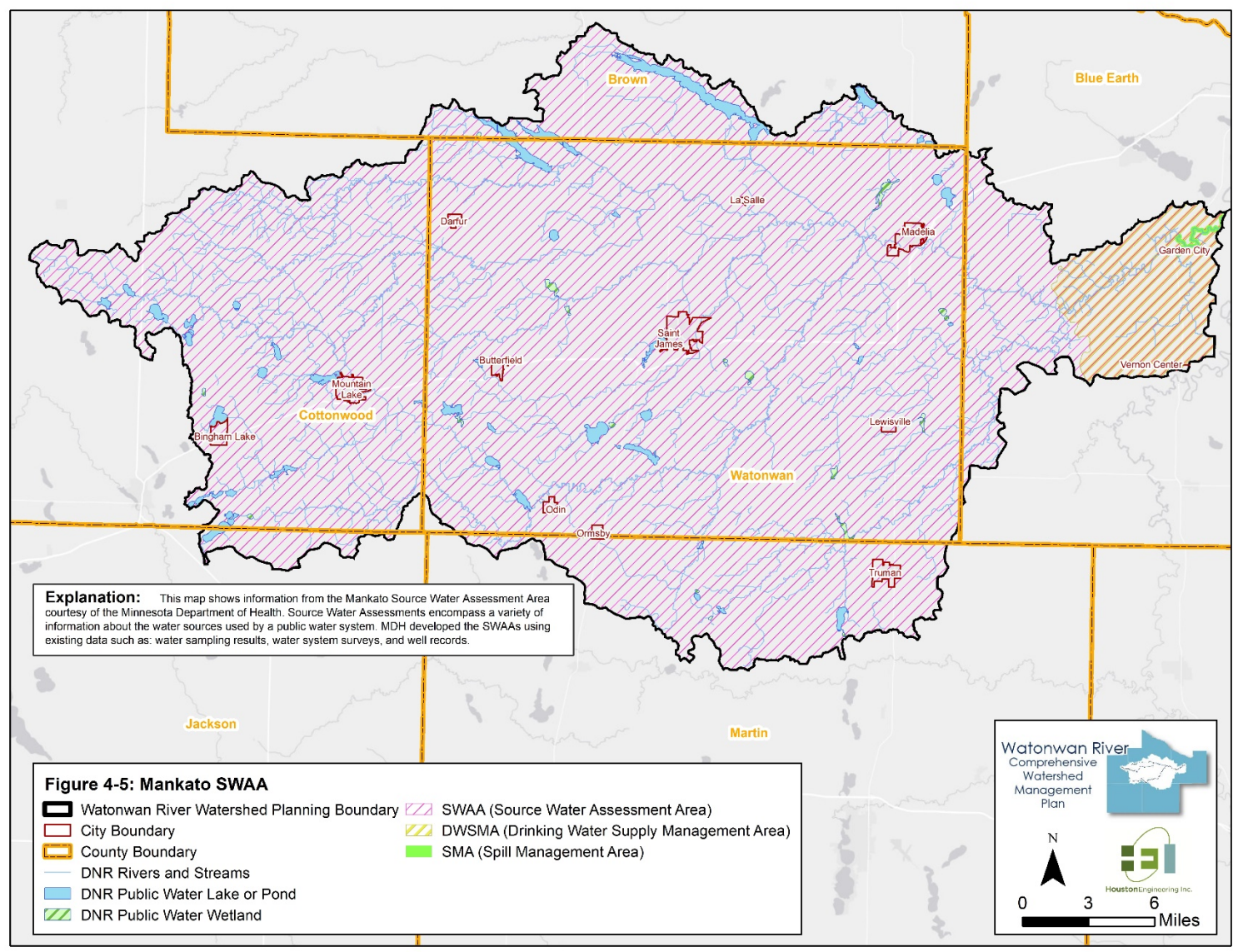


Figure 4-4: Groundwater DWSMA and WPA areas in the WRW.



**Figure 4-5: Mankato Source Water Assessment Area (SWAA)**





**Figure 4-6: Impaired Waters in the WRW.**

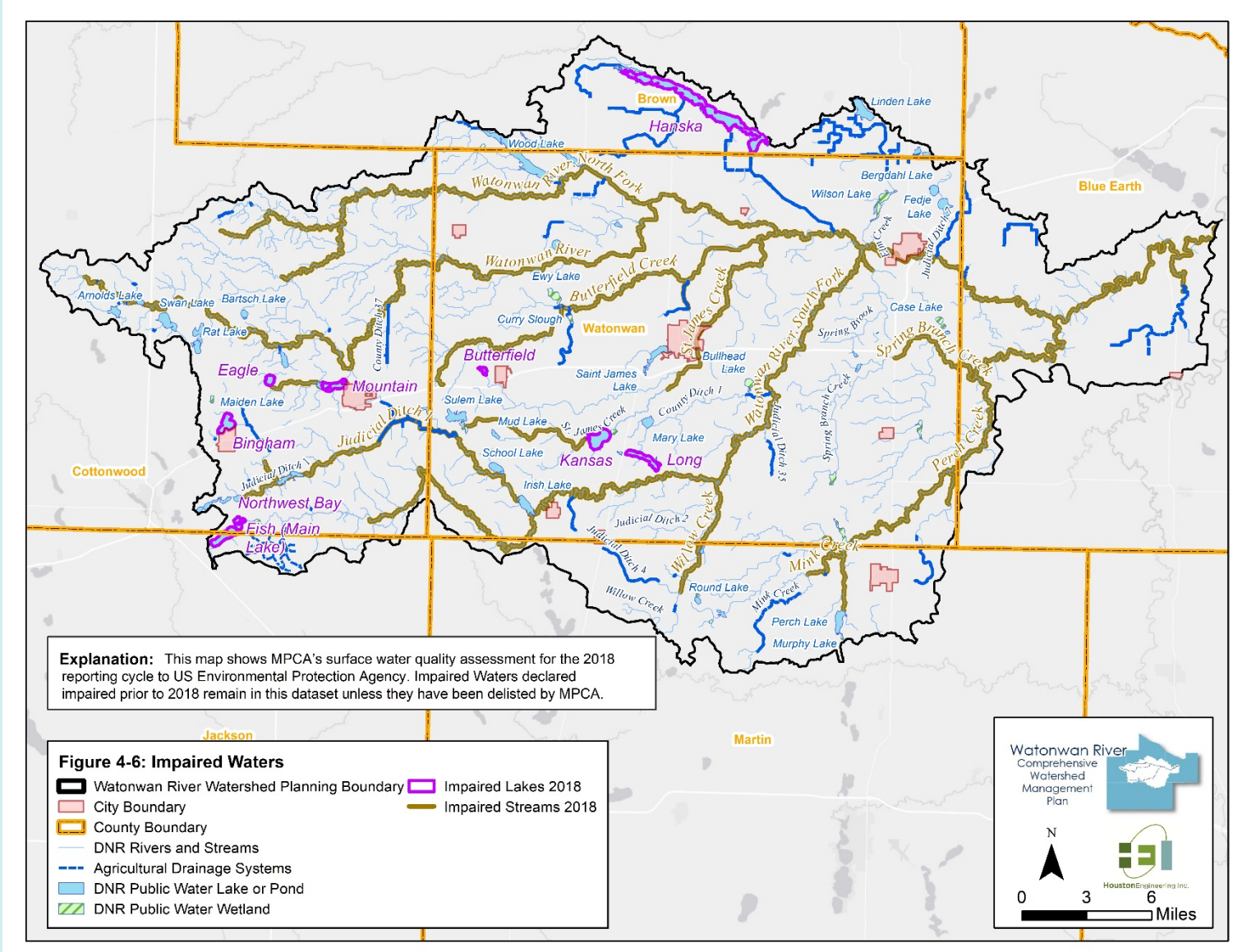
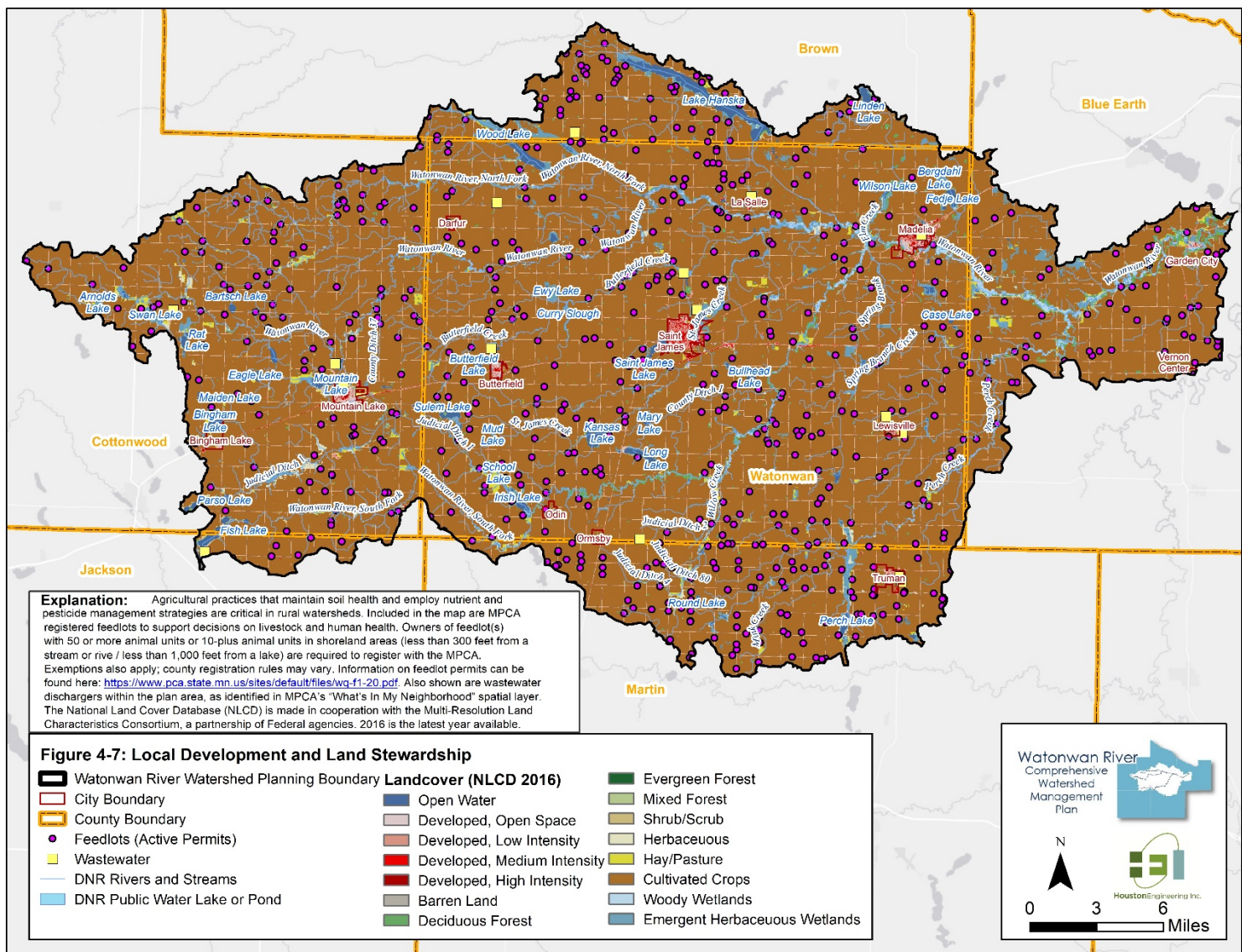


Figure 4-7: WRW Local Development and Land Stewardship.



**Figure 4-8: WRW Aquatic Habitat and Recreation**

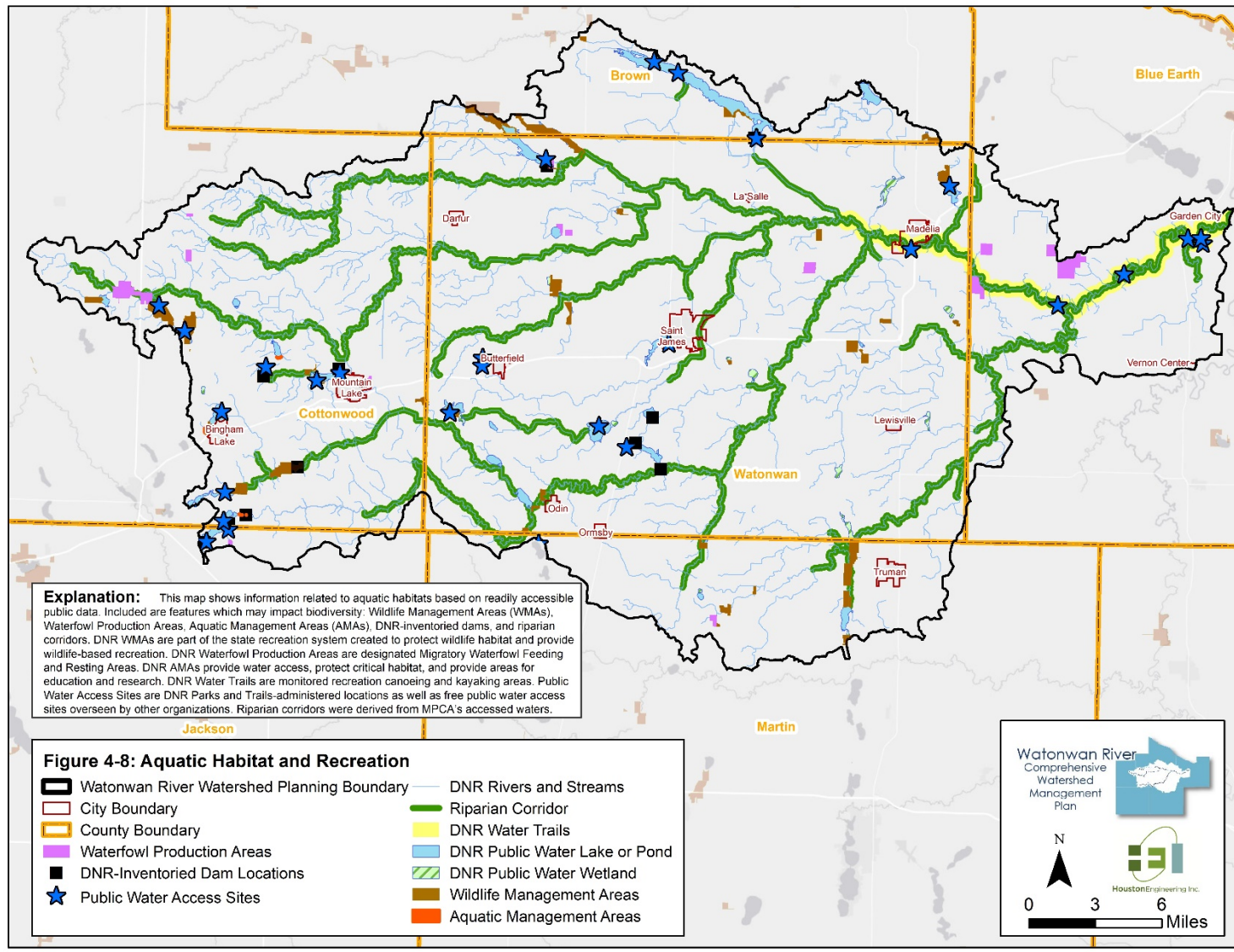
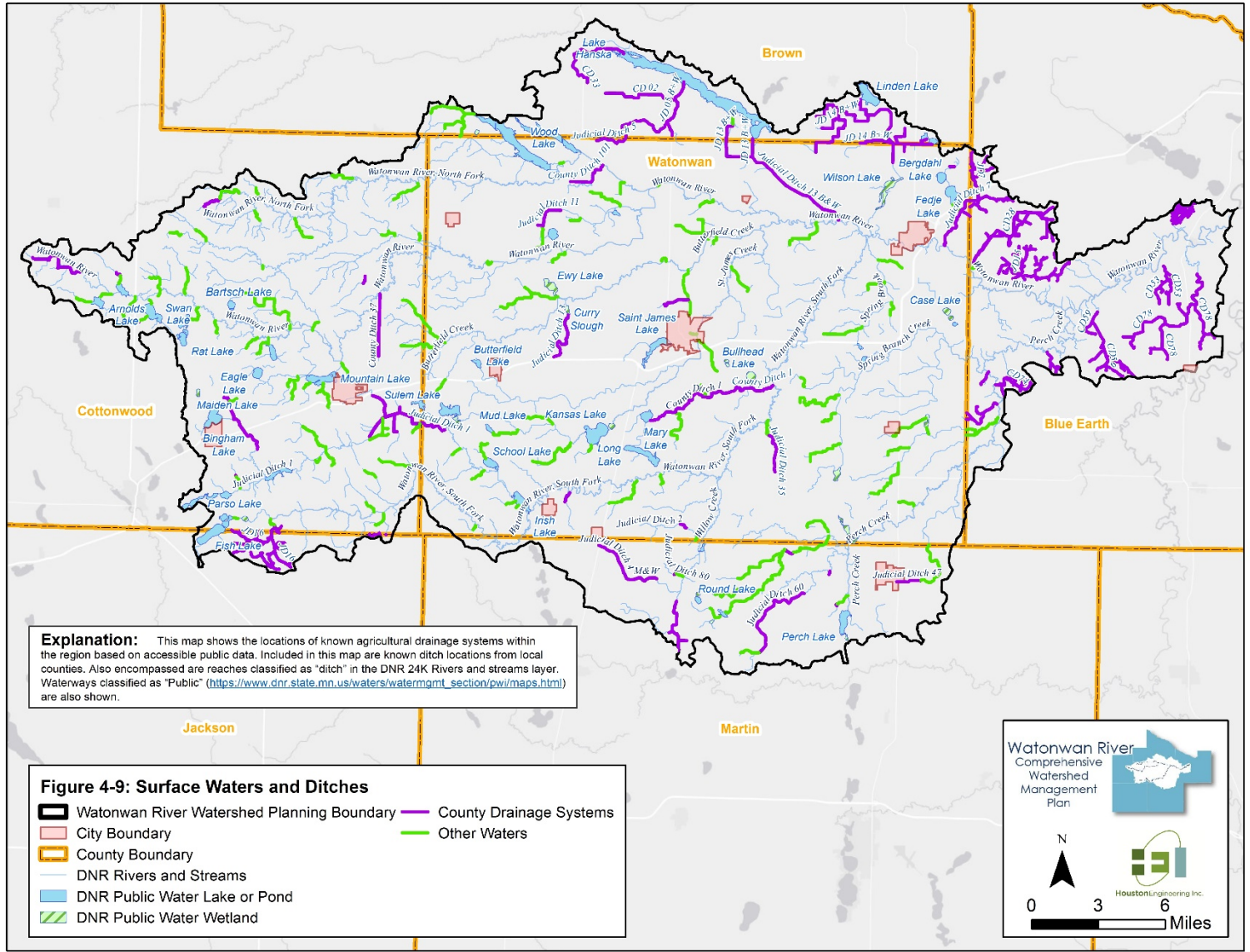


Figure 4-9: WRW Surface Waters, Public Ditches, and Classified "Other Waters"



**Figure 4-10: WRW Wetlands**

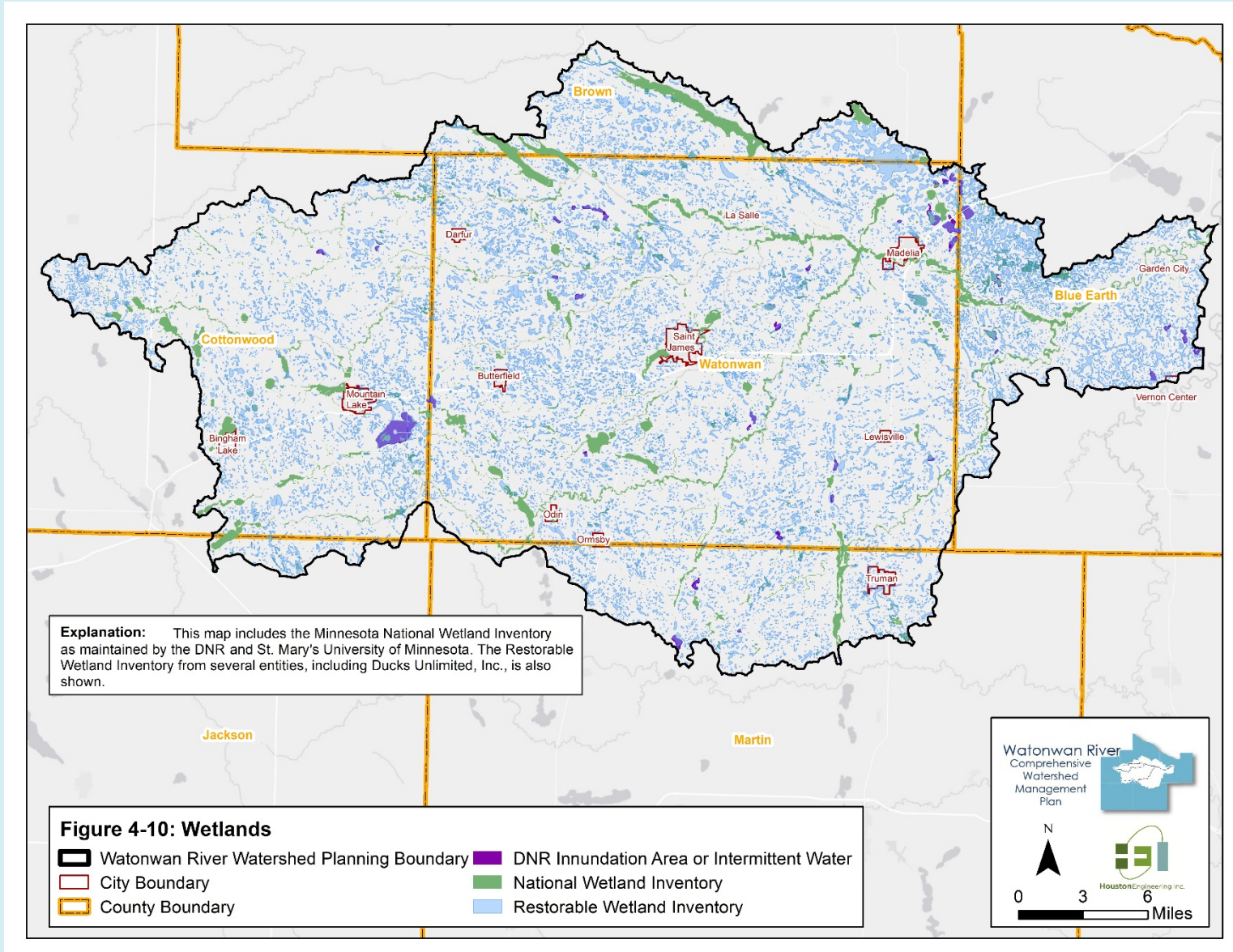
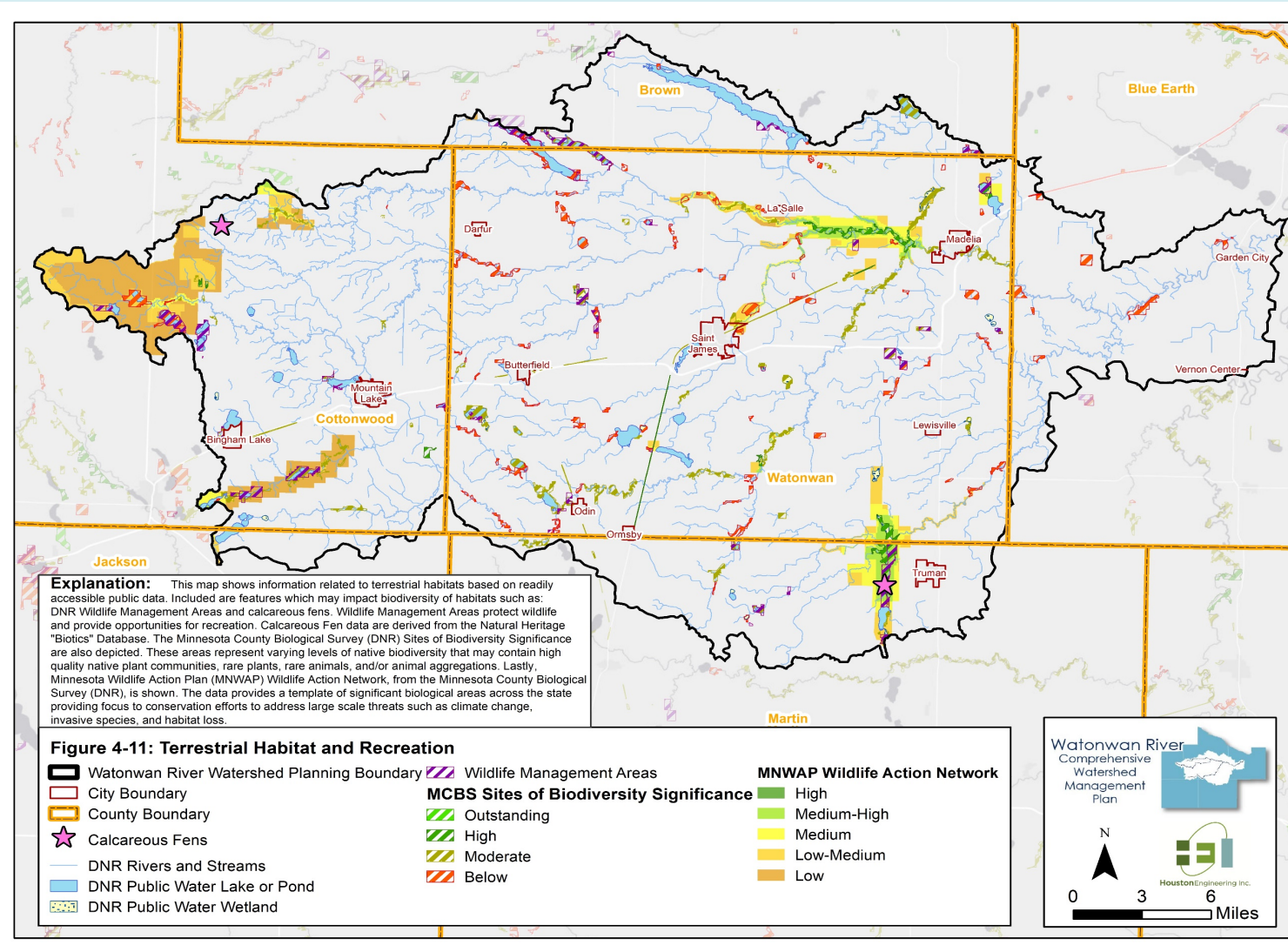


Figure 4-11: WRW Terrestrial Habitat and Recreation





**5.**

## **Measurable Goals**

## SECTION 5.0 MEASURABLE GOALS

The following definitions were developed to establish a common language for communicating information:

- ✦ Measurable Goal: A statement of intended accomplishment for each priority issue. Goals are meant to be simply stated and achievable, can be quantitative or qualitative, long or short-term, and are meant to be measurable through the implementation of actions to attain a desired outcome.
- ✦ Short-Term Goal(s): Interim conditions to accomplish or make progress towards during the 10-year lifespan of this plan;
- ✦ Desired Future Condition(s): The long-term goal to accomplish, regardless of timeframe.

### 5.1 Establishing Measurable Goals

Short and long-term measurable goals are presented for each Tier 1 priority issue established in Section 4. A variety of information was used to develop goals, including:

- ✦ Percent reduction targets from the Watowan River Watershed Restoration and Protection Strategies report (WRAPS) and the Watowan River Watershed Groundwater Restoration and Protection Strategies Report (GRAPS) (Appendix C);
- ✦ Results from the Prioritize, Target, and Measure Application (PTMApp);
- ✦ Input from Advisory and Policy Committee members; and
- ✦ The knowledge of local water and resource managers provided by the Steering Team.

### 5.2 Measurable Goals

Measurable goals for Tier 1 priority issues are organized into chapters by resource. Each resource chapter contains a cover page summarizing which resource concerns will be addressed, and if applicable, the planning region priority for the resource (Figures 5-1 through 5-3). Because the WRW is large and issues impact certain areas more than others, this plan prioritizes measurable goals for surface water, groundwater, and habitat resources at the planning region scale. The weighting criteria for prioritization consist of a variety of geospatial data, data from PTMApp, input from the Steering Team and Advisory Committee, the WRAPS, and the GRAPS. Prioritization criteria and relation to measurable goals is shown in Appendix D.

Planning region resource prioritization is where planning partners aim to implement practices laid out in the target implementation plan outlined in Section 6 to address priority issues and make progress towards goals. In example, when working on surface water issues, implementation preference will go towards projects in higher priority surface water planning regions (i.e. South Fork Watowan River planning region). Other considerations, such as funding opportunities, local government capacity, and landowner willingness are just as vital for determining where implementation will occur. Planning region resource prioritization sets a framework to focus on the prioritized planning regions but allows funding to lower prioritized areas if needed.

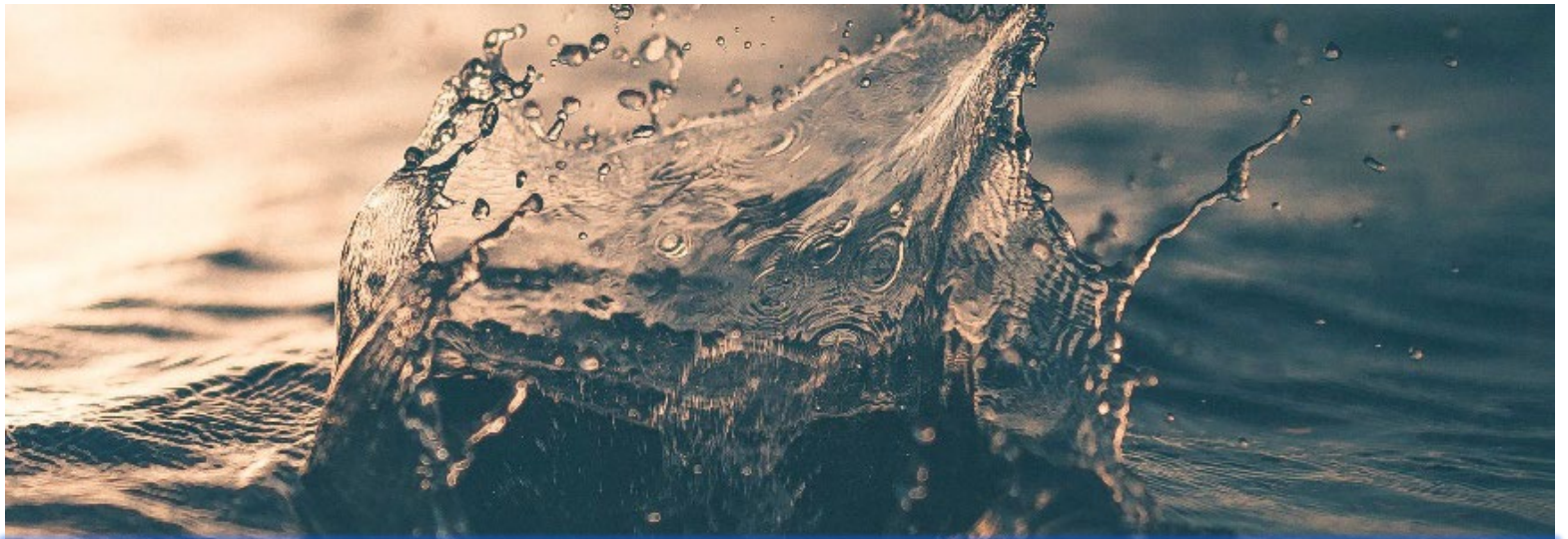
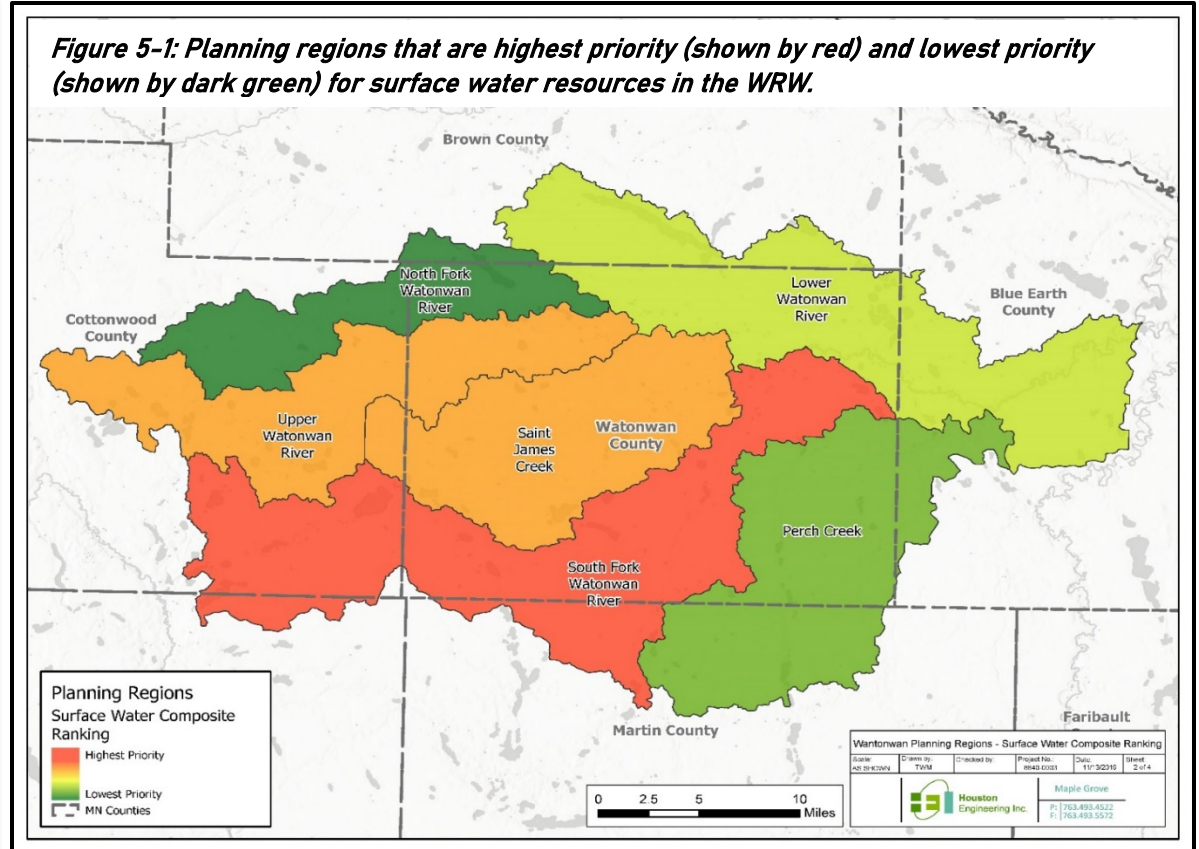




## SURFACE WATER MEASURABLE GOALS

This chapter sets measurable goals for:

- ✓ Agricultural Drainage Systems
- ✓ Lakes
- ✓ Rivers and Streams
- ✓ Wetlands
- ✓ Surface Runoff and Flooding



*Surface water is the highest priority within the South Fork Watowan River Planning Region.*



## RESOURCE CONCERN: AGRICULTURAL DRAINAGE SYSTEMS

- ✓ Issue SW 1.1: Level of multipurpose drainage management utility to reduce downstream peak flows and flooding, reduce erosion and sedimentation, and protect or improve water quality.

There is a need to improve water quality and flood resiliency within the watershed while maintaining adequate drainage for productive agricultural lands. The intent of this issue statement is to increase the level of multipurpose drainage management (MDM) practices within the watershed. This goal centers around MDM as an opportunity to improve water quality and flood resiliency in tandem with the maintenance and repair of drainage ditch systems.

Prior to settlement, land in the WRW was covered by native prairie, big woods, lakes, marshes, rivers and streams. Now, agriculture is the predominant land use, with corn/soybean rotations accounting for 93% of cropped lands (Greater Blue Earth Basin Alliance, 2018). The land has been extensively tiled and ditched in attempt to support productive agricultural practices. In addition to land management changes, large storm events have become more prevalent in recent decades creating added management issues. Challenges in weather, land-use, and water resource management have developed from the attempt to balance the effect in surface water runoff, subsequent erosion, sedimentation, and floodplain management. Achievement of the goals below will also result in sediment (or TSS) and nutrient loading benefits.



### *Measurable Goals*

#### Short-Term:

- ✓ SW 1.1a: Coordinate with the drainage authorities to implement multipurpose drainage management (MDM) on 10 public drainage systems to improve water quality and flood resiliency in tandem with the maintenance and repair of drainage systems.
- ✓ SW 1.1b: Develop an MDM plan and set 5-year and 10-year goals for anticipated future conditions.

#### Desired Future Condition:

- ✓ Implement MDM on 100% of drainage systems.



## RESOURCE CONCERN: AGRICULTURAL DRAINAGE SYSTEMS

- ✓ Issue SW 1.2: Lack of conservation practices on drainage systems.

Through time, there has been significant alteration of the natural landscape to develop drainage systems (e.g., surface and subsurface drain tile, and drainage ditches) for supporting agricultural practices in the watershed. Because of these alterations, a greater degree of conservation implementation is needed across these systems to improve water quality and reduce system maintenance and repair costs.

This goal will identify drainage systems most in need of conservation and what type of conservation will be of most value and benefit.



### *Measurable Goals*

#### Short-Term:

- ✓ SW 1.2a: Drainage systems that are in need of repair and would benefit from conservation practices are identified through coordination with partners.

#### Desired Future Condition:

- ✓ Continue to identify systems that would benefit from conservation practices and implement beneficial conservation practices.

## RESOURCE CONCERN: LAKES

✓ Issue SW 2.1: Elevated nutrients and sediment in lakes.

According to the Watowan River Watershed WRAPS, there are 35 lakes over 100 acres in the WRW. Of those 35, monitoring was conducted on 11 lakes for aquatic life (fishing) and 15 lakes for aquatic recreation (swimming). Five lakes are impaired for aquatic life (Hanska, Mountain, Bingham, Fish, and Long) and four lakes are impaired for aquatic recreation (Bigham, Eagle, Kansas, and Butterfield). Only one lake was found to support aquatic life (St. James), and two support aquatic recreation (Fish and St. James) (MPCA, 2020a).



Aquatic recreation impairments in lakes are identified by lake clarity and algae-fueling phosphorus. Aquatic life impairments in lakes are identified by the populations (numbers and types) and balance of fish and bugs within the waterbody. Nutrient and sediment loading into lakes creates responses in the biologic functions of the lake. Some of these reactions affect the amount of sunlight that enters the water and dissolved oxygen that is required for life.

There is a need to enhance shoreline health, provide education for lake communities, and provide technical and financial assistance to lakeshore owners to install best management practices that reduce nutrients and sediment loading to watershed lakes. These actions will be focused in areas that contribute to priority lakes (Table 5-1). These prioritized lakes align with the areas prioritized for restoration and protection efforts as part of the Watowan River Watershed WRAPS (MPCA, 2020a; Table 23), and by local partners as part of the 1W1P planning process.

Measurable goals to address nutrient and sediment loads in lakes are based off 10-year phosphorus reduction targets in the WRAPS (MPCA, 2020a). Sources of phosphorus for impaired lakes are presented in Table 13 of the Watershed River Watershed TMDL (MPCA, 2020b). This information can be used during implementation to track progress towards stated load reduction goals.

**Table 5-1: Priority lakes for elevated nutrients and sediment.**

Lake Name	Classification	Prioritization Criteria	Planning Region
Butterfield Lake	Restoration	<ul style="list-style-type: none"> <li>Tipping Point: Barely Impaired*</li> </ul>	Saint James Creek
Fish Lake	Protection	<ul style="list-style-type: none"> <li>Protection of Supporting Waters*</li> <li>High sensitivity to nutrient loading. Nutrient management and other BMPs are especially important in the watershed of this lake**</li> </ul>	South Fork Watowan River
Bingham Lake	Protection	<ul style="list-style-type: none"> <li>Additional development.**</li> </ul>	South Fork Watowan River
St. James Lake	Protection	<ul style="list-style-type: none"> <li>Protection of Supporting Waters*</li> <li>Due to the small lake to watershed area, this system would likely respond well to a variety of agricultural and urban water quality BMPs.**</li> </ul>	Saint James Creek
Kansas Lake	Restoration	<ul style="list-style-type: none"> <li>Dirtiest Waters*</li> <li>Landuse zoning including Shoreline management would help assist the</li> </ul>	Saint James Creek

Lake Name	Classification	Prioritization Criteria	Planning Region
		already established fishery from future degradation or development pressure.**	
Lake Hanska	Restoration	<ul style="list-style-type: none"> <li>• Popular Recreational Water Bodies*</li> </ul>	Lower Watowan River
Fedji Lake	Restoration	<ul style="list-style-type: none"> <li>• This lake may benefit from a Lake Management plan, including potential draw downs and vegetative management.**</li> </ul>	Lower Watowan River

\* See WRAPS Table 23 for more information on prioritization criteria

\*\* Prioritized based on local and partner input during the IWIP planning process

## Measurable Goals

### Short-Term:

- ✓ SW 2.1a: Restoration- Achieve a 10% reduction in phosphorus load in lakes identified for restoration.
- ✓ SW 2.1b: Protection- Achieve a no-net increase in phosphorus loading to lakes identified for protection.

### Desired Future Condition:

- ✓ Waterbodies achieve their water quality standards.

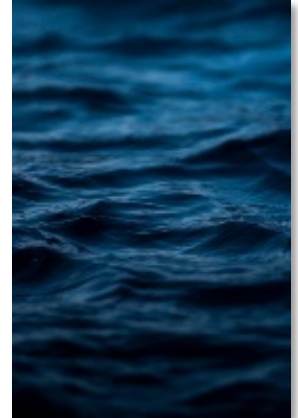


## RESOURCE CONCERN: LAKES

- ✓ Issue SW 2.2: Management of lake levels and associated watershed flow conveyance.

Lakes serve communities and enthusiasts as places of respite and recreation. Fluctuating water levels, decreased vegetative cover, declining native plant species composition, and increased impervious surfaces all contribute to decreasing water clarity and the quality of lake water and habitat.

There is a need in the WRW to increase dialog on lake level management. This plan intends to jointly collaborate with lakeshore residents and the DNR to pursue outreach efforts and informational materials. This effort will encourage further exploration on this topic with the public and plan partners to improve the quality and sustainability of lakes in the watershed.



### *Measurable Goals*

#### Short-Term:

- ✓ SW 2.2a: Conduct 2 educational outreach efforts with the DNR to discuss lake management.

#### Desired Future Condition:

- ✓ Continue to conduct educational efforts to encourage the development of lake management plans with local partners.

## RESOURCE CONCERN: RIVERS AND STREAMS

- ✓ Issue SW 3.1: Elevated nutrients and sediment in rivers and streams.

Our rivers and streams are powerful and symbolic features on the landscape. Though nutrient and sediment transport is a natural process, excess nutrients and sediment in rivers and streams can impact aquatic life and recreation (e.g., swimming and fishing). The WRW has 79 stream reaches. At the time of developing this plan, 39 were monitored to assess the designated use of aquatic life, yielding 32 impairments. Similarly, 16 streams were monitored to assess the designated use of aquatic recreation, of which 15 were impaired (MPCA, 2020a).

Excess nutrients, especially nitrogen, can also impact the quality of surface water drinking water supplies. The City of Mankato and MDH have drafted a Source Water Assessment for public water supply which outlines some of the nitrate issues the drinking water supplier is facing. The Lower Watonwan River planning region has 16,872 acres within the Mankato Surface Water Drinking Water Supply Management Area. This contributes source water to the city Ranney well as it joins with the Blue Earth and Minnesota Rivers. Mankato Well 13, which is the Ranney well that is closest to the Blue Earth River, had nitrate concentrations at or above the drinking water maximum contaminant level (MCL) standard of 10 mg/L during two periods. The first period occurred during June of 2013, when raw water concentrations exceeded 12 mg/L, while nitrate in the Blue Earth River was between 10.9 and 21.7 mg/L. The second period coincided with the 2015–2016 high nitrate period. Well water nitrate was measured at 10 mg/L on December 2, 2015, before dropping below the MCL for most of the rest of the winter. Samples collected from April through July 2016 were found to be at or above the MCL, with the June 10 sample measuring 14 mg/L.

Nitrate concentration in Well 13 has remained below the MCL since, with a maximum concentration of 7.6 mg/L being observed in June of 2017. Post-treatment, or entry point, concentrations of nitrate have been kept below the MCL through blending. The city of Mankato is able to blend their shallow wells with nitrate-free well water from deeper aquifers to achieve high quality, low nitrate finished water. As a result, while Well 13 was pumping water high in nitrate in 2015–16, finished water did not exceed 5 mg/L.

During implementation, actions will be pursued to reduce nutrient and sediment delivery to WRW rivers and streams, aimed at protecting and restoring aquatic life, aquatic recreation, and drinking water quality. These actions will be preferentially focused to areas that contribute to priority rivers and streams (Table 5-2). These prioritized rivers and streams align with the areas prioritized for restoration and protection efforts as part of the Watonwan River Watershed WRAPS (MPCA, 2020a; Table 23).

**Table 5-2: Priority rivers and streams for elevated nutrients and sediment.**

River or Stream Name	Prioritization Criteria*	Planning Region
<b>Nitrogen</b>		
Unnamed Creek reach 505	Restoration- Tipping Point: Barely Impaired	Upper Watonwan River
Watonwan River reach 501	Local and Partner Input**	Lower Watonwan River
<b>Sediment</b>		
North Fork of the Watonwan River	Restoration- Tipping Point: Barely Impaired	North Fork Watonwan River
Butterfield Creek	Restoration- Tipping Point: Barely Impaired	Saint James Creek

River or Stream Name	Prioritization Criteria*	Planning Region
<b>Nitrogen</b>		
Unnamed Creek reach 505	Restoration- Tipping Point: Barely Impaired	Upper Watowan River
Watowan River reach 501	Local and Partner Input**	Lower Watowan River
<b>Sediment</b>		
Watowan River reach 563	Restoration- Tipping Point: Barely Impaired	Lower Watowan River
St. James Creek	Restoration- Dirtiest Waters	Saint James Creek

\* See WRAPS Table 23 for more information on prioritization criteria

\*\* Prioritized based on local and partner input during the 1W1P planning process

Nutrient and sediment load reduction goals were created for each planning region, shown in maps on the following page. Load reduction goals are based on application of WRAPS-defined percentage reduction targets (MPCA, 2020a; Table 4) to calculated Prioritize, Target, and Measure Application (PTMApp) mass loads. This plan's short-term load reduction goals represent the WRAPS 10-year target for that parameter, while the long-term goal applies the watershed wide reduction percentage target. During implementation, the group will evaluate methods to align the information from WRAPS monitoring and modeling with information derived from PTMApp.

Table 5-3 below provides a comparison between PTMApp-calculated loads and Watershed Pollutant Load Monitoring Network (WPLMN) data outlined on pg. 77 of the Watowan WRAPS. PTMApp-calculated watershed outlet loads are within the observed range of high-year and low-year WPLMN monitored values for sediment and total phosphorus. Total nitrogen load calculated by PTMApp is below the observed range high-year and low-year WPLMN monitored values, though close to the monitored load in 2009. Individual planning region loads, when summarized together, exceed the PTMApp-calculated total watershed outload. This is observed due to summation of planning region outlet loads not incorporating a load decay function that removes mass of parameter delivered based on distance traveled. More information on the theory and mechanics of PTMApp may be found in Appendix Q.

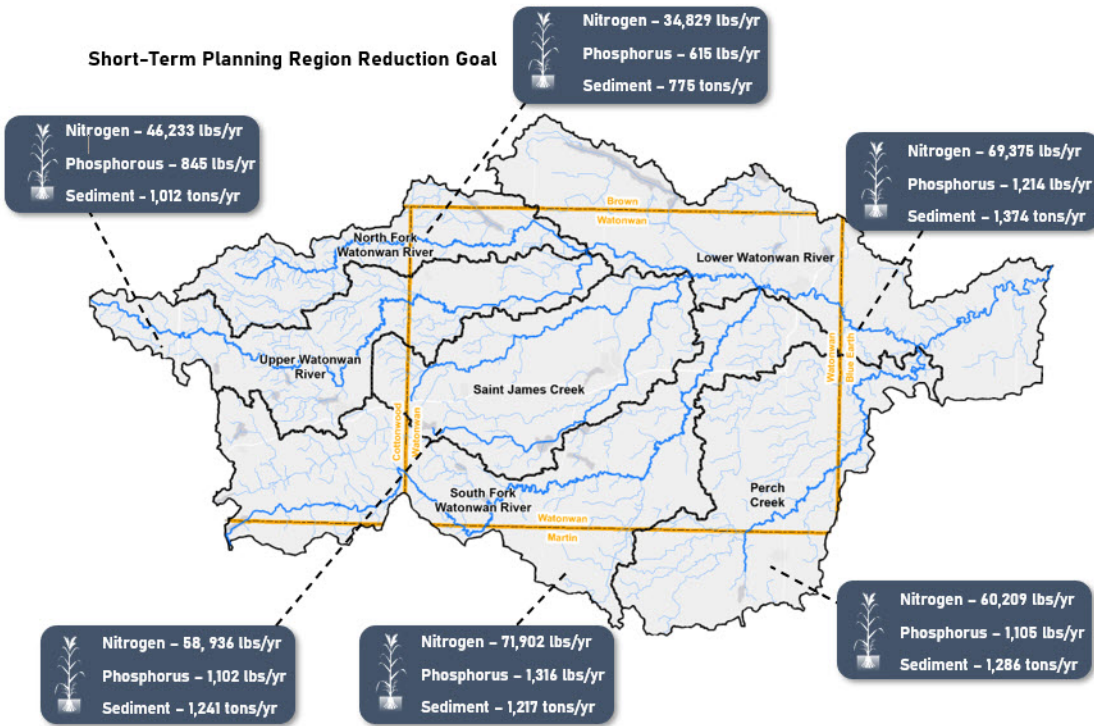
**Table 5-3: PTMApp-calculated watershed outlet load comparison to WPLMN observed data.**

Parameter	PTMApp (load/yr)	WRAPS (WPLMN Annual Average (2007-2015))*	WRAPS (High Year, 2010, All Parameters)*	WRAPS (Low Year, 2009, All Parameters)*
Total Nitrogen (lbs)	1,618,862	13,103,682	17,962,902	2,041,375
Total Phosphorus (lbs)	87,852	205,959	512,585	68,052
Sediment (tons)	63,058	33,444	76,658	6,508

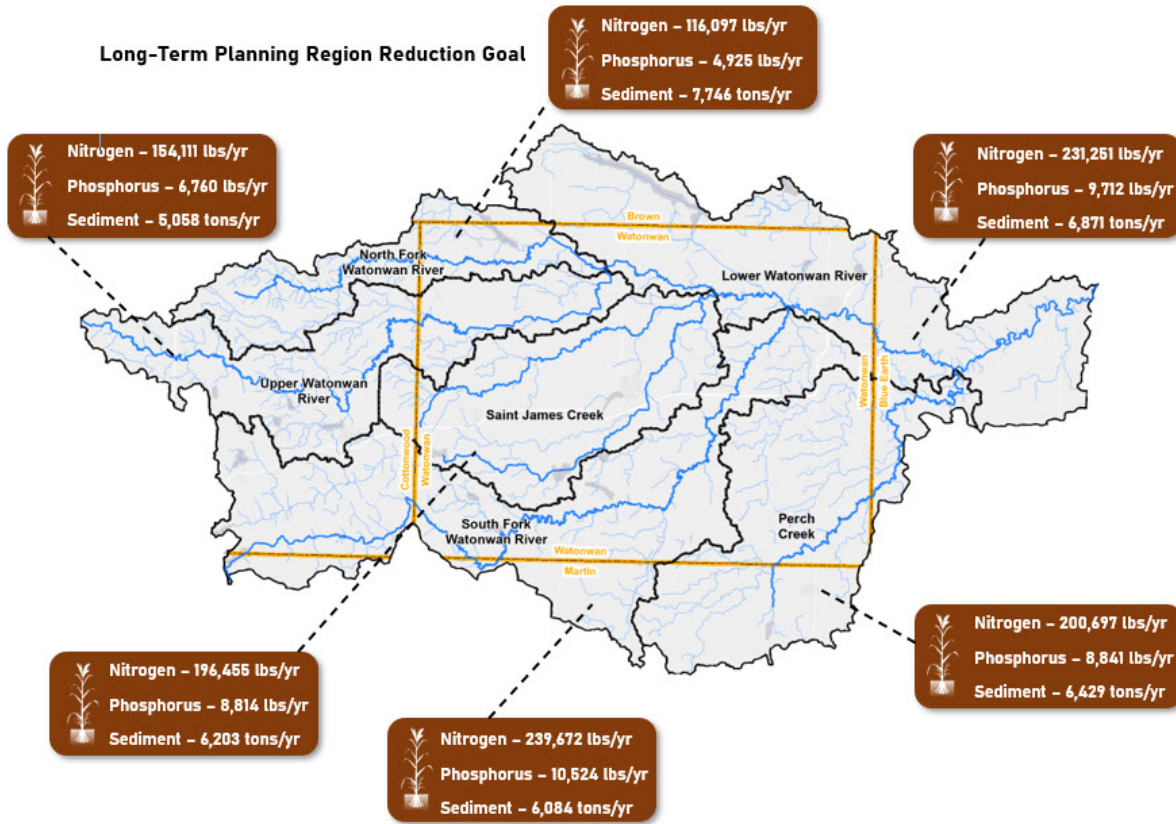
\*Converted from Kilograms



**Short-Term Planning Region Reduction Goal**



**Long-Term Planning Region Reduction Goal**



## Measurable Goals

### Short-Term:

- SW 3.1a: Planning Region Scale (summarized in Short Term Planning Region Reduction map above):
  - ✓ Restoration: Achieve a 15% reduction in nitrogen defined as the WRW WRAPS watershed-wide 10-yr target, determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 5% reduction in phosphorus defined as half of the WRW WRAPS watershed-wide 10-yr target, determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 4% reduction in TSS defined as the WRW WRAPS watershed-wide 10-yr target, determined by PTMApp Planning Region Outlet Load
- SW 3.1b: Reach-Specific Scale:
  - ✓ Restoration: Reduction in the number of streams classified as impaired
  - ✓ Protection: No increase in parameter loading to stream reaches not classified as impaired
- ✓ SW 3.1c: Conduct 10 educational efforts to highlight existing nutrient management and watershed BMP incentive programs.

### Desired Future Condition:

- Planning Region Scale (summarized in Long Term Planning Region Reduction map above):
  - ✓ Restoration: Achieve a 50% reduction in nitrogen defined as the WRW WRAPS watershed-wide target, determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 40% reduction in phosphorus defined as the WRW WRAPS watershed-wide target determined by PTMApp Planning Region Outlet Load
  - ✓ Restoration: Achieve a 20% reduction in TSS defined as the WRW WRAPS watershed-wide target, determined by PTMApp Planning Region Outlet Load
- Reach-Specific Scale:
  - ✓ Waterbodies achieve their water quality standards for sediments and nutrients.



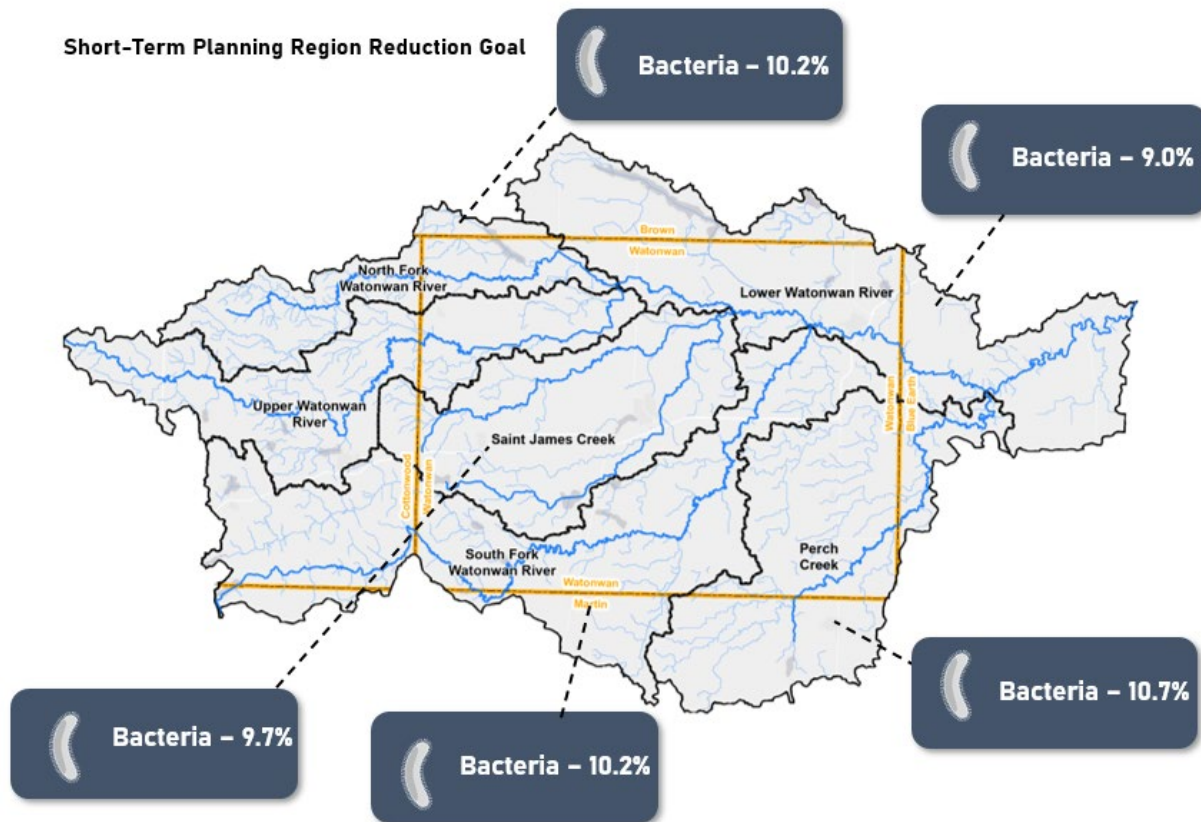
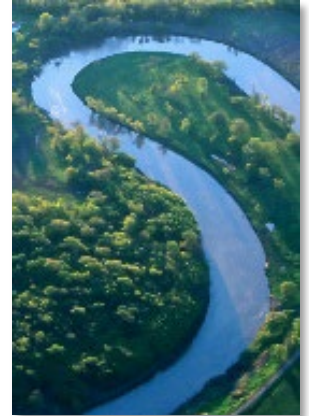
## RESOURCE CONCERN: RIVERS AND STREAMS

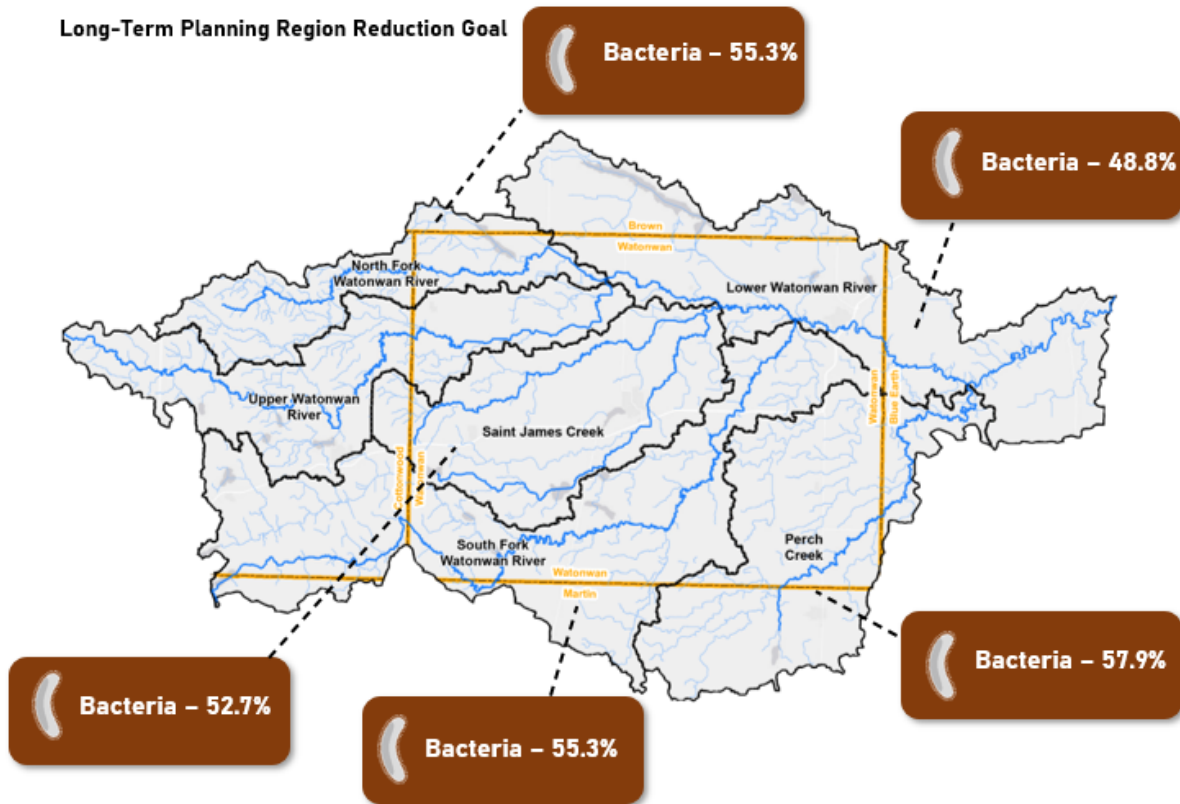
✓ Issue SW 3.2: Elevated bacteria levels in rivers and streams.

Fecal coliform and E. coli are often referred to as bacteria in water quality contexts. Elevated bacteria in waters are indicators of animal or human fecal matter, which may contain pathogens. Fecal matter can make aquatic recreation unsafe because contact with fecal matter can lead to potentially severe illnesses. Unlike most water quality impairments, fecal bacteria are living organisms. Because bacteria can reproduce or die-off in the environment, bacteria in water is dynamic and can be more challenging to understand.

Of the 18 streams monitored for bacteria as a pollutant, 17 were identified impaired (MPCA, 2020a). Bacteria was identified to be an impairment in ten reaches of the Watowan River, three reaches of St. James Creek, and one reach each of Butterfield Creek, Perch Creek, Spring Branch Creek, and Judicial Ditch 1.

This goal applies WRAPS defined reduction percentages to the required percent reduction defined by the WRW Total Maximum Daily Load to meet water quality standards, summarized in the maps below (MPCA, 2020a, 2020b).





## Measurable Goals

### Short-Term:

- SW 3.2a: Planning Region Scale (summarized in Short Term Planning Region Reduction map above):
  - ✓ Restoration: Achieve a 12% reduction in stream bacteria defined as the WRW WRAPS watershed-wide 10yr target, determined by WRW TMDL total load reduction target.
- SW 3.2b: Reach-Specific Scale:
  - ✓ Restoration: Reduction in the number of streams classified as impaired
  - ✓ Protection: Maintain or reduce stream bacteria in reaches not classified as impaired.
- ✓ SW 3.2c: Conduct 10 educational efforts to highlight watershed livestock BMP and SSTS incentive programs

### Desired Future Condition:

- Planning Region Scale (summarized in Long Term Planning Region Reduction map above):
  - ✓ Restoration: Achieve a 65% reduction in stream bacteria defined as the WRW WRAPS watershed-wide target, determined by WRW TMDL total load reduction target
- Reach-Specific Scale:
  - ✓ Waterbodies achieve their water quality standards.



## RESOURCE CONCERN: RIVERS AND STREAMS

- ✓ Issue SW 3.3: Loss of lateral and longitudinal floodplain access and connectivity.

Floodplains serve as the interface between the land and water with a variety of beneficial functions. Floodplains act as a buffer to limit delivery of sediment and nutrients to surface waters from runoff and provide natural protection by reducing downstream flooding during times of increased flows in water ways. They also serve as a means of connecting broader habitat environments, which enrich ecosystem diversity and resiliency.

Land use practices and land use management directly influence water flow across a landscape, which in turn can affect the floodplains. When floodplains are reduced or damaged, habitats can become fragmented. Altered watercourses (e.g., channelized or impounded) have limited lateral and longitudinal floodplain connectivity and do not allow the channel to effectively transport sediment.

This goal is focused on lateral connectivity for floodplain access and longitudinal connectivity for aquatic organism passage. There is a need to conduct an inventory to determine how existing infrastructure and water conveyance structures influence the natural connectivity of rivers and streams. Inventories will focus on prioritized river and stream reaches (Table 5-4). These resources align with the areas prioritized for addressing connectivity and fish passage barriers as part of the Watonwan River Watershed WRAPS (MPCA, 2020a; Table 23).



**Table 5-4: Priority rivers and streams for floodplain access and connectivity.**

River or Stream Name	Prioritization Criteria*	Planning Region
South Fork of the Watonwan River	Connectivity/Fish Passage Barriers	South Fork Watonwan River
Butterfield Creek	Connectivity/Fish Passage Barriers	Saint James Creek
Perch Creek	Connectivity/Fish Passage Barriers	Perch Creek

\* See WRAPS Table 23 for more information on prioritization criteria

### Measurable Goals

#### Short-Term:

- ✓ SW 3.3a: Conduct a bridge and culvert inventory to document the location, size, condition, and estimated cost of repair or upgrade.

#### Desired Future Condition:

- ✓ Set infrastructure repair/replacement goals based on outcome of short-term inventory. Continue to assess condition of watershed bridges and culverts.



## RESOURCE CONCERN: RIVERS AND STREAMS

- ✓ Issue SW 3.4: Streambank, ravine, and bluff erosion.

Streambank, ravine, and bluff erosion have been shown to be large sources of excess sediment to surface waters in the WRW, and also contribute to phosphorus loading (MPCA, 2020a) This plan will target restoration and stabilization practices to reduce the impacts of stream, ravine, and bluff erosion on surface waters. These practices may include rip rap, live stakes, hard armor, and rock riffles. Targeting methodology will be based on defined priority resources and will rely on previous geomorphology studies that have been completed in the WRW, namely Watowan River Watershed Hydrology, Connectivity, and Geomorphology Assessment Report (DNR, 2014).

Management of woody debris within the stream channel is a concern in the watershed. Local DNR and Shoreland Administrator should be consulted if debris that is a substantial hazard toward existing infrastructure is intended to be removed.



### *Measurable Goals*

Short-Term:

- ✓ SW 3.4a: Implement 3 practices to restore and/or stabilize degraded stream reaches

Desired Future Condition:

- ✓ Continue to assess, prioritize, and target feasible projects that address degraded stream reaches in the watershed



## RESOURCE CONCERN: WETLANDS

- ✓ Issue SW 4.1: Loss of wetland functions in watershed.

Wetlands serve many ecological and environmental purposes, including:

- ✈ establishing and maintaining healthy ecosystem functioning, especially aquatic and terrestrial habitat;
- ✈ improving groundwater quality and quantity;
- ✈ reducing overland sediment, nutrient, and bacterial runoff; and
- ✈ providing additional water storage, thereby reducing downstream flood risk.



Wetlands in the watershed have been decreased by roughly 92% (MPCA, 2016). Implementing and enforcing regulatory controls, targeting restoration and improvement to wetland basins, and providing education and technical assistance are some avenues this plan intends to explore to preserve, improve, and restore wetland functions. This measurable goal is centered on preserving and restoring existing quality wetland areas and restoring previously existing wetlands.

### *Measurable Goals*

Short-Term:

- ✓ SW 4.1a: Restore and improve 500 acres of wetlands.
- ✓ SW 4.1b: Complete 1,000 contacts with local landowners to encourage enrollment in state and federal programs to preserve and restore wetlands.

Desired Future Condition:

- ✓ Continue outreach and promotion of wetland benefits.





## RESOURCE CONCERN: SURFACE RUNOFF AND FLOODING

- ✓ Issue SW 5.1: Land use changes leading to loss of vegetative cover and field residue.

The rich topsoil of the Upper Midwest U.S. is a globally significant resource. The WWPP plans to protect, enhance, and encourage the stewardship of the soils in this watershed, ensuring long-term economic vitality and benefit to local environmental resources. As a result, the WWPP will promote and implement effective and efficient vegetative cover best management practices (BMPs) by prioritizing and targeting areas to stabilize the landscape, enhance the soils, and benefit water quality.



### *Measurable Goals*

#### Short-Term:

- ✓ SW 5.1a: Implement and maintain additional vegetative cover practices on 41,900 acres of the total watershed land area.
- ✓ SW 5.1b: Conduct 20 educational efforts to highlight available technical and financial assistance to protect soil health and reduce peak-flow rates.

#### Desired Future Condition:

- ✓ Continue to build upon the short term vegetative cover goal.
- ✓ Extend short term annual educational outreach goal.







## RESOURCE CONCERN: SURFACE RUNOFF AND FLOODING

✓ Issue SW 5.2: Land use changes leading to the loss of natural storage.

Land use changes in urban and rural environments can lead to issues related to flooding, erosion, pollution, and habitat disruption and loss. This goal focuses on providing support to property owners and implementing landscape improvements to mitigate adverse impacts of land use changes. One means of mitigating impacts is by identifying prospective areas for water storage. Determining the runoff reduction goal was accomplished by generation of a Watonwan Watershed Hydrology technical memorandum (Appendix R). The methods outlined in this memo establish a watershed runoff reduction value needed return to historically projected flows. The WRAPS runoff reduction target (MPCA, WRAPS, Table 4) was applied to this value to determine final reduction goals.



Actions to add storage on the landscape will focus on prioritized river and stream reaches (Table 5-5). These rivers and streams were prioritized for addressing hydrologic alteration as part of the Watonwan River Watershed WRAPS (MPCA, 2020a; Table 23).

**Table 5-5: Priority rivers and streams for additional storage and hydrologic alteration.**

River or Stream Name	Prioritization Criteria*	Planning Region
Perch Creek	Hydrologic Alteration	Perch Creek
Spring Branch Creek	Hydrologic Alteration	Perch Creek
Tributaries to Lake Hanska	Hydrologic Alteration	Lower Watonwan River
Upper Watonwan River	Hydrologic Alteration	Upper Watonwan River
Original Mountain Lake basin area	Hydrologic Alteration	Upper Watonwan River

\* See WRAPS Table 23 for more information on prioritization criteria

### Measurable Goals

#### Short-Term:

- ✓ SW 5.2a: Achieve 0.10 inches of water runoff reduction across the watershed, or 4,327 acre-feet of runoff reduction by implementation of targeted PTMApp practices across the watershed
- ✓ SW 5.2b: Achieve 4% watershed-wide reduction in peak and annual streamflow, defined as the 10-year target in the WRW WRAPS
- ✓ SW 5.2c: Conduct 20 educational efforts to highlight available technical and financial assistance to implement runoff reduction and rate-control BMPs

#### Desired Future Condition:

- ✓ Achieve 0.19 inches of water runoff reduction across the watershed, or 8,654 acre-feet of runoff reduction by implementation of targeted PTMApp practices across the watershed
- ✓ Achieve 25% watershed-wide reduction in peak and annual streamflow, defined as the watershed-wide goal in the WRW WRAPS
- ✓ Extend short-term educational outreach goal



## RESOURCE CONCERN: SURFACE RUNOFF AND FLOODING

- ✓ Issue SW 5.3: Level of watershed and community resilience to extreme weather events.

Extreme weather events and the increasing variability of global weather trends presents a significant challenge to water resource managers. Indifferent of cause, there is a need to increase watershed and community resiliency. There is a need to increase collaboration within the watershed on Emergency Management and also develop a plan for managing larger and more variable (increased frequency and volume) extreme weather events. This plan will identify areas on the landscape to implement preventative measures to best manage extreme weather events and also build more resilience with community awareness so emergencies can be best managed into the future by utilizing local knowledge of known flood-prone areas, and FEMA designated floodplain maps.



### *Measurable Goals*

#### Short-Term:

- ✓ SW 5.3a: Conduct 20 educational efforts about water quantity and community resilience to extreme weather events
- ✓ SW 5.3b: Conduct a bridge and culvert inventory to document the location, size, condition, and estimated cost of repair or upgrade

#### Desired Future Condition:

- ✓ Extend short-term educational outreach goal.
- ✓ Set infrastructure repair/replacement goals based on outcome of short-term inventory. Continue to assess condition of watershed bridges and culverts.

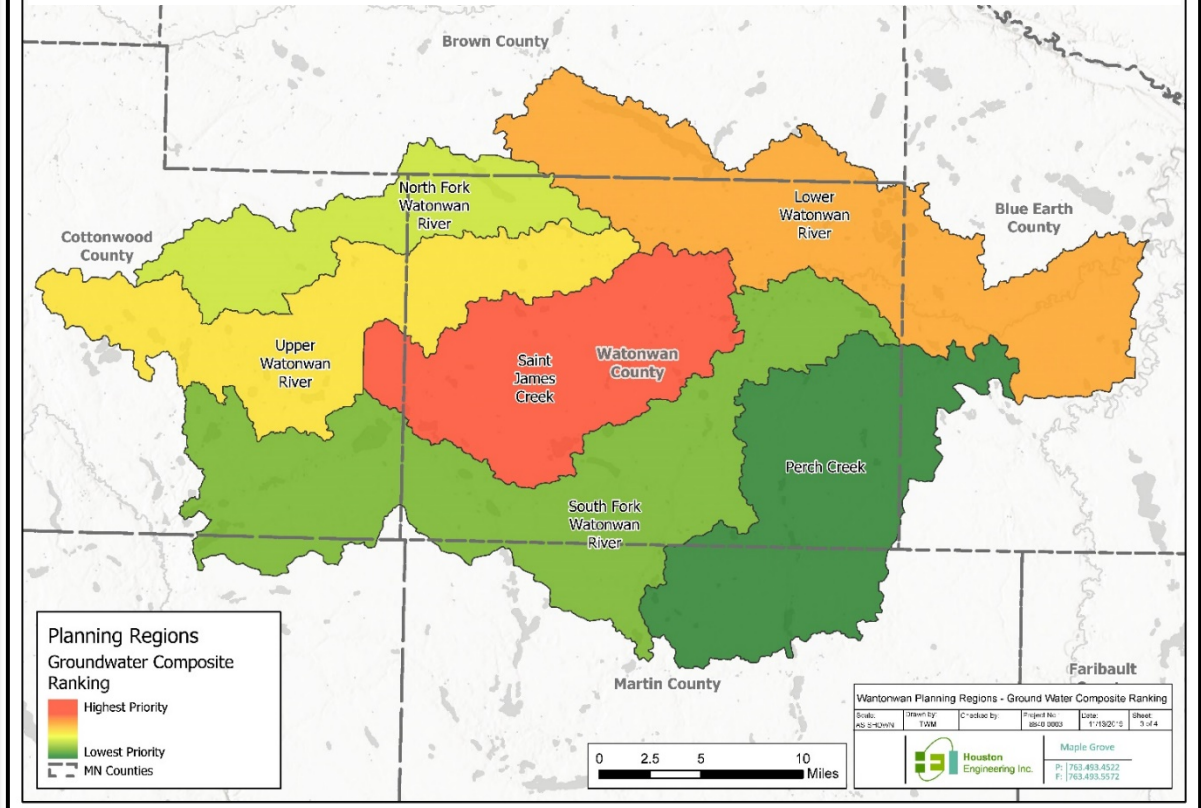


# GROUNDWATER MEASURABLE GOALS

This section sets measurable goals for:

- ✓ Groundwater Quality
- ✓ Groundwater Quantity

**Figure 5-2: Planning regions that are highest priority (shown by red) and lowest priority (shown by dark green) for groundwater resources in the WRW.**

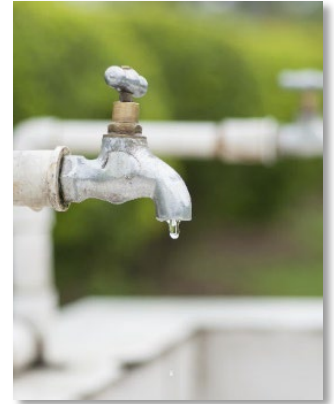


*Groundwater is the highest priority within the Saint James Creek Planning Region.*

## RESOURCE CONCERN: GROUNDWATER QUALITY

✓ Issue GW 1.1: Elevated levels of nitrates in groundwater.

Groundwater accounts for all the region's drinking water. Protecting against elevated levels of nitrates in drinking water is one of the top concerns in the watershed. More information about nitrate vulnerable areas within the watershed can be found at <https://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan/mitigation/wrpr/wrprpart1/vulnerableareamp>. Elevated levels of nitrates in drinking water can present a health risk - especially for babies. None of the newly constructed, private, or other drinking water supply wells sampled by the MDH had levels at or above the Safe Drinking Water Act standard of 10 mg/L, although shallow wells had over 70% of samples exceeding the natural background levels of 3 mg/L (MDH, 2018). Levels over natural background mean groundwater quality is being influenced by land use activities.



Increased awareness and action are needed to protect and maintain wells with low nitrate concentrations, and protect threatened wells showing nitrate levels nearing the drinking water standard. This plan intends to address these concerns, engage the communities and landowners, and implement measures as needed to secure positive outlook for groundwater resources into the future.

Implementation will be focused in priority areas (Table 5-6). These areas are a high priority for protecting groundwater due to the soils, geology, and other attributes, as summarized in the WRAPS (MPCA, 2020a; Table 23). Further, nitrate testing results (Figure 3-7, Section 3) and other available state geospatial data layers will be used to guide implementation decisions.

**Table 5-6: Priority areas for nitrates in groundwater.**

Area Name	Prioritization Criteria*	Planning Region
La Salle and Garden City Area (Mankato Ranney Wells)	Drinking water and Groundwater	Lower Watonwan River
North Fork Watonwan	Drinking water and Groundwater	North Fork Watonwan River
St. James Wellhead protection area	Drinking water and Groundwater	Saint James Creek

\* See WRAPS Table 23 for more information on prioritization criteria

## Measurable Goals

### Short-Term:

- ✓ GW 1.1a: Protection (in areas with nitrate concentration 0 – 4.9 mg/L): Maintain and improve existing vegetative cover by discouraging or preventing conversion to cultivated land; Contaminant source management on existing land uses (PTMApp Source Reduction, BMPs, SSTS management, and easements).
- ✓ GW 1.1b: Protection (in areas with nitrate concentration 5.0 – 9.9 mg/L): Contaminant source reduction or elimination; Shift land uses away from those that may leach excess nitrogen (Alternative management tools, upgrade failing STSS, easements).
- ✓ GW 1.1c: Hold 10 educational efforts to promote implementation of nutrient management practices.
- ✓ GW 1.1d: Hold 10 water testing clinics to determine nitrate concentrations in irrigation water and provide access to testing kits to irrigators.
- ✓ GW 1.1e: Hold 20 clinics to educate citizens on private well nitrogen levels.

### Desired Future Condition:

- ✓ Extend short-term protection goals
- ✓ Maintain zero drinking water wells tested for nitrates to be at or above the 10 mg/L standard [this goal is based on the GRAPS recording that no drinking water wells, at the time of the study, were found to exceed the 10 mg/L drinking water standard; GRAPS p59]
- ✓ Extend short-term annual educational outreach effort goals.

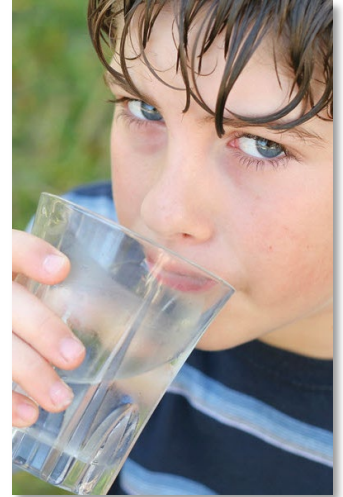
## RESOURCE CONCERN: GROUNDWATER QUALITY

- ✓ Issue GW 1.2: Contaminants in groundwater.

Groundwater contamination is present in parts of the WRW. Some aquifers and wells used for public water supplies are very shallow and unprotected and can be easily contaminated by human activities, such as the application and/or use of fertilizer and pesticides. MDA uses two monitoring wells within Watowan County to monitor for common detection pesticides. Pesticides have been detected in both wells, but not at concentrations above human-health based drinking water standards or reference values (MDA, 2018).

In contrast, some groundwater contamination is naturally occurring. Approximately 47% of tested drinking water wells have elevated levels of naturally occurring arsenic with approximately 16% exceeding the Safe Drinking Water Act (SDWA) standard of 10 µg/L (MDH, 2018).

These contaminants can affect both private wells and public water systems when levels exceed drinking water standards. Some of the public water systems have water quality issues in their untreated source water that requires either blending or treating the water to meet SDWA standards. Increased awareness and action are needed regarding the elevated levels of contaminants in groundwater resources. This plan intends to address these concerns, engage the communities and landowners, and implement measures as needed to secure positive outlook for groundwater resources into the future.



### *Measurable Goals*

#### Short-Term:

- ✓ GW 1.2a: Maintain zero wells with pesticide concentrations above human-health based drinking water standards or referenced values.
- ✓ GW 1.2b: Hold 20 educational efforts to inform the public of the potential threat of contaminants in groundwater and the importance of testing.

#### Desired Future Condition:

- ✓ Extension of short-term goals.

## RESOURCE CONCERN: GROUNDWATER QUANTITY

- ✓ Issue GW 2.1: Groundwater use and loss of recharge.

Groundwater accounts for about 97% of the reported water use in the WRW. Most groundwater is used for public water supply. Agricultural irrigation is the second largest water user, followed by livestock watering and industrial processing. Maintaining a sustainable supply of groundwater resources serves to benefit communities in the watershed that use groundwater for these purposes, as well as natural features that are groundwater fed (calcareous fens, wetland complexes, groundwater-dominant lakes, native plant communities, and rare plant and animal species).

There is a need to broaden awareness of groundwater availability within the watershed. Water efficiency best management practices, public and landowner collaboration, and implementing on-the-ground practices that can encourage and improve groundwater recharge will be promoted as part of this plan. Resources such as the University of Minnesota - Extension irrigation specialist may be utilized to support these efforts. Specific initial opportunities include promotion of the City of St. James wellhead protection area success, and leveraging the DNR Community-based Aquifer Management Partnership (CAMP) to raise awareness of WRW water supply issues.



### *Measurable Goals*

#### Short-Term:

- ✓ GW 2.1a: Implement 20 practices that promote aquifer recharge in DWSMA and Wellhead Protection Areas.
- ✓ GW 2.1b: Hold 10 educational efforts for the public to learn current successes and issues with groundwater use and groundwater recharge.

#### Desired Future Condition:

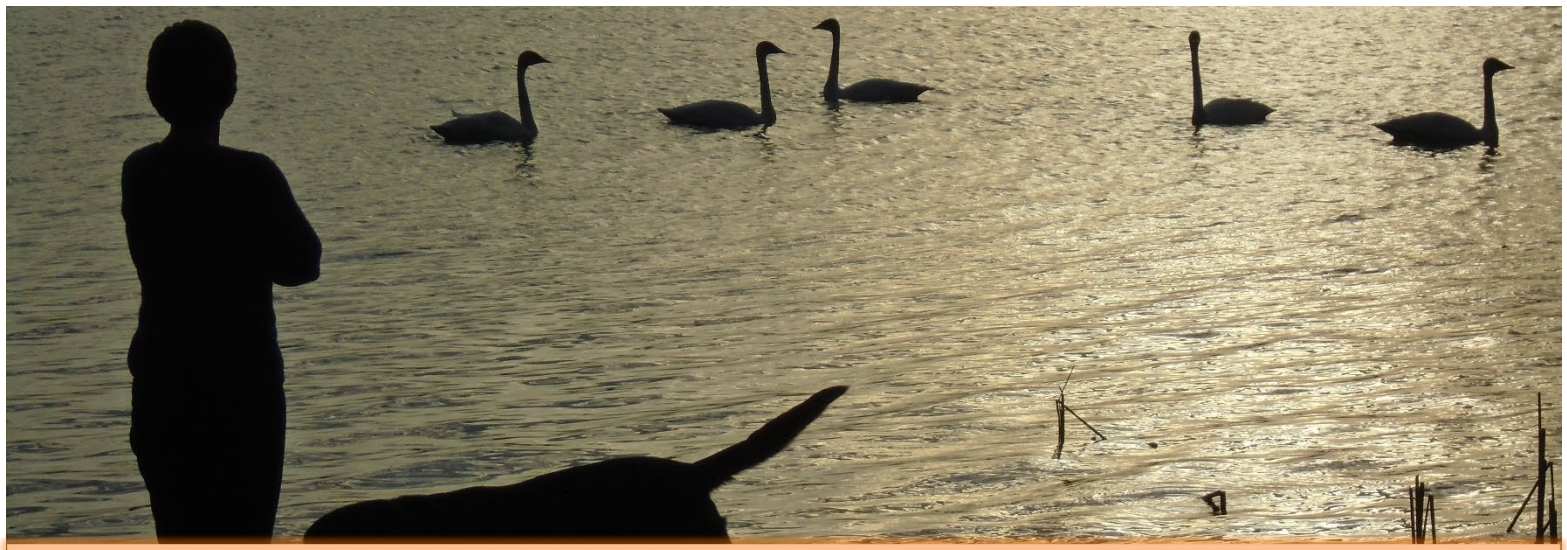
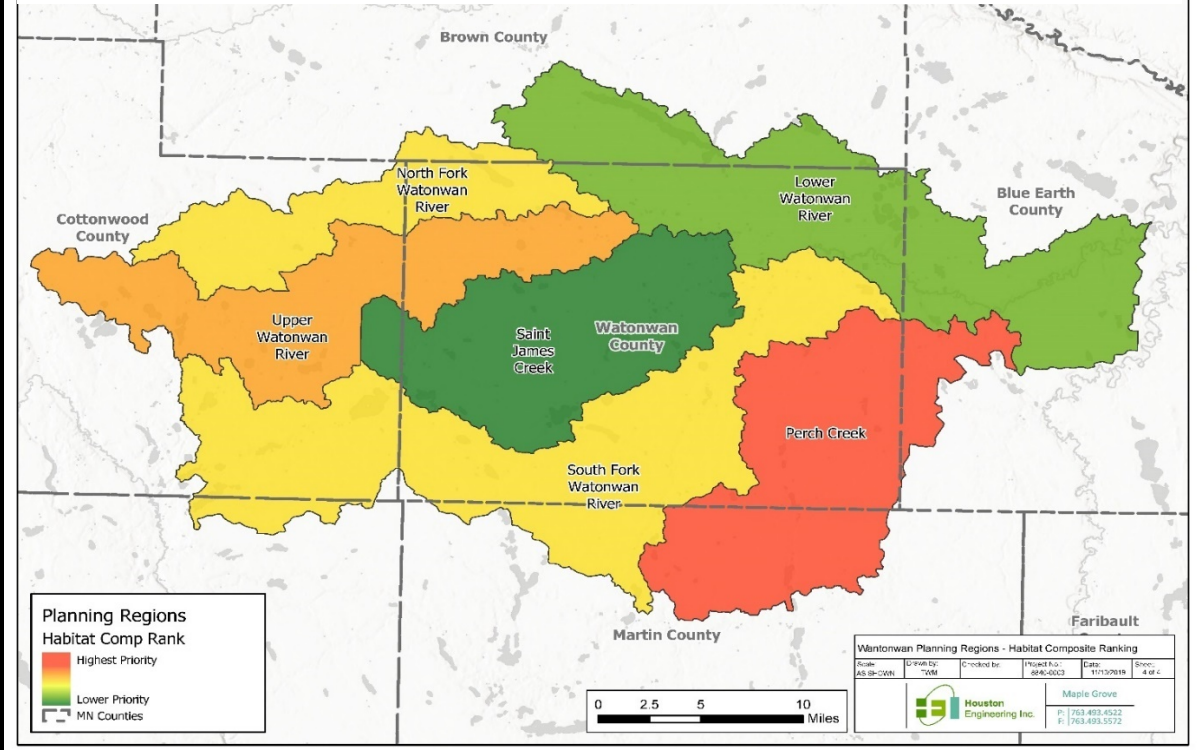
- ✓ All community members understand successes and issues with groundwaters use and recharge, and efficient water use systems are in use to balance aquifer withdrawal with recharge

# HABITAT AND RECREATION MEASURABLE GOALS

This section sets measurable goals for:

- ✓ Aquatic Habitat
- ✓ Terrestrial Habitat
- ✓ Recreation

**Figure 5-3: Planning regions that are highest priority (shown by red) and lowest priority (shown by dark green) for habitat and recreational resources in the WRW.**



*Habitat and recreation are the highest priority within the Perch Creek Planning Region.*



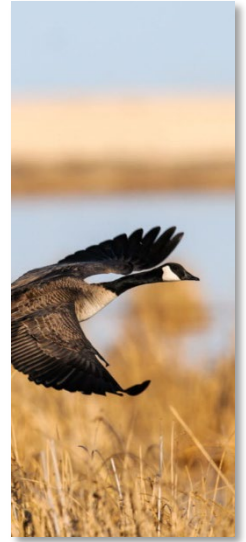
## RESOURCE CONCERN: AQUATIC HABITAT

✓ Issue HR 1.1: Aquatic and riparian habitat loss from development and flow variability.

Riparian habitat areas provide many ecosystem services including flood control, erosion control, and reduction of nutrient delivery into adjacent waterbodies. Healthy vegetated aquatic habitat (those without excessive invasive species, and good species diversity) also provide a sort of armoring for those areas that interface a waterbody and land's surface. Degraded riparian and aquatic habitat impact aquatic life by reducing ability to feed, shelter, and reproduce, which results in altered behavior, increased mortality, and decreased populations.

There are 30 biologically impaired stream reaches in the watershed that do not support standards for aquatic life. Degraded habitat was identified as a stressor in all 30 of these reaches (MPCA, 2020a). Many of the bio-impaired stream reaches showed some issues with land use and riparian vegetation. Without adequate riparian vegetation, issues such as excessive flow – which causes stream instability and sediment issues – are magnified because the stream lacks the strength to resist erosion.

There is a need in the watershed to better manage water conveyance and flow variability. By managing the hydraulic regimes and reducing flashiness, aquatic and riparian habitats will experience less severe adverse impacts during extreme precipitation events or spring runoff. This plan intends to take account of infrastructure in the waterways, promote landscape best management practices, and encourage and promote developing a more stable hydraulic regime across the watershed, especially in areas with prioritized wildlife habitat (Table 5-7) (MPCA, 2020a; Table 23).



**Table 5-7: Priority areas for wildlife habitat.**

Area Name	Prioritization Criteria	Planning Region
Bat Lake	Wildlife Habitat- "Outstanding" biological significance class with higher quality aquatic plant assemblages*	Upper Watowan River
Arnolds Lake WMA	Local and Partner Input**	Upper Watowan River
Delft WMA	Local and Partner Input**	Upper Watowan River
Little Swan WMA	Local and Partner Input**	Upper Watowan River
Mountain Lake WMA	Local and Partner Input**	Upper Watowan River
Voss WMA	Local and Partner Input**	Upper Watowan River
Red Rock Rural Water System - Lake Augusta WPA	Local and Partner Input**	Upper Watowan River
Mountain Lake WPA	Local and Partner Input**	Upper Watowan River; South Fork Watowan River
Bingham Lake	Wildlife Habitat- Opportunities to improve waterfowl production*	South Fork Watowan River
Banks WMA	Local and Partner Input**	South Fork Watowan River
Bennett WMA	Local and Partner Input**	South Fork Watowan River
Carpenter WMA	Local and Partner Input**	South Fork Watowan River
Fossum WMA: Berdell Unit	Local and Partner Input**	South Fork Watowan River

Area Name	Prioritization Criteria	Planning Region
Fossum WMA: Bottin Tract	Local and Partner Input**	South Fork Watowan River
Fossum WMA: Thorn Unit	Local and Partner Input**	South Fork Watowan River
Regehr WMA	Local and Partner Input**	South Fork Watowan River
Tierney WMA	Local and Partner Input**	South Fork Watowan River
Turtle WMA	Local and Partner Input**	South Fork Watowan River
W. R. Taylor Memorial WMA	Local and Partner Input**	South Fork Watowan River
Willow Creek WMA	Local and Partner Input**	South Fork Watowan River
Windom WPA	Local and Partner Input**	South Fork Watowan River
Wood Lake WMA	Local and Partner Input**	North Fork Watowan River
Rock Ridge WMA	Local and Partner Input**	North Fork Watowan River
Mulligan Slough WMA	Local and Partner Input**	North Fork Watowan River
Darfur WPA	Local and Partner Input**	North Fork Watowan River, Upper Watowan River
Kansas Lake	Wildlife Habitat- Opportunities to improve waterfowl production*	Saint James Creek
Curry WMA	Local and Partner Input**	Saint James Creek
Ewy Lake WMA	Local and Partner Input**	Saint James Creek
Rosendale WMA	Local and Partner Input**	Saint James Creek
Sulem Lake WMA	Local and Partner Input**	Saint James Creek
Saint James	Local and Partner Input**	Saint James Creek
Perch Creek	Wildlife Habitat- Blanding's Turtle habitat*	Perch Creek
Unnamed Wetland	Wildlife Habitat- "Moderate" biological significance class with diverse bird life*	Perch Creek
Armbrust WMA	Local and Partner Input**	Perch Creek
Case Lake WMA	Local and Partner Input**	Perch Creek
Exceder WMA	Local and Partner Input**	Perch Creek
Gleam WMA	Local and Partner Input**	Perch Creek
Lewisville WMA	Local and Partner Input**	Perch Creek
Perch Creek WMA	Local and Partner Input**	Perch Creek
W. R. Taylor Memorial WMA	Local and Partner Input**	Perch Creek
Truman WPA	Local and Partner Input**	Perch Creek
Lake Hanska	Wildlife Habitat- Designated wildlife lake; Opportunities to improve waterfowl production*	Lower Watowan River
Linden Lake	Wildlife Habitat- "Moderate" biological significance class with diverse bird life*	Lower Watowan River
Fedji Lake	Wildlife Habitat- Opportunities to improve waterfowl production*	Lower Watowan River
Emerson WMA	Local and Partner Input**	Lower Watowan River
Lake Hanska WMA	Local and Partner Input**	Lower Watowan River

Area Name	Prioritization Criteria	Planning Region
Younger Brothers WMA: North West Unit	Local and Partner Input**	Lower Watowan River
Younger Brothers WMA: South East Unit	Local and Partner Input**	Lower Watowan River
Southeast Hanska WMA	Local and Partner Input**	Lower Watowan River
Bergdahl WMA	Local and Partner Input**	Lower Watowan River
William A. Groebner WMA	Local and Partner Input**	Lower Watowan River
Albin WMA	Local and Partner Input**	Lower Watowan River
Madelia WPA	Local and Partner Input**	Lower Watowan River
La Salle WPA	Local and Partner Input**	Lower Watowan River

\* See WRAPS Table 23 for more information on prioritization criteria

\*\* Prioritized based on local and partner input during the 1W1P planning process

## Measurable Goals

### Short-Term:

- ✓ HR 1.1a: Across the watershed, meet a 12% increase in MPCA Stream Habitat Assessment score, defined as the 10-year target in the WRW WRAPS.
- ✓ HR 1.1b: Complete culvert/fish barrier inventory.

### Desired Future Condition:

- ✓ Meet a 35% increase in MPCA Stream Habitat Assessment score, defined as the watershed-wide target in the WRW WRAPS.

## RESOURCE CONCERN: AQUATIC HABITAT

- ✓ Issue HR 1.2: Aquatic habitat loss from bank erosion and channel instability in creeks, streams, and rivers.

There are 30 biologically impaired stream reaches in the watershed that do not support standards for aquatic life. Degraded habitat was identified as a stressor in all 30 of these reaches. Many of the bio-impaired stream reaches showed some issues with channel instability and excess sediment. Without adequate riparian vegetation, issues such as excessive flow – which causes stream instability and sediment issues – are magnified because the stream lacks the strength to resist erosion.



The Watowan River Watershed Hydrology, Connectivity, and Geomorphology Assessment Report estimates bank erosion rates from Madelia to confluence with Blue Earth River (DNR, 2014). This information can be used as a starting point to identify and prioritize locations to address bank and channel instability. River reaches in the table below (Table 5-8) will also be considered for prioritization to align with WRAPS efforts.

**Table 5-8: Priority rivers and streams for aquatic habitat from bank erosion and channel instability.**

River Reach	Prioritization Criteria*	Planning Region
Unnamed Creek reach 505	Tipping Point: Barely Impaired	Upper Watowan River
Watowan River reach 563	Tipping Point: Barely Impaired	Lower Watowan River

\* See WRAPS Table 23 for more information on prioritization criteria

### Measurable Goals

Short-Term:

- ✓ HR 1.2a: Work with DNR to prioritize locations to address bank and channel instability.

Desired Future Condition:

- ✓ Set stabilization goals based upon outcomes from the prioritization exercise.

## RESOURCE CONCERN: AQUATIC HABITAT

- ✓ Issue HR 1.3: Aquatic invasive and nuisance species and their impacts.

Invasive and nuisance species are those species that are not native to a certain area and therefore cause disruption in the natural balance of the habitat and the food chain. Invasive species jeopardize the quality and quantity of species diversity in aquatic environments. Aquatic invasive and nuisance species can limit or reduce the habitat area available for those species to thrive.

There is a need to develop a way to monitor and decrease aquatic invasive species infestations and develop more resilient aquatic and riparian habitats within the watershed. When riparian and aquatic habitats are disrupted by land management practices or from excessive erosion and sedimentation, native species may not survive. In such areas, there is increased potential for invasive species to take over. At times, these riparian and aquatic habitats do not have the chance to recover in between natural events such as flooding or excessive stormwater runoff. This plan intends to examine invasive species control measures, provide education and outreach activities in the watershed, and to increase natural habitat resilience against aquatic invasive and nuisance species.



### Measurable Goals

#### Short-Term:

- ✓ HR 1.3a: Restoration- Manage existing AIS infestations to address existing degradation of aquatic habitat.
- ✓ HR 1.3b: Protection- Work to prevent introduction and spread of aquatic invasive species, including (but not limited to) invasive carp, Eurasian Watermilfoil, Purple Loosestrife, Zebra Mussels, and Spiny Water Fleas (which have not been recorded in the WRW).

#### Desired Future Condition:

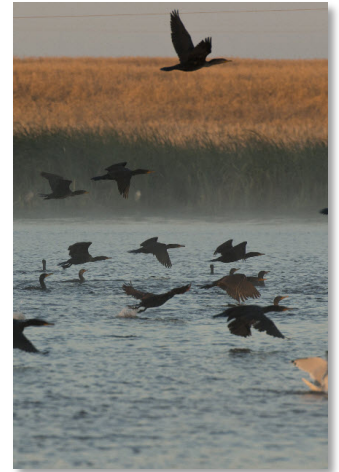
- ✓ Extension of short-term Restoration and Protection goals.
- ✓ Consolidate existing information and develop AIS infestation susceptibility indices.

## RESOURCE CONCERN: TERRESTRIAL HABITAT

- ✓ Issue HR 2.1: Terrestrial habitat fragmentation and loss.

Connectivity of natural terrestrial habitats correspond with greater species diversity, and stronger ecosystem resilience; simultaneously, greater ecosystem services capacity for an environment. Fragmentation occurs when buffers, riparian areas, and larger habitat areas are divided or removed by various land use practices. This creates challenges for wildlife to maintain themselves on small swatches of land.

There is a need to increase terrestrial habitat corridor restoration to decrease habitat fragmentation in the WRW to protect and enhance species such as the Blanding's turtle and several other species listed in Table 3.6 in Section 3. Local ordinances, zoning regulations, and local planning efforts, such as the Blue Earth County Greenprint effort, can assist in habitat conservation and restoration. The Greenprint platform also models aquatic habitat priorities, allowing for the determination of multi-benefit habitat priority areas that will be a focal point of habitat restoration efforts. This plan intends to increase educational activities and create more contiguous terrestrial habitats throughout the watershed, prioritizing areas identified by the Minnesota Wildlife Action Plan.



### Measurable Goals

#### Short-Term:

- ✓ HR 2.1a: Complete 20 habitat projects to restore habitat corridors and decrease habitat fragmentation.

#### Desired Future Condition:

- ✓ Establish ecosystem resiliency to preserve terrestrial habitat.

## RESOURCE CONCERN: TERRESTRIAL HABITAT

- ✓ Issue HR 2.2: Terrestrial invasive and nuisance species and their impacts.

The WRW is located within the Minnesota River Prairie Ecological Subsection, which is home to 52 federal- or state-listed endangered, threatened, or special concern species. Invasive species and competition are a problem for these listed species. There is a need to restore terrestrial habitats and protect them from the invasion and spread of terrestrial invasive and nuisance species. More information about terrestrial invasive species can be found at <https://www.mda.state.mn.us/pest-information>.

Digital geospatial data is a tool that will be used to assist in tracking and monitoring management of native and invasive species and their habitats. This plan intends to practice existing regulatory controls including that for invasive species control: Minn. Stat. 84D and Minn. R. 6216, and for Noxious Weed control: Minn. Stat. 18.76-18.91. Land management practices and education and outreach activities are also planned as part of plan implementation.



### *Measurable Goals*

#### Short-Term:

- ✓ HR 2.2a: Restoration - Manage existing terrestrial and nuisance species to address existing degradation of terrestrial habitat.
- ✓ HR 2.2b: Protection - Work to minimize the spread of terrestrial invasive species, including (but not limited) to: Emerald Ash Borer, Canada Thistle, Purple Loosestrife, and Palmer Amaranth.

#### Desired Future Condition:

- ✓ Extension of short-term Restoration and Protection goals.
- ✓ Update/ utilize state database for existing and emerging species of concern in upland habitat.

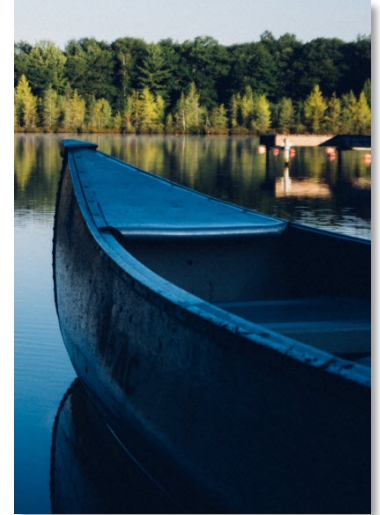


## RESOURCE CONCERN: RECREATION

- ✓ Issue HR 3.1: The lack of recreational access and connectivity to natural resources and communities within the watershed.

Citizens within and beyond the WRW value access to its recreational opportunities centered around the natural environment and enjoying the outdoors, including camping, fishing, hunting, canoeing, kayaking, hiking, and birding. There are lakes with public boat access, waterfowl production areas, wildlife and management areas, river access points, walk in access points, and public parks.

A priority of this plan is increase public access within the WRW to outdoor recreation opportunities. This plan intends to implement measures to identify, maintain, and improve public accesses, trails, and roads; enhance educational qualities of natural areas; and prioritize and promote public access to recreational and natural areas.



### *Measurable Goals*

Short-Term:

- ✓ HR 3.1a: Maintain and improve existing public accesses, trails and roads.

Desired Future Condition:

- ✓ Increase number of legal and controlled public access along streams, rivers, and lakes, while not disturbing priority habitat areas.





## LOCAL KNOWLEDGE BASE GOALS

This section sets measurable goals for:

- ✓ Public Awareness

*Enhancing the Local Knowledge Base is critical to the successful implementation of the WRCWMP.*





## RESOURCE CONCERN: PUBLIC AWARENESS

- ✓ Issue LKB 1.1: Level of landowner awareness and understanding of Best Management Practices (BMPs) for environmental conservation.

In 2017–2018, WRW citizens and local conservation partners came together to identify strategies that might lead to more conservation adoption across the watershed. One of the strategies identified was the need for one-on-one meetings and site visits across the watershed to build relationships and trust. A second strategy was the need for increased awareness about available conservation programs and the economics of BMPs to make farming “easier and less stressful” (Watowan River Watershed Network, 2018).

This plan builds on these strategies to engage with the public, build relationships, and create a regular forum for open, honest conversations about land management practices and how they can mutually benefit water resources and bottom lines. One avenue for this is through comprehensive site visits. A comprehensive site visit can be conducted on any site in the watershed and can be inclusive of Minnesota Agricultural Water Quality Certification Program (MAWQCP), promotion of nutrient management and 4 Rs, and more. The group will continue to pursue new comprehensive programs for use in this plan.



### *Measurable Goals*

#### Short-Term:

- ✓ LKB 1.1a: Conduct 100 comprehensive site visits to promote and foster implementation of water quality BMPs and encourage comprehensive conservation recommendations.
- ✓ LKB 1.1b: Increase landowner awareness through 10 BMP educational outreach efforts.

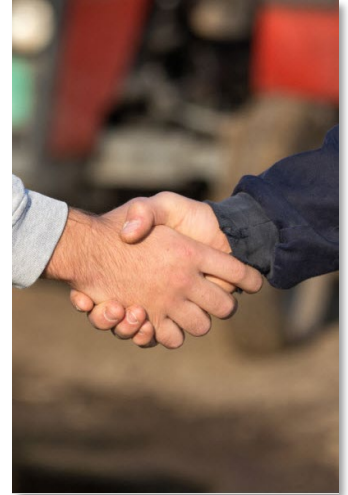
#### Desired Future Condition:

- ✓ Extend short term property visit and outreach goal.
- ✓ Conduct 100 comprehensive site visits to promote and foster implementation of water quality BMPs.

## RESOURCE CONCERN: PUBLIC AWARENESS

- ✓ Issue LKB 1.2: Level of awareness and knowledge of the resource issues and potential implementation roadblocks.

The WWPP seeks to protect and improve the quality of land and water resources and positively impact its local communities. There is a need to intentionally invite the public into the realm of the resource issues within the watershed and discuss what “fixing” those issues entails, including the benefits and roadblocks to implementing the actions set forth in this plan (Section 6).



### *Measurable Goals*

Short-Term:

- ✓ LKB 1.2a: Conduct 10 outreach efforts to discuss watershed plan implementation to increase in awareness and knowledge of the plan and to identify potential implementation roadblocks.

Desired Future Condition:

- ✓ Extend short term goal.



## LAND STEWARDSHIP GOALS

This section sets measurable goals for:

- ✓ Urban Stewardship
- ✓ Rural Stewardship
- ✓ Riparian and Shoreland Stewardship



*Stewardship of natural resources is essential to the recreation and economic vitality of the WRW.*

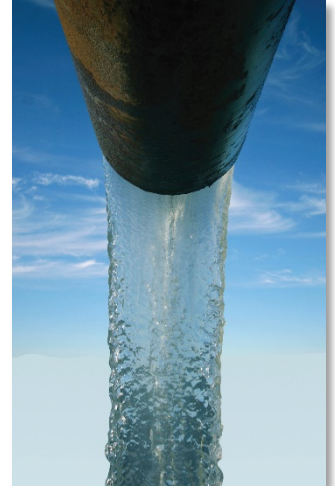


## RESOURCE CONCERN: URBAN STEWARDSHIP

- ✓ Issue LS 1.1: The impact of impervious surface on stormwater runoff and associated impacts on surface water.

Stormwater runoff should be managed in areas with impervious surfaces. There are no Municipal Separate Storm Sewer System (MS4) program communities within the Watowan River Watershed. Low impact development and conservation design techniques are encouraged in developing areas of the watershed.

There is a need to work with communities on a regular basis to educate and share ways that urban environments affect stormwater runoff and water quality. By means of annual outreach and encouraging residents to adopt urban conservation and water reuse projects it is intended that this will improve stormwater runoff and land and water resiliency within the WRCWMP.



### *Measurable Goals*

#### Short-Term:

- ✓ LS 1.1a: Install urban stormwater BMPs in 10 communities to address peak flow rates, sediment, and nutrient loading.
- ✓ LS 1.1b: Promote green space in urban areas by hosting 10 outreach efforts.

#### Desired Future Condition:

- ✓ Address peak flow rates, sediment, and nutrient loading through urban BMPs in all applicable areas.

## RESOURCE CONCERN: RURAL STEWARDSHIP

- ✓ Issue LS 2.1: The need to increase soil health and its impact on agricultural productivity and natural resources.

Soil health influences farmer's yield, monetary and environmental costs of applying inputs to fields, and the longevity and resiliency of agricultural lands. Healthy soils support higher yields, reduce runoff, retain nutrients and sediment on the landscape and support robust micro-biotic communities. This is vital to agriculture and the livelihood of individual landowners/farmers, and communities that rely on agriculture. Soil health matters to everyone, including consumers.

Managing for healthy soils has been gaining momentum in the WRW. In 2017-2018, local landowner and operator interviews revealed an openness to learn more about soil health practices (Watowan River Watershed Network, 2018). This plan builds on that momentum to identify, prioritize, and implement soil health practices (e.g. cover crops, nutrient management, conservation tillage) and provide technical and financial support to property owners.



*Ridge Till in the Watowan Watershed*

### Measurable Goals

Short-Term:

- ✓ LS 2.1a: Implement 5 soil health practices per Planning Region in high priority areas.

Desired Future Condition:

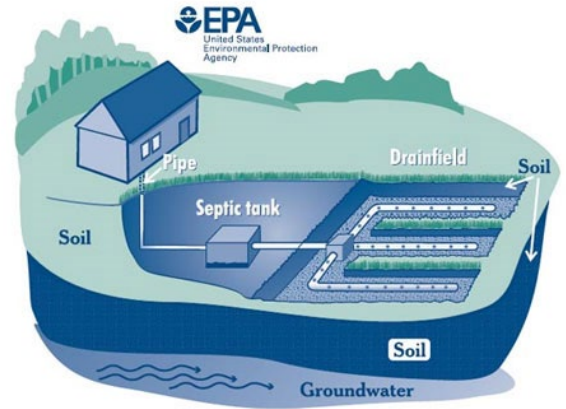
- ✓ Across all planning regions, implement soil health practices for all priority areas.

## RESOURCE CONCERN: RURAL STEWARDSHIP

- ✓ Issue LS 2.2: Subsurface Sewage Treatment Systems (SSTS) and their potential to contaminate groundwater and degrade surface water.

Subsurface sewage treatment systems (SSTSs) have the potential to adversely impact surface and groundwater resources. There is a need in the watershed to increase awareness of these systems and their potential effects on contaminating surface and groundwater. This plan follows Minnesota Rules Chapter 7080-7083 and local ordinances to help staff manage SSTSs by providing financial assistance for those whose systems which need to be replaced and/or repaired.

A system that is not protective is considered an imminent threat to public health or safety. Each county estimates the number of imminent public health threat systems annually. Counties will report an estimate of how many of these systems are in the watershed. The number per year will be used to track progress towards the short-term goal. This will help protect surface and groundwater quality.



### Measurable Goals

Short-Term:

- ✓ LS 2.2a: Address at least 50% of estimated imminent public health threat systems.

Desired Future Condition:

- ✓ Address 100% of estimated imminent public health threat systems.



## RESOURCE CONCERN: RURAL STEWARDSHIP

- ✓ Issue LS 2.3: Addressing inadequate manure management.

Livestock manure can be a positive agricultural attribute when managed and utilized as a beneficial use. There is a need to encourage and support livestock producers to be innovative, efficient, and effective on manure management to protect water resources and encourage soil health practices. Actions within this plan encourage livestock producers to develop and regularly update Manure Management Plans and implement nutrient and manure management best management practices (BMPs). Annual outreach activities will be offered to open a forum about existing manure management ordinances, associated best management practices, and to open a circle for farmers to discuss what works and what can be done better.



### *Measurable Goals*

Short-Term:

- ✓ LS 2.3a: Identify and address 10 targeted surface water/riparian areas where manure management has adversely affected surface water and where improvements can be made.
- ✓ LS 2.3b: Conduct 10 outreach efforts to inform producers of existing manure management ordinances and associated BMPs.

Desired Future Condition:

- ✓ Address all surface water/riparian areas where manure management has adversely affected surface water and where improvements can be made.





## RESOURCE CONCERN: RIPARIAN AND SHORELAND STEWARDSHIP

- ✓ Issue LS 3.1: Level of riparian and shoreland natural resource management.

When natural riparian and shoreland areas are eroded, minimalized, or unsupported, a myriad of water quality issues may arise. There is a need to develop a more robust discussion, support, and action to address problem areas in the Watonwan Watershed.

This plan intends to generate discussion between watershed partners that enforce ordinances and permit programs to provide consistency, effectiveness, and efficiency. This plan will develop a platform to provide financial and technical support to property owners for implementing shoreland best management practices (BMPs) and provide outreach to property owners about riparian and shoreland health and BMPs.



### *Measurable Goals*

Short-Term:

- ✓ LS 3.1a: Improve and increase riparian and shoreland natural resources management through coordinated efforts, as measured through the number of DNR Score Your Shore assessments completed and percentage of scores improved.

Desired Future Condition:

- ✓ Complete DNR Score Your Shore assessments and implement conservation practices to improve riparian and shoreland stability.



**6.**

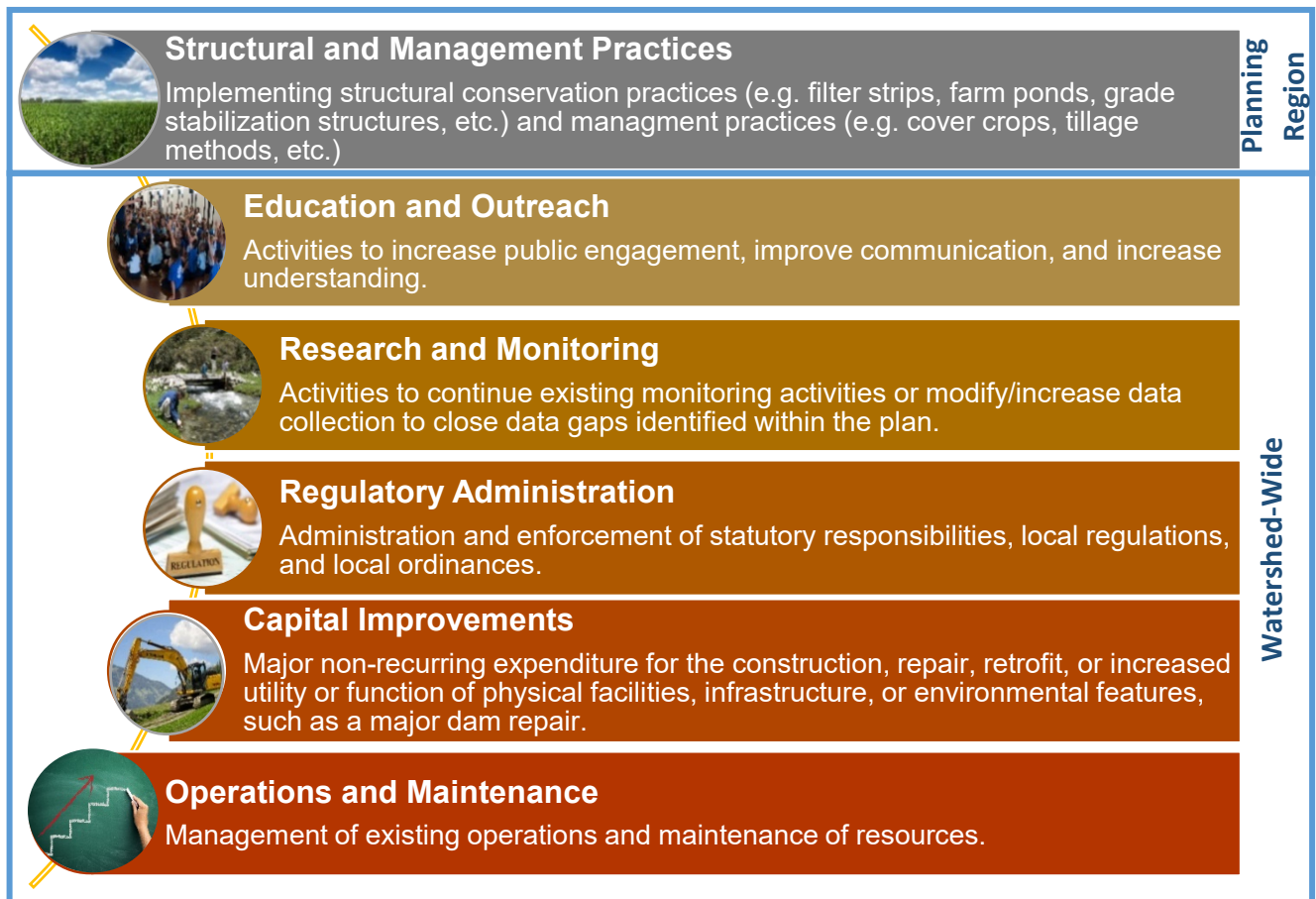
# **Implementation Schedule**

## SECTION 6.0 IMPLEMENTATION SCHEDULE

A primary outcome of a 1W1P planning effort is to identify the most effective actions which can be implemented to make the greatest progress towards plan goals. This section contains a targeted implementation schedule to summarize information about each action, where and when it will occur, who will be responsible for implementation, how it will be measured, and how much it will cost.

Many types of actions can be implemented to make progress towards goals. Actions may occur across the watershed (watershed-wide) or be targeted within a specific planning region. Similar actions are grouped below, representing implementation programs that will be discussed in Section 7. All actions contained within this section are summarized in Appendix S.

Many of the actions within this plan section are identified as “ongoing.” The annual work planning process will establish the exact timing of actions that will be pursued each year. Actions identified for that year or as “ongoing” will be considered at that point. During the second biennium, the group will establish the timeline for the ongoing actions in this plan. Many of the ongoing actions were established before this planning process began and will continue during plan implementation.



## 6.1 Cost of Implementing the Plan

The ability to achieve measurable goals, and the speed at which they are realized, largely depends on the amount of funding available for implementation. If more funds are available, more actions within the targeted implementation schedule can be implemented and more progress can be made toward goals. The amount of funding for implementing this plan is uncertain, presenting a challenge for planning purposes. To address this challenge, three funding levels are provided in this plan.

- ✦ **Baseline Funding:** The Baseline Funding scenario provides the 10-yr budget and assumes plan funding will remain similar to current funding focused on water issues within the plan area. Baseline Funding was determined by defining the annual budgets of the WWPP entities and allocating by percent of area each county has in the watershed. Actions included in this scenario are the highest priority for implementation. Ten years of funding is assumed to be \$6,811,000 to maintain an existing level of implementation within the WRW.
- ✦ **Enhanced Funding:** The Enhanced Funding scenario provides an alternate 10-yr budget, including ten years of baseline annual funding with additional funding from Clean Water Fund dollars (Watershed Based Implementation Funding (WBIF)). Actions included in this scenario are second highest priority for implementation. Ten years of Enhanced Funding is assumed to equal \$3,373,750. Assuming WBIF is consistently available over the 10-year life cycle of this plan, the amount of implementation dollars available for WRW implementation efforts will be Baseline funds plus Enhanced funds.
- ✦ **Collaborative Efforts and Competitive Funding:** Collaborative Efforts and Competitive Funding values in Table 6-1 (following page) indicate the amount of additional funding needed to complete plan actions that cannot be completed with only Baseline and Enhanced Funding. That is, to implement all Research and Monitoring and Capital Improvement related actions, more money will need to be leveraged by the group than is available with Baseline and Enhanced Funding levels combined. The *(formal name to be determined pending formal agreement)* plans to pursue competitive grant funding, funding from or partnerships with individual counties or municipalities, and other alternative funding sources to support these actions.

Table 6-1 provides the estimated costs for implementing actions in the plan for the three funding levels. Costs are also included for Operations and Maintenance of natural and artificial waterways at or near their current expenditure level. This plan assumes local, state, and/or federal fiscal support of regulation and enforcement remains unchanged and includes funding for plan administration costs.

**Table 6-1: Estimated implementation cost per implementation program.**

	\$ Baseline Funding	\$\$ Enhanced Funding	\$\$\$ Collaborative Efforts and Competitive Funding
	Est. 10-year Baseline Budget	Est. 10-year Additional Funding Needs	Est. 10-year Budget Shortfall
	Est. 10-Year Cost	Est. 10-Year Additional Funding	Est. 10-Year Additional Funding
<b>Implementation Program</b>			
Structural and Management Practices Cost-Share Incentive Program	\$215,000	\$2,685,000	N/A
Education and Outreach Implementation Program	\$352,000	\$240,000	N/A
Research and Monitoring Implementation Program	\$79,000	\$78,750	\$388,750
Regulatory Administration Implementation Program	\$685,000	\$0	N/A
Capital Improvements Implementation Program	\$180,000	\$370,000	\$7,475,000
<b>Additional Expenses</b>			
<i>Operations and Maintenance</i>	\$5,300,000	\$0	N/A
<b>Total</b>	<b>\$6,811,000</b>	<b>\$3,373,750</b>	<b>\$7,863,750</b>
<b>Cumulative Total</b>	<b>\$6,811,000</b>	<b>\$10,184,750</b>	<b>\$18,048,500</b>

For the Structural and Management Practices Cost Share Incentive Program, total watershed funding was distributed among the six planning regions based on the allocations specified in Table 6-2. Each planning region's overall funding was then divided between management practices (40% of overall structural and management practices budget), structural projects (40%), and easements (20%).

**Table 6-2: Structural and Management Practices Cost-Share Incentive Program funding allocations per planning region.**

Planning Region Name	Percent of Total Structural and Management Practice Funding	Baseline Funding				Enhanced Funding			
		10-yr Baseline Funding	10-yr Funding for Structural BMPs	10-yr Funding for Management BMPs	10-yr Funding for Easements	10-yr Enhanced Funding	10-yr Enhanced Funding for Structural BMPs	10-yr Enhanced Funding for Management BMPs	10-yr Enhanced Funding for Easements
North Fork Watowan River	10%	\$25,000	\$10,000	\$10,000	\$5,000	\$275,000	\$110,000	\$110,000	\$55,000
Upper Watowan River	15%	\$35,000	\$15,000	\$15,000	\$5,000	\$400,000	\$160,000	\$160,000	\$80,000
Saint James Creek	25%	\$50,000	\$20,000	\$20,000	\$10,000	\$665,000	\$265,000	\$265,000	\$135,000
South Fork Watowan River	20%	\$40,000	\$15,000	\$15,000	\$10,000	\$535,000	\$215,000	\$215,000	\$105,000
Perch Creek	10%	\$25,000	\$10,000	\$10,000	\$5,000	\$275,000	\$110,000	\$110,000	\$55,000
Lower Watowan River	20%	\$40,000	\$15,000	\$15,000	\$10,000	\$535,000	\$215,000	\$215,000	\$105,000
<b>Total</b>		<b>\$215,000</b>	<b>\$85,000</b>	<b>\$85,000</b>	<b>\$45,000</b>	<b>\$2,685,000</b>	<b>\$1,075,000</b>	<b>\$1,075,000</b>	<b>\$535,000</b>

The targeted implementation schedule includes actions intended to be completed by local entities as well as other plan partners, including state agencies, federal agencies, and non-governmental organizations (NGOs). To execute actions described within the plan, all participants will need to exercise considerable coordination and cooperation. The planning region priority maps, WRAPS priorities, and professional judgement were used by the Steering Committee to allocate funding percentage distributions.

## 6.2 Measurable Goals Reference Guide

Within the subsequent subsections of Section 6, the implementation actions are linked to the measurable goals from Section 5. Table 6-3 is a quick reference guide for identifying the connection between actions in this Section 6 and the short-term goals they are intended to make progress towards from Section 5. It was assumed that the short-term progress would connect to the long-term goals.

**Table 6-3: Quick reference guide for identifying the connection between actions in this Section 6 and the goals they are intended to make progress towards from Section 5.**

Goal Number	Goal
Surface Water (SW)	
SW 1.1a	Coordinate with the drainage authorities to implement multipurpose drainage management (MDM) on 10 public drainage systems to improve water quality and flood resiliency in tandem with the maintenance and repair of drainage systems.
SW 1.1b	Develop an MDM plan and set 5-year and 10-year goals for anticipated future conditions.
SW 1.2a	Drainage systems that are in need of repair and would benefit from conservation practices are identified through coordination with partners.
SW 2.1a	Restoration – Achieve a 10% reduction in phosphorus load in lakes identified for restoration.
SW 2.1b	Protection – Achieve a no-net increase in phosphorus loading to lakes identified for protection.
SW 2.2a	Conduct 2 educational outreach efforts with the DNR to discuss lake management.
SW 3.1a	Planning Region Scale (Nutrient and Sediment Goals)
SW 3.1b	Reach-Specific Scale (Nutrient and Sediment Goals)
SW 3.1c	Conduct 10 educational efforts to highlight existing nutrient management and watershed BMP incentive programs.
SW 3.2a	Planning Region Scale (bacteria)
SW 3.2b	Reach-Specific Scale (bacteria)
SW 3.2c	Conduct 10 educational efforts to highlight watershed livestock BMP and SSTS incentive programs
SW 3.3a	Conduct a bridge and culvert inventory to document the location, size, condition, and estimated cost of repair or upgrade.
SW 3.4a	Implement 3 practices to restore and/or stabilize degraded stream reaches.
SW 4.1a	Restore and improve 500 acres of wetlands.

Goal Number	Goal
SW 4.1b	Complete 1,000 contacts with local landowners to encourage enrollment in state and federal programs to preserve and restore wetlands.
SW 5.1a	Implement and maintain additional vegetative cover practices on 41,900 acres of the total watershed land area.
SW 5.1b	Conduct 20 educational efforts to highlight available technical and financial assistance to protect soil health and reduce peak-flow rates.
SW 5.2a	Achieve 0.10 inches of water runoff reduction across the watershed, or 4,327 acre-feet of runoff reduction by implementation of targeted PTMApp practices across the watershed.
SW 5.2b	Achieve 4% watershed-wide reduction in peak and annual streamflow, defined as the 10-year target in the WRW WRAPS
SW 5.2c	Conduct 20 educational efforts to highlight available technical and financial assistance to implement runoff reduction and rate-control BMPs.
SW 5.3a	Conduct 20 educational efforts about water quantity and community resilience to extreme weather events.
SW 5.3b	Conduct a bridge and culvert inventory to document the location, size, condition, and estimated cost of repair or upgrade.
<b>Groundwater (GW)</b>	
GW 1.1a	Protection (in areas with nitrate concentration 0 – 4.9 mg/L): Maintain and improve existing vegetative cover by discouraging or preventing conversion to cultivated land; Contaminant source management on existing land uses (PTMApp Source Reduction, BMPs, SSTS management, and easements).
GW 1.1b	Protection (in areas with nitrate concentration 5.0 – 9.9 mg/L): Contaminant source reduction or elimination; Shift land uses away from those that may leach excess nitrogen (Alternative management tools, upgrade failing STSS, easements).
GW 1.1c	Hold 10 educational efforts to promote implementation of nutrient management practices.
GW 1.1d	Hold 10 water testing clinics to determine nitrate concentrations in irrigation water and provide access to testing kits to irrigators.
GW 1.1e	Hold 20 clinics to educate citizens on private well nitrogen levels.
GW 1.2a	Maintain zero wells with pesticide concentrations above human-health based drinking water standards or referenced values.



Goal Number	Goal
GW 1.2b	Hold 20 educational efforts to inform the public of the potential threat of contaminants in groundwater and the importance of testing.
GW 2.1a	Implement 20 practices that promote aquifer recharge in DWSMA and Wellhead Protection Areas.
GW 2.1b	Hold 10 educational efforts for the public to learn current successes and issues with groundwater use and groundwater recharge.
<b>Habitat and Recreation (HR)</b>	
HR 1.1a	Across the watershed, meet a 12% increase in MPCA Stream Habitat Assessment score, defined as the 10-year target in the WRW WRAPS.
HR 1.1b	Complete culvert/fish barrier inventory.
HR 1.2a	Work with DNR to prioritize locations to address bank and channel instability.
HR 1.3a	Restoration- Manage existing AIS infestations to address existing degradation of aquatic habitat.
HR 1.3b	Protection- Work to prevent introduction and spread of aquatic invasive species, including (but not limited to) invasive carp, Eurasian Watermilfoil, Purple Loosestrife, Zebra Mussels, and Spiny Water Fleas (which have not been recorded in the WRW).
HR 2.1a	Complete 20 habitat projects to restore habitat corridors and decrease habitat fragmentation.
HR 2.2a	Manage existing terrestrial and nuisance species to address existing degradation of terrestrial habitat.
HR 2.2b	Work to minimize the spread of terrestrial invasive species, including (but not limited) to: Emerald Ash Borer, Canada Thistle, Purple Loosestrife, and Palmer Amaranth.
HR 3.1a	HR 3.1a: Maintain and improve existing public accesses, trails and roads.
<b>Local Knowledge Base (LKB)</b>	
LKB 1.1a	Conduct 100 comprehensive site visits to promote and foster implementation of water quality BMPs and encourage comprehensive conservation recommendations.
LKB 1.1b	Increase landowner awareness through 10 BMP educational outreach efforts.
LKB 1.2a	Conduct 10 outreach efforts to discuss watershed plan implementation to increase in awareness and knowledge of the plan and to identify potential implementation roadblocks.

Goal Number	Goal
Land Stewardship (LS)	
LS 1.1a	Install urban stormwater BMPs in 10 communities to address peak flow rates, sediment, and nutrient loading.
LS 1.1b	Promote green space in urban areas by hosting 10 outreach efforts.
LS 2.1a	Implement 5 soil health practices per Planning Region in high priority areas.
LS 2.2a	Address at least 50% of estimated imminent public health threat systems.
LS 2.3a	Identify and address 10 targeted surface water/riparian areas where manure management has adversely affected surface water and where improvements can be made.
LS 2.3b	Conduct 10 outreach efforts to inform producers of existing manure management ordinances and associated BMPs.
LS 3.1a	Improve and increase riparian and shoreland natural resources management through coordinated efforts, as measured through the number of DNR Score Your Shore assessments completed and percentage of scores improved.

### 6.3 Planning Region Implementation Efforts

For purposes of this plan, actions that summarize structural and management practices are planning region specific. The specific details for structural and management practices (who, what, when, where, and cost) are described in the implementation profile for each planning region.



**Structural and Management Practices**  
Implementing structural conservation practices (e.g. filter strips, farm ponds, grade stabilization structures, etc.) and management practices (e.g. cover crops, tillage methods, etc.)

**Planning Region**

The Prioritize, Target, and Measure Application (PTMApp) was used to prioritize and target possible locations of structural and management practices in each planning region. The results of this analysis are summarized in the implementation profiles below. Each implementation profile make use of standard information products from PTMApp, which can be used in many business workflows, including:

- Describing conditions within the watershed;
- Prioritizing the locations of water quality concerns;
- Completing a source assessment to identify the largest source of sediment and nutrients;

- ✦ Evaluating potential locations where structural and management practices appear to be technically feasible;
- ✦ Estimating the water quality benefits of structural and management practices; and
- ✦ Targeting the preferred locations for structural and management practices based on cost-effectiveness, cost, absolute load reduction or some other metric.

PTMApp estimates existing loads and water quality value arising from implementation of structural and management practices. These values are expressed as the annual mass load of sediment, total phosphorus (TP), or total nitrogen (TN) prior to, and following practice implementation. For purposes of this plan, existing loads and load reduction benefits are summarized at planning region outlets. However, load reduction benefits can be evaluated for any of the priority resource points within the WRW (Appendix Q).

Project and practice costs were approximated using EQIP cost estimates (1.25 x 2016 rates). It is assumed that a one-time EQIP-based cost share payment is representative of the funding needed for plan implementation. For each treatment group a representative BMP was chosen, and costs were analyzed for that BMP to ensure average cost and cost range met expectations. Table 6-3 provides the unit costs of PTMApp practices used for this planning effort.

**Table 6-3: PTMApp unit costs used to estimate the best management practice (BMP) cost for each treatment group.**

Treatment Group	Practice Unit Cost
Storage	\$3.38 per cubic yard of water stored
Filtration	\$592.59 per acre of practice surface area
Biofiltration	\$56.15 per cubic yard of water inflow (treated volume)
Infiltration	\$33,999.11 per acre of practice surface area
Protection	\$2,666.69 per acre of practice surface area
Source Reduction	\$38.59 per acre of practice surface area

The WRW PTMApp implementation approach was designed to select the most cost-effective structural projects and management practices for removing sediment, TP, and TN until the cost of those recommended projects equaled the Enhanced Funding scenario (Baseline plus WBIF). Cost-effectiveness means the lowest dollar invested per mass reduced of sediment, TP, and TN. Individual budgets were allocated to structural projects and management practices to ensure that both types of activities would be included in each planning region.

The type, number, cost, and location of structural and management practices shown in the targeted implementation schedule and implementation profiles reflect the PTMApp implementation approach designed for this plan. These assumed planning elements will inevitably change during plan implementation due to a wide variety of factors, including but not limited to:

- ✦ Voluntary participation by landowners and residents;
- ✦ Field verification of practice type and location;
- ✦ Amount of funding available for implementation;
- ✦ New data on resource conditions;
- ✦ Practices/projects ready to implement;
- ✦ Location and type of existing practice on the landscape; and
- ✦ Effectiveness of education, outreach, and research initiatives.

As such, the type, number, cost, and location of structural and management practices shown in the targeted implementation schedule are presented to represent a best-case-scenario for planning purposes. During implementation, alternative practices will also be pursued to make progress towards plan goals.

The cost-effectiveness of a water quality improvement project will be a key factor in informing decisions about which alternative practices to fund to improve water quality. An investment guide (Table 6-4) was created to show the distribution of estimated monetary investment needed to provide a mass unit reduction in sediment, TP, and TN based on the cost and estimated load reduction for the PTMApp structural and management practices that were selected for this plan. Practices with an estimated cost-effectiveness near the lower quartile value in the table are very cost-effective relative to the targeted structural and management practices presented in the implementation profiles. Practices with an estimated cost-effectiveness near the median value have similar cost-effectiveness as the targeted structural and management practices. And practices with an estimated cost-effectiveness near the upper quartile are less cost-effective, but still practical relative to the targeted structural and management practices.

This information can provide a guide for evaluating potential alternative or additional structural and management practices to determine if they provide a cost-effective solution for making progress towards water quality goals. For example, if there is an opportunity to implement a project or practice that is not part of the set of structural and management practices within the targeted implementation schedule, and the cost-effectiveness falls within the range presented in the investment guide (Table 6-4), it is likely that project or practice would provide a good option for making progress towards measurable water quality goals. Or if a landowner within the watershed proposes a structural or management practice with an anticipated cost-effectiveness that falls outside of the range presented within this investment guide, other options can be pursued. This guide was created specifically for evaluating water quality improvements. Other methods will be necessary to evaluate the cost-effectiveness of other benefits (e.g. habitat improvement) for implemented practices. A list of possible alternative practices is shown in Table 6-5, but it is not all-inclusive.

**Table 6-4: Cost-effectiveness investment guide for making progress towards water quality goals**

Planning Region	Practice Type	Sediment (\$/ton/year)			Phosphorus (\$/lb./year)			Nitrogen (\$/lb./year)		
		Lower Quartile \$	Median \$\$	Upper Quartile \$\$\$	Lower Quartile \$	Median \$\$	Upper Quartile \$\$\$	Lower Quartile \$	Median \$\$	Upper Quartile \$\$\$
North Fork Watowan River	Structural Practices	\$69.67	\$102.22	\$154.34	\$401.13	\$606.25	970.09	\$14.83	\$22.73	\$34.33
	Management Practices	\$48.97	\$64.90	\$72.80	\$297.41	\$315.60	349.62	\$37.13	\$39.40	\$43.65
Upper Watowan River	Structural Practices	\$70.09	\$114.53	\$156.07	\$412.14	\$601.90	1071.03	\$14.80	\$23.65	\$39.41
	Management Practices	\$49.56	\$65.11	\$73.58	\$308.49	\$334.97	361.65	\$38.51	\$41.82	\$45.15
Saint James Creek	Structural Practices	\$93.20	\$154.89	\$220.52	\$390.71	\$622.45	990.39	\$15.00	\$23.72	\$36.63
	Management Practices	\$60.37	\$75.75	\$88.50	\$303.13	\$336.04	369.52	\$37.84	\$41.95	\$46.13
South Fork Watowan River	Structural Practices	\$63.49	\$108.59	\$157.40	\$348.50	\$626.28	1131.21	\$13.43	\$22.34	\$40.06
	Management Practices	\$40.98	\$53.45	\$64.51	\$292.64	\$305.14	336.01	\$36.53	\$38.09	\$41.95
Perch Creek	Structural Practices	\$68.72	\$93.07	\$121.71	\$332.36	\$601.99	1040.51	\$12.39	\$21.70	\$38.34
	Management Practices	\$30.68	\$38.13	\$45.59	\$310.96	\$333.81	351.57	\$38.82	\$41.67	\$43.89
Lower Watowan River	Structural Practices	\$72.34	\$113.82	\$152.11	\$342.69	\$564.32	1029.00	\$12.34	\$19.66	\$37.33
	Management Practices	\$37.54	\$54.98	\$68.04	\$302.93	\$312.94	\$336.69	\$37.82	\$39.07	\$42.03

The following implementation profiles for each of the WRW planning regions are provided to guide the selection and placement of management practices and structural projects. The implementation profile for each region summarizes the:

- current conditions in the planning region
- practices feasible for implementation;
- types and locations of “best,” most cost-effective management practices and structural projects which collectively comprise the implementation approach to work toward achieving water quality goals in the planning region;
- estimated costs arising from practice implementation, relative to goals; and
- anticipated load reduction benefits arising from implementation, relative to the planning region goals.

The estimated load reduction benefits from implementation of the practices is estimated in PTMApp. Benefits are expressed as the mass load reduction of sediment, TP, and TN resulting from implementation, although sediment reduction cost-effectiveness was the only criteria used to prioritize practice selection. Reductions in TP and TN loads are secondary benefits from implementing the recommended structural and management practices. Load reduction benefits are summarized in the implementation profiles at the outlet of the planning region.

Cost-effectiveness curves (graphs within each implementation profile) were developed for each planning region to better understand the necessary financial investment to improve water quality and work toward water quality goals. Each cost-effectiveness curve was developed by ranking structural and management practices from most cost-effective to least cost effective using the data from specific practices (management or structural) and from a single planning region (e.g. \$/lb. of TP reduction at the outlet of Saint James Creek). Cost-effectiveness was the sole factor used to rank practices. In reality,

other factors such as landowner willingness, capacity, and feasibility should also play a large role in determining which practices should be prioritized.

It should be mentioned that the cumulative benefit of structural and management practices implemented in upstream planning regions will lead to measurable reductions in sediment, TP, and TN loads at the outlet of any downstream planning region. For example, structural and management practices implemented within the Saint James Creek Planning region have the potential to improve water quality at the outlet of the Lower Watonwan River planning region, thus decreasing the necessary investment to improve water quality within the Lower Watonwan River planning region.

Some structural and management practices do not use PTMApp data for targeting. Examples of these practices include in channel restoration, wind breaks, and cattle exclusion. Instead, priority resources (and associated measurable goals, Section 5) can be used to inform decisions about where these types of practices should go.

Lastly, Structural and Management practice implementation profiles include an action focused on maintaining or expanding existing acres of the watershed enrolled in land conservation programs. While this plan recognizes that there are other perpetual easements of value in the plan area, the implementation profiles focus on state and federal programs such as the continuous conservation reserve program (CCRP), conservation reserve enhancement program (CREP), and reinvest in Minnesota (RIM) easements.

These land conservation programs are administered by state and/or federal agencies with the aim of targeting environmentally sensitive lands for conservation practice installation or removal from agricultural production. CCRP, for example, offers a yearly rental payment to farmers who enroll in the program and agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality.

## NORTH FORK WATONWAN RIVER PLANNING REGION: PLANNING REGION OVERVIEW

### Planning Region Priorities

The highest priority for implementation efforts are aimed at restoring impaired stream reaches and lakes as identified in Table 23 of WRW WRAPS (MPCA, 2020), protecting streams and lakes which are nearing impairment, restoring or protecting terrestrial and aquatic habitat with high species diversity and high conservation need as identified by the MNWAP wildlife action network, and protecting drinking water resources. Prioritized waterbodies are outlined in Section 5 and are shown in green on the right and described in detail beneath the map. Several areas near the headwaters of the North Fork Watowan River are prioritized for habitat conservation.

### Goals used as the Basis for Practice Selection

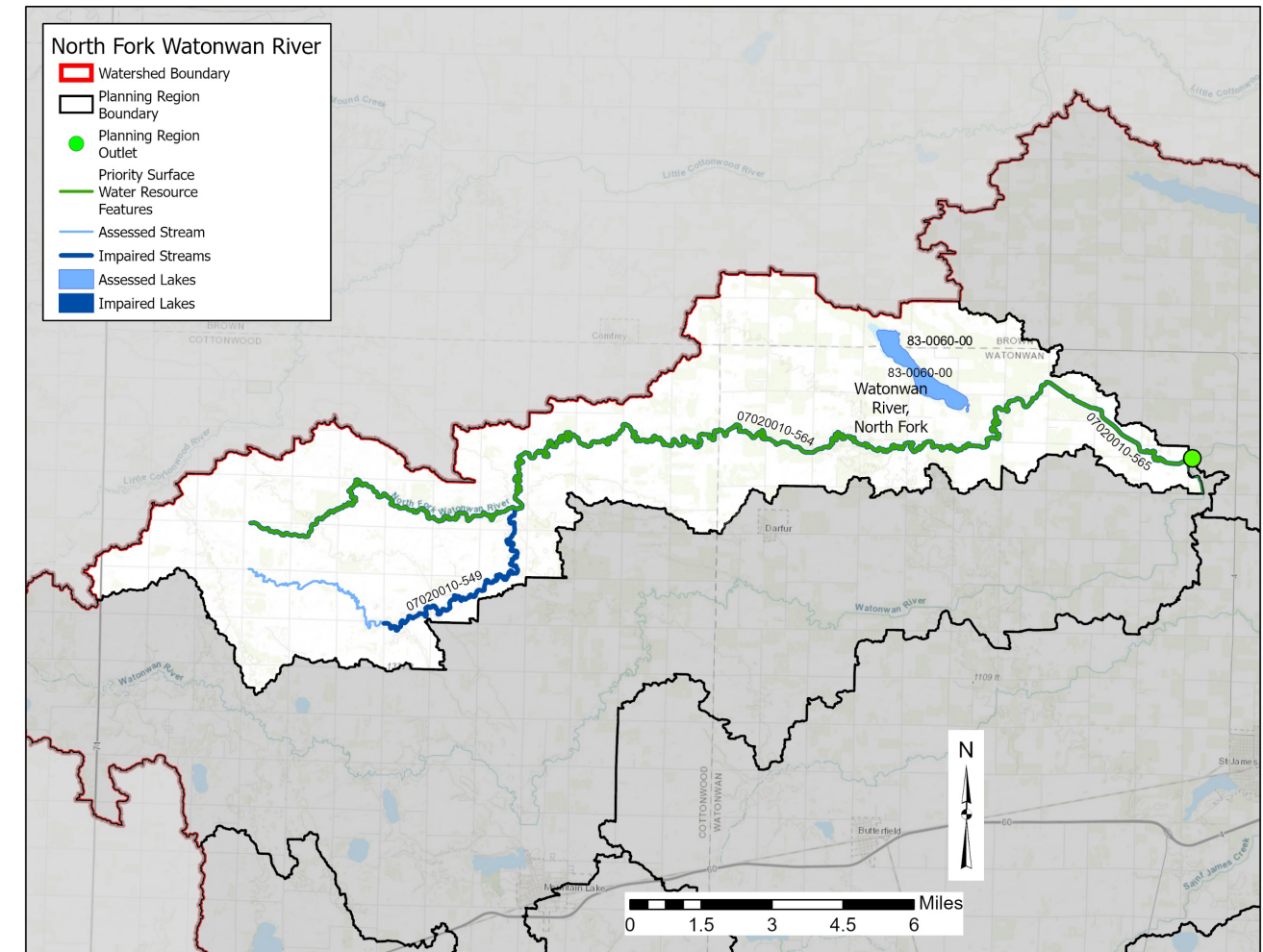
The goals used to select practices for this implementation plan focused primarily on reducing sediment, TP and TN at the watershed outlet. Short-term sediment and nitrogen reduction goals align with the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. The short-term phosphorus reduction goal was set to half of the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. All long-term percent load reduction goals align with the goals from the WRAPS report.

Potential practices for improving water quality are chosen by first analyzing the feasibility of implementing various practices in different locations across the watershed. The probable beneficial progress that an upstream structural or management practice will make toward a water quality goal as measured at a priority resource point is then estimated. Any additional practical and/or social aspects (e.g. landowner willingness, existing practices, etc.) should be considered during implementation.

Planning Region Outlet	Goal Timeframe	Reduction Goal (Load)			Justification for Goal		
		Sediment <i>tons/year</i> (%)	Total Phosphorus <i>lbs./year</i> (%)	Total Nitrogen <i>lbs./year</i> (%)	Sediment	Total Phosphorus	Total Nitrogen
North Fork Watowan River	Short-term (10-year)	775 (4%)	615 (5%)	34,829 (15%)	1	2	1
	Long-term (>10-year)	7,746 (40%)	4,925 (40%)	116,097 (50%)	3	3	3

- 1 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 2 - Goal was set equal to half of the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 3 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide goal

### Priority and Assessed Waterbodies

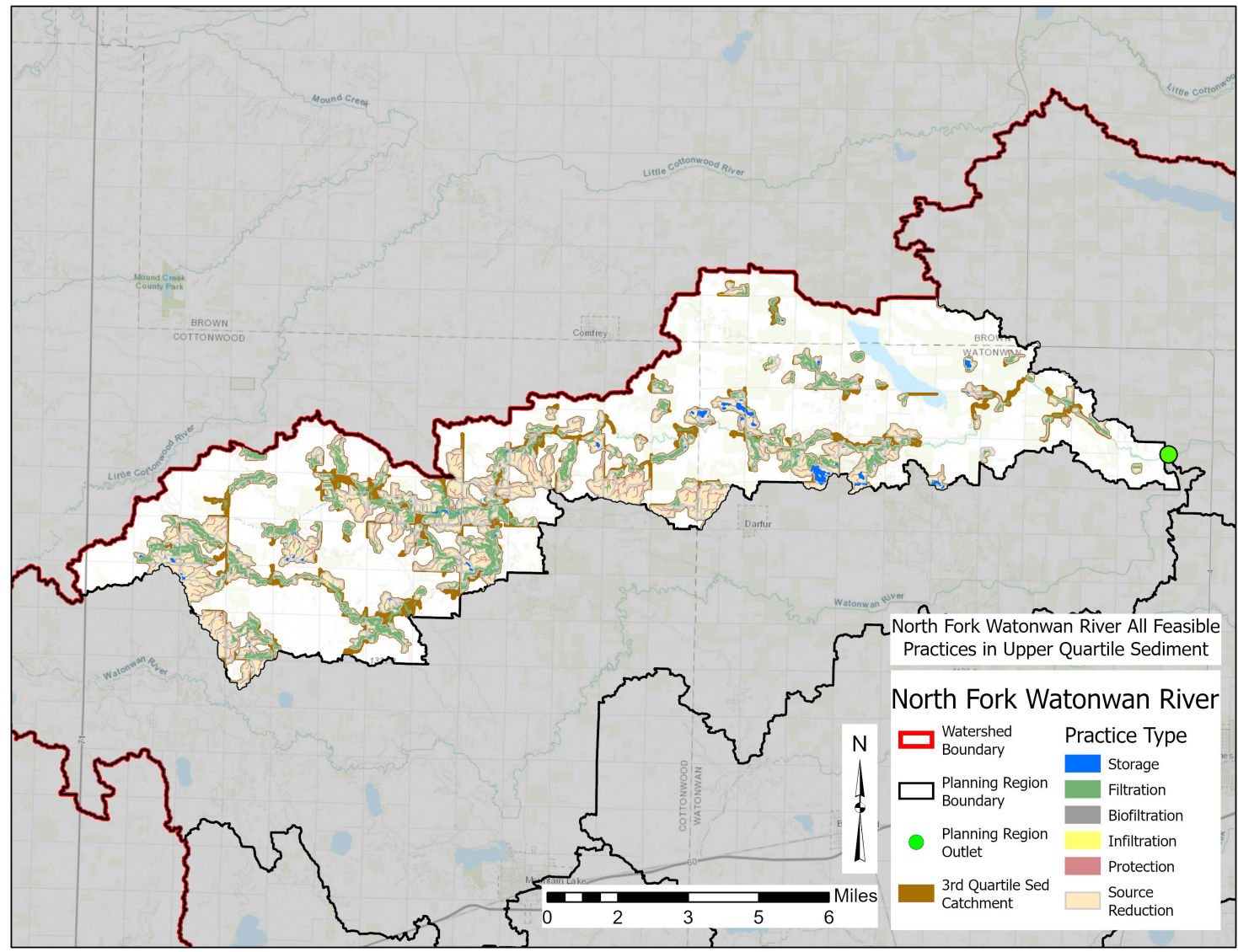


The following streams have been identified as key streams requiring restoration attention, as they do not currently meet Minnesota water quality standards for sediment, TP, TN, and/or *E.coli*. The headwaters reach of the North Fork Watowan River (AUID 07020010-564) does not meet aquatic life or aquatic recreation standards due to low fish index of biotic integrity (F-IBI) and macroinvertebrate index of biotic integrity (M-IBI) scores, elevated *E. coli* concentrations, and elevated TSS concentration (formerly turbidity). The downstream segment of the North Fork Watowan River does not meet aquatic life standards (-565). Two segments of the unnamed creek (-549, -583) also fail to meet aquatic life standards due to F-IBI and M-IBI scores.

Wood Lake (83-0060-00) lacks sufficient data to make an aquatic life or aquatic recreation determination.

Managing the landscape to reduce sediment, TP, and TN loading to the planning region outlet will begin the restoration process within the impaired waterbodies within the North Fork Watowan River Planning Region.

## NORTH FORK WATONWAN RIVER PLANNING REGION: FEASIBLE STRUCTURAL AND MANAGEMENT PRACTICES



### Feasible Structural and Management Practices in the North Fork Watowan River Planning Region

Locations for structural and management practices are initially screened using a set of “practicability” criteria (e.g. minimum load reduction) and cost-effectiveness. The remaining technically feasible practices, summarized and shown in the table and map to the left, highlight those practices that fall within high sediment yield catchments in the North Fork Watowan River Planning Region. There are many more practices summarized here than can realistically be implemented. The number and type of practices which can be implemented is largely influenced by the amount of funding available, what measurable goal(s) are being pursued, and what practices are most locally accepted by the community for voluntary implementation. This large list of feasible practices is narrowed down by identifying what practices will be the focus of plan implementation efforts assuming funding for implementation largely remains unchanged from current levels. Cost-effectiveness of practices is determined by first estimating the total cost to install the practice and then factoring in the water quality benefit from that practice. The most cost-effective practices that meet all practicability criteria become part of the “Targeted Implementation Plan” shown on subsequent pages.

PTMApp Treatment Group	NRCS Practice Type(s)
Structural - Storage	Depressions Drainage Water Management Nutrient Removal Wetlands Water and Sediment Control Basins (WASCOBs)
Structural - Filtration	Contour Buffer Strip Multi-species Buffer
Structural - Biofiltration	Denitrifying Bioreactor Saturated Buffer
Structural - Infiltration	Multi-stage Ditch Infiltration Trench
Structural - Protection	Stiff Stemmed Grasses Grass Waterways Deep Rooted Vegetation Stream Bank Stabilization
Management - Source Reduction	Cover Crops and Conservation Tillage

### Feasible Structural and Management Practices

PTMApp Treatment Group (With Representative BMPs)	Practice Type		Number in Planning Region
	Structural	Management	
Storage (e.g. ponds, WASCOBs)	●		119
Filtration (e.g. filter strips, grassed waterways)	●		572
Biofiltration (e.g. denitrifying bioreactors, saturated buffers)	●		0
Infiltration (e.g. Multi-stage ditch, infiltration trench)	●		5
Protection (e.g. stream protection, critical area planting)	●		265
Source Reduction (e.g. cover crops, conservation tillage)		●	9,323 acres (418 practices)



**Management Practices Quick Summary:**

- Cover crops, tillage management, rotational grazing
- Targeted to areas of highest soil loss



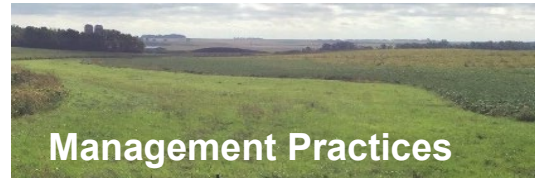
**Structural Practices Quick Summary:**

- WASCOBs, filter strips, ponds, and waterways
- Most cost-efficient over project life



# NORTH FORK WATOWAN RIVER PLANNING REGION: MANAGEMENT PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation

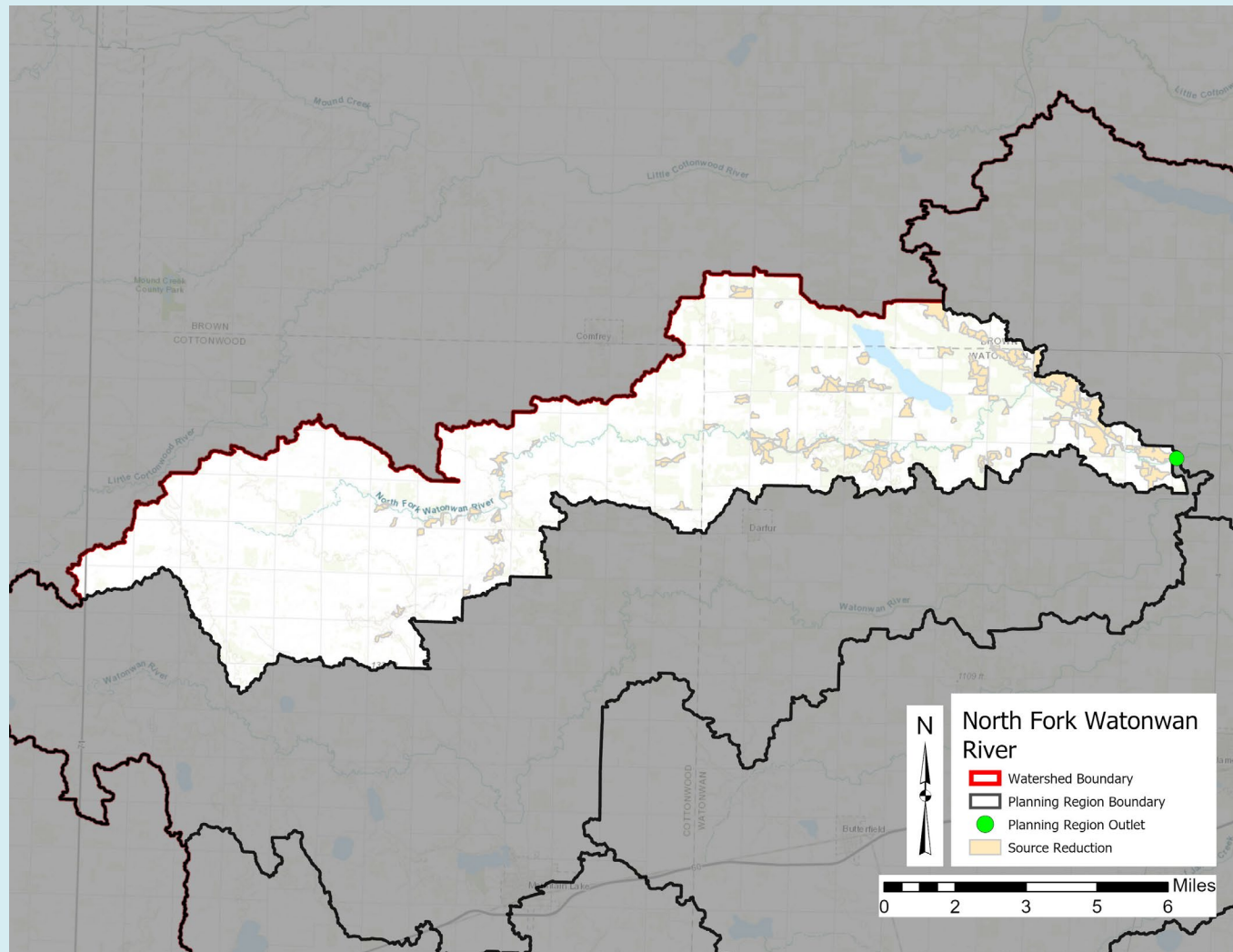


**Management Practices**

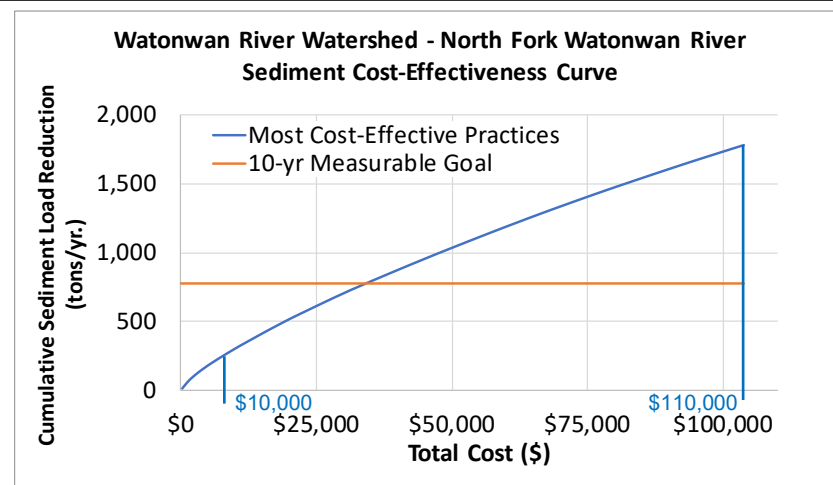
A total of 2,688 acres are suggested for targeted implementation of management (source reduction) practices in the North Fork Watowan River Planning Region targeted implementation approach.

Shown below are the locations on the landscape of the best, most cost-effective management practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these management practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (181 acres - 17 catchments) and 10-yr. enhanced funding (all 2,688 acres) in the targeted implementation approach is shown by the blue line.



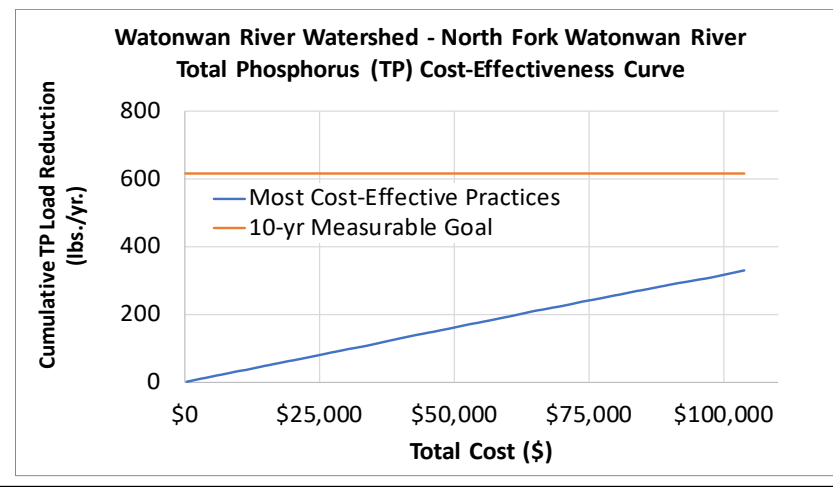
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

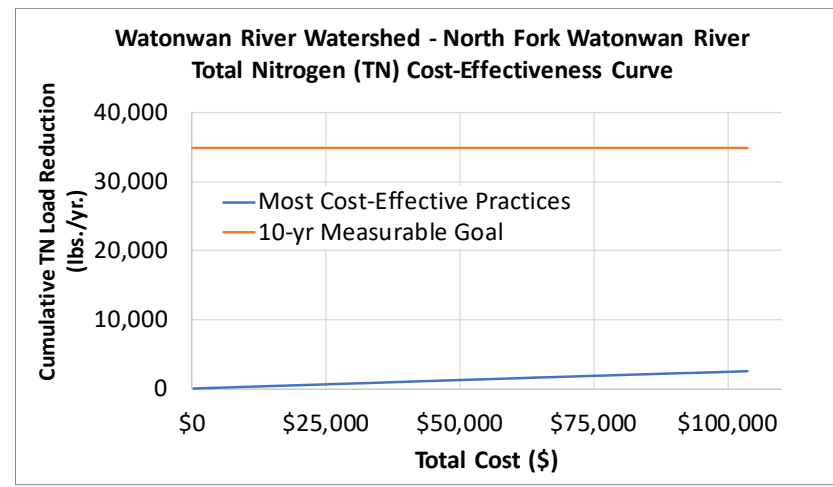
Existing Load: 19,365 tons/yr.  
Target Load Reduction: 775 tons/yr.  
Anticipated Load Reduction: 1,775 tons/yr.  
Anticipated Reduction: 9.2%  
Total Cost: \$110,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 12,313 lbs./yr.  
Target Load Reduction: 615 lbs./yr.  
Anticipated Load Reduction: 330 lbs./yr.  
Anticipated Reduction: 2.7%  
Total Cost: \$110,000



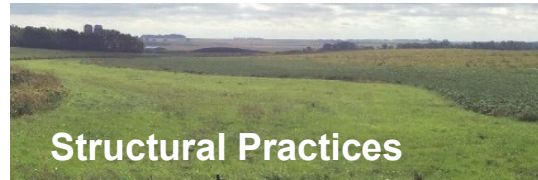
**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 232,194 lbs./yr.  
Target Load Reduction: 34,829 lbs./yr.  
Anticipated Load Reduction: 2,640 lbs./yr.  
Anticipated Reduction: 1.1%  
Total Cost: \$110,000

# NORTH FORK WATOWAN RIVER PLANNING REGION: STRUCTURAL PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation



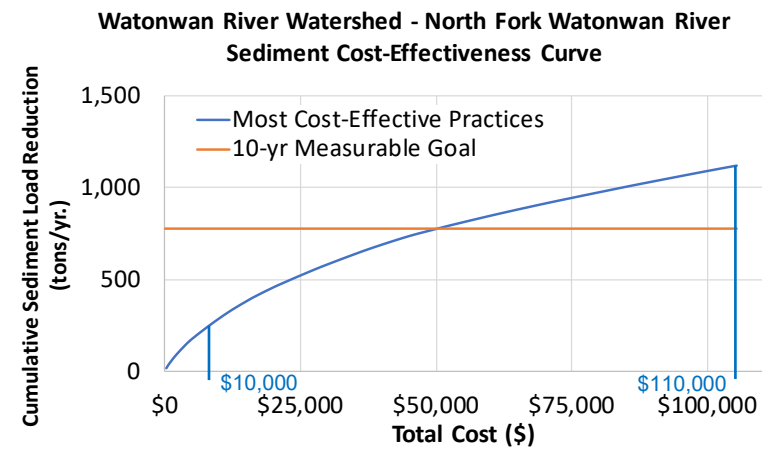
**Structural Practices**

There are 183 structural practices suggested for targeted implementation in the North Fork Watowan River Planning Region targeted implementation approach: 183 filtration practices.

Shown below are the locations on the landscape of the best, most cost-effective practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these 183 structural practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (21 practices) and 10-yr. enhanced funding (all 183 practices) in the targeted implementation approach is shown by the blue line.

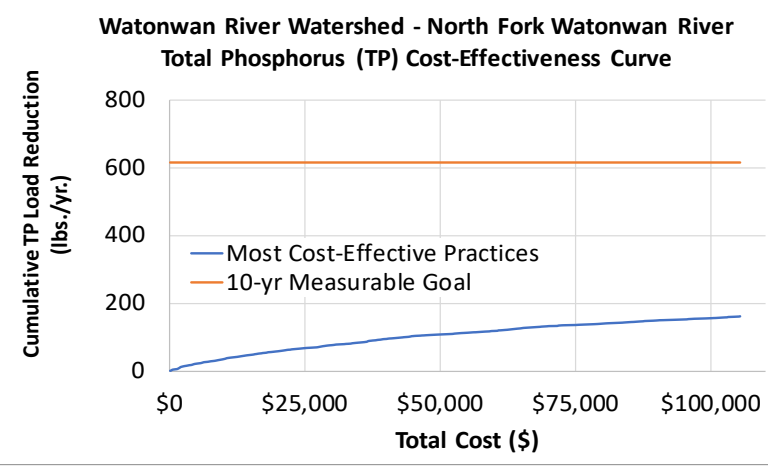
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

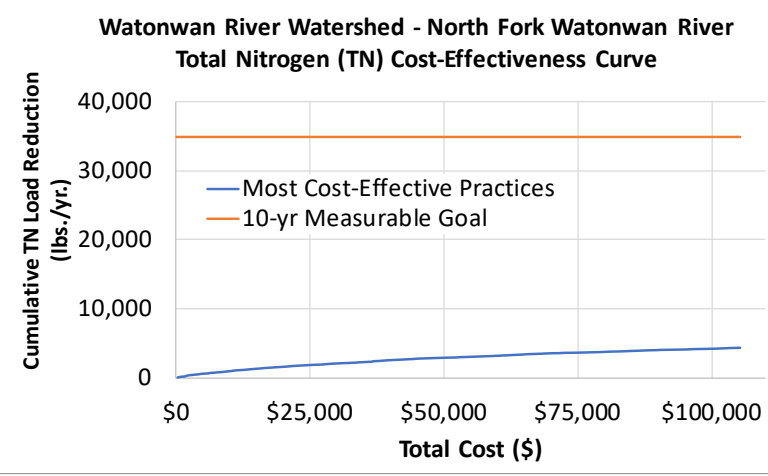
Existing Load: 19,365 tons/yr.  
Target Load Reduction: 775 tons/yr.  
Anticipated Load Reduction: 1,120 tons/yr.  
Anticipated Reduction: 5.8%  
Total Cost: \$110,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

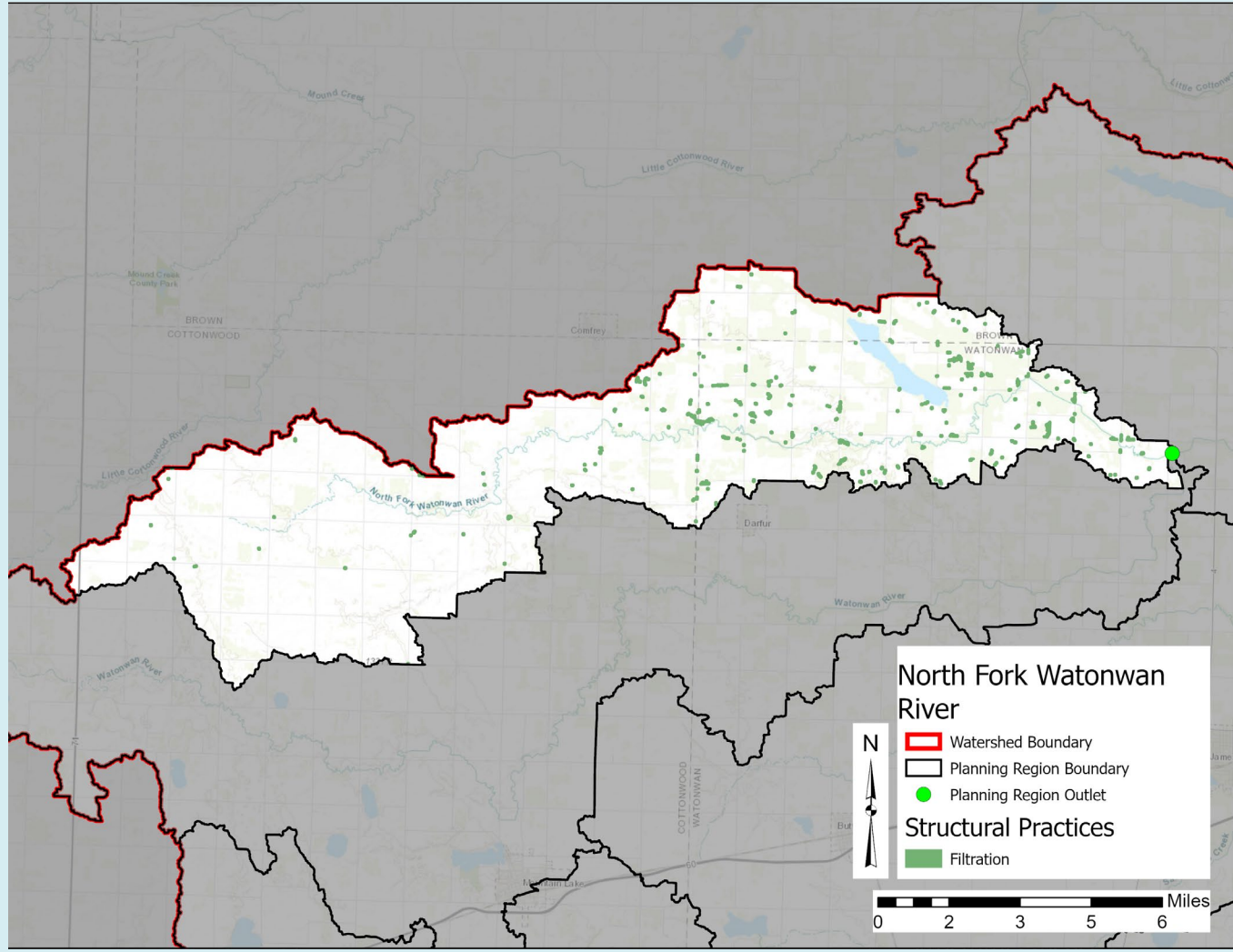
Existing Load: 12,313 lbs./yr.  
Target Load Reduction: 615 lbs./yr.  
Anticipated Load Reduction: 163 lbs./yr.  
Anticipated Reduction: 1.3%  
Total Cost: \$110,000



**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 232,194 lbs./yr.  
Target Load Reduction: 34,829 lbs./yr.  
Anticipated Load Reduction: 4,404 lbs./yr.  
Anticipated Reduction: 1.9%  
Total Cost: \$110,000



## NORTH FORK WATONWAN RIVER PLANNING REGION: IMPLEMENTATION PROFILE

Action-Specific Goal	Output (Number of Practices)	Annual Budget (Rates are 1.25x average 2016 EQIP rates)	Responsibility - Lead (underlined> & Partner(s)	Timeline					PTMApp Practice Assessment of Goals			Multiple Benefits								
				2020-2021	2022-2023	2024-2025	2026-2027	2028-2029	Modeled Sediment Reduction (%)	Modeled TP Reduction (%)	Modeled TN Reduction (%)	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality and Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base
Management Practices - Prioritize and implement management BMPs that reduce the delivery of sediment and nutrient loads by decreasing surface water runoff (nutrient management, conservation tillage, etc.) <i>10-yr Baseline Funding (\$10,000)</i>	181 acres (17 practices)	\$ 1,000/year	<u>SWCD, NRCS, MDA, County</u>	Ongoing															LS.2.1a	
<i>10-yr Enhanced Funding* (\$110,000)</i>	2,688 acres (134 practices)	\$ 11,000/year																		LS.2.1a
Structural Practices - Prioritize and implement structural BMPs that reduce the delivery of sediment and nutrient loads (WASCOBs, grassed waterways, filter strips, vegetative buffers, etc.) <i>10-yr Baseline Funding (\$10,000)</i>	21	\$ 1,000/year																		LS.2.1a
<i>10-yr Enhanced Funding* (\$110,000)</i>	183	\$ 11,000/year																		LS.2.1a
Easement Practices - Government acquisition of private land for the purpose of establishing conservation practices such as native plantings, tree planting, or wetland restoration (e.g. CCRP - temporary, CREP/RIM - permanent) <i>10-yr Baseline Funding (\$5,000)</i>	10 acres	\$ 500/year	<u>SWCD, NRCS, BWSR, County</u>	Ongoing															LS.2.1a	
<i>10-yr Enhanced Funding* (\$55,000)</i>	110 acres	\$ 5,500/year																		LS.2.1a

\* Enhanced funding includes practices from 10-yr baseline funding.

## UPPER WATOWAN RIVER PLANNING REGION: PLANNING REGION OVERVIEW

### Planning Region Priorities

The highest priority for implementation efforts are aimed at restoring impaired stream reaches and lakes as identified in Table 23 of WRW WRAPS (MPCA, 2020), protecting streams and lakes which are nearing impairment, restoring or protecting terrestrial and aquatic habitat with high species diversity and high conservation need as identified by the MNWAP wildlife action network, and protecting drinking water resources. Prioritized waterbodies are outlined in Section 5 and are shown in green on the right and described in detail beneath the map. Several areas near the headwaters of the Watowan River are prioritized for habitat conservation. A large area within the southernmost portion of the planning region is also a high priority for drinking water resource protection.

### Goals used as the Basis for Practice Selection

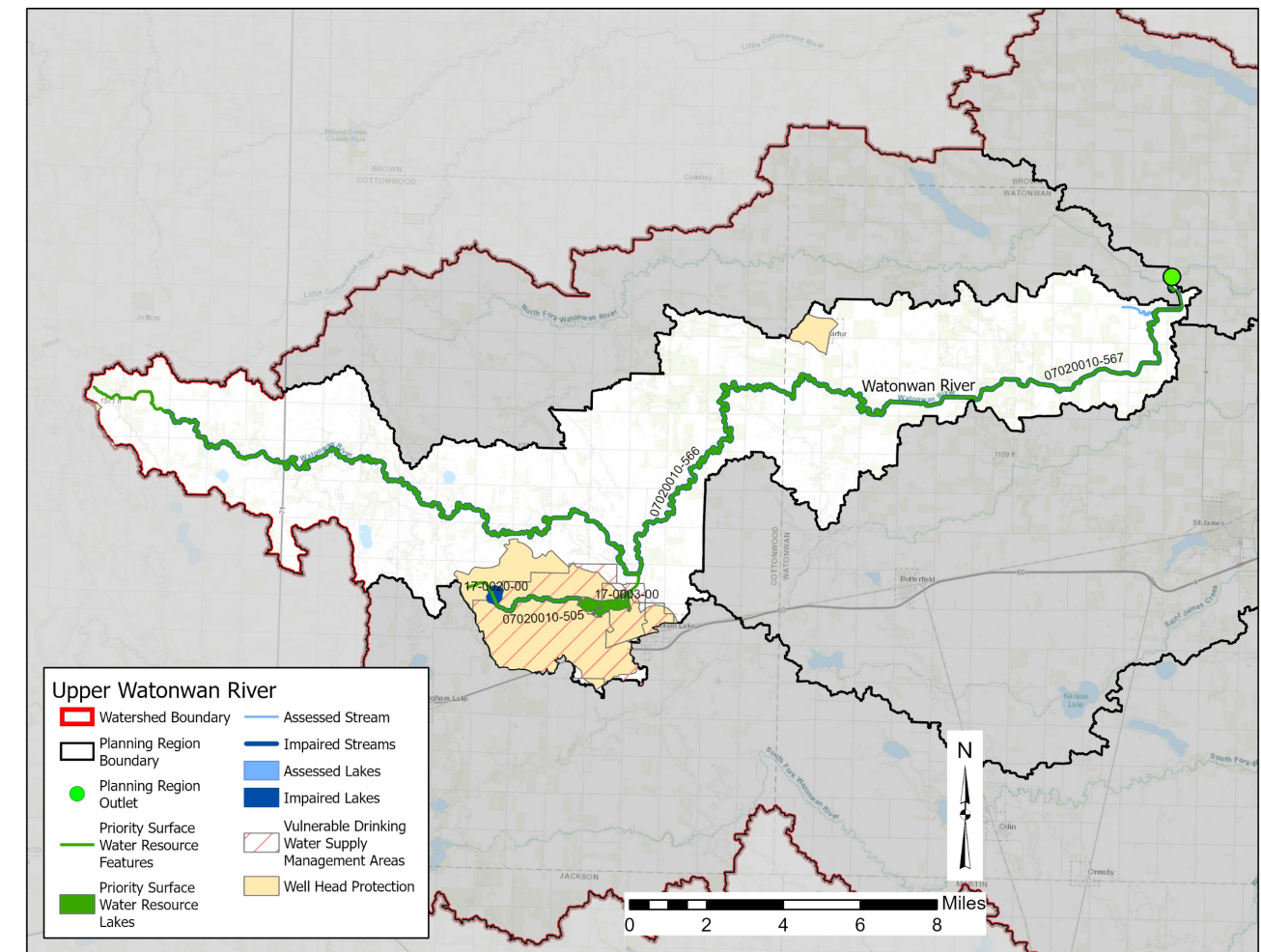
The goals used to select practices for this implementation plan focused primarily on reducing sediment, TP, and TN at the watershed outlet. Short-term sediment and nitrogen reduction goals align with the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. The short-term phosphorus reduction goal was set to half of the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. All long-term percent load reduction goals align with the goals from the WRAPS report.

Potential practices for improving water quality are chosen by first analyzing the feasibility of implementing various practices in different locations across the watershed. The probable beneficial progress that an upstream structural or management practice will make toward a water quality goal as measured at a priority resource point is then estimated. Any additional practical and/or social aspects (e.g. landowner willingness, existing practices, etc.) should be considered during implementation.

Planning Region Outlet	Goal Timeframe	Reduction Goal (Load)			Justification for Goal		
		Sediment <i>tons/year</i> (%)	Total Phosphorus <i>lbs./year</i> (%)	Total Nitrogen <i>lbs./year</i> (%)	Sediment	Total Phosphorus	Total Nitrogen
Upper Watowan River	Short-term (10-year)	1,012 (4%)	845 (5%)	46,233 (15%)	1	2	1
	Long-term (>10-year)	10,116 (40%)	6,760 (40%)	154,111 (50%)	3	3	3

- 1 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 2 - Goal was set equal to half of the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 3 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide goal

### Priority and Assessed Waterbodies

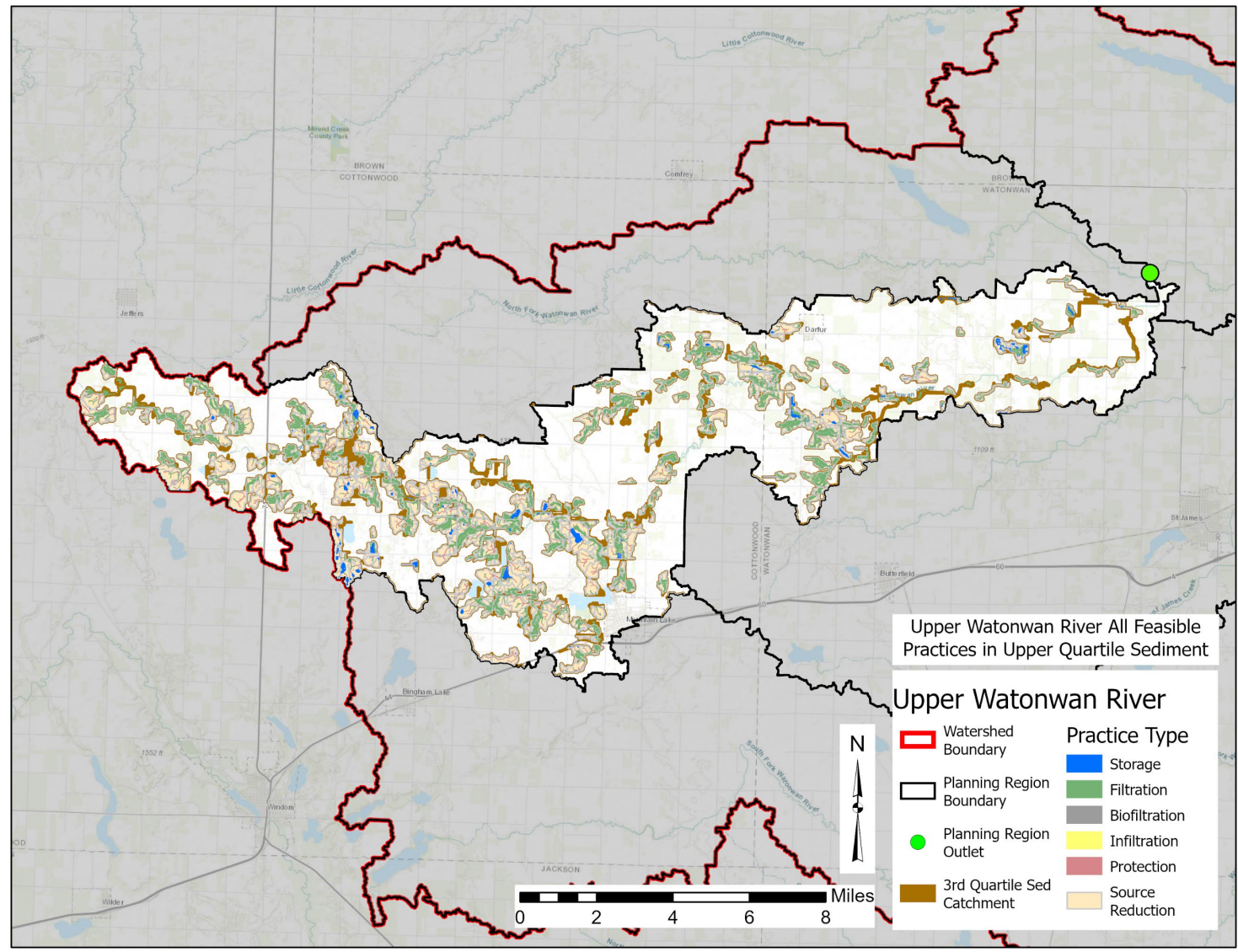


The following streams have been identified as key streams requiring restoration attention, as they do not currently meet Minnesota water quality standards for sediment, TP, TN, and/or *E. coli*. Both reaches of the Watowan River within the Upper Watowan River Planning Region (AUID 07020010-566 and -567) do not meet aquatic life or aquatic recreation standards due to low fish index of biotic integrity (F-IBI) and macroinvertebrate index of biotic integrity (M-IBI) (-566 only) scores, elevated *E. coli* (formerly fecal coliform) concentrations, and elevated TSS concentration (formerly turbidity). The unnamed creek referred to as the Mountain Lake Inlet (-505) also fail to meet aquatic life standards due to a low M-IBI score.

Mountain Lake (AUID 17-0003-00) is impaired for aquatic life due to a low F-IBI score and Eagle Lake (17-0020-00) is impaired for aquatic recreation due to excess nutrients.

Managing the landscape to reduce sediment, TP, and TN loading to the planning region outlet will begin the restoration process within the impaired waterbodies within the Upper Watowan River Planning Region.

## UPPER WATONWAN RIVER PLANNING REGION: FEASIBLE STRUCTURAL AND MANAGEMENT PRACTICES



### Feasible Structural and Management Practices in the Upper Watowan River Planning Region

Locations for structural and management practices are initially screened using a set of “practicability” criteria (e.g. minimum load reduction) and cost-effectiveness. The remaining technically feasible practices, summarized and shown in the table and map to the left, highlight those practices that fall within high sediment yield catchments in the Upper Watowan River Planning Region. There are many more practices summarized here than can realistically be implemented. The number and type of practices which can be implemented is largely influenced by the amount of funding available, what measurable goal(s) are being pursued, and what practices are most locally accepted by the community for voluntary implementation. This large list of feasible practices is narrowed down by identifying what practices will be the focus of plan implementation efforts assuming funding for implementation largely remains unchanged from current levels. Cost-effectiveness of practices is determined by first estimating the total cost to install the practice and then factoring in the water quality benefit from that practice. The most cost-effective practices that meet all practicability criteria become part of the “Targeted Implementation Plan” shown on subsequent pages.

PTMApp Treatment Group	NRCS Practice Type(s)
Structural - Storage	Depressions
	Drainage Water Management
	Nutrient Removal Wetlands
	Water and Sediment Control Basins (WASCOBs)
Structural - Filtration	Contour Buffer Strip
	Multi-species Buffer
Structural - Biofiltration	Denitrifying Bioreactor
	Saturated Buffer
Structural - Infiltration	Multi-stage Ditch
	Infiltration Trench
Structural - Protection	Stiff Stemmed Grasses
	Grass Waterways
	Deep Rooted Vegetation
	Stream Bank Stabilization
Management - Source Reduction	Cover Crops and Conservation Tillage

### Feasible Structural and Management Practices

PTMApp Treatment Group (With Representative BMPs)	Practice Type		Number in Planning Region
	Structural	Management	
Storage (e.g. ponds, WASCOBs)	●		226
Filtration (e.g. filter strips, grassed waterways)	●		933
Biofiltration (e.g. denitrifying bioreactors, saturated buffers)	●		4
Infiltration (e.g. Multi-stage ditch, infiltration trench)	●		4
Protection (e.g. stream protection, critical area planting)	●		402
Source Reduction (e.g. cover crops, conservation tillage)		●	14,364 acres (638 practices)



**Management Practices Quick Summary:**

- Cover crops, tillage management, rotational grazing
- Targeted to areas of highest soil loss

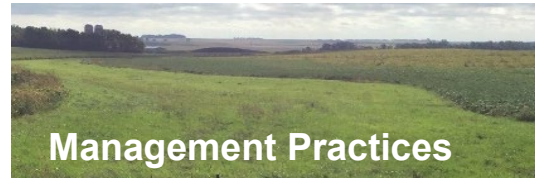


**Structural Practices Quick Summary:**

- WASCOBs, filter strips, ponds, and waterways
- Most cost-efficient over project life

# UPPER WATONWAN RIVER PLANNING REGION: MANAGEMENT PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation

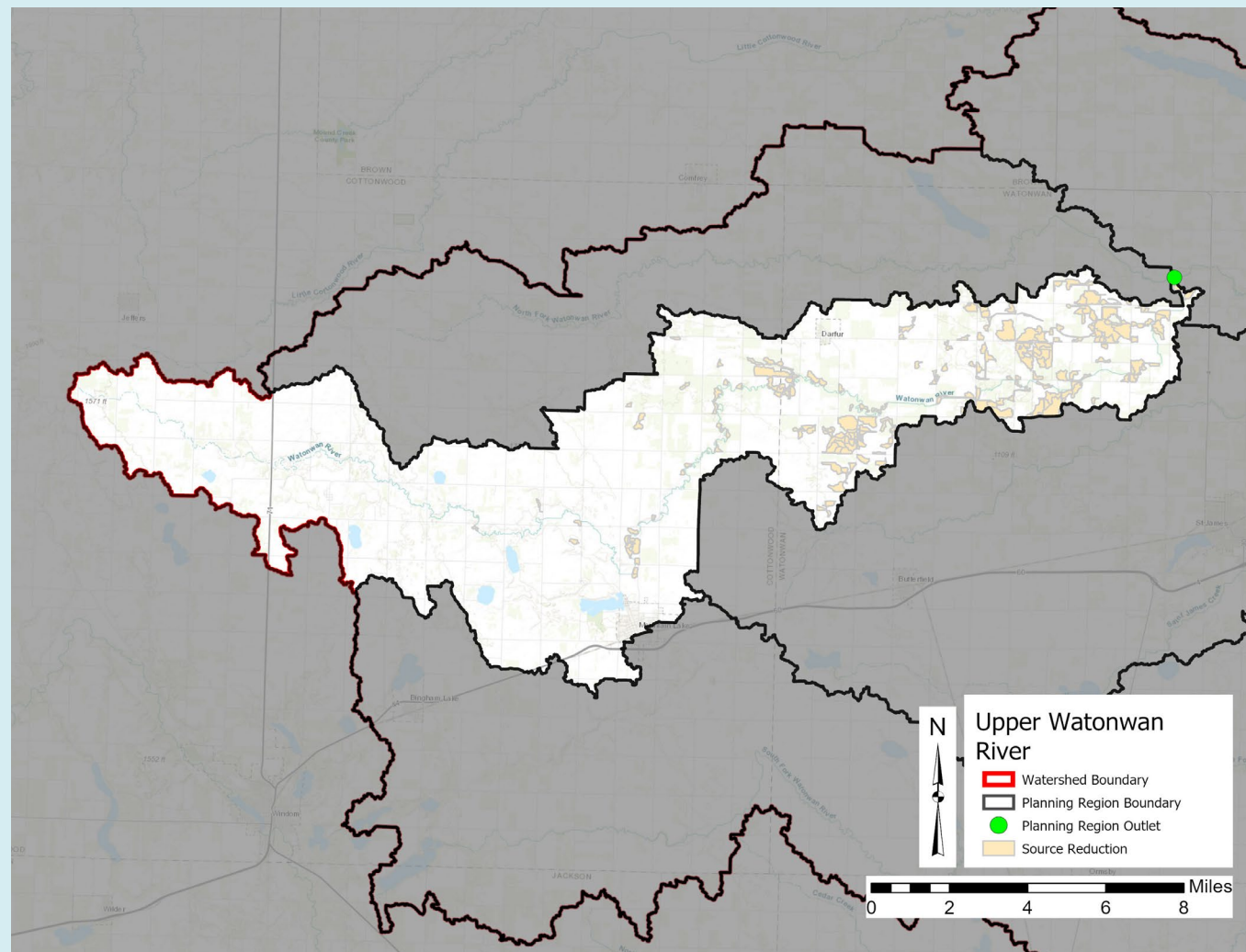


**Management Practices**

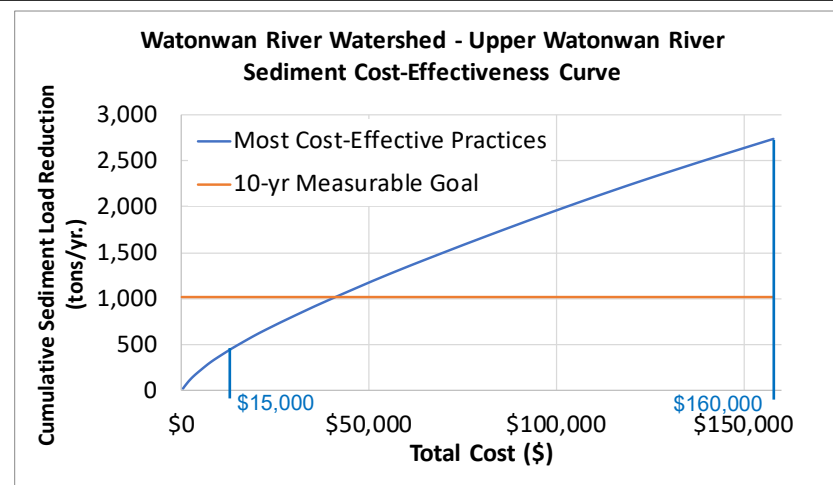
A total of 4,095 acres are suggested for targeted implementation of management (source reduction) practices in the Upper Watowan River Planning Region targeted implementation approach.

Shown below are the locations on the landscape of the best, most cost-effective management practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these management practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (282 acres - 28 practices) and 10-yr. enhanced funding (all 4,095 acres) in the targeted implementation approach is shown by the blue line.



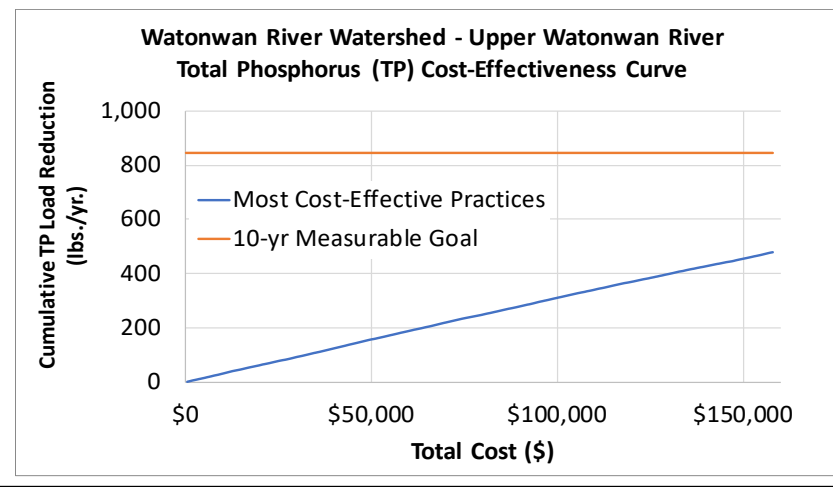
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

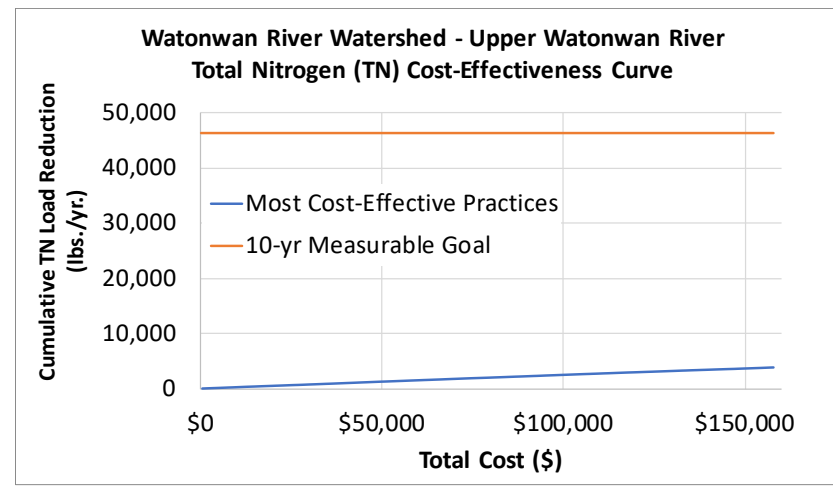
Existing Load: 25,290 tons/yr.  
Target Load Reduction: 1,012 tons/yr.  
Anticipated Load Reduction: 2,733 tons/yr.  
Anticipated Reduction: 10.8%  
Total Cost: \$160,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 16,900 lbs./yr.  
Target Load Reduction: 845 lbs./yr.  
Anticipated Load Reduction: 477 lbs./yr.  
Anticipated Reduction: 2.8%  
Total Cost: \$160,000



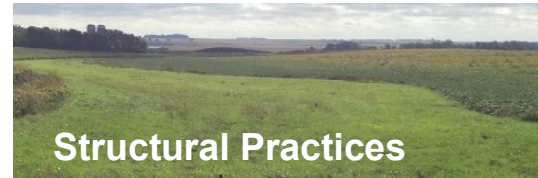
**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 308,222 lbs./yr.  
Target Load Reduction: 46,233 lbs./yr.  
Anticipated Load Reduction: 3,820 lbs./yr.  
Anticipated Reduction: 1.2%  
Total Cost: \$160,000

## UPPER WATONWAN RIVER PLANNING REGION: STRUCTURAL PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

### Locations for Targeting Implementation

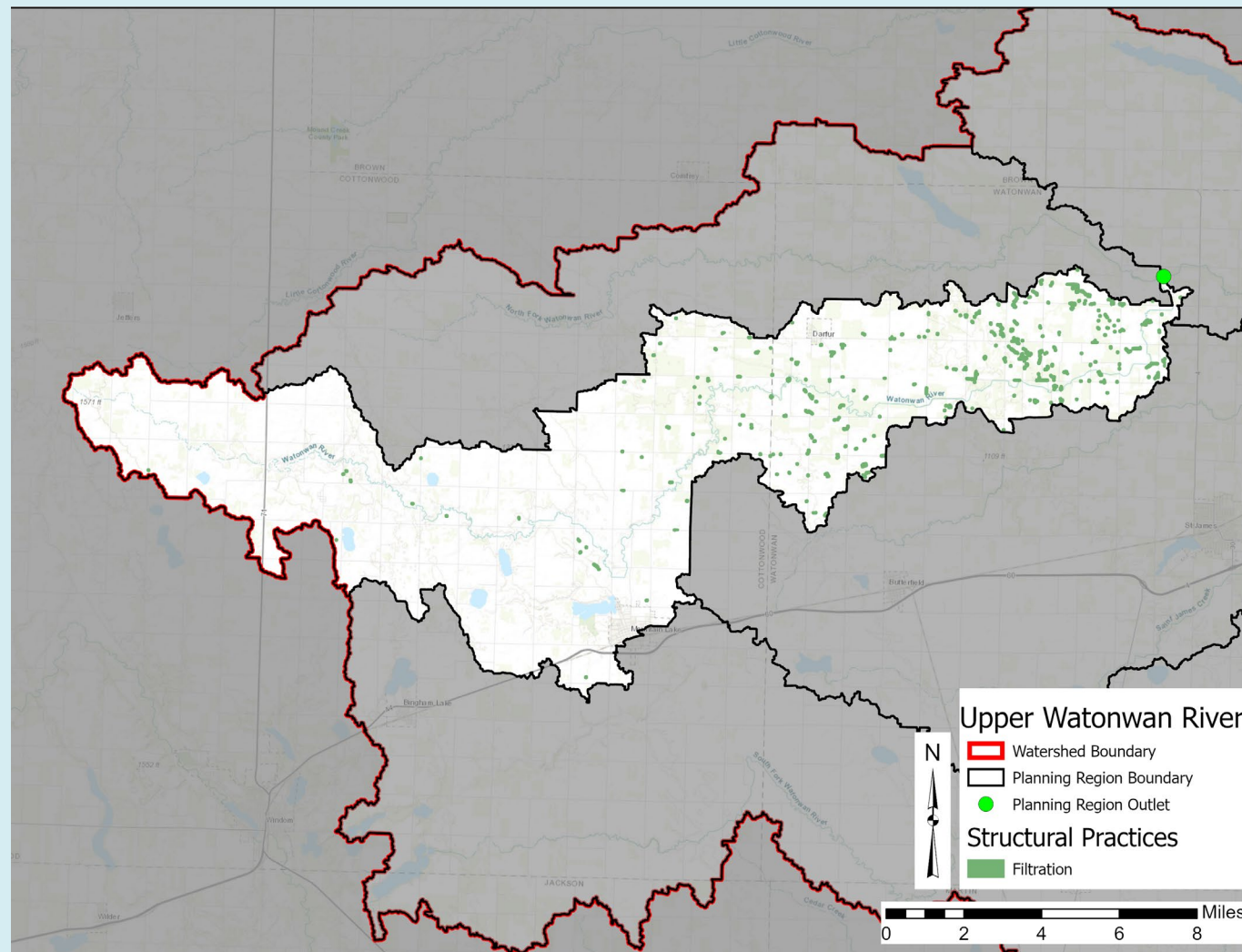


Structural Practices

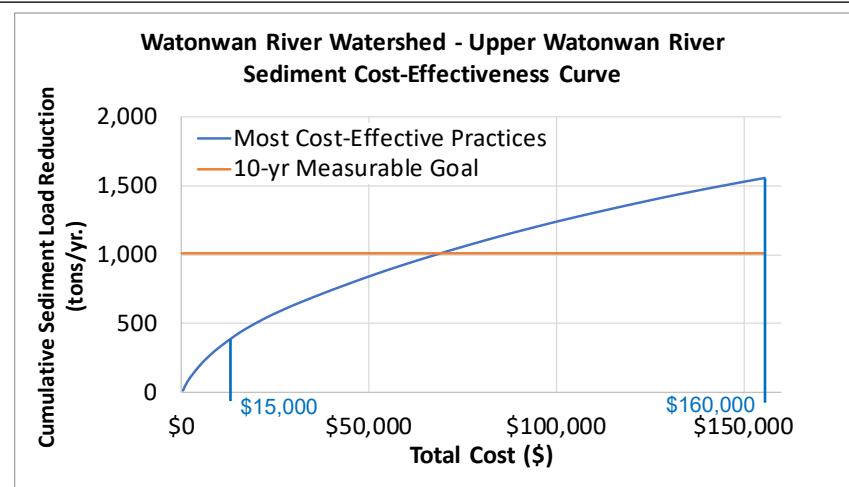
There are 233 structural practices suggested for targeted implementation in the Upper Watowan River Planning Region targeted implementation approach: 233 filtration practices.

Shown below are the locations on the landscape of the best, most cost-effective practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these 233 structural practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (33 practices) and 10-yr. enhanced funding (all 233 practices) in the targeted implementation approach is shown by the blue line.



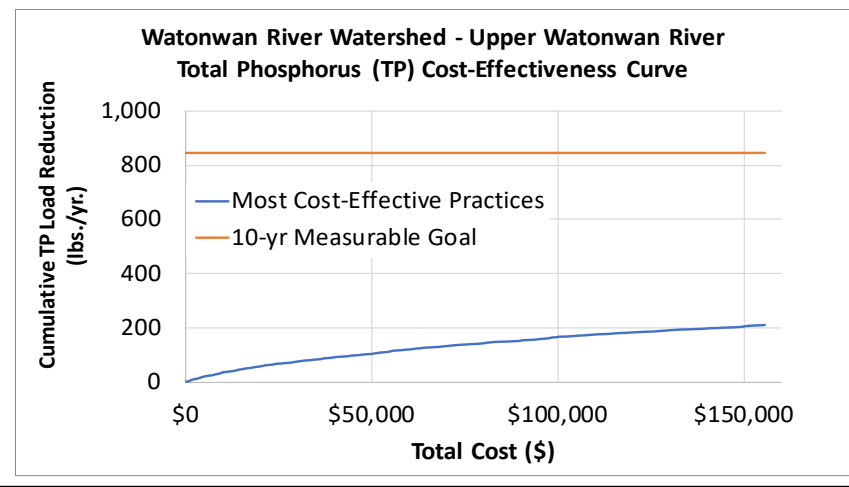
### Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

Clarity ↓ 4% Sediment 4% Reduction

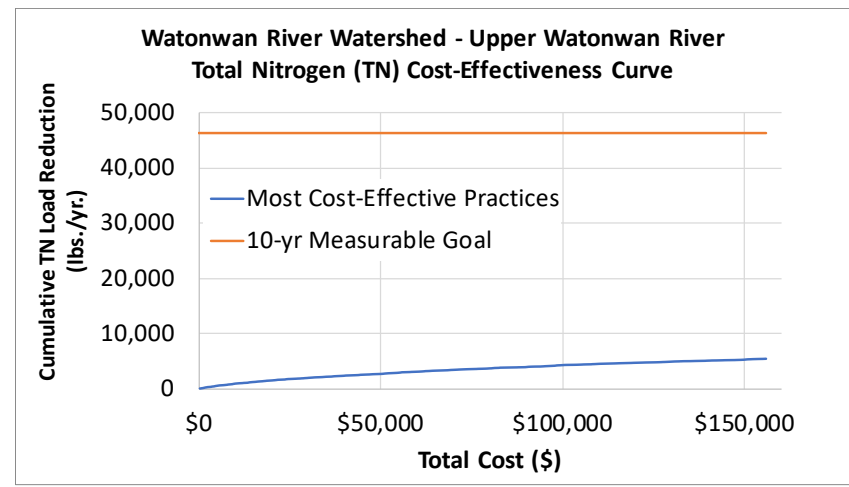
Existing Load: 25,290 tons/yr.  
Target Load Reduction: 1,012 tons/yr.  
Anticipated Load Reduction: 1,551 tons/yr.  
Anticipated Reduction: 6.1%  
Total Cost: \$160,000



**10-yr Measurable Goal**

P ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 16,900 lbs./yr.  
Target Load Reduction: 845 lbs./yr.  
Anticipated Load Reduction: 209 lbs./yr.  
Anticipated Reduction: 1.2%  
Total Cost: \$160,000



**10-yr Measurable Goal**

N ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 308,222 lbs./yr.  
Target Load Reduction: 46,233 lbs./yr.  
Anticipated Load Reduction: 5,550 lbs./yr.  
Anticipated Reduction: 1.8%  
Total Cost: \$160,000

## UPPER WATONWAN RIVER PLANNING REGION: IMPLEMENTATION PROFILE

Action-Specific Goal	Output (Number of Practices)	Annual Budget (Rates are 1.25x average 2016 EQIP rates)	Responsibility - Lead (underlined> & Partner(s)	Timeline					PTMApp Practice Assessment of Goals			Multiple Benefits											
				2020-2021	2022-2023	2024-2025	2026-2027	2028-2029	Modeled Sediment Reduction (%)	Modeled TP Reduction (%)	Modeled TN Reduction (%)	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality and Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base	Stewardship (Urban, Rural, and Shoreland)		
Management Practices - Prioritize and implement management BMPs that reduce the delivery of sediment and nutrient loads by decreasing surface water runoff (nutrient management, conservation tillage, etc.) <i>10-yr Baseline Funding (\$15,000)</i>	282 acres (28 practices)	\$ 1,500/year	<u>SWCD, NRCS, MDA, County</u>	Ongoing						1.6%	0.2%	0.1%		SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a	
<i>10-yr Enhanced Funding* (\$160,000)</i>	4,095 acres (196 practices)	\$ 16,000/year									10.8%	2.8%	1.2%		SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a
Structural Practices - Prioritize and implement structural BMPs that reduce the delivery of sediment and nutrient loads (WASCOBs, grassed waterways, filter strips, vegetative buffers, etc.) <i>10-yr Baseline Funding (\$15,000)</i>	33	\$ 1,500/year									1.4%	0.2%	0.3%	SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a
<i>10-yr Enhanced Funding* (\$160,000)</i>	233	\$ 16,000/year									6.1%	1.2%	1.8%	SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a
Easement Practices - Government acquisition of private land for the purpose of establishing conservation practices such as native plantings, tree planting, or wetland restoration (e.g. CCRP - temporary, CREP/RIM - permanent) <i>10-yr Baseline Funding (\$5,000)</i>	10 acres	\$ 500/year	<u>SWCD, NRCS, BWSR, County</u>	Ongoing									SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a	HR.2.1a			LS.2.1a	
<i>10-yr Enhanced Funding* (\$80,000)</i>	160 acres	\$ 8,000/year													SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a	HR.2.1a		

\* Enhanced funding includes practices from 10-yr baseline funding.



## SAINT JAMES CREEK PLANNING REGION: PLANNING REGION OVERVIEW

### Planning Region Priorities

The highest priority for implementation efforts are aimed at restoring impaired stream reaches and lakes as identified in Table 23 of WRW WRAPS (MPCA, 2020), protecting streams and lakes which are nearing impairment, restoring or protecting terrestrial and aquatic habitat with high species diversity and high conservation need as identified by the MNWAP wildlife action network, and protecting drinking water resources. Prioritized waterbodies are outlined in Section 5 and are shown in green on the right and described in detail beneath the map. Several areas along the lower portion of Saint James Creek and at the outlet of the planning region are prioritized for habitat conservation.

### Goals used as the Basis for Practice Selection

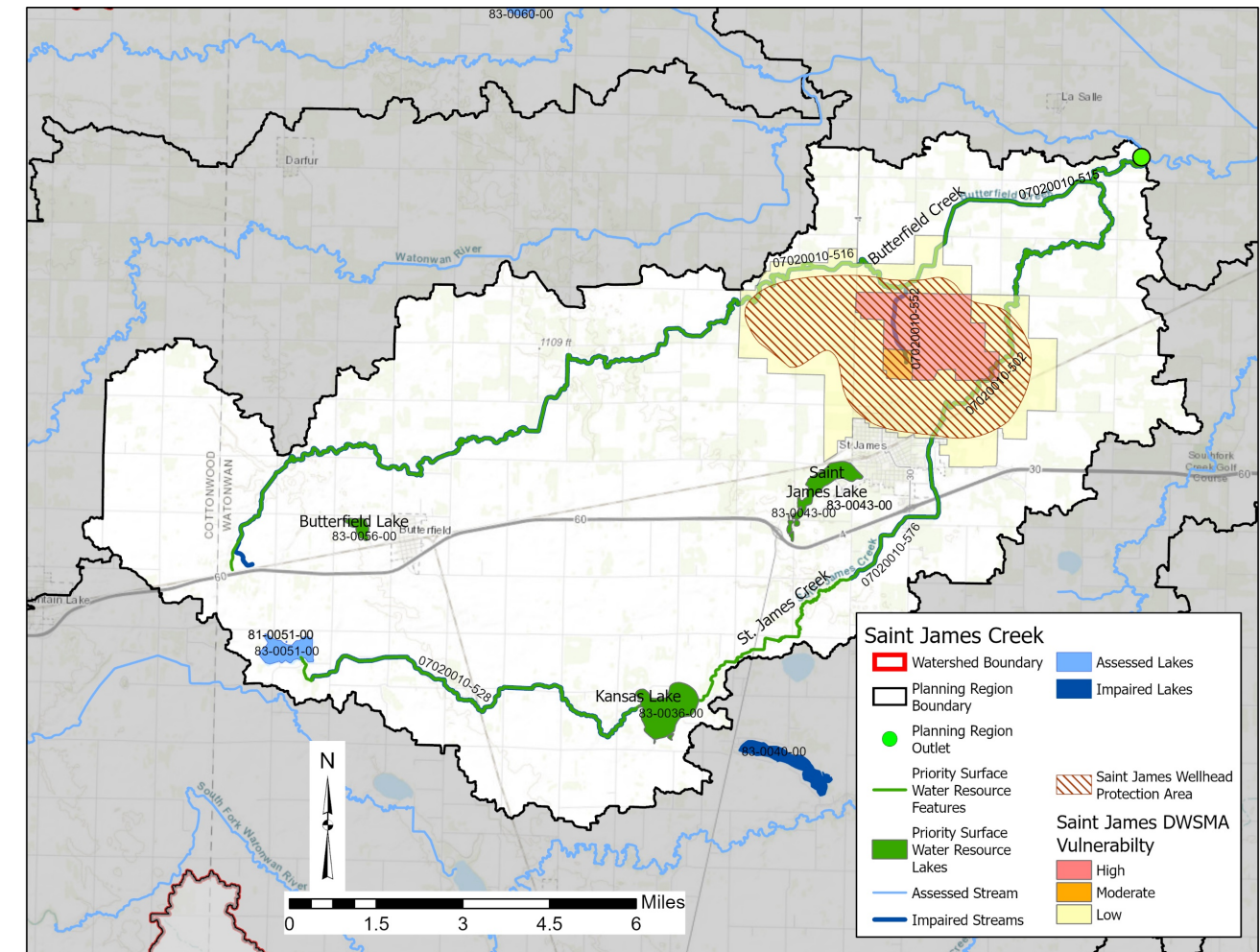
The goals used to select practices for this implementation plan focused primarily on reducing sediment, TP, and TN at the watershed outlet. Short-term sediment and nitrogen reduction goals align with the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. The short-term phosphorus reduction goal was set to half of the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. All long-term percent load reduction goals align with the goals from the WRAPS report.

Potential practices for improving water quality are chosen by first analyzing the feasibility of implementing various practices in different locations across the watershed. The probable beneficial progress that an upstream structural or management practice will make toward a water quality goal as measured at a priority resource point is then estimated. Any additional practical and/or social aspects (e.g. landowner willingness, existing practices, etc.) should be considered during implementation.

Planning Region Outlet	Goal Timeframe	Reduction Goal (Load)			Justification for Goal		
		Sediment <i>tons/year</i> (%)	Total Phosphorus <i>lbs./year</i> (%)	Total Nitrogen <i>lbs./year</i> (%)	Sediment	Total Phosphorus	Total Nitrogen
Saint James Creek	Short-term (10-year)	1,241 (4%)	1,102 (5%)	58,936 (15%)	1	2	1
	Long-term (>10-year)	12,406 (40%)	8,814 (40%)	196,455 (50%)	3	3	3

- 1 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 2 - Goal was set equal to half of the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 3 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide goal

### Priority and Assessed Waterbodies

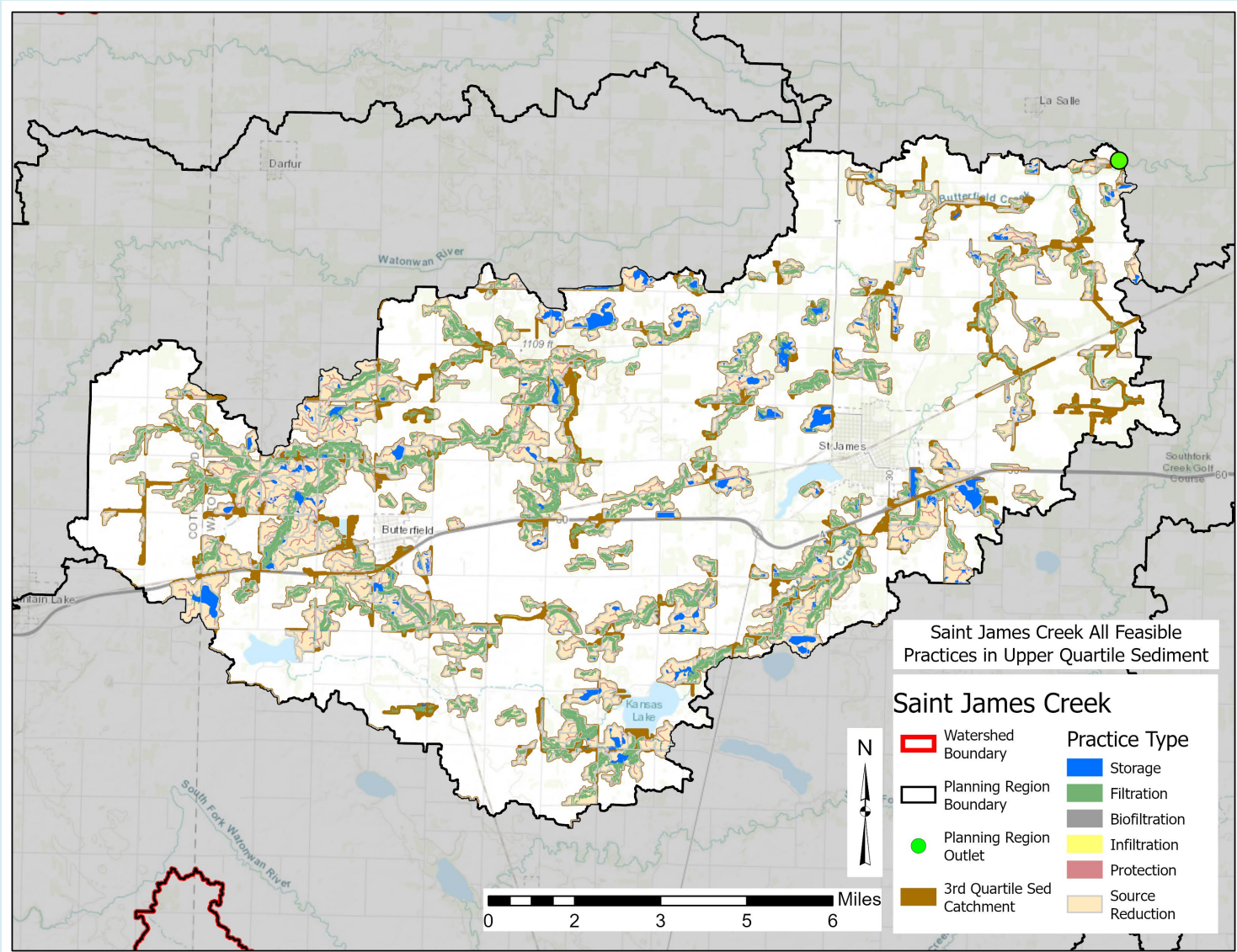


The following streams have been identified as key streams requiring restoration attention, as they do not currently meet Minnesota water quality standards for sediment, TP, TN, and/or *E.coli*. One stream reach segment of St. James Creek (AUID 07020010-576) does not meet aquatic recreation standards, one segment of St. James Creek does not meet aquatic life standards (-528) and two segments of St. James Creek are classified as limited resource value streams (-502, -515). Butterfield Creek (-516) does not meet water quality standards for aquatic life or aquatic recreation, and Unnamed Creek (-552) does not meet Aquatic Life Standards.

Kansas Lake (AUID 83-0036-00) and Butterfield Lake (83-0056-00) are impaired for aquatic recreation due to excess nutrients. Sulem Lake (83-0051-00) lacks sufficient data to make an aquatic life or aquatic recreation determination.

Managing the landscape to reduce sediment, TP, and TN loading to the planning region outlet will begin the restoration process within the impaired waterbodies within the Saint James Creek Planning Region.

## SAINT JAMES CREEK PLANNING REGION: FEASIBLE STRUCTURAL AND MANAGEMENT PRACTICES



### Feasible Structural and Management Practices in the Saint James Creek Planning Region

Locations for structural and management practices are initially screened using a set of “practicability” criteria (e.g. minimum load reduction) and cost-effectiveness. The remaining technically feasible practices, summarized and shown in the table and map to the left, highlight those practices that fall within high sediment yield catchments in the Saint James Creek Planning Region. There are many more practices summarized here than can realistically be implemented. The number and type of practices which can be implemented is largely influenced by the amount of funding available, what measurable goal(s) are being pursued, and what practices are most locally accepted by the community for voluntary implementation.

This large list of feasible practices is narrowed down by identifying what practices will be the focus of plan implementation efforts assuming funding for implementation largely remains unchanged from current levels. Cost-effectiveness of practices is determined by first estimating the total cost to install the practice and then factoring in the water quality benefit from that practice. The most cost-effective practices that meet all practicability criteria become part of the “Targeted Implementation Plan” shown on subsequent pages.

PTMApp Treatment Group	NRCS Practice Type(s)
Structural - Storage	Depressions
	Drainage Water Management
	Nutrient Removal Wetlands Water and Sediment Control Basins (WASCOBs)
Structural - Filtration	Contour Buffer Strip
	Multi-species Buffer
Structural - Biofiltration	Denitrifying Bioreactor
	Saturated Buffer
Structural - Infiltration	Multi-stage Ditch
	Infiltration Trench
Structural - Protection	Stiff Stemmed Grasses
	Grass Waterways
	Deep Rooted Vegetation Stream Bank Stabilization
Management - Source Reduction	Cover Crops and Conservation Tillage

### Feasible Structural and Management Practices

PTMApp Treatment Group (With Representative BMPs)	Practice Type		Number in Planning Region
	Structural	Management	
Storage (e.g. ponds, WASCOBs)	●		352
Filtration (e.g. filter strips, grassed waterways)	●		1,058
Biofiltration (e.g. denitrifying bioreactors, saturated buffers)	●		25
Infiltration (e.g. Multi-stage ditch, infiltration trench)	●		25
Protection (e.g. stream protection, critical area planting)	●		399
Source Reduction (e.g. cover crops, conservation tillage)		●	16,297 acres (739 practices)



**Management Practices Quick Summary:**

- Cover crops, tillage management, rotational grazing
- Targeted to areas of highest soil loss

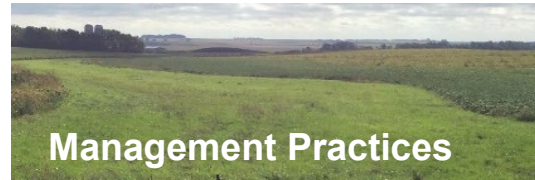


**Structural Practices Quick Summary:**

- WASCOBs, filter strips, ponds, and waterways
- Most cost-efficient over project life

# SAINT JAMES CREEK PLANNING REGION: MANAGEMENT PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation

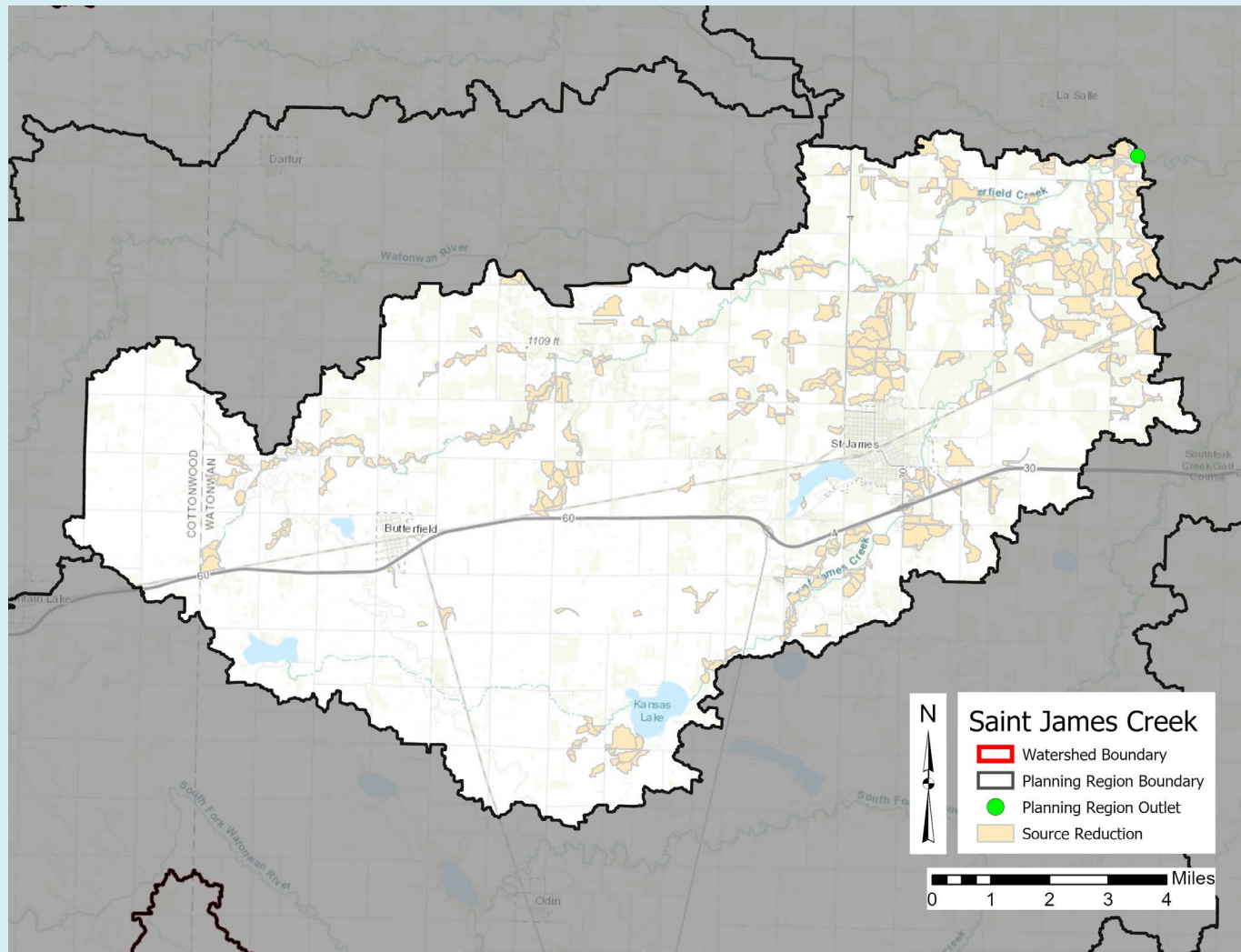


**Management Practices**

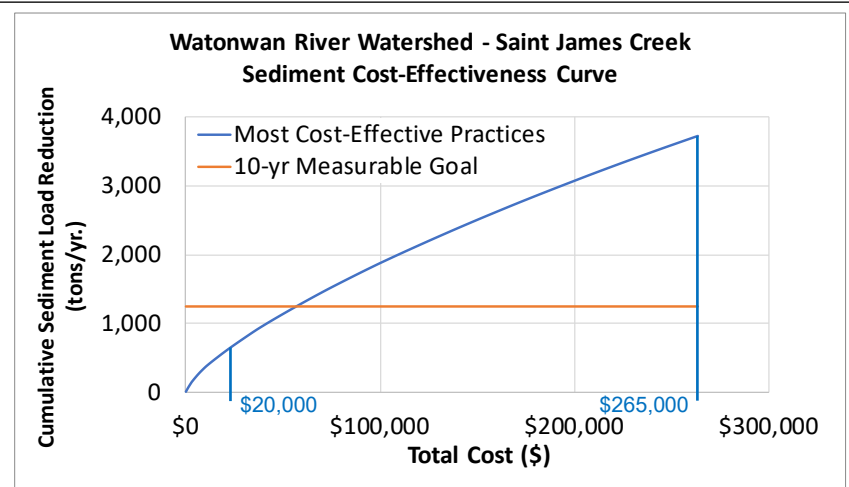
A total of 6,825 acres are suggested for targeted implementation of management (source reduction) practices in the Saint James Creek Planning Region targeted implementation approach.

Shown below are the locations on the landscape of the best, most cost-effective management practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these management practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (470 acres - 45 practices) and 10-yr. enhanced funding (all 6,825 acres) in the targeted implementation approach is shown by the blue line.



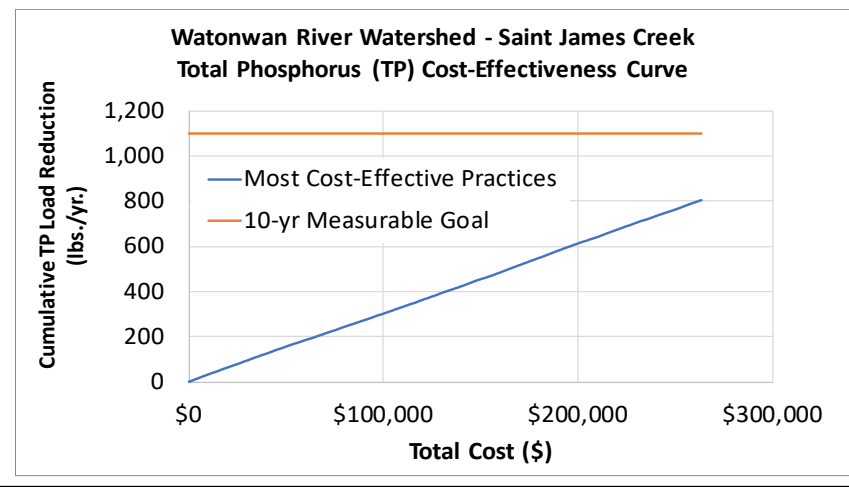
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

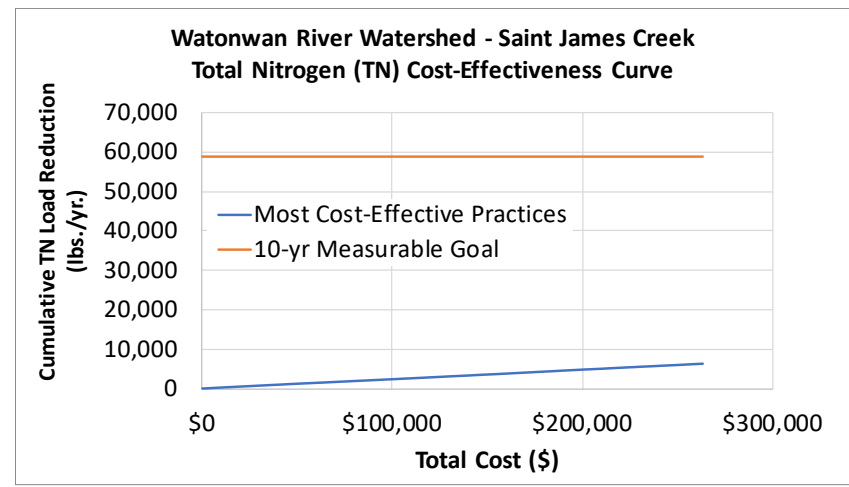
Existing Load: 31,015 tons/yr.  
Target Load Reduction: 1,241 tons/yr.  
Anticipated Load Reduction: 3,721 tons/yr.  
Anticipated Reduction: 12.0%  
Total Cost: \$265,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 22,035 lbs./yr.  
Target Load Reduction: 1,102 lbs./yr.  
Anticipated Load Reduction: 803 lbs./yr.  
Anticipated Reduction: 3.6%  
Total Cost: \$265,000



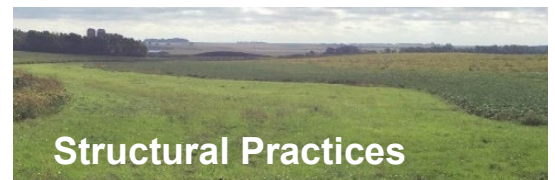
**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 392,910 lbs./yr.  
Target Load Reduction: 58,936 lbs./yr.  
Anticipated Load Reduction: 6,433 lbs./yr.  
Anticipated Reduction: 1.6%  
Total Cost: \$265,000

# SAINT JAMES CREEK PLANNING REGION: STRUCTURAL PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation

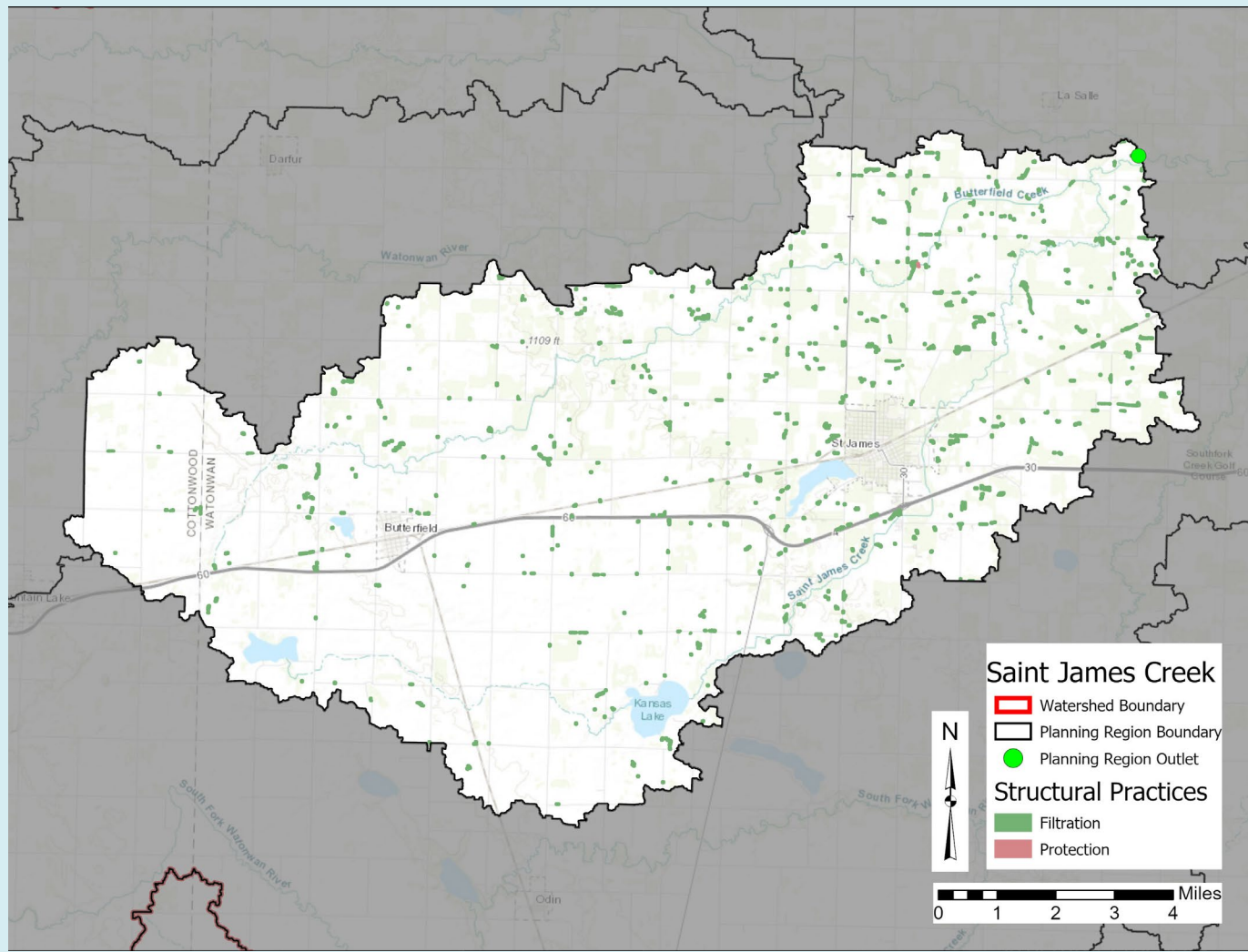


**Structural Practices**

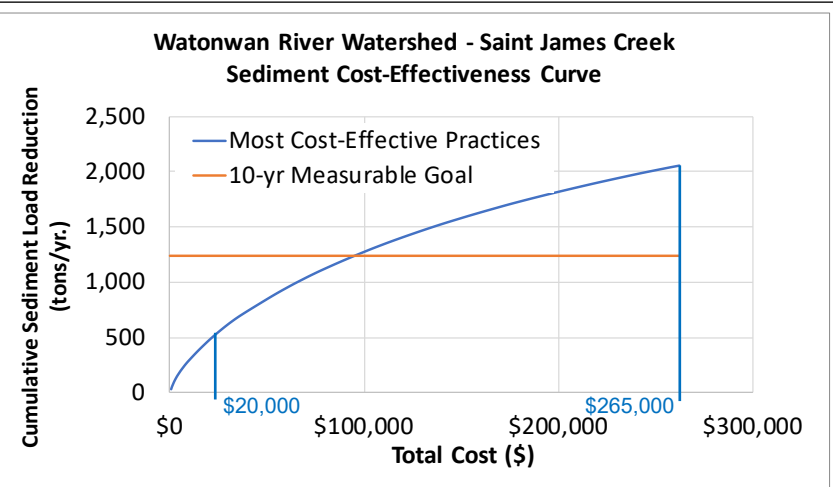
There are 453 structural practices suggested for targeted implementation in the Saint James Creek Planning Region targeted implementation approach: 452 filtration practices and 1 protection practice.

Shown below are the locations on the landscape of the best, most cost-effective practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these 453 structural practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (51 practices) and 10-yr. enhanced funding (all 453 practices) in the targeted implementation approach is shown by the blue line.



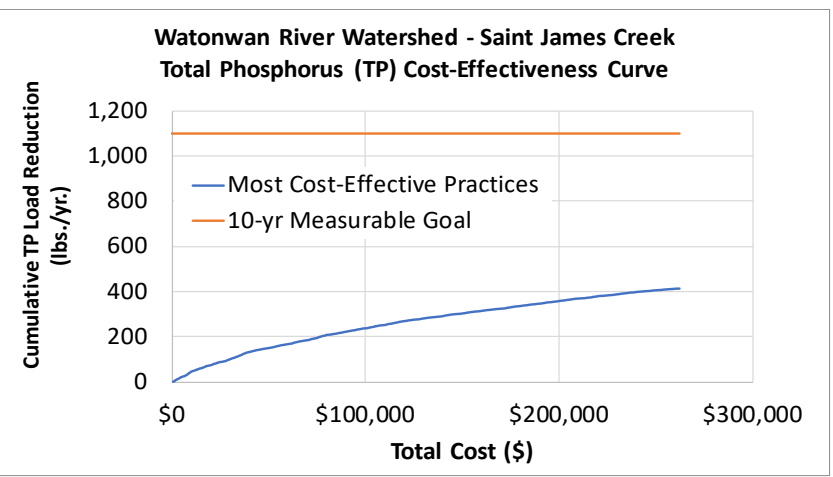
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

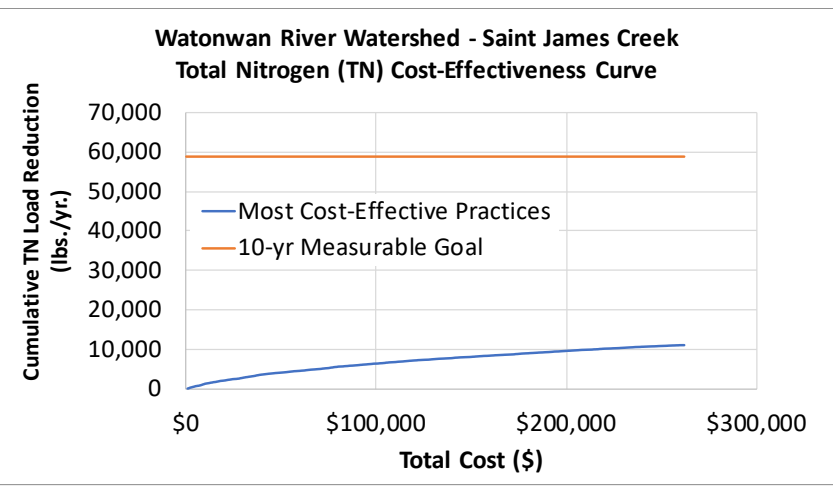
Existing Load: 31,015 tons/yr.  
Target Load Reduction: 1,241 tons/yr.  
Anticipated Load Reduction: 2,060 tons/yr.  
Anticipated Reduction: 6.6%  
Total Cost: \$265,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 22,035 lbs./yr.  
Target Load Reduction: 1,102 lbs./yr.  
Anticipated Load Reduction: 413 lbs./yr.  
Anticipated Reduction: 1.9%  
Total Cost: \$265,000



**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 392,910 lbs./yr.  
Target Load Reduction: 58,936 lbs./yr.  
Anticipated Load Reduction: 10,993 lbs./yr.  
Anticipated Reduction: 2.8%  
Total Cost: \$265,000

## SAINT JAMES CREEK PLANNING REGION: IMPLEMENTATION PROFILE

Action-Specific Goal	Output (Number of Practices)	Annual Budget (Rates are 1.25x average 2016 EQIP rates)	Responsibility - Lead (underlined> & Partner(s)	Timeline					PTMApp Practice Assessment of Goals			Multiple Benefits																
				2020-2021	2022-2023	2024-2025	2026-2027	2028-2029	Modeled Sediment Reduction (%)	Modeled TP Reduction (%)	Modeled TN Reduction (%)	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality and Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base	Stewardship (Urban, Rural, and Shoreland)							
Management Practices - Prioritize and implement management BMPs that reduce the delivery of sediment and nutrient loads by decreasing surface water runoff (nutrient management, conservation tillage, etc.) <i>10-yr Baseline Funding (\$20,000)</i>	470 acres (45 practices)	\$ 2,000/year	<u>SWCD, NRCS, MDA, County</u>	Ongoing				1.8%	0.3%	0.1%		SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a								
<i>10-yr Enhanced Funding* (\$265,000)</i>	6,825 acres (367 practices)	\$ 26,500/year										SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a								
Structural Practices - Prioritize and implement structural BMPs that reduce the delivery of sediment and nutrient loads (WASCOBs, grassed waterways, filter strips, vegetative buffers, etc.) <i>10-yr Baseline Funding (\$20,000)</i>	51	\$ 2,000/year										SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a							
<i>10-yr Enhanced Funding* (\$265,000)</i>	453	\$ 26,500/year										SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a							
Easement Practices - Government acquisition of private land for the purpose of establishing conservation practices such as native plantings, tree planting, or wetland restoration (e.g. CCRP - temporary, CREP/RIM - permanent) <i>10-yr Baseline Funding (\$10,000)</i>	20 acres	\$ 1,000/year									<u>SWCD, NRCS, BWSR, County</u>	Ongoing							SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a	HR.2.1a			LS.2.1a
<i>10-yr Enhanced Funding* (\$135,000)</i>	270 acres	\$ 13,500/year																		SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a	HR.2.1a		

\* Enhanced funding includes practices from 10-yr baseline funding.

## SOUTH FORK WATOWAN RIVER PLANNING REGION: PLANNING REGION OVERVIEW

### Planning Region Priorities

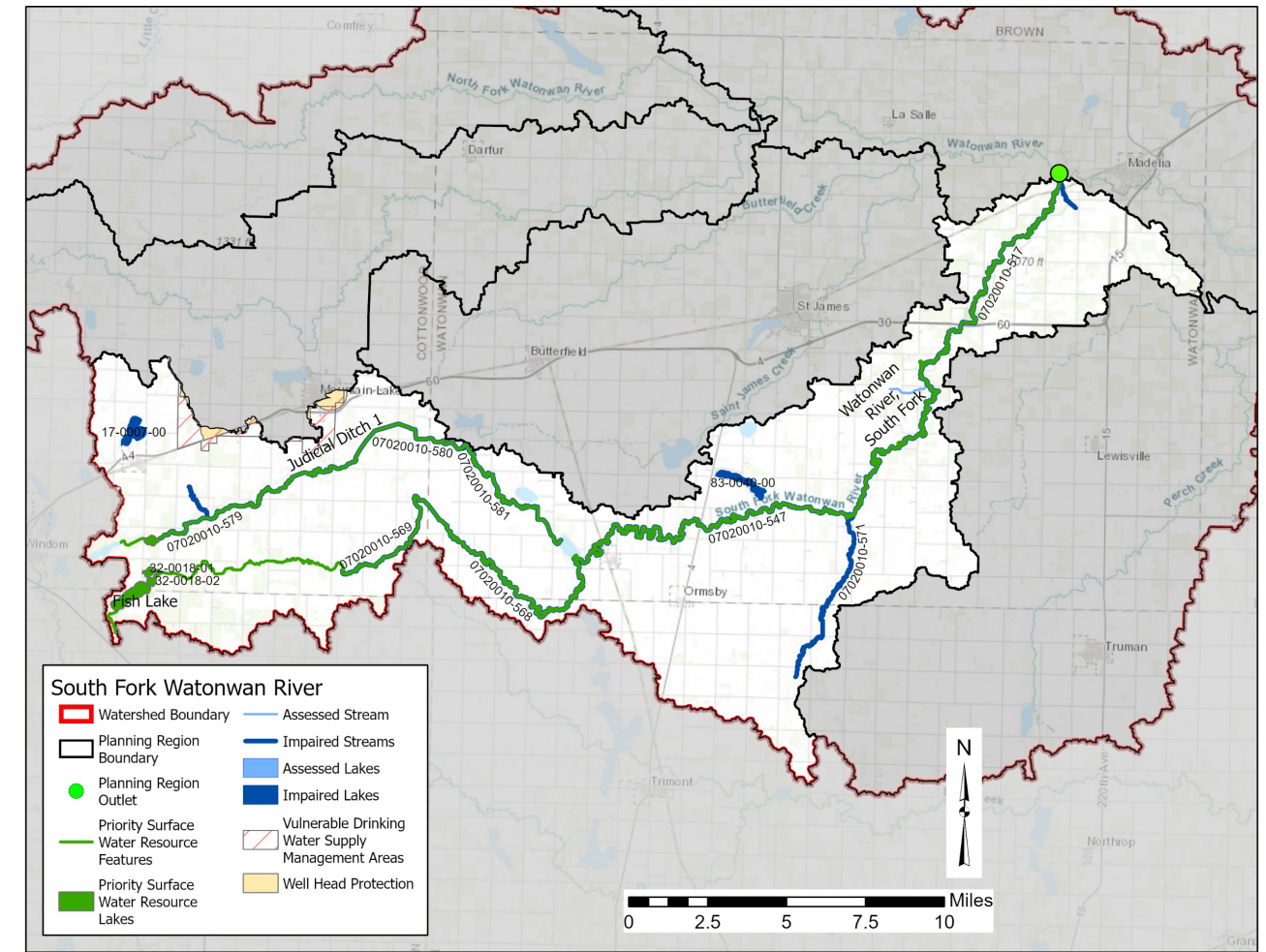
The highest priority for implementation efforts are aimed at restoring impaired stream reaches and lakes as identified in Table 23 of WRW WRAPS (MPCA, 2020), protecting streams and lakes which are nearing impairment, restoring or protecting terrestrial and aquatic habitat with high species diversity and high conservation need as identified by the MNWAP wildlife action network, and protecting drinking water resources. Prioritized waterbodies are outlined in Section 5 and are shown in green on the right and described in detail beneath the map. Several areas near the headwaters of the South Fork Watowan River and Judicial Ditch 1 are prioritized for habitat conservation. A small area within the northwestern portion of the planning region is also a high priority for drinking water resource protection.

### Goals used as the Basis for Practice Selection

The goals used to select practices for this implementation plan focused primarily on reducing sediment, TP, and TN at the watershed outlet. Short-term sediment and nitrogen reduction goals align with the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. The short-term phosphorus reduction goal was set to half of the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. All long-term percent load reduction goals align with the goals from the WRAPS report.

Potential practices for improving water quality are chosen by first analyzing the feasibility of implementing various practices in different locations across the watershed. The probable beneficial progress that an upstream structural or management practice will make toward a water quality goal as measured at a priority resource point is then estimated. Any additional practical and/or social aspects (e.g. landowner willingness, existing practices, etc.) should be considered during implementation.

### Waterbodies that are Impaired or in Need of Protection

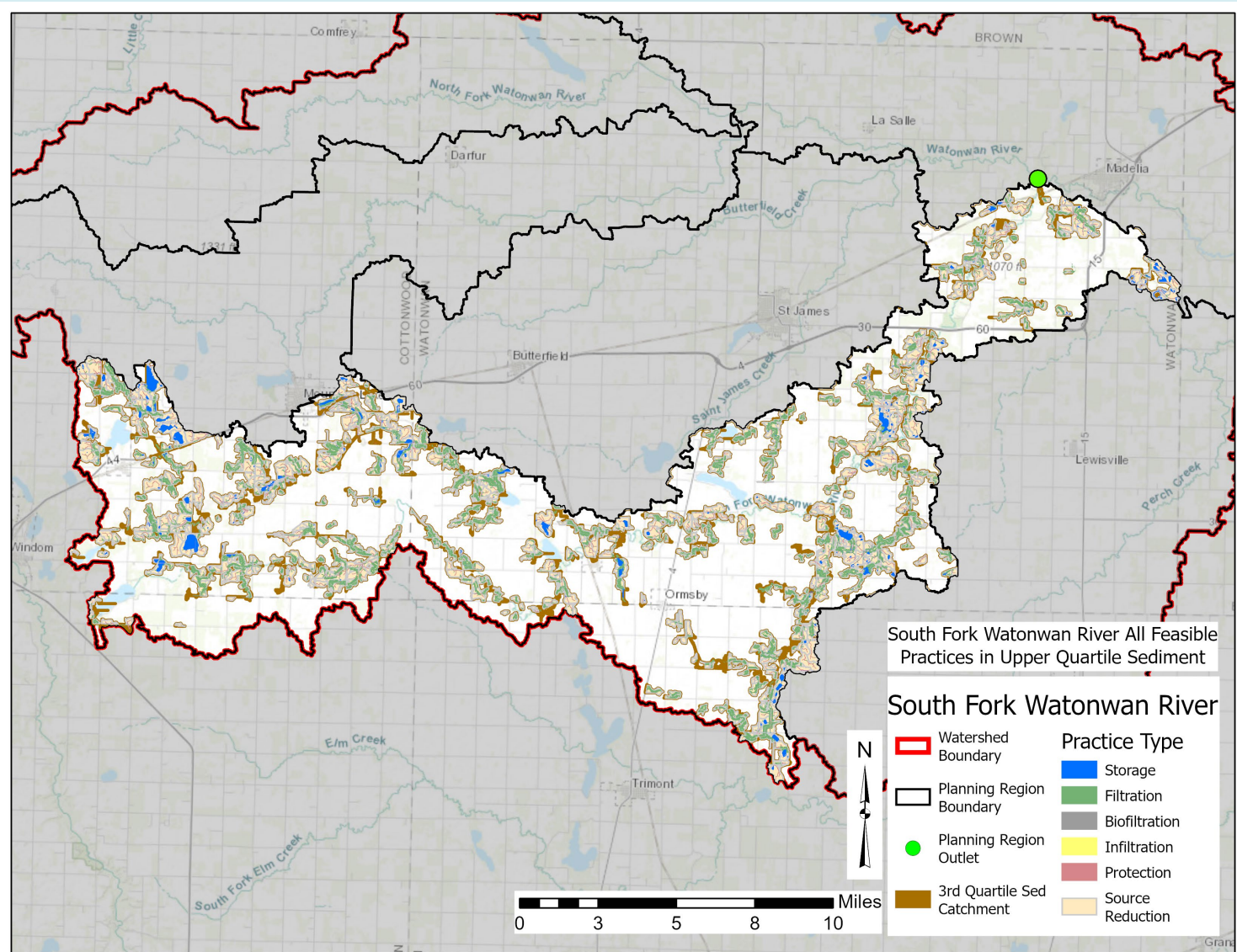


Planning Region Outlet	Goal Timeframe	Reduction Goal (Load)			Justification for Goal		
		Sediment <i>tons/year</i> (%)	Total Phosphorus <i>lbs./year</i> (%)	Total Nitrogen <i>lbs./year</i> (%)	Sediment	Total Phosphorus	Total Nitrogen
South Fork Watowan River	Short-term (10-year)	1,217 (4%)	1,316 (5%)	71,902 (15%)	1	2	1
	Long-term (>10-year)	12,168 (40%)	10,524 (40%)	239,672 (50%)	3	3	3

The following streams have been identified as key streams requiring restoration attention, as they do not currently meet Minnesota water quality standards for sediment, TP, TN, and/or *E. coli*. Two stream reach segments of the Watowan River (AUID 07020010-510, -511) fail to meet aquatic life or aquatic recreation standards due to low fish index of biotic integrity (F-IBI) and macroinvertebrate index of biotic integrity (M-IBI) scores and elevated concentrations of TSS and *E. coli*. Two reach segments of the South Fork Watowan River (-547, -569) do not meet aquatic life standards due to low F-IBI scores and elevated concentrations of TSS (-517 only). Two additional reaches (-517, -568) do not meet aquatic life or aquatic recreation standards due to low F-IBI and M-IBI scores, elevated concentrations of TSS (-517), and elevated concentrations of *E. coli* (-568). Spring brook (-540), Willow Creek (-571), two reaches of Judicial Ditch 1 (-579, -580), and an unnamed creek (-561) do not meet aquatic life standards due to low F-IBI and M-IBI scores, and one stream reach of Judicial Ditch 1 does not meet aquatic life or aquatic recreation standards (-581) due to a low F-IBI score and elevated *E. coli* concentrations. Bingham Lake (AUID 17-0007-00), Fish Lake (32-0018-03), and Long Lake (83-0040-00) are impaired for aquatic life due to low F-IBI scores. Bingham Lake is also impaired for aquatic recreation due to excess nutrients. Mary Lake (83-035-00) and Lake Three (17-0012-00) lack sufficient data to make an aquatic life or aquatic recreation determination.

- 1 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 2 - Goal was set equal to half of the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 3 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide goal

## SOUTH FORK WATONWAN RIVER PLANNING REGION: FEASIBLE STRUCTURAL AND MANAGEMENT PRACTICES



### Feasible Structural and Management Practices in the South Fork Watowan River Planning Region

Locations for structural and management practices are initially screened using a set of “practicability” criteria (e.g. minimum load reduction) and cost-effectiveness. The remaining technically feasible practices, summarized and shown in the table and map to the left, highlight those practices that fall within high sediment yield catchments in the South Fork Watowan River Planning Region. There are many more practices summarized here than can realistically be implemented. The number and type of practices which can be implemented is largely influenced by the amount of funding available, what measurable goal(s) are being pursued, and what practices are most locally accepted by the community for voluntary implementation. This large list of feasible practices is narrowed down by identifying what practices will be the focus of plan implementation efforts assuming funding for implementation largely remains unchanged from current levels. Cost-effectiveness of practices is determined by first estimating the total cost to install the practice and then factoring in the water quality benefit from that practice. The most cost-effective practices that meet all practicability criteria become part of the “Targeted Implementation Plan” shown on subsequent pages.

PTMApp Treatment Group	NRCS Practice Type(s)
Structural - Storage	Depressions Drainage Water Management Nutrient Removal Wetlands Water and Sediment Control Basins (WASCOBs)
Structural - Filtration	Contour Buffer Strip Multi-species Buffer
Structural - Biofiltration	Denitrifying Bioreactor Saturated Buffer
Structural - Infiltration	Multi-stage Ditch Infiltration Trench
Structural - Protection	Stiff Stemmed Grasses Grass Waterways Deep Rooted Vegetation Stream Bank Stabilization
Management - Source Reduction	Cover Crops and Conservation Tillage

### Feasible Structural and Management Practices

PTMApp Treatment Group (With Representative BMPs)	Practice Type		Number in Planning Region
	Structural	Management	
Storage (e.g. ponds, WASCOBs)	●		544
Filtration (e.g. filter strips, grassed waterways)	●		1,740
Biofiltration (e.g. denitrifying bioreactors, saturated buffers)	●		28
Infiltration (e.g. Multi-stage ditch, infiltration trench)	●		18
Protection (e.g. stream protection, critical area planting)	●		714
Source Reduction (e.g. cover crops, conservation tillage)		●	26,874 acres (1,193 practices)



**Management Practices Quick Summary:**

- Cover crops, tillage management, rotational grazing
- Targeted to areas of highest soil loss

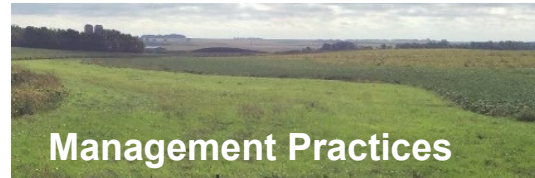


**Structural Practices Quick Summary:**

- WASCOBs, filter strips, ponds, and waterways
- Most cost-efficient over project life

# SOUTH FORK WATONWAN RIVER PLANNING REGION: MANAGEMENT PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation

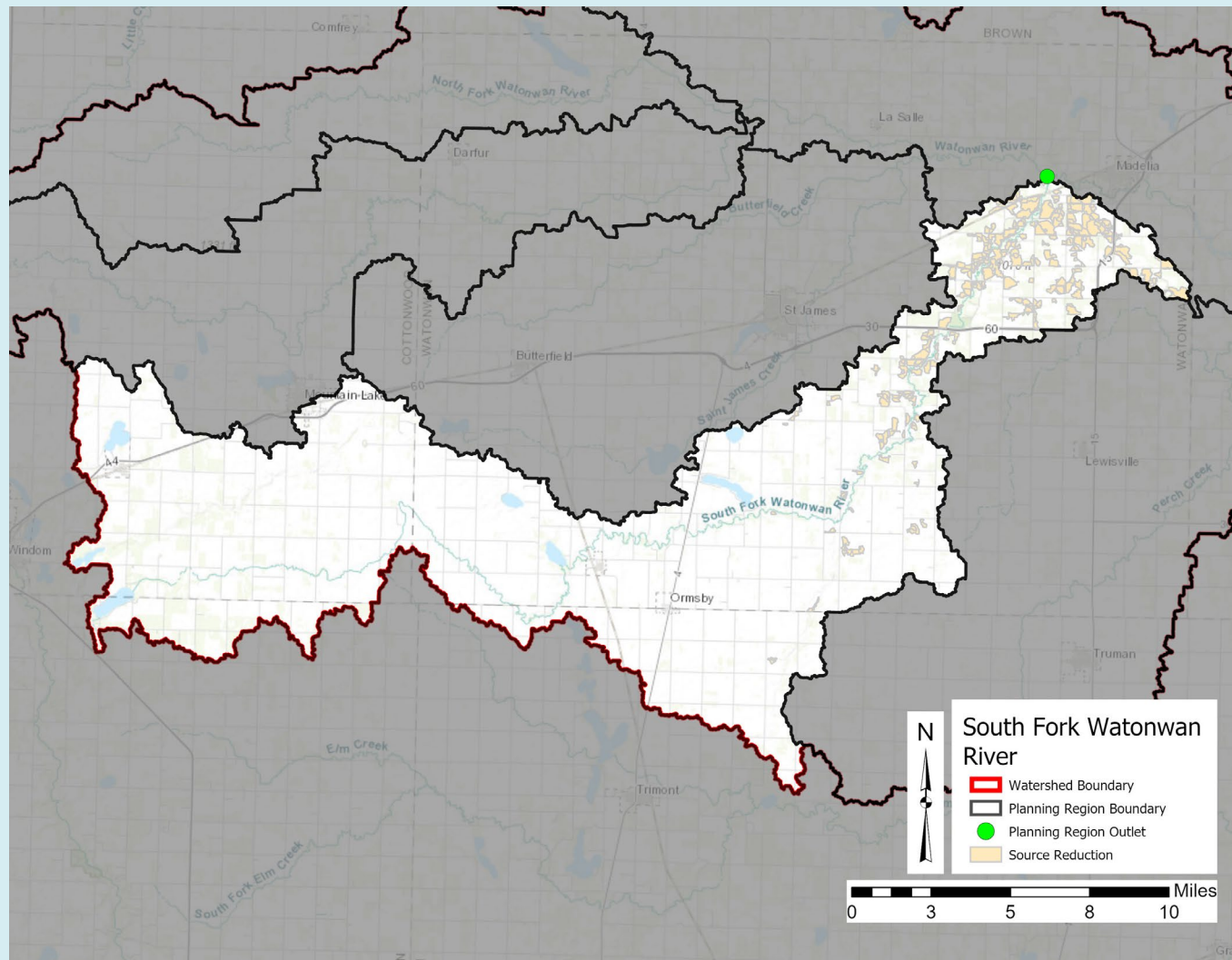


**Management Practices**

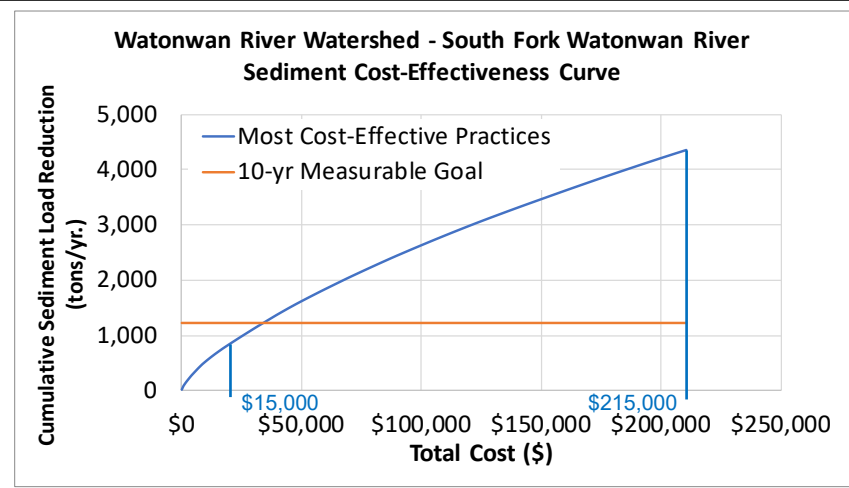
A total of 5,461 acres are suggested for targeted implementation of management (source reduction) practices in the South Fork Watowan River Planning Region targeted implementation approach.

Shown below are the locations on the landscape of the best, most cost-effective management practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these management practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (367 acres - 29 practices) and 10-yr. enhanced funding (all 5,461 acres) in the targeted implementation approach is shown by the blue line.



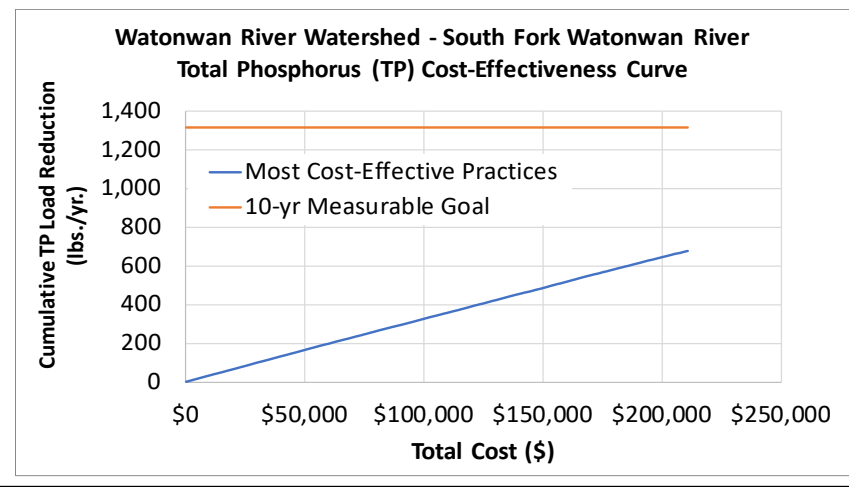
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

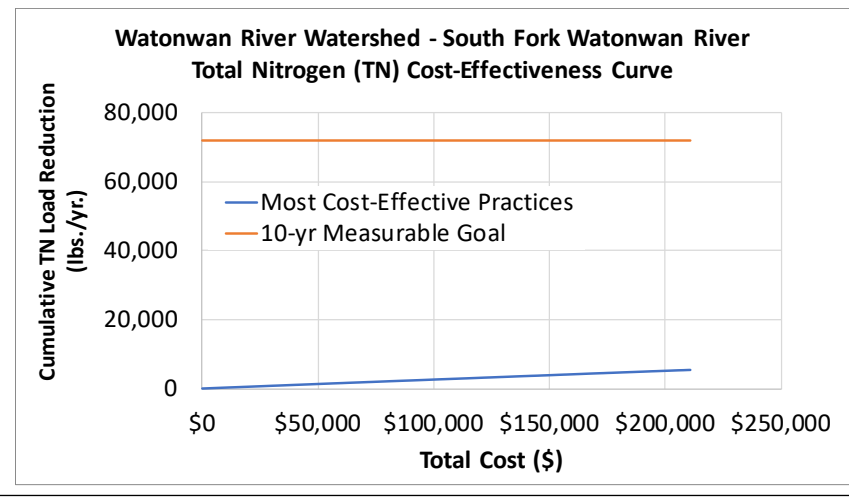
Existing Load: 30,420 tons/yr.  
Target Load Reduction: 1,217 tons/yr.  
Anticipated Load Reduction: 4,347 tons/yr.  
Anticipated Reduction: 14.3%  
Total Cost: \$215,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 26,310 lbs./yr.  
Target Load Reduction: 1,316 lbs./yr.  
Anticipated Load Reduction: 675 lbs./yr.  
Anticipated Reduction: 2.6%  
Total Cost: \$215,000



**10-yr Measurable Goal**

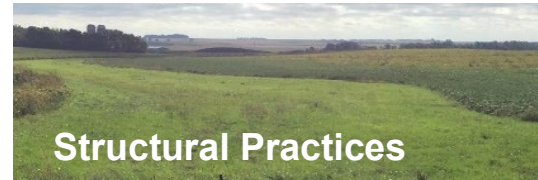
**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 479,344 lbs./yr.  
Target Load Reduction: 71,902 lbs./yr.  
Anticipated Load Reduction: 5,404 lbs./yr.  
Anticipated Reduction: 1.1%  
Total Cost: \$215,000



## SOUTH FORK WATONWAN RIVER PLANNING REGION: STRUCTURAL PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

### Locations for Targeting Implementation

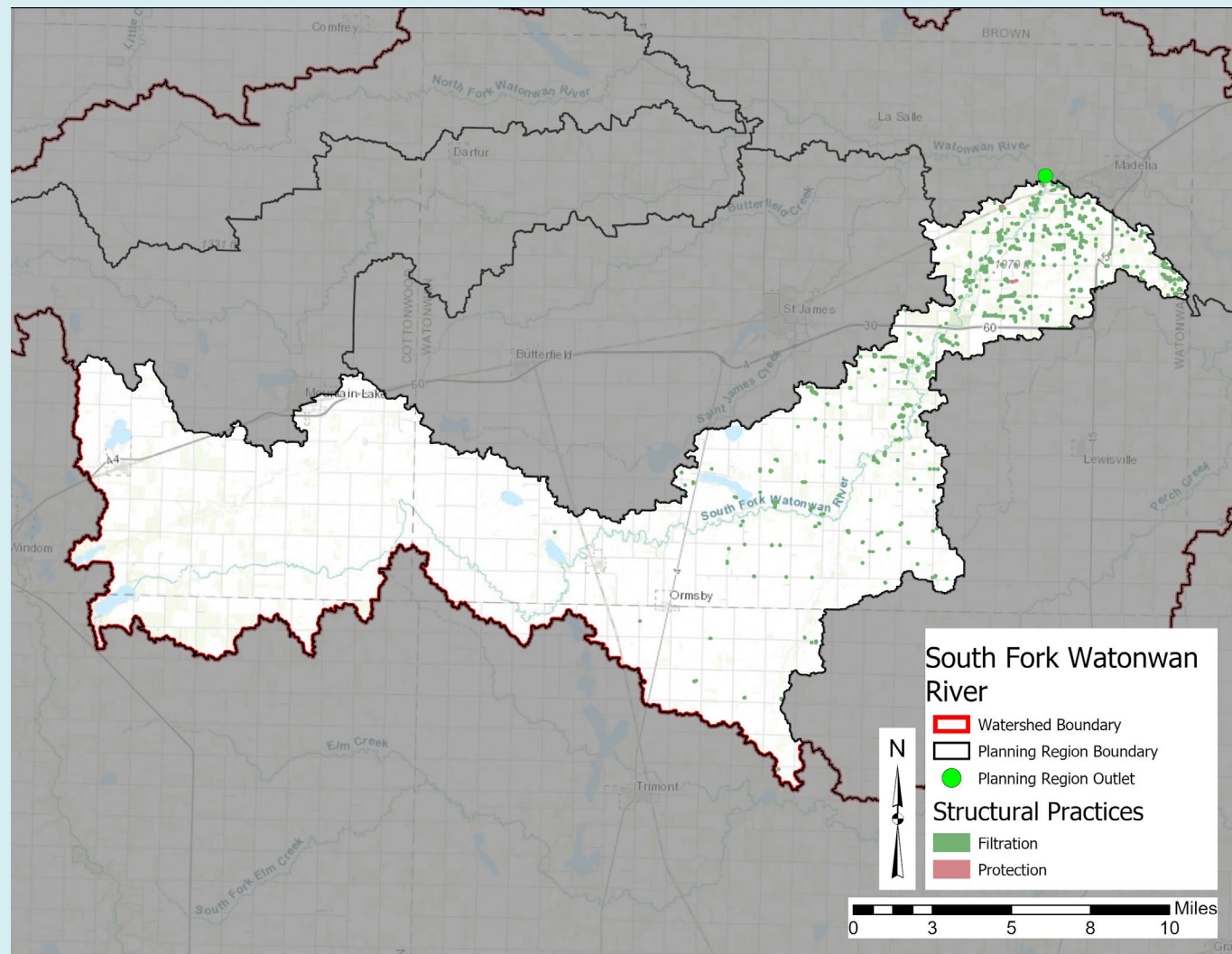


**Structural Practices**

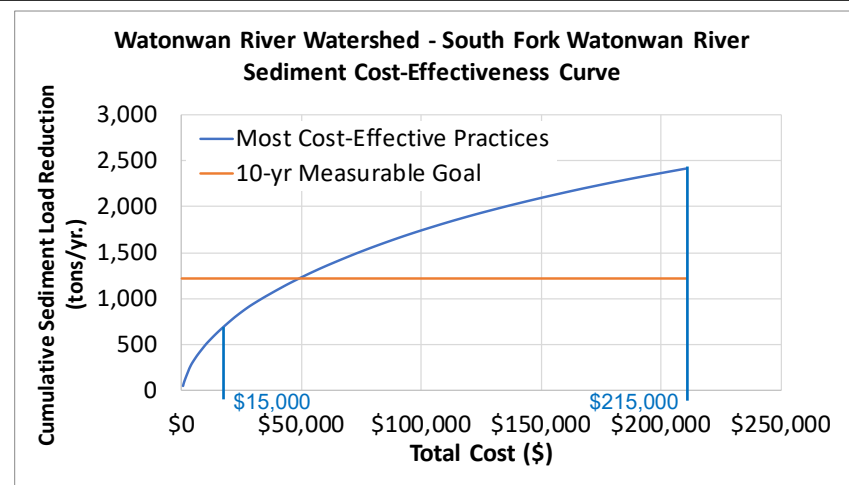
There are 323 structural practices suggested for targeted implementation in the South Fork Watowan River Planning Region targeted implementation approach: 321 filtration practices and 2 protection practices.

Shown below are the locations on the landscape of the best, most cost-effective practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these 323 structural practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (38 practices) and 10-yr. enhanced funding (all 323 practices) in the targeted implementation approach is shown by the blue line.



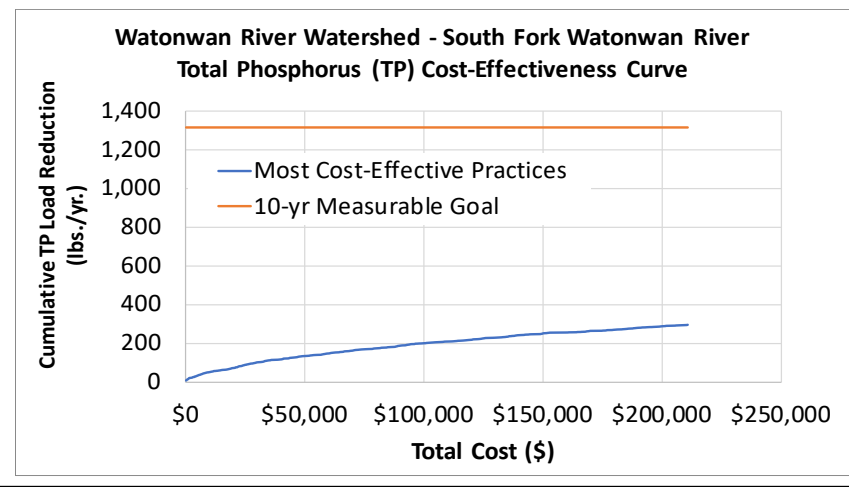
### Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

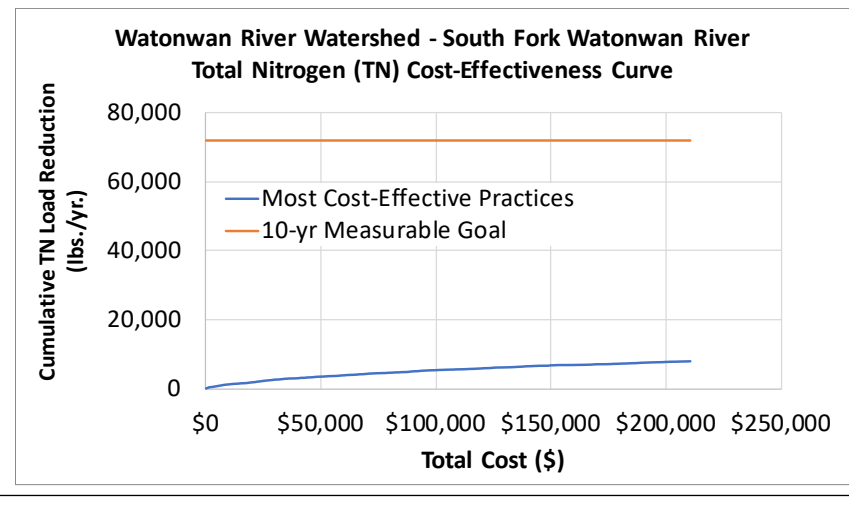
Existing Load: 30,420 tons/yr.  
Target Load Reduction: 1,217 tons/yr.  
Anticipated Load Reduction: 2,417 tons/yr.  
Anticipated Reduction: 7.9%  
Total Cost: \$215,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 26,310 lbs./yr.  
Target Load Reduction: 1,316 lbs./yr.  
Anticipated Load Reduction: 296 lbs./yr.  
Anticipated Reduction: 1.1%  
Total Cost: \$215,000



**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 479,344 lbs./yr.  
Target Load Reduction: 71,902 lbs./yr.  
Anticipated Load Reduction: 8,009 lbs./yr.  
Anticipated Reduction: 1.7%  
Total Cost: \$215,000



## PERCH CREEK PLANNING REGION: PLANNING REGION OVERVIEW

### Planning Region Priorities

The highest priority for implementation efforts are aimed at restoring impaired stream reaches and lakes as identified in Table 23 of WRW WRAPS (MPCA, 2020), protecting streams and lakes which are nearing impairment, restoring or protecting terrestrial and aquatic habitat with high species diversity and high conservation need as identified by the MNWAP wildlife action network, and protecting drinking water resources. Prioritized waterbodies are outlined in Section 5 and are shown in green on the right and described in detail beneath the map. Several areas near the headwaters of Perch Creek and the headwaters area of Spring Branch Creek are prioritized for habitat conservation.

### Goals used as the Basis for Practice Selection

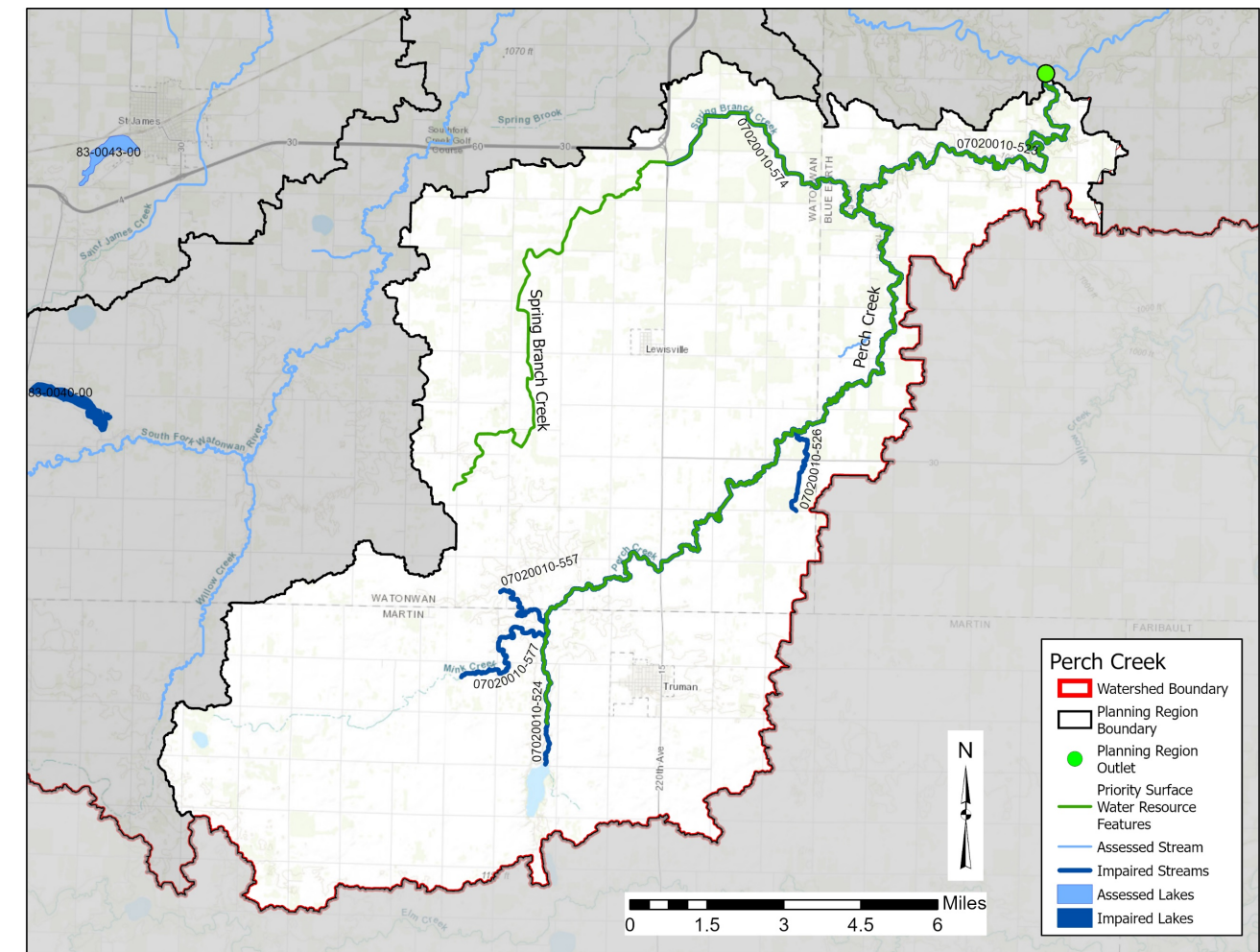
The goals used to select practices for this implementation plan focused primarily on reducing sediment, TP, and TN at the watershed outlet. Short-term sediment and nitrogen reduction goals align with the 10-yr targeted reduction from the Watonwan River Watershed WRAPS report. The short-term phosphorus reduction goal was set to half of the 10-yr targeted reduction from the Watonwan River Watershed WRAPS report. All long-term percent load reduction goals align with the goals from the WRAPS report.

Potential practices for improving water quality are chosen by first analyzing the feasibility of implementing various practices in different locations across the watershed. The probable beneficial progress that an upstream structural or management practice will make toward a water quality goal as measured at a priority resource point is then estimated. Any additional practical and/or social aspects (e.g. landowner willingness, existing practices, etc.) should be considered during implementation.

Planning Region Outlet	Goal Timeframe	Reduction Goal (Load)			Justification for Goal		
		Sediment <i>tons/year</i> (%)	Total Phosphorus <i>lbs./year</i> (%)	Total Nitrogen <i>lbs./year</i> (%)	Sediment	Total Phosphorus	Total Nitrogen
Perch Creek	Short-term (10-year)	1,286 (4%)	1,105 (5%)	60,209 (15%)	1	2	1
	Long-term (>10-year)	12,858 (40%)	8,841 (40%)	200,697 (50%)	3	3	3

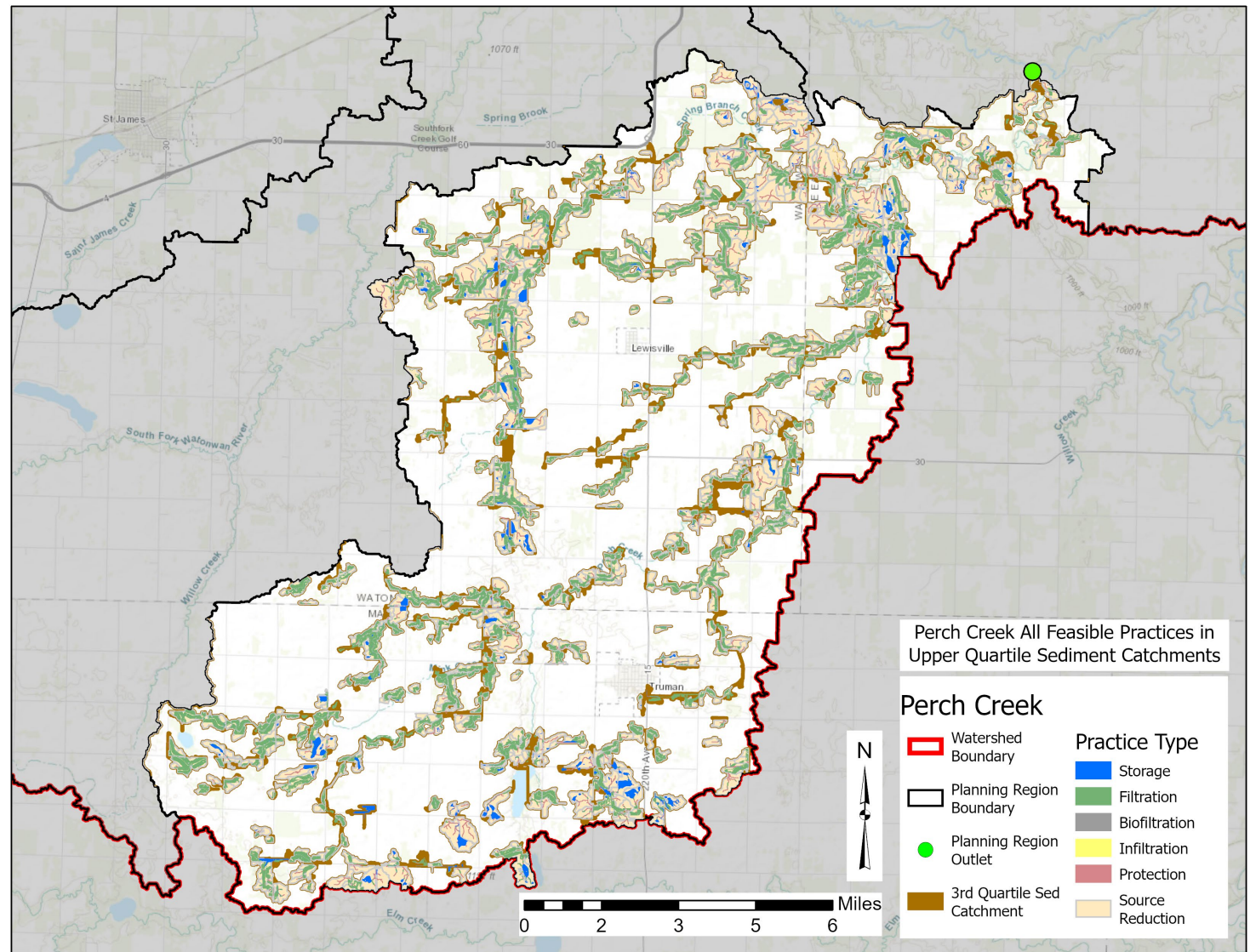
- 1 - Goal was set equal to the Watonwan River Watershed WRAPS watershed-wide 10-yr target
- 2 - Goal was set equal to half of the Watonwan River Watershed WRAPS watershed-wide 10-yr target
- 3 - Goal was set equal to the Watonwan River Watershed WRAPS watershed-wide goal

### Priority and Assessed Waterbodies



The following streams have been identified as key streams requiring restoration attention, as they do not currently meet Minnesota water quality standards for sediment, TP, TN, and/or *E. coli*. Two stream reach segments of Perch Creek (AUID 07020010-523, -524) do not meet aquatic life standards due to low fish index of biotic integrity (F-IBI) scores in both streams, and a low macroinvertebrate index of biotic integrity (M-IBI) score and elevated TSS (formerly turbidity) concentrations. Perch Creek reach -523 also does not meet aquatic recreation standards due to elevated concentrations of *E. coli*. Two unnamed streams (-526, -557) fail to meet aquatic life standards due to low F-IBI scores, with -526 also having a low M-IBI score. Spring Branch Creek (-574) does not meet water quality standards for aquatic life or aquatic recreation due to a low F-IBI score and elevated concentrations of *E. coli*, and Mink Creek (-577) does not meet aquatic life standards due to low F-IBI and M-IBI scores. Round Lake (46-0084-00) lacks sufficient data to make an aquatic life or aquatic recreation determination. Managing the landscape to reduce sediment, TP, and TN loading to the planning region outlet will begin the restoration process within the impaired waterbodies within the Perch Creek Planning Region.

## PERCH CREEK PLANNING REGION: FEASIBLE STRUCTURAL AND MANAGEMENT PRACTICES



### Feasible Structural and Management Practices in the Perch Creek Planning Region

Locations for structural and management practices are initially screened using a set of “practicability” criteria (e.g. minimum load reduction) and cost-effectiveness. The remaining technically feasible practices, summarized and shown in the table and map to the left, highlight those practices that fall within high sediment yield catchments in the Perch Creek Planning Region. There are many more practices summarized here than can realistically be implemented. The number and type of practices which can be implemented is largely influenced by the amount of funding available, what measurable goal(s) are being pursued, and what practices are most locally accepted by the community for voluntary implementation.

This large list of feasible practices is narrowed down by identifying what practices will be the focus of plan implementation efforts assuming funding for implementation largely remains unchanged from current levels. Cost-effectiveness of practices is determined by first estimating the total cost to install the practice and then factoring in the water quality benefit from that practice. The most cost-effective practices that meet all practicability criteria become part of the “Targeted Implementation Plan” shown on subsequent pages.

PTMApp Treatment Group	NRCS Practice Type(s)
Structural - Storage	Depressions
	Drainage Water Management
	Nutrient Removal Wetlands
	Water and Sediment Control Basins (WASCOBs)
Structural - Filtration	Contour Buffer Strip
	Multi-species Buffer
Structural - Biofiltration	Denitrifying Bioreactor
	Saturated Buffer
Structural - Infiltration	Multi-stage Ditch
	Infiltration Trench
Structural - Protection	Stiff Stemmed Grasses
	Grass Waterways
	Deep Rooted Vegetation
	Stream Bank Stabilization
Management - Source Reduction	Cover Crops and Conservation Tillage

### Feasible Structural and Management Practices

PTMApp Treatment Group (With Representative BMPs)	Practice Type		Number in Planning Region
	Structural	Management	
Storage (e.g. ponds, WASCOBs)	●		375
Filtration (e.g. filter strips, grassed waterways)	●		1,267
Biofiltration (e.g. denitrifying bioreactors, saturated buffers)	●		27
Infiltration (e.g. Multi-stage ditch, infiltration trench)	●		26
Protection (e.g. stream protection, critical area planting)	●		498
Source Reduction (e.g. cover crops, conservation tillage)		●	18,866 acres (929 practices)



**Management Practices Quick Summary:**

- Cover crops, tillage management, rotational grazing
- Targeted to areas of highest soil loss

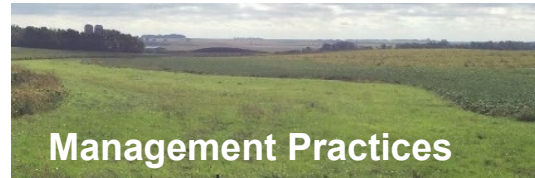


**Structural Practices Quick Summary:**

- WASCOBs, filter strips, ponds, and waterways
- Most cost-efficient over project life

## PERCH CREEK PLANNING REGION: MANAGEMENT PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

### Locations for Targeting Implementation

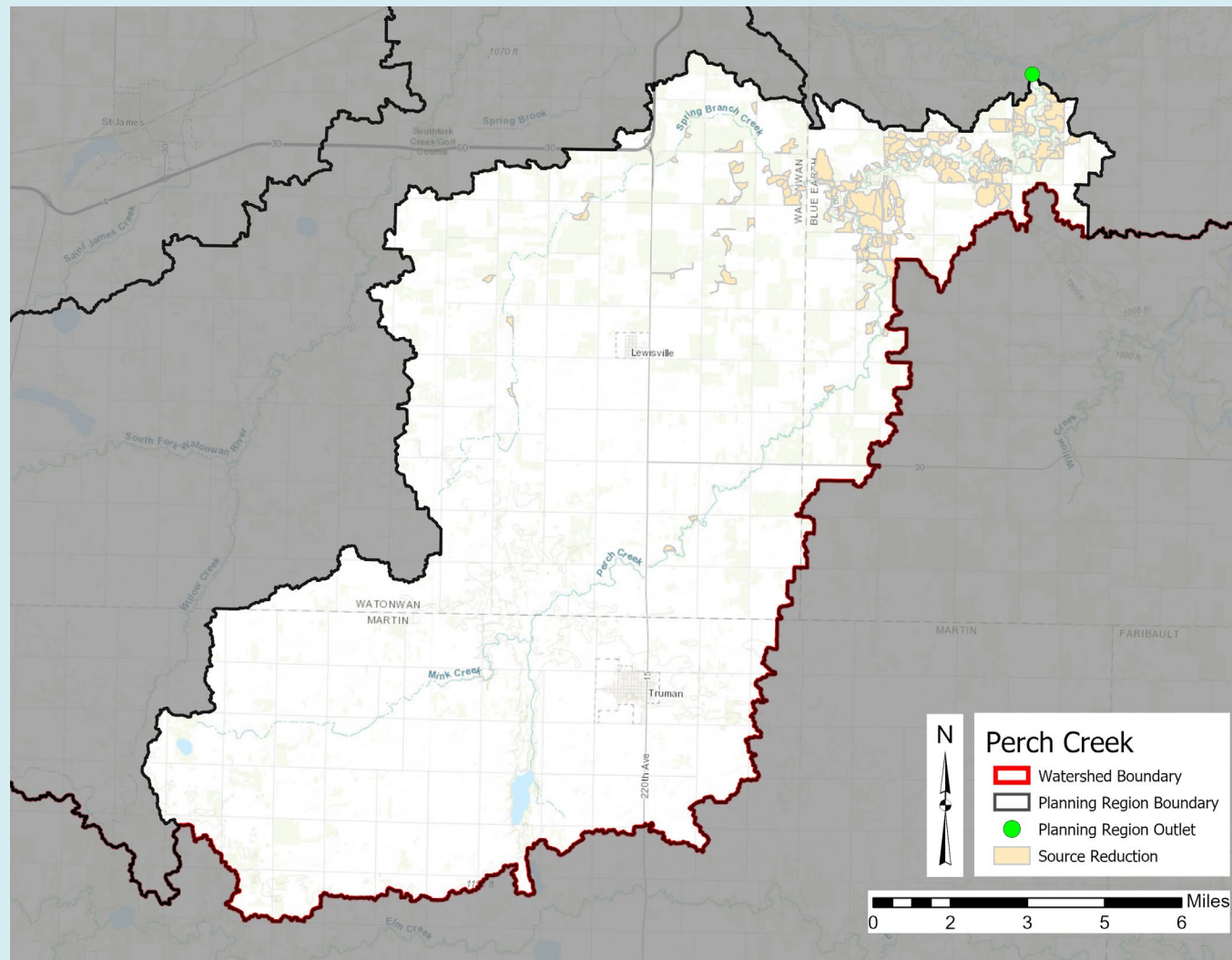


**Management Practices**

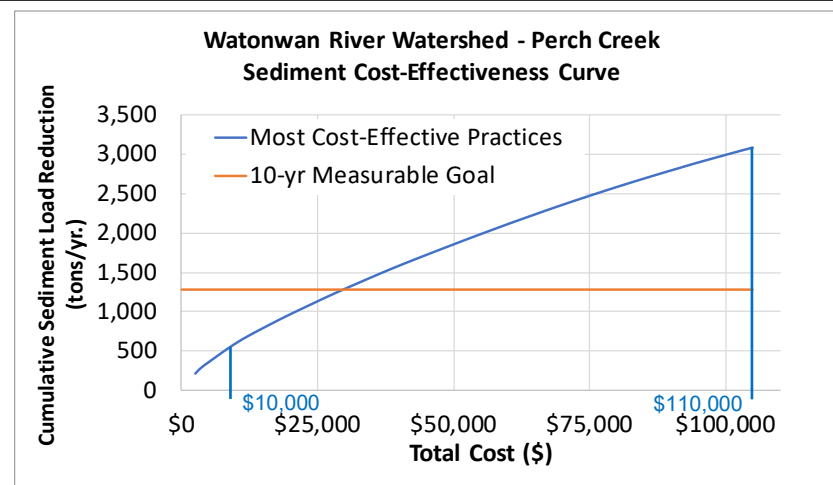
A total of 2,721 acres are suggested for targeted implementation of management (source reduction) practices in the Perch Creek Planning Region targeted implementation approach.

Shown below are the locations on the landscape of the best, most cost-effective management practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these management practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (125 acres - 7 practices) and 10-yr. enhanced funding (all 2,721 acres) in the targeted implementation approach is shown by the blue line.



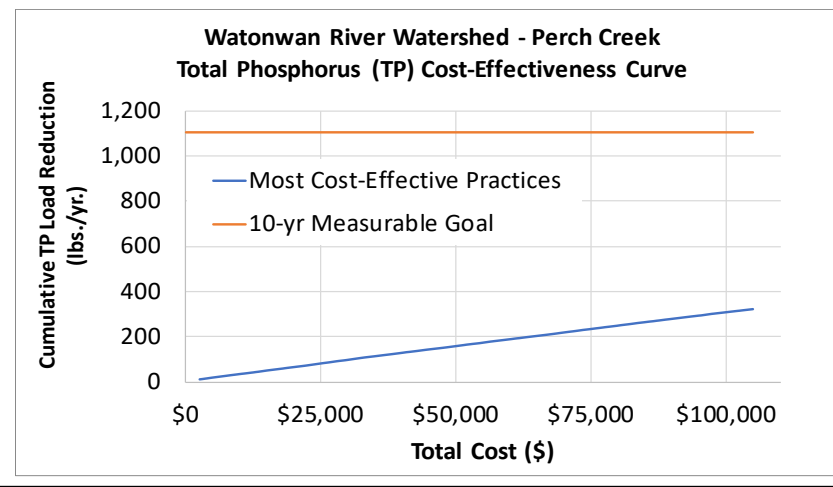
### Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

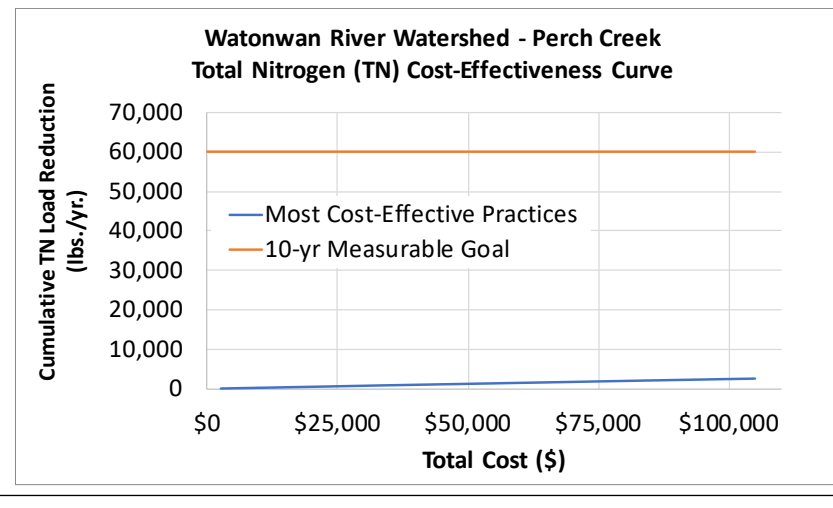
Existing Load: 32,145 tons/yr.  
Target Load Reduction: 1,286 tons/yr.  
Anticipated Load Reduction: 3,080 tons/yr.  
Anticipated Reduction: 9.6%  
Total Cost: \$110,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 22,103 lbs./yr.  
Target Load Reduction: 1,105 lbs./yr.  
Anticipated Load Reduction: 323 lbs./yr.  
Anticipated Reduction: 1.5%  
Total Cost: \$110,000



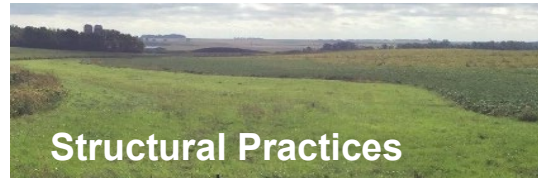
**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 401,392 lbs./yr.  
Target Load Reduction: 60,209 lbs./yr.  
Anticipated Load Reduction: 2,591 lbs./yr.  
Anticipated Reduction: 0.6%  
Total Cost: \$110,000

## PERCH CREEK PLANNING REGION: STRUCTURAL PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

### Locations for Targeting Implementation

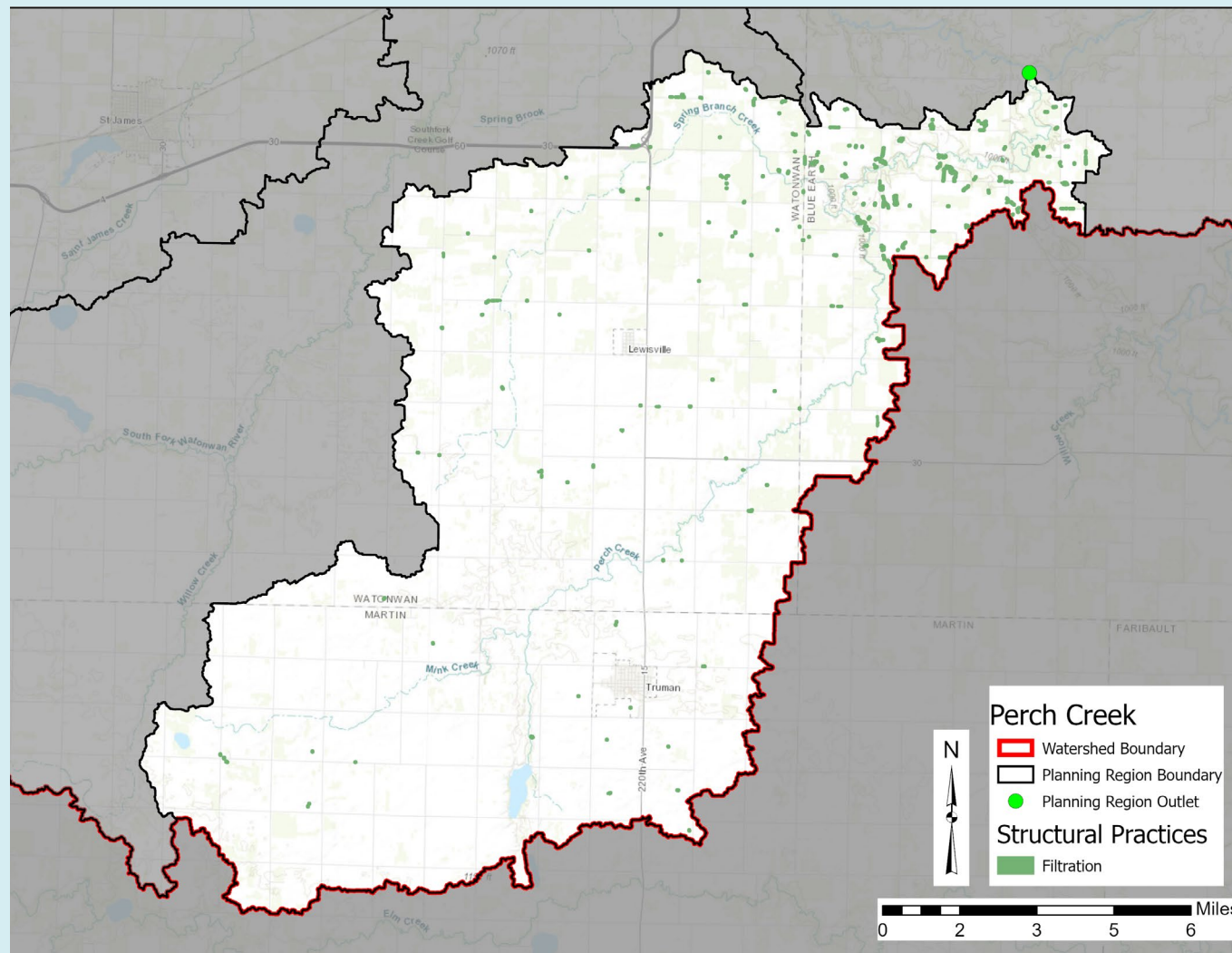


Structural Practices

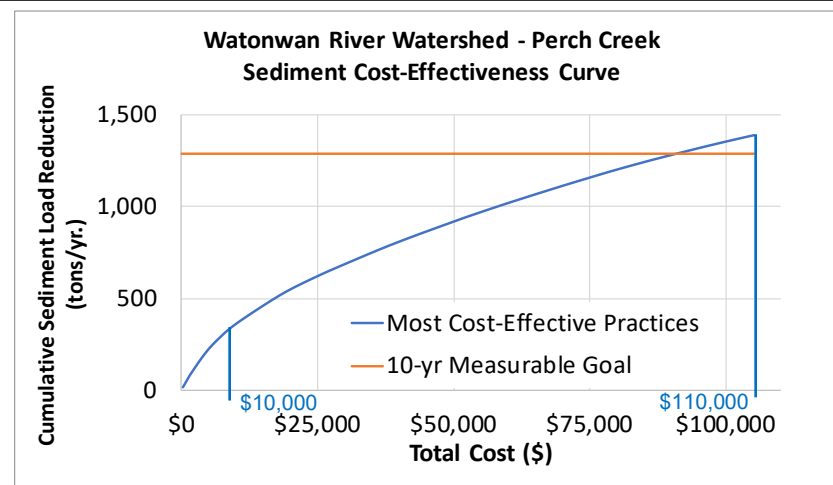
There are 174 structural practices suggested for targeted implementation in the Perch Creek Planning Region targeted implementation approach: 174 filtration practices.

Shown below are the locations on the landscape of the best, most cost-effective practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these 174 structural practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (12 practices) and 10-yr. enhanced funding (all 174 practices) in the targeted implementation approach is shown by the blue line.



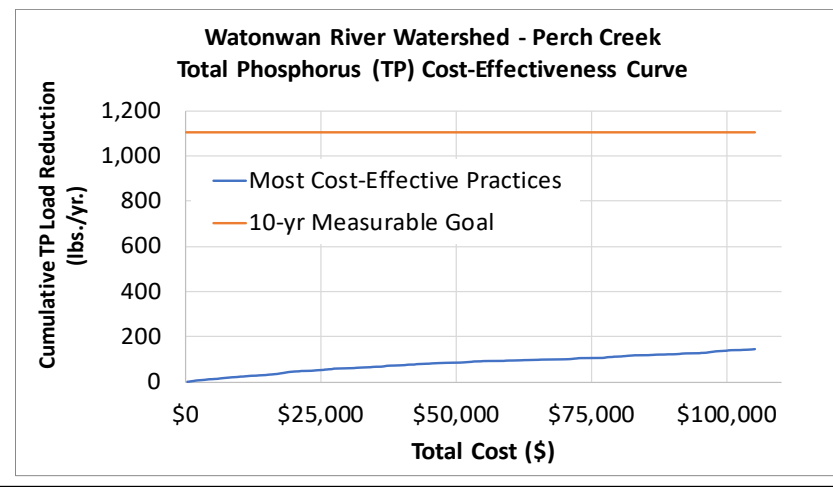
### Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

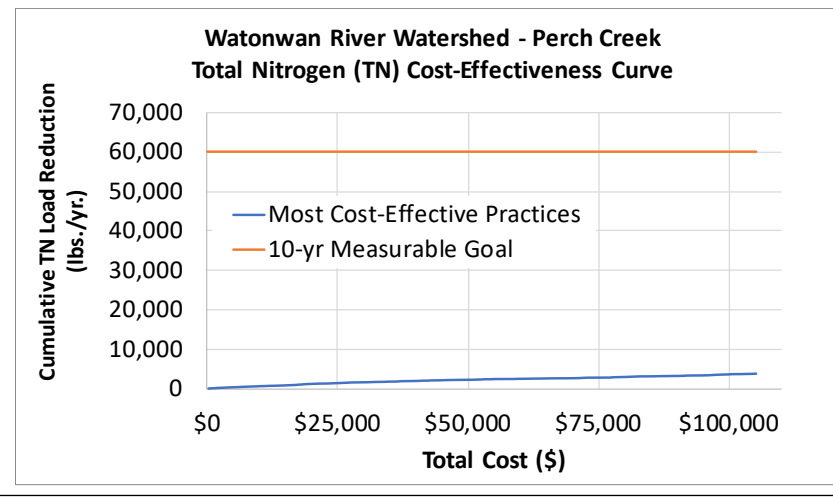
Existing Load: 32,145 tons/yr.  
Target Load Reduction: 1,286 tons/yr.  
Anticipated Load Reduction: 1,389 tons/yr.  
Anticipated Reduction: 4.3%  
Total Cost: \$110,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 22,103 lbs./yr.  
Target Load Reduction: 1,105 lbs./yr.  
Anticipated Load Reduction: 144 lbs./yr.  
Anticipated Reduction: 0.7%  
Total Cost: \$110,000



**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 401,392 lbs./yr.  
Target Load Reduction: 60,209 lbs./yr.  
Anticipated Load Reduction: 3,831 lbs./yr.  
Anticipated Reduction: 1.0%  
Total Cost: \$110,000

## PERCH CREEK PLANNING REGION: IMPLEMENTATION PROFILE

Action-Specific Goal	Output (Number of Practices)	Annual Budget (Rates are 1.25x average 2016 EQIP rates)	Responsibility - Lead (underlined> & Partner(s)	Timeline					PTMApp Practice Assessment of Goals			Multiple Benefits									
				2020-2021	2022-2023	2024-2025	2026-2027	2028-2029	Modeled Sediment Reduction (%)	Modeled TP Reduction (%)	Modeled TN Reduction (%)	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality and Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base	Stewardship (Urban, Rural, and Shoreland)
Management Practices - Prioritize and implement management BMPs that reduce the delivery of sediment and nutrient loads by decreasing surface water runoff (nutrient management, conservation tillage, etc.) <i>10-yr Baseline Funding (\$10,000)</i>	125 acres (7 practices)	\$ 1,000/year	<u>SWCD, NRCS, MDA, County</u>	Ongoing				1.1%	0.1%	0.0%		SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a	
<i>10-yr Enhanced Funding* (\$110,000)</i>	2,721 acres (135 practices)	\$ 11,000/year										SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a	
Structural Practices - Prioritize and implement structural BMPs that reduce the delivery of sediment and nutrient loads (WASCOBs, grassed waterways, filter strips, vegetative buffers, etc.) <i>10-yr Baseline Funding (\$10,000)</i>	12	\$ 1,000/year										SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a
<i>10-yr Enhanced Funding* (\$110,000)</i>	174	\$ 11,000/year										SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a				LS.2.1a
Easement Practices - Government acquisition of private land for the purpose of establishing conservation practices such as native plantings, tree planting, or wetland restoration (e.g. CCRP - temporary, CREP/RIM - permanent) <i>10-yr Baseline Funding (\$5,000)</i>	10 acres	\$ 500/year	<u>SWCD, NRCS, BWSR, County</u>	Ongoing							SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a	HR.2.1a			LS.2.1a	
<i>10-yr Enhanced Funding* (\$55,000)</i>	110 acres	\$ 5,500/year										SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW1.1a&b GW1.2a GW2.1a	HR.2.1a			LS.2.1a

\* Enhanced funding includes practices from 10-yr baseline funding.

## LOWER WATONWAN RIVER PLANNING REGION: PLANNING REGION OVERVIEW

### Planning Region Priorities

The highest priority for implementation efforts are aimed at restoring impaired stream reaches and lakes as identified in Table 23 of WRW WRAPS (MPCA, 2020), protecting streams and lakes which are nearing impairment, restoring or protecting terrestrial and aquatic habitat with high species diversity and high conservation need as identified by the MNWAP wildlife action network, and protecting drinking water resources. Impaired waterbodies are outlined in Section 5 and are shown in dark blue on the right and described in detail beneath the map. Several areas near the upper portion of the Watowan River within the planning region are prioritized for habitat conservation. A large area within the easternmost portion of the planning region is also a high priority for drinking water resource protection. This area also contains the Mankato Spill Management Area

### Goals used as the Basis for Practice Selection

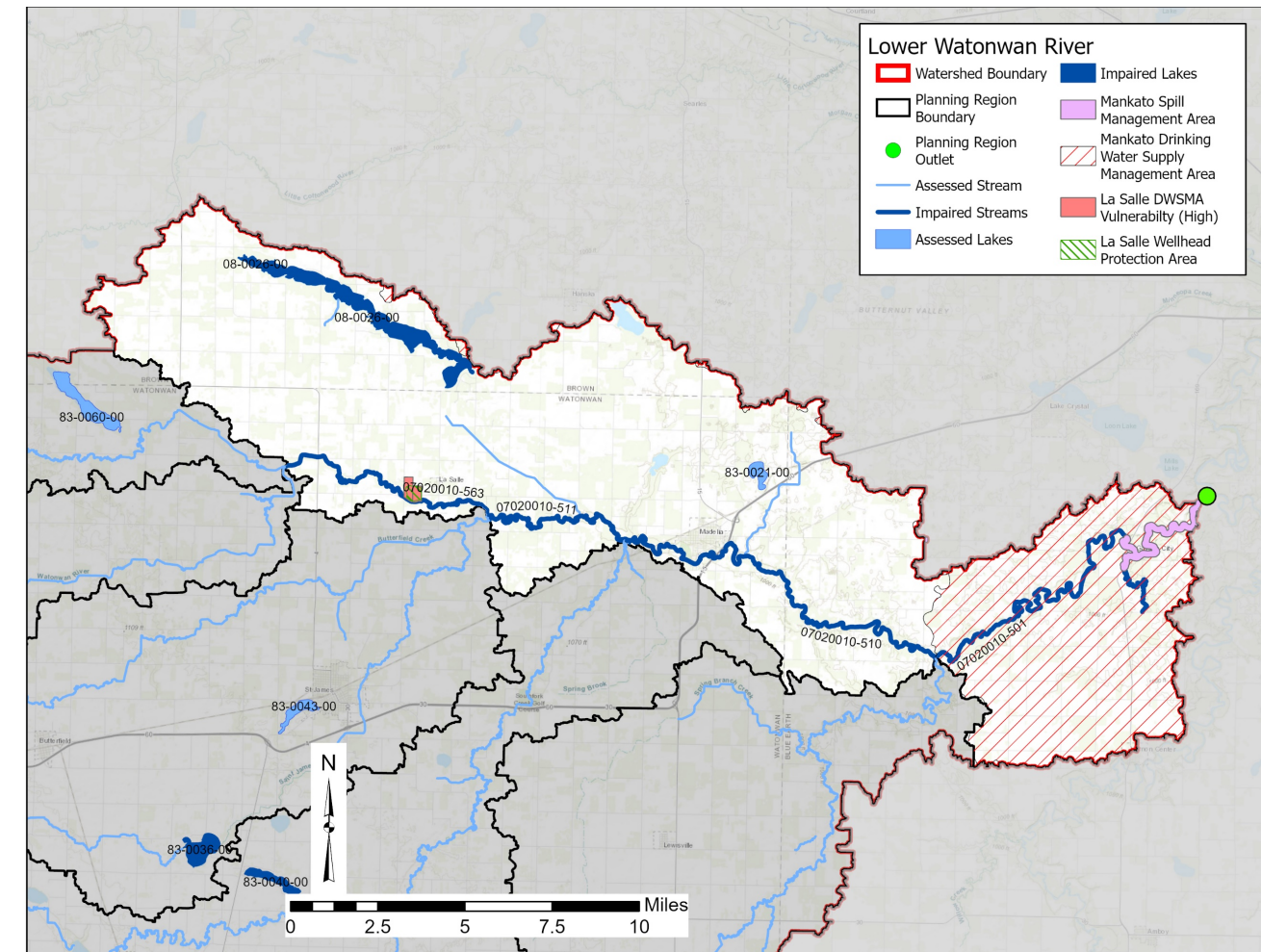
The goals used to select practices for this implementation plan focused primarily on reducing sediment, TP, and TN at the watershed outlet. Short-term sediment and nitrogen reduction goals align with the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. The short-term phosphorus reduction goal was set to half of the 10-yr targeted reduction from the Watowan River Watershed WRAPS report. All long-term percent load reduction goals align with the goals from the WRAPS report.

Potential practices for improving water quality are chosen by first analyzing the feasibility of implementing various practices in different locations across the watershed. The probable beneficial progress that an upstream structural or management practice will make toward a water quality goal as measured at a priority resource point is then estimated. Any additional practical and/or social aspects (e.g. landowner willingness, existing practices, etc.) should be considered during implementation.

Planning Region Outlet	Goal Timeframe	Reduction Goal (Load)			Justification for Goal		
		Sediment <i>tons/year</i> (%)	Total Phosphorus <i>lbs./year</i> (%)	Total Nitrogen <i>lbs./year</i> (%)	Sediment	Total Phosphorus	Total Nitrogen
Lower Watowan River	Short-term (10-year)	1,374 (4%)	1,214 (5%)	69,375 (15%)	1	2	1
	Long-term (>10-year)	13,742 (40%)	9,712 (40%)	231,251 (50%)	3	3	3

- 1 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 2 - Goal was set equal to half of the Watowan River Watershed WRAPS watershed-wide 10-yr target
- 3 - Goal was set equal to the Watowan River Watershed WRAPS watershed-wide goal

### Priority and Assessed Waterbodies



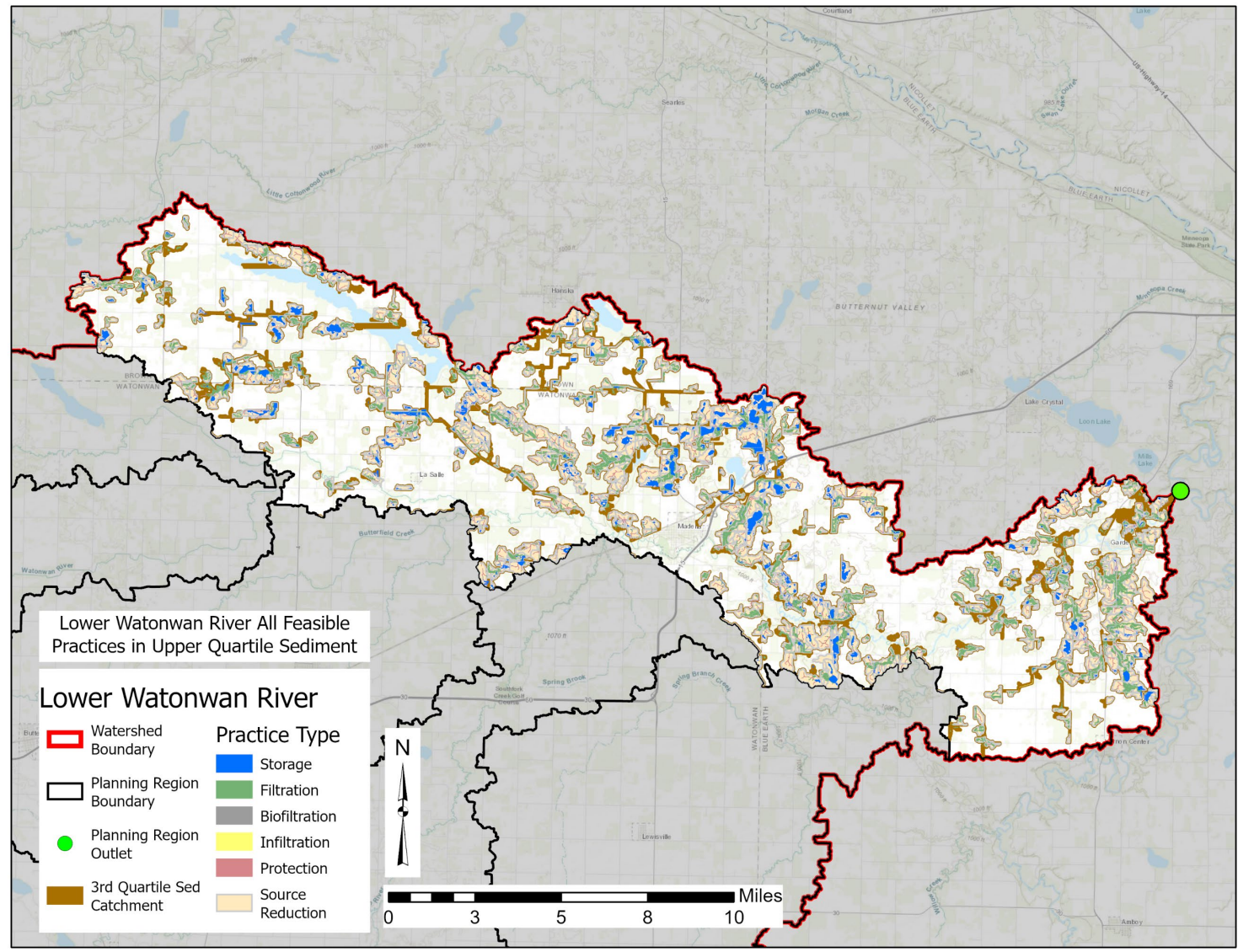
The following streams have been identified as key streams requiring restoration attention, as they do not currently meet Minnesota water quality standards for sediment, TP, TN, and/or *E. coli*. Five stream reach segment of the Watowan River (AUID 07020010-501, -510, -511, -562, -563) do not meet aquatic life or aquatic recreation standards due to elevated concentrations of *E. coli* and TSS, low fish index of biotic integrity (F-IBI) scores (-501, -510, -511, -562), low macroinvertebrate index of biotic integrity (M-IBI) scores (-501, -510, -511). County Ditch 78 (-559) fails to meet water quality standards for aquatic life due to low F-IBI and M-IBI scores.

Hanska Lake (AUID 08-0026-00) is impaired for aquatic life due to a low F-IBI score. Fedji Lake (83-0021-00) lacks sufficient data to make an aquatic life or aquatic recreation determination.

Managing the landscape to reduce sediment, TP, and TN loading to the planning region outlet will begin the restoration process within the impaired waterbodies within the Lower Watowan River Planning Region.



## LOWER WATONWAN RIVER PLANNING REGION: FEASIBLE STRUCTURAL AND MANAGEMENT PRACTICES



### Feasible Structural and Management Practices in the Lower Watowan River Planning Region

Locations for structural and management practices are initially screened using a set of “practicability” criteria (e.g. minimum load reduction) and cost-effectiveness. The remaining technically feasible practices, summarized and shown in the table and map to the left, highlight those practices that fall within high sediment yield catchments in the Lower Watowan River Planning Region. There are many more practices summarized here than can realistically be implemented. The number and type of practices which can be implemented is largely influenced by the amount of funding available, what measurable goal(s) are being pursued, and what practices are most locally accepted by the community for voluntary implementation. This large list of feasible practices is narrowed down by identifying what practices will be the focus of plan implementation efforts assuming funding for implementation largely remains unchanged from current levels. Cost-effectiveness of practices is determined by first estimating the total cost to install the practice and then factoring in the water quality benefit from that practice. The most cost-effective practices that meet all practicability criteria become part of the “Targeted Implementation Plan” shown on subsequent pages.

PTMAApp Treatment Group	NRCS Practice Type(s)
Structural - Storage	Depressions
	Drainage Water Management
	Nutrient Removal Wetlands Water and Sediment Control Basins (WASCOBs)
Structural - Filtration	Contour Buffer Strip
	Multi-species Buffer
Structural - Biofiltration	Denitrifying Bioreactor
	Saturated Buffer
Structural - Infiltration	Multi-stage Ditch
	Infiltration Trench
Structural - Protection	Stiff Stemmed Grasses
	Grass Waterways
	Deep Rooted Vegetation
	Stream Bank Stabilization
Management - Source Reduction	Cover Crops and Conservation Tillage

### Feasible Structural and Management Practices

PTMAApp Treatment Group (With Representative BMPs)	Practice Type		Number in Planning Region
	Structural	Management	
Storage (e.g. ponds, WASCOBs)	●		735
Filtration (e.g. filter strips, grassed waterways)	●		1,418
Biofiltration (e.g. denitrifying bioreactors, saturated buffers)	●		43
Infiltration (e.g. Multi-stage ditch, infiltration trench)	●		32
Protection (e.g. stream protection, critical area planting)	●		728
Source Reduction (e.g. cover crops, conservation tillage)		●	24,393 acres (941 practices)



**Management Practices Quick Summary:**

- Cover crops, tillage management, rotational grazing
- Targeted to areas of highest soil loss



**Structural Practices Quick Summary:**

- WASCOBs, filter strips, ponds, and waterways
- Most cost-efficient over project life

# LOWER WATOWAN RIVER PLANNING REGION: MANAGEMENT PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation

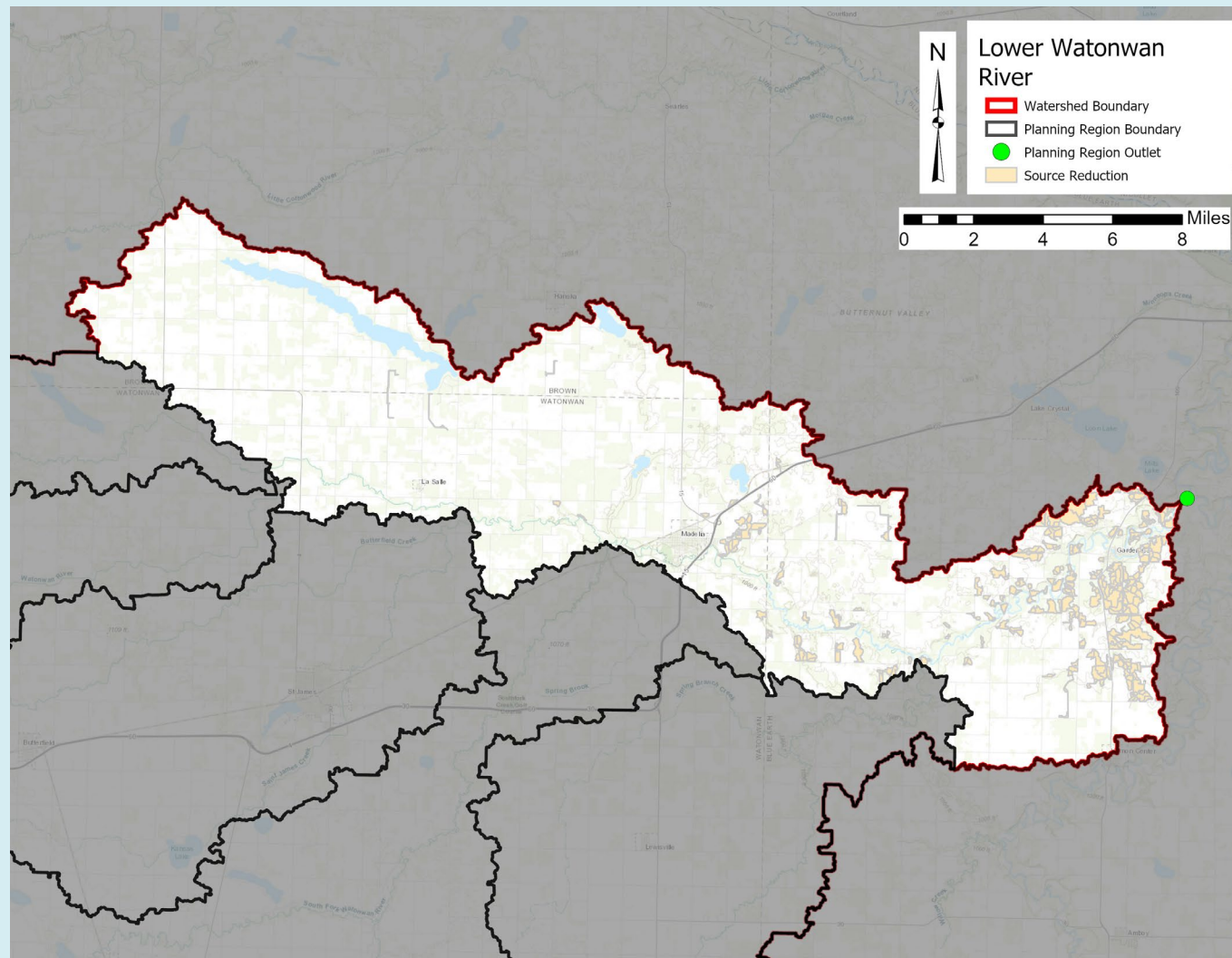


**Management Practices**

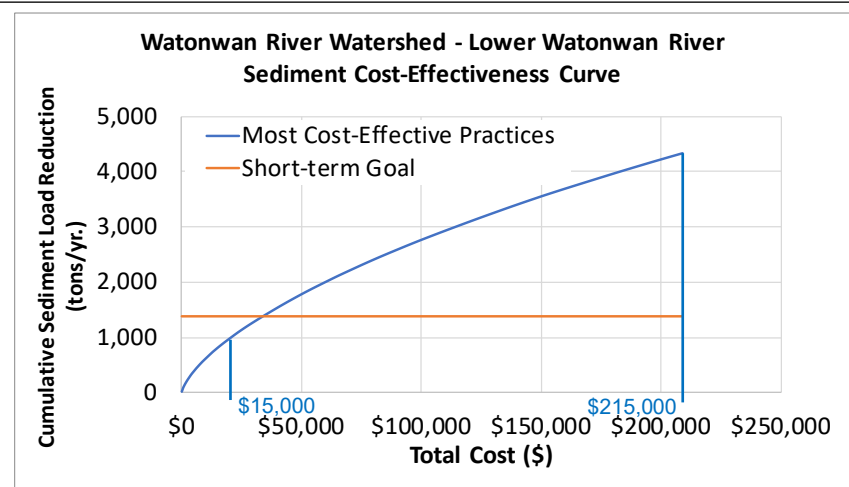
A total of 5,418 acres are suggested for targeted implementation of management (source reduction) practices in the Lower Watowan River Planning Region targeted implementation approach.

Shown below are the locations on the landscape of the best, most cost-effective management practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these management practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (375 acres - 32 practices) and 10-yr. enhanced funding (all 5,418 acres) in the targeted implementation approach is shown by the blue line.



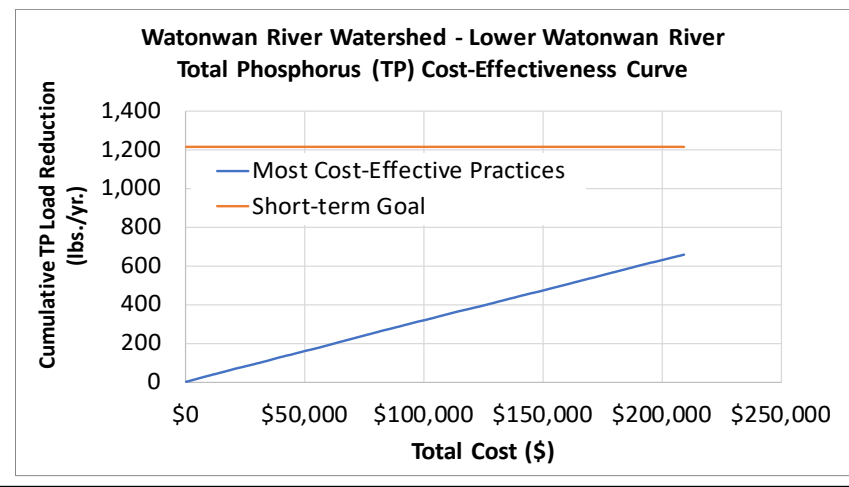
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ 4% Sediment 4% Reduction

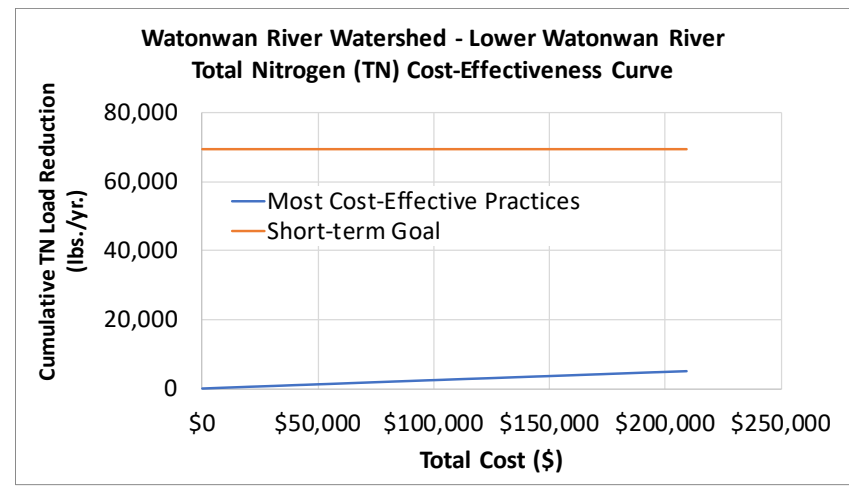
Existing Load: 34,355 tons/yr.  
Target Load Reduction: 1,374 tons/yr.  
Anticipated Load Reduction: 4,324 tons/yr.  
Anticipated Reduction: 12.6%  
Total Cost: \$215,000



**10-yr Measurable Goal**

**P** ↓ 5% Total Phosphorus 5% Reduction

Existing Load: 24,280 lbs./yr.  
Target Load Reduction: 1,214 lbs./yr.  
Anticipated Load Reduction: 655 lbs./yr.  
Anticipated Reduction: 2.7%  
Total Cost: \$215,000



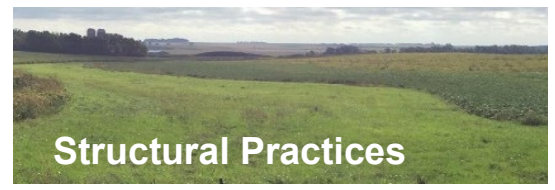
**10-yr Measurable Goal**

**N** ↓ 15% Total Nitrogen 15% Reduction

Existing Load: 642,502 lbs./yr.  
Target Load Reduction: 69,375 lbs./yr.  
Anticipated Load Reduction: 5,243 lbs./yr.  
Anticipated Reduction: 1.1%  
Total Cost: \$215,000

# LOWER WATONWAN RIVER PLANNING REGION: STRUCTURAL PRACTICES IN THE TARGETED IMPLEMENTATION PLAN

## Locations for Targeting Implementation

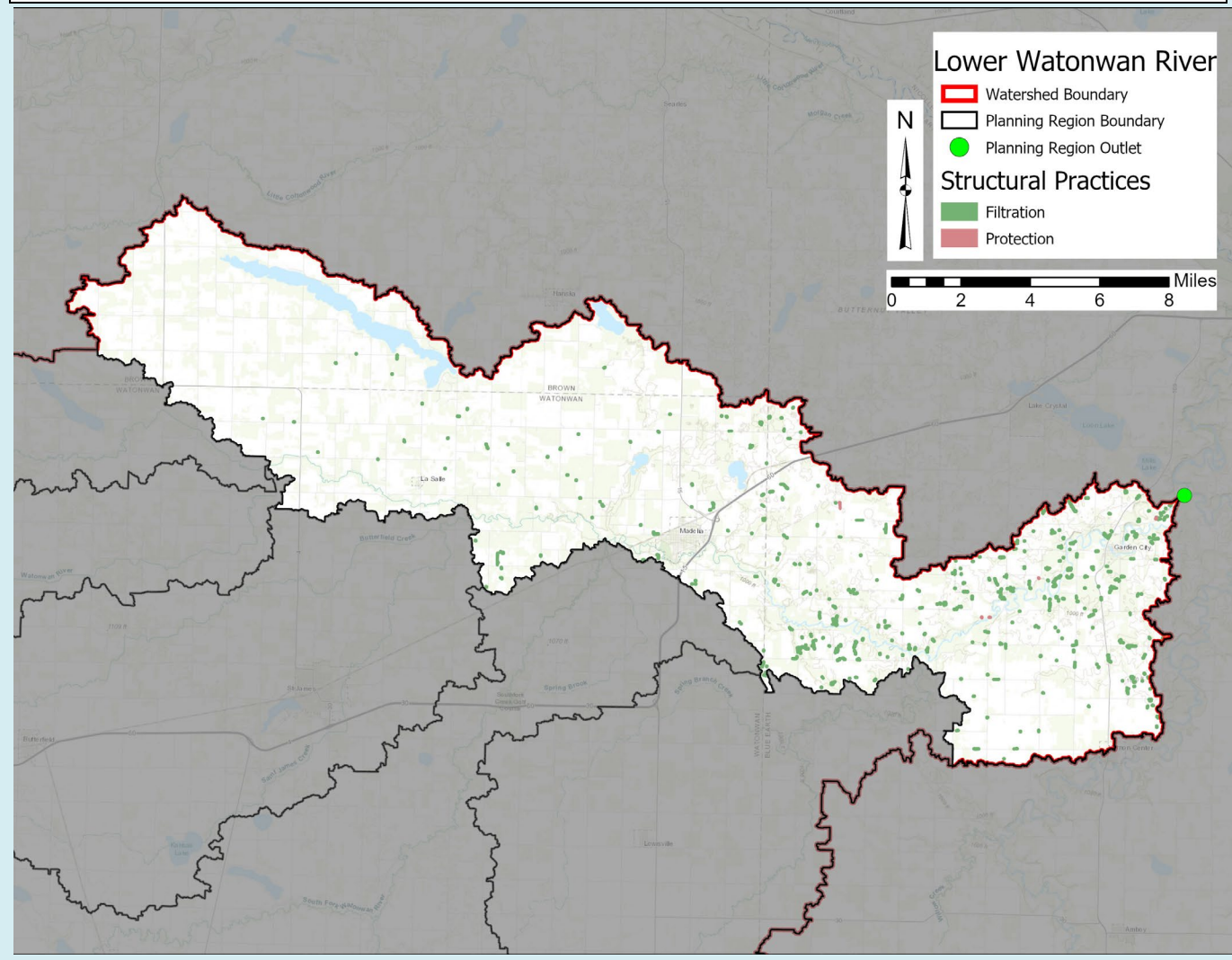


**Structural Practices**

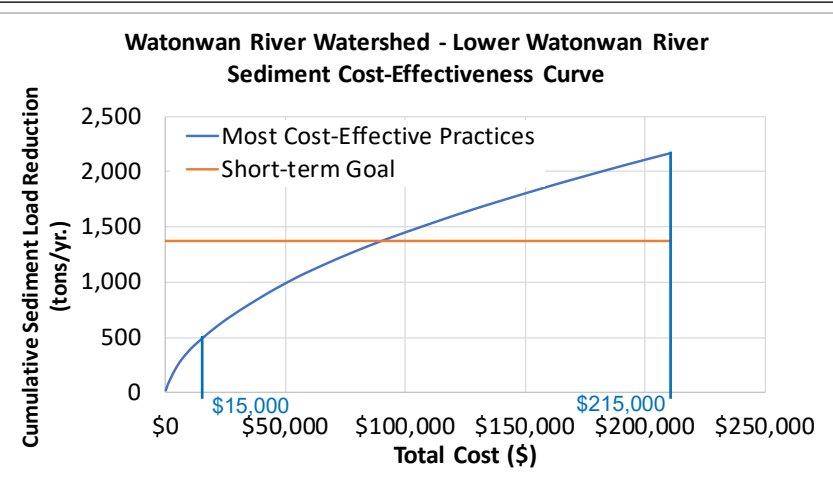
There are 313 structural practices suggested for targeted implementation in the Lower Watonwan River Planning Region targeted implementation approach: 308 filtration practices and 5 protection practices.

Shown below are the locations on the landscape of the best, most cost-effective practices for implementation. Practice locations shown do not consider existing practices or factors like landowner willingness.

Shown to the right are the anticipated costs and water quality value of implementing these 453 structural practices. The charts show the sediment, TP, and TN measurable goals (horizontal lines) for the planning region. Measurable progress towards goals based on 10-yr. baseline funding (42 practices) and 10-yr. enhanced funding (all 313 practices) in the targeted implementation approach is shown by the blue line.



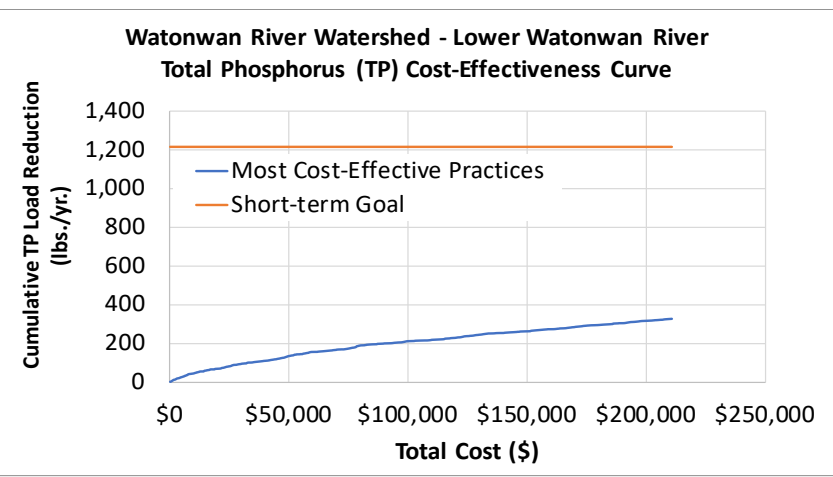
## Anticipated Progress Towards Goals from Implementation



**10-yr Measurable Goal**

**Clarity** ↓ **4%** Sediment **4%** Reduction

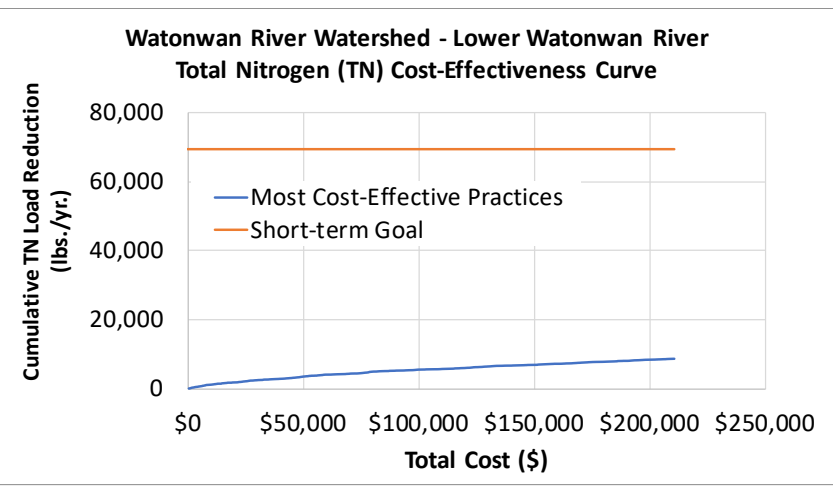
Existing Load: 34,355 tons/yr.  
Target Load Reduction: 1,374 tons/yr.  
Anticipated Load Reduction: 2,169 tons/yr.  
Anticipated Reduction: 6.3%  
Total Cost: \$215,000



**10-yr Measurable Goal**

**P** ↓ **5%** Total Phosphorus **5%** Reduction

Existing Load: 24,280 lbs./yr.  
Target Load Reduction: 1,214 lbs./yr.  
Anticipated Load Reduction: 328 lbs./yr.  
Anticipated Reduction: 1.3%  
Total Cost: \$215,000



**10-yr Measurable Goal**

**N** ↓ **15%** Total Nitrogen **15%** Reduction

Existing Load: 462,502 lbs./yr.  
Target Load Reduction: 69,375 lbs./yr.  
Anticipated Load Reduction: 8,904 lbs./yr.  
Anticipated Reduction: 1.9%  
Total Cost: \$215,000

## LOWER WATONWAN RIVER PLANNING REGION: IMPLEMENTATION PROFILE

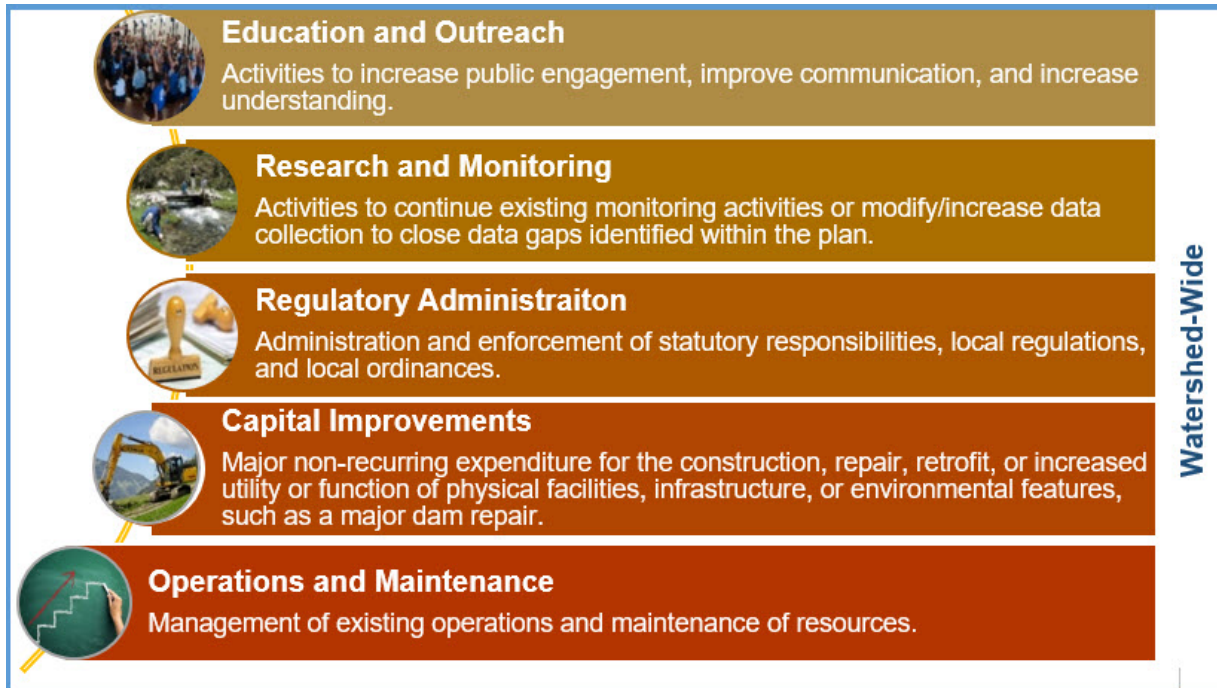
Action-Specific Goal	Output (Number of Practices)	Annual Budget (Rates are 1.25x average 2016 EQIP rates)	Responsibility - Lead (underlined> & Partner(s)	Timeline					PTMApp Practice Assessment of Goals			Multiple Benefits																
				2020-2021	2022-2023	2024-2025	2026-2027	2028-2029	Modeled Sediment Reduction (%)	Modeled TP Reduction (%)	Modeled TN Reduction (%)	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality and Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base	Stewardship (Urban, Rural, and Shoreland)							
Management Practices - Prioritize and implement management BMPs that reduce the delivery of sediment and nutrient loads by decreasing surface water runoff (nutrient management, conservation tillage, etc.) <i>10-yr Baseline Funding (\$15,000)</i>	375 acres (32 practices)	\$ 1,500/year	<u>SWCD</u> , NRCS, MDA, County	Ongoing				2.3%	0.2%	0.1%		SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW.1.1a&b GW.1.2a GW.2.1a				LS.2.1a								
<i>10-yr Enhanced Funding# (\$215,000)</i>	5,418 acres (261 practices)	\$ 21,500/year																	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b		SW.5.1a SW.5.2a&b	GW.1.1a&b GW.1.2a GW.2.1a				LS.2.1a	
Structural Practices - Prioritize and implement structural BMPs that reduce the delivery of sediment and nutrient loads (WASCOBs, grassed waterways, filter strips, vegetative buffers, etc.) <i>10-yr Baseline Funding (\$15,000)</i>	42	\$ 1,500/year														1.4%	0.2%	0.3%	SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW.1.1a&b GW.1.2a GW.2.1a				LS.2.1a
<i>10-yr Enhanced Funding# (\$215,000)</i>	313	\$ 21,500/year														6.3%	1.3%	1.9%	SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW.1.1a&b GW.1.2a GW.2.1a				LS.2.1a
Easement Practices - Government acquisition of private land for the purpose of establishing conservation practices such as native plantings, tree planting, or wetland restoration (e.g. CCRP - temporary, CREP/RIM - permanent) <i>10-yr Baseline Funding (\$10,000)</i>	20 acres	\$ 1,000/year	<u>SWCD</u> , NRCS, BWSR, County	Ongoing							SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW.1.1a&b GW.1.2a GW.2.1a	HR.2.1a				LS.2.1a							
<i>10-yr Enhanced Funding# (\$105,000)</i>	210 acres	\$ 10,500/year																	SW.1.1a	SW.2.1a SW.2.1b	SW.3.1a&b SW.3.2a&b	SW.4.1a	SW.5.1a SW.5.2a&b	GW.1.1a&b GW.1.2a GW.2.1a	HR.2.1a			LS.2.1a

# Enhanced funding includes practices from 10-yr baseline funding.

Planning Region	10-yr Baseline Funding				10-yr Enhanced Funding			
	Acres of Management Practices (PTMAApp Catchments)	Number of Structural Filtration Practices	Number of Structural Protection Practices	Acres of Easement Practices	Acres of Management Practices (PTMAApp Catchments)	Number of Structural Filtration Practices	Number of Structural Protection Practices	Acres of Easement Practices
North Fork Watowan River	181 (17)	21	0	10	2,688 (134)	183	0	110
Saint James Creek	470 (45)	51	0	20	6,825 (367)	452	1	270
Upper Watowan River	282 (28)	33	0	10	4,095 (196)	233	0	160
Perch Creek	125 (7)	12	0	10	2,721 (135)	174	0	110
Lower Watowan River	375 (32)	42	0	20	5,418 (261)	308	5	210
South Fork Watowan River	367 (29)	38	0	20	5,461 (246)	231	2	210
Watowan River Watershed	1,800 (158)	197	0	90	27,208 (1,339)	1,581	8	1,070

## 6.3 Watershed-Wide Implementation Efforts

Actions in the following categories are implemented watershed-wide, to ensure consistency and effectiveness at a watershed-scale.



Presented below are the targeted implementation schedules for the implementation of these watershed-wide actions within the Watowan River Watershed. Where it applies, the funding level column is defined as follows; B = Baseline Funding, E = Enhanced Funding, and C = Collaborative and Competitive (Col/Comp) Funding.

Table 6-5 Capital Improvements Program Implementation

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Responsibility - Lead (underlined> & Partner(s)	Timeline					Goal # by Resource Concern								
						2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base
CI-1	Support lake associations and other landowners in lake -based decision-making for lakes with high phosphorus loading..	See Section 7; Table 7-3			<u>County</u> , SWCD, DNR	Ongoing						SW.2.1a SW 2.1b							
CI-2	Stabilize and protect streams, rivers, and bluffs through restoration of straightened channels to decrease stream velocity, reduce flood impacts, and enhance recreational and fish and wildlife habitat value.	See Section 7; Table 7-3			<u>County</u> , SWCD	Ongoing							SW.3.1a SW.3.1b				HR.1.1a HR.1.1b		
CI-3	Implement livestock waste management systems and manage water using runoff control measures.	See Section 7; Table 7-3			<u>County</u> , SWCD, MDA	Ongoing							SW.3.2a SW.3.2b				GW.1.1a GW.1.1b		
CI-4	Protect and restore wetlands through programs as property tax credits, easements, and wetland bank sites. Restore and improve 500 acres of wetlands.	See Section 7; Table 7-3			<u>County</u> , SWCD, BWSR	Ongoing								SW.4.1a		GW.1.1a GW.1.1b			
CI-5	Repair, maintain, and implement additional flood storage practices, larger scale retention projects, larger scale floodplain culverts, and floodwater impoundments to address the most significant flooding contributors first based on outcome of future conditions hydrologic and hydraulic model.	See Section 7; Table 7-3			<u>County</u> , SWCD, City	Ongoing									SW.5.2a SW.5.2b				
CI-6	Address failing culverts and fish barriers through engagement with county public works, townships, and private landowners to accurately size bridges and culverts.	See Section 7; Table 7-3			<u>County</u> , SWCD, DNR	Ongoing											HR.1.1b		

Table 6-6 Research and Monitoring Program Implementation

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E, Co/Comp - C)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern									
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base	Stewardship (Urban, Rural, and Shoreland)
RM-1	Continue monitoring programs such as wellhead monitoring, volunteer rain gages, water sampling, and lake level monitoring.	Monitoring Programs	Ongoing Program	\$44,000	B	<u>County</u> , SWCD, DNR, MDA, MDH	Ongoing						SW.2.1a SW.2.1b SW.2.2a	SW.3.1a SW.3.1b SW.3.1c			GW.1.1a GW.1.1b GW.1.1c				
RM-2	Develop and maintain an aquatic invasive species database including the location of current populations, areas prone to invasion, and natural barriers to coordinate infestation management efforts, including (but not limited) to invasive carp, Eurasian Watermilfoil, Purple Loosestrife, zebra mussels, and Spiny Water Fleas.	AIS management plan / database	\$15,000	\$15,000	B	<u>County</u> , SWCD, DNR	Ongoing											HR.1.3a HR.1.3b			
RM-3	Target key landscapes and areas that should be priority for reducing runoff (i.e. steep slopes, highly erodible soils, etc.) utilizing PTMApp data outputs such as soil erodibility factor and length-slope factor variables from the revised universal soil loss equation (RUSLE), as well as available geologic/soils data.	Prioritization Study	\$10,000	\$10,000	B	<u>County</u> , SWCD	•	•													
RM-4	Prioritize feedlot inspections, regardless of size, in areas of greatest risk to pollution of water resources.	Prioritization Study	\$5,000	\$5,000	B	<u>County</u> , SWCD, MPCA	Ongoing									SW.5.1 a SW.5.2a SW.5.2b					LS.2.3a
RM-5	Prioritize areas with a high density of private wells, high pollution sensitivity, Mankato drinking water supply management area, and/or where there are known groundwater contaminants (e.g., wellhead protection areas, sensitive landscapes, etc.) to implement BMPs	Prioritization Study	\$5,000	\$5,000	B	<u>County</u> , SWCD, DNR, MDH, MDA, public water suppliers	•										GW.1.2a				



Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E, Col/Comp - C)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern								
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base
	that reduce the risk of contaminants in groundwater utilizing the Nitrogen Infiltration Risk analysis.																			
RM-6	Identify, prioritize and target structures needed to repair/replace or build to address the most significant flooding contributors first.	Prioritization Study	\$10,000	\$10,000	E	<u>SWCD</u> , County, DNR, City	•	•												
RM-7	Leverage existing or planned work while conducting watershed-wide source assessment of near-channel sediment loading (i.e., banks, bluffs, and ravines) and identify priority banks for stabilization BMPs.	1 assessment	\$75,000	\$75,000	E, C	<u>SWCD</u> , County	Ongoing							SW.3.4a						
RM-8	Pursue management activities to address terrestrial invasives of concern, including but not limited to early detection, control measures, and educational outreach campaigns.	Annual Management Expenditure	\$5,000	\$50,000	E, C	<u>County</u> , SWCD, DNR, MDA, Townships, City	Ongoing													HR.2.2a HR.2.2b
RM-9	Leverage existing or planned work to identify areas adjacent to existing public lands that contain wildlife habitat features (wetlands, floodplain, MBS biodiversity sites, priority shallow lakes, etc.) and prioritize to encourage enrollment in land set-aside programs.	Prioritization Study	\$10,000	\$10,000	E, C	<u>County</u> , SWCD, DNR		•							SW.3.3a					HR.2.1a
RM-10	Leverage existing or planned work while following DNR guidance for wood removal in riparian corridors at or below the ordinary high-water level. Above the ordinary high-water level will be covered by shoreland ordinance.	Resource	\$2,500	\$2,500	E, C	<u>DNR</u> , County, SWCD		•							SW.3.4a					HR 1.1a



Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E, Col/Comp - C)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern							
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation
	programs (i.e., Continuous CRP, RIM, CREP, reserve for wellhead protection, wetland banking, etc.) to improve wildlife habitat.																		
RM-14	Identify needed improvements to infrastructure relative to public accesses, trails, road maintenance, and signage to promote and increase use of publicly-owned lands.	Recreational infrastructure management plan	\$10,000	10000	C	<u>County</u> , DNR					Ongoing								HR.3.1a
RM-15	Identify and prioritize degraded lakeshore and upstream bank failure sites for BMP implementation to address lake nutrient and sediment loading.	1 Study	\$10,000	\$10,000	C	<u>SWCD</u> , County, DNR					Ongoing	SW.2.1a							
RM-16	Develop and apply resources to assess and estimate wetland loss.	1 Study	\$10,000	\$10,000	C	<u>County</u> , SWCD, DNR					Ongoing			SW.4.1a SW.4.1b					
RM-17	Identify, prioritize, and target areas where connectivity can be established through the creation of a water feature, installation of a new structure, or repair/replacement of an old structure.	Prioritization Study	\$5,000	\$5,000	C	<u>County</u> , SWCD, City, DNR					Ongoing			SW.3.3a					
RM-18	Identify and Prioritize aquifer recharge BMPs within identified DWSMAs.	Prioritization Study	\$5,000	\$5,000	C	<u>County</u> , SWCD, MDH, public water suppliers	•	•							GW.2.1a				

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E, Co/Comp - C)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern									
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base	Stewardship (Urban, Rural, and Shoreland)
RM-19	Start/complete the Geologic Atlas process for all counties	Geologic Atlas Per County	Estimate Partnership Cost	Cost per remaining County	C	<u>County</u> , SWCD, DNR, MGS	Ongoing										GW.2.1a				
RM-20	Identify and prioritize soil health practices in planning regions.	Prioritization Study	<i>N/A: Existing PMTApp Data</i>		N/A	<u>County</u> , SWCD, DNR, MGS	•									GW.2.1a					
RM-21	Monitor and document the details of each flood event that results in damages.	<i>N/A: Existing Budget</i>			N/A	<u>County</u> , SWCD, City, DNR	Ongoing							SW 3.1a SW 3.2b		SW.5.3					
				Total 10-Year Costs (\$)	546,500																

**Table 6-7 Education and Outreach Program Implementation**

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline – B, Enhanced – E)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern							
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation
EO-1	Complete 100 visits annually to local landowners to encourage enrollment in state and federal programs to preserve and restore wetlands.	100 visits/year	\$150/visit; \$15,000/year	\$150,000	B	<u>SWCD</u> , County	Ongoing					SW.4.1b							
EO-2	Conduct property stewardship visits to discuss BMP implementation with interested property owners.	5 comprehensive site visits/year	\$500/visit	\$25,000	B	<u>SWCD</u> , County, City, MDA	Ongoing										LKB.1.1a LKB.1.1b		
EO-3	Provide technical assistance to bring 75% of SSTS into compliance.	Ongoing Marketing	\$2,000/year	\$20,000	B	<u>County</u> , <u>SWCD</u> , MPCA, MDA	Ongoing											LS.2.2a	
EO-4	Conduct property landowner awareness visits to foster understanding of BMPs and environmental conservation.	10 site visits/year	\$150/visit	\$15,000	B	<u>SWCD</u> , County, City, MDA	Ongoing										LKB.1.1a LKB.1.1a		
EO-5	Develop an outreach plan to coordinate the educational and outreach efforts consistent with the goals of this plan.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>SWCD</u> , County, City	Ongoing										LKB.1.1a		
EO-6	Provide outreach to property owners about riparian and shoreland BMPs.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>SWCD</u> , County, DNR	Ongoing											LS.3.1a	
EO-7	Conduct 1 educational outreach effort annually to highlight watershed livestock BMP and SSTS incentive programs.	1 outreach effort/year	\$1,000/outreach effort	\$10,000	B	<u>County</u> , <u>SWCD</u> , City	Ongoing					SW.3.2c		GW.1.1c					

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern							
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation
EO-8	Explore and promote protection and restoration of wetlands through such programs as property tax credits, easements, and establishment of wetland bank sites.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>SWCD</u> , County, BWSR	Ongoing							SW.4.1b					
EO-9	Increase the number of farmers enrolled in the Nutrient Management Initiative Program to evaluate nutrient management practices.	Number of enrollments/year	\$1,000/year	\$10,000	B	<u>County</u> , SWCD, MDA	Ongoing								GW.1.1c				
EO-10	Hold 1 water testing outreach effort annually to determine nitrate concentrations in irrigation water.	1 outreach effort/year	\$1,000/outreach effort	\$10,000	B	<u>County</u> , SWCD, MDA, MDH	Ongoing								GW.1.1c				
EO-11	Provide information to private well users about local drinking water quality and well testing opportunities: Coliform Bacteria (every year); Nitrate (every other year); Arsenic (at least once); Lead (at least once); Manganese (at least once). Conduct outreach to enhance the public's understanding of Contaminants of Emerging Concern (CEC) by communicating the health impacts and exposure potential of emerging contaminants in drinking water.	2 well testing clinic/year	\$1,000/clinic	\$10,000	B	<u>County</u> , SWCD, MDH	Ongoing								GW.1.2b				
EO-12	Work with County Emergency Management Staff, City Staff, and affected landowners to educate the community and build awareness regarding extreme weather events.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>SWCD</u> , County	Ongoing							SW.5.3a					

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern									
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base	Stewardship (Urban, Rural, and Shoreland)
EO-13	Maintain and expand set-aside acres in sensitive areas, including areas in publicly supported conservation programs like CRP, from being converted to higher intensity uses.	# of Set-Aside Acres	\$1,000/year	\$10,000	B	<u>County</u> , SWCD, USDA Farm Service Agency	Ongoing										GW.2.1b				
EO-14	Promote and encourage the adoption of irrigation water management BMPs that increase water conservation.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>MDA</u> , SWCD, DNR	Ongoing										GW.2.1b				
EO-15	Engage county public works, townships and private landowners in prioritizing and replacing failing culvert/ barriers that impact aquatic life as identified in county CIPs (including technical assistance and design standards).	1 outreach effort/year	\$1,000/ outreach effort	\$10,000	B	<u>County</u> , Townships, SWCD	•	•	•											HR.1.1b	
EO-16	Promote BMPs that increase perennial native vegetation in riparian areas to provide connections between fragments, expand riparian access and increase riparian cover.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>County</u> , SWCD	Ongoing													HR.1.1a	
EO-17	Annually complete outreach efforts to describe opportunities to improve water quality while maintaining drainage capacity.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>County</u> , SWCD, Drainage Authority	Ongoing					SW.1.1a									
EO-18	Support lake associations and other landowners in lake-based decision making.	Ongoing Marketing	\$1,000/year	\$10,000	B	<u>SWCD</u> , County, DNR	Ongoing						SW.2.1a SW.2.1b								
EO-19	Request and work with MN DNR to hold 2 public outreach efforts to discuss lake level management.	2 outreach efforts/year	\$1,000/ outreach effort	\$2,000	B	<u>SWCD</u> , County, DNR, Lake Associations	Ongoing						SW.2.1a SW.2.1b								

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern								
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Local Knowledge Base
EO-20	Form committee to explore collaborative efforts in dealing with aquatic invasive species including education, control, rapid response, and inspections.	<i>N/A: Existing Staff Time</i>			B	<u>County</u> , SWCD, DNR	•													
EO-21	Generate and provide supporting educational and outreach materials consistent with the goals of this plan.	Ongoing Marketing	\$1,000/year	\$50,000	E	<u>SWCD</u> , County, City	Ongoing												LKB.1.2a	
EO-22	Conduct outreach and host educational programs to increase the adoption of conservation practices and soil health practices to highlight available assistance technical and financial assistance to implement these practices.	2 outreach efforts/year	\$1,000/outreach effort	\$20,000	E	<u>SWCD</u> , County	Ongoing									SW.5.1b SW.5.2c				
EO-23	Coordinate opportunities for local field days, training and outreach for farmers, co-ops, and crop consultant; include state and federal agency resource partners to facilitate outreach efforts. Focus on land-water relationship concepts, alternative nitrogen management practices, soil health, second crops and other conservation, land stewardship practices that provide long-term sustainable solutions to protect groundwater quality and quantity.	2 outreach efforts	\$1,000/outreach effort	\$20,000	E	<u>SWCD</u> , County, MDH, MDA	Ongoing									SW.5.1b SW.5.2c	GW.2.1b			
EO-24	Conduct 2 educational outreach efforts annually about water quantity and community resilience to extreme weather events.	2 outreach efforts/year	\$1,000/outreach effort	\$20,000	E	<u>County</u> , SWCD, Cities	Ongoing									SW.5.3a				



Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Funding Level (Baseline - B, Enhanced - E)	Responsibility - Lead (underlined) & Partner(s)	Timeline					Goal # by Resource Concern						
							2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)
EO-25	Educate the public about invasive species infestations and how to prevent further spread.	2 outreach efforts/year	\$1,000/ outreach effort	\$20,000	E	<u>SWCD</u> , County, DNR	Ongoing									HR.1.3a HR.1.3b HR.2.2b		
EO-26	Work with 1 community annually to implement urban stormwater BMPs to address peak flow rates, sediment, and nutrient loading.	1 community/ year	\$2,000/year	\$20,000	E	<u>City</u> , County, SWCD, MPCA	Ongoing											LS.1.1b
EO-27	Conduct outreach efforts on the fragmentation of high-quality habitat and voluntary conservation programs to restore these habitats.	2 outreach efforts/year	\$1,000/ outreach effort	\$20,000	E	<u>SWCD</u> , County, DNR	Ongoing								HR.2.1a			
EO-28	Hold 1 educational outreach effort annually to promote implementation of nutrient management practices.	1 outreach effort/year	\$1,000/ outreach effort	\$10,000	E	<u>County</u> , SWCD, MDA, MDH	Ongoing				SW.3.1c			GW.1.1c Gw.1.1d				
EO-29	Promote the implementation of whole-farm and nutrient management practices to improve farm profitability and reduce nitrogen loss.	1 outreach effort/year	\$1,000/ outreach effort	\$10,000	E	<u>SWCD</u> , County, MDA, MDH	Ongoing							GW.1.1c				LS.2.1a
EO-30	Continue to identify programs and opportunities for growers to test and implement new nitrogen practices, innovative technology or cropping systems that protect groundwater quality that prevent or reduce nitrogen loss (e.g., cover crops, alternative crops, precision ag / new technologies, nutrient management initiative, etc.)	1 outreach effort/year	\$1,000/ outreach effort	\$10,000	E	<u>County</u> , SWCD, MDA	Ongoing							GW.1.1c Gw.1.1d				



Table 6-8 Regulatory and Administration Program

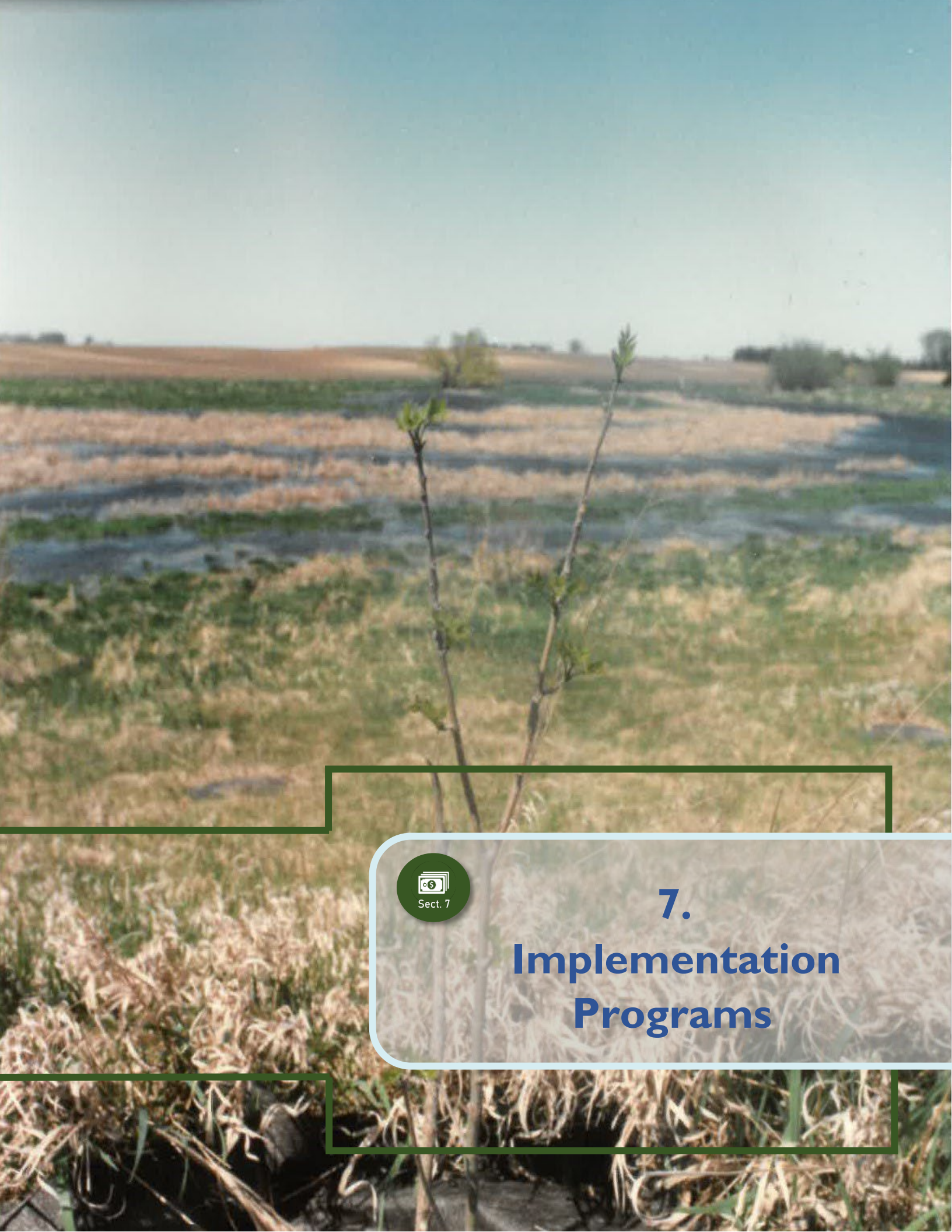
Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Responsibility - Lead (bolded) & Partner(s)	Timeline					Goal # by Resource Concern								
						2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Public Awareness
R-1	Coordinate with Drainage Authorities to identify and prioritize MPDM during Plan and Schedule development.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, Drainage Authority	Ongoing					SW.1.1a								
R-2	Provide financial and technical assistance to implement MDPDM practices.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, Drainage Authority	Ongoing					SW.1.1b								
R-3	Develop a local drainage project coordination team to identify drainage systems in need of repair and conservation practice implementation.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, Drainage Authority	Ongoing					SW.1.2a								
R-4	Administer zoning regulations to preserve and restore the natural shoreland areas.	<i>N/A: Existing Budget</i>			<b>County</b> , DNR	Ongoing						SW.2.1a SW.2.1b					HR.1.1a HR.2.1a		
R-5	Enforce feedlot riparian setback requirements.	<i>N/A: Existing Budget</i>			<b>County</b> , MPCA	Ongoing							SW.3.2a SW.3.2b						LS.2.3a
R-6	Administer the County Feedlot Program.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, MPCA	Ongoing							SW.3.2a SW.3.2b						LS.2.3a
R-7	Enforce field manure application requirements.	<i>N/A: Existing Budget</i>			<b>County</b> , MPCA	Ongoing							SW.3.2a SW.3.2b						LS.2.3a

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Responsibility - Lead (bolded) & Partner(s)	Timeline					Goal # by Resource Concern									
						2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Public Awareness	Stewardship (Urban, Rural, and Shoreland)
R-8	Enforce state stream buffer requirements.			<i>N/A: Existing Budget</i>	<b>County</b> , SWCD, BWSR		Ongoing													
R-9	Implement and enforce applicable county ordinances and the Wetland Conservation Act (WCA) to retain wetland quantity, function, and value, and investigate WCA consistency to assess the possibility of shared services.			<i>N/A: Existing Budget</i>	<b>County</b> , SWCD, BWSR		Ongoing						SW.4.1a							
R-10	Implement well set back rules by ordinance.			<i>N/A: Existing Budget</i>	<b>County</b> , SWCD, DNR, MDH		Ongoing								GW.1.2a					
R-11	Implement Wellhead Protection Areas and prioritize the protection of DWMSAs			<i>N/A: Existing Budget</i>	<b>County</b> , City, MDH		Ongoing								GW.1.2a					
R-12	Adhere to Minnesota Statutes and Rules pertaining to invasive species (Minnesota Statute 84D and Minnesota Rules 6216) and the Noxious Weed Law (Minnesota Statutes Sections 18.76 to 18.91).			<i>N/A: Existing Budget</i>	<b>County</b> , Townships, City		Ongoing									HR.2.2a HR.2.2b				
R-13	Administer Minn. R. Chapter 7080 through 7083 and local county ordinances to manage SSTS and implement a loan program for SSTS upgrade to protect surface and groundwater quality.			<i>N/A: Existing Budget</i>	<b>County</b> , SWCD, MPCA, MDA		Ongoing													LS.2.2a

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Responsibility - Lead (bolded) & Partner(s)	Timeline					Goal # by Resource Concern								
						2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Public Awareness
R-14	Hold joint discussions with watershed partners that enforce ordinances and permit programs to provide consistency, effectiveness, and efficiency across the watershed to benefit water quality and habitat vitality. The intent of this action is to share knowledge, not to adjust local regulations.	N/A: Existing Budget			<b>SWCD, County, DNR</b>	Ongoing													LS.3.1a
R-15	Provide technical and financial resources to seal, maintain, or replace failing or abandoned wells.	N/A: Existing Budget			<b>SWCD, County, MDH</b>	Ongoing									GW.1.1a GW.1.1b GW1.2a				

**Table 6-9 Operations and Maintenance Implementation**

Action #	Goal-Related Actions	Unit	Unit Cost	Total 10-Year Cost (\$)	Responsibility - Lead (bolded) & Partner(s)	Timeline					Goal # by Resource Concern								
						2020-21	2022-23	2024-25	2026-27	2028-29	Agricultural Drainage Systems	Lakes	Rivers and Streams	Wetlands	Surface Runoff and Flooding	Groundwater Quality & Quantity	Habitat (Aquatic and Terrestrial)	Recreation	Public Awareness
OM-1	Continue to implement ditch repair and inspection programs.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, Drainage Authority	Ongoing					SW.1.1a SW.1.1b								
OM-2	Coordinate with counties to identify where infrastructure repair/upgrades should be prioritized.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, DNR	Ongoing							SW.3.3a						
OM-3	Pursue RIM and CREP opportunities to expand existing riparian buffers.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, NRCS	Ongoing							SW.3.4a						
OM-4	Manage public access sites for invasive and nuisance species and coordinate efforts in rapid response and access inspections.	<i>N/A: Existing Budget</i>			<b>County</b> , SWCD, DNR	Ongoing										HR.1.3			
OM-5	Pursue funding to support construction of new BMPs and enhancements of existing BMPs that expand stormwater management capacity.	<i>N/A: Existing Budget</i>			<b>City</b> , <b>County</b> , SWCD, MPCA	Ongoing													LS.1.1a
OM-6	Encourage and promote low-impact development techniques and methods.	<i>N/A: Existing Budget</i>			<b>City</b> , <b>County</b> , SWCD, MPCA	Ongoing													LS.1.1a



Sect. 7

# 7. Implementation Programs

## SECTION 7.0 IMPLEMENTATION PROGRAMS

### 7.1 Implementation Programs

In Section 6, each action is assigned to either a structural practice, management practice, education and outreach, data gaps and research, regulatory, or capital improvement targeted implementation schedule. These action types correspond to the implementation program which will be used to fund the action.

Implementation programs are the funding mechanism to implement actions and make progress toward achieving plan goals. This plan establishes implementation programs for the WRCWMP and describes them conceptually in this section.

#### ***Structural and Management Practices Cost-Share Incentive Program***

The Structural and Management Practices Cost-Share Incentive Program funds actions pertaining to the planning, design, and implementation of on-the-ground projects and practices to make progress towards plan goals. These can be structural practices (e.g. grassed waterways, controlled drainage) or management practices (e.g. cover crops, nutrient management, conservation tillage). Table 7-1 provides a list of example practices that may be eligible to receive funding from the Structural and Management Practices Cost-Share Incentive Program.

Practices funded by the Structural and Management Practices Cost-Share Incentive Program are typically much smaller in size than capital improvement projects. The program assists landowners in implementing these voluntary actions through financial incentive, technical assistance, conservation easement, or land acquisition.

Grant applications to fund the Structural and Management Practices Cost-Share Incentive Program will be prepared jointly through WRCWMP entities to promote consistency in services across the plan area. During implementation, the WRCWMP partners will create a decision-making process using criteria to prioritize what practices get funded, and how much funding practices will receive. Example prioritization criteria that will be used include prioritizing a project that:

- Is located within a priority subwatershed in agreement with plan goals,
- Is identified in the targeted implementation schedule, and
- Impacts (is within or upstream of) a priority resource.

Additional considerations may include:

- Projects that make progress toward multiple goals,
- Landowner willingness, and
- Progress made toward goals.

The Partnership will evaluate prioritization criteria annually as part of its work plan process. Each local partner will work with landowners within their jurisdiction to identify projects.



*Table 7-1: Probable list of structural and management practices eligible for funding under the Structural and Management Practices Cost-Share Incentive Program. This list is not comprehensive, additional practices may be included by discretion of WRCWMP Partners.*

Structural or Management Practice	NRCS Code	Storage	Filtration	Bio-filtration	Infiltration	Protection	Source Reduction	User Defined
Alternative Tile Intake - Gravel Inlet	606		x					
Alternative Tile Intake - Other Blind Intake	606		x					
Alternative Tile Intake - Perforated Riser Intake	606	x						
Anaerobic Digester	366							x
Bioretention Basin	N/A			x				
Conservation Cover	327						x	
Conservation Crop Rotation	328						x	
Conservation Tillage	329						x	
Constructed Wetlands	N/A	x						
Contour Buffer Strips	332		x					
Contour Farming	330						x	
Cover Crop	340						x	
Critical Area Planting	342					x		
Culvert Sizing	N/A	x						
Dam	402	x						
Drainage Water Management	554	x						
Filter Strips	393		x					
Forage and Biomass Planting	512						x	
Grade Stabilization Structure	410					x		
Grassed Waterways and Swales	412		x			x		
Infiltration Trench	N/A				x			
Irrigation Water Management	442						x	
Lined Waterway or Outlet	468				x			
Multi-stage Ditch	N/A				x			
Nutrient Management	590						x	
Pest Management	595							x
Pond for Water Use	378	x						
Prescribed Burning	338							x
Prescribed Grazing	556						x	
Riparian Forest Buffer	391		x					
Riparian Herbaceous Cover	322		x					
Roof Runoff Management	558							x
Rotational Grazing	N/A						x	
Saturated Buffer	N/A			x				
Sediment Basin	350	x						
Septic System Improvement	N/A							x
Storm Water Retention Basins	N/A	x						
Stream Channel Stabilization	584					x		
Streambank and Shoreline Protection	580					x		
Strip-cropping	585					x		
Structure for Water Control	587	x						
Terrace	600		x					
Tree/Shrub Establishment	612					x		
Water and Sediment Control Basin	638	x						
Water Reuse	636							x
Wetland Creation	658	x						
Wetland Restoration	657	x						

### **Education and Outreach Implementation Program**

The primary purpose of the Education and Outreach Implementation Program is to create positive and impactful education and outreach experiences for the general public, property owners, and local decision makers. The Education and Outreach Implementation Program funds actions categorized as “education and outreach” in Section 6. Implementation of these actions make progress toward or accomplish plan goals. Examples include:

- Action: Hold 1 educational workshop annually to promote implementation of nutrient management practices.
  - ✓ Accomplishes Goal SW 3.1c: Conduct 10 educational efforts to highlight existing nutrient management and watershed BMP incentive programs.
- Action: Request and work with MN DNR to hold 2 public outreach efforts to discuss lake level management.
  - ✓ Accomplishes Goal SW 2.2a: Conduct 2 educational outreach efforts with the DNR to discuss lake management.
- Action: Complete 100 visits annually to local landowners to encourage enrollment in state and federal programs to preserve and restore wetlands.
  - ✓ Accomplishes Goal SW 4.1b: Complete 1,000 contacts with local landowners to encourage enrollment in state and federal programs to preserve and restore wetlands.

The entities in the WWPP have worked collaboratively on education and outreach on a watershed basis for decades, such as those carried out during the WRAPS process. During the planning process, an education and outreach analysis was completed to evaluate further need for public participation and engagement in meeting plan goals. The result of this analysis is the Education and Outreach Implementation Program, goals, and actions created in this plan.

The outcomes of actions funded by the Education and Outreach Implementation Program will be evaluated through surveys. The intent of these surveys is to gauge the impact the education/outreach efforts (and funds spent on them) were having on the watershed. Further, plan partners will consolidate educational activity information monthly to assess progress toward measurable goals. Outreach efforts will be documented on an annual basis and will be reported back to BWSR.

The Education and Outreach Implementation Program will be locally administered by representative WRCWMP entities or administered through sharing of services (Appendix T ). Expectations are that a common set of education and outreach materials will be developed for use across the watershed but delivered by the staff within each county.

Plan partners already collaborate with others to increase education, outreach, and community engagement within the WRW on a variety of topics and events. Establishment of the Greater Blue Earth River Basin Alliance (GBERBA) in 2003 organized efforts to streamline watershed-wide public engagement. Between 2015 and 2018, members of the WWPP and the Minnesota Pollution Control Agency (MPCA) conducted individual stakeholder interviews, formed focus groups across the watershed, and facilitated citizen and conservation partner meetings to better understand how the community perceives watershed health. These efforts helped develop the WRAPS which served as the backbone of many WRCWMP measurable goals and actions.

Several public outreach and education activities are tailored to youth, such as Earth Day programs in area schools, and fairs throughout the six WRW counties. These activities center around educating area youth on the importance of our natural landscape and the environmental issues that impact it.

Social media is a medium the WRCWMP entities will leverage in addition to in-person efforts. Most commonly, these are Facebook, Twitter, and YouTube. Though many citizens use these platforms as their source for news and information, many do not. Therefore, e-mail, website updates, newsletters, news

articles, and other releases will remain a priority for communicating WRCWMP activity to the general public, property owners, and local decision makers. The GBERBA (<https://www.gberba.org/>) and Watonwan River Watershed Network (<https://watonwanriver.org/>) websites are examples of this method of education and outreach delivery.

### **Research and Monitoring Implementation Program**

The Research and Monitoring Implementation Program funds actions categorized as “data gaps and research” in Section 6. These actions close data gaps to inform effective implementation strategies and better meet plan goals. Examples of these actions include:

- ✦ Target key landscapes and areas that should be priority for reducing runoff (e.g. steep slopes, highly erodible soils) utilizing PTMAApp data outputs and available geologic/soils data; and
  - ✦ Identify and prioritize aquifer recharge BMPs within identified DWSMAs; and
- Continue monitoring programs including such as well head monitoring, volunteer rain gauges, water sampling, and lake level monitoring.

WRCWMP entities have and will continue to invest in the development and assembly of data and information. A large portion of this data and information are water quality monitoring data. A diverse set of partnering state agencies and local units of government have a robust surface and groundwater monitoring network in place that continues to be refined. The actions of this plan will maintain existing efforts and pursue additional ones to fill identified data gaps.

Local entities continue to pursue funding to assess and monitor water quality in the WRW to fill identified data gaps, measure progress toward implementation goals for both protection and restoration and provide the basis for future planning and adaptive management. As finding the funding for this is difficult, there will likely be a need to rely heavily on state agency partners.

WRCWMP entities have decided there is sufficient monitoring to measure the pace of progress for implementing this plan. Over the course of the year, WRCWMP entities will use the best available science and tools to estimate progress toward measurable goals, including PTMAApp results (or similar) (Table 7-2 on the following page). If additional data gaps are presented in the future, additional monitoring will be used to close those gaps. Analysis of data will be conducted as a result of the WRCWMP to guide annual work planning efforts and refine prioritization efforts within the WRW.

There are three main water quality programs administered by MPCA as part of its watershed approach, which is a 10-year rotation for assessing waters of the state (MPCA, 2012). The first is Intensive Watershed Monitoring, which provides a periodic snapshot of water quality conditions every ten years. The second is the Watershed Pollutant Load Monitoring Network, which provides long-term, continuous assessments of water quality conditions in between years of intensive monitoring at HUC 8 and HUC 10 scales (MPCA, 2020a; <https://www.pca.state.mn.us/water/watershed-pollutant-load-monitoring>). The third is the Citizen Stream and Lake Monitoring Program, which engages local citizen volunteers to become more active in collecting water quality data. There are two such sites in the WRW, located on Judicial Ditch 1 and the Watonwan River near Madelia (MPCA, 2016). Combined, the 54 total biological monitoring sites, 17 stream chemistry sites, and other ongoing tracking and monitoring programs can be used by plan participants to document measurable water changes resulting from implementation as part of this program (Table 7-2).

The MPCA awarded Surface Water Assessment Grants (SWAG) to the Minnesota State University Mankato Water Resource Center in 2014 for water quality monitoring in the Watonwan River. The goals of these SWAG grants have been to expand the local entities’ training programs and outreach efforts enabling organizations to recruit and retain additional citizen volunteers for both lake and stream monitoring in the WRW and enhance and complete datasets for streams and lakes throughout the

watershed to evaluate overall water quality. Other existing surface water monitoring sites in the plan area are operated by the DNR and the USGS.

To meet plan goals, monitoring efforts must also support tracking of groundwater supply quantity and quality trends in the WRW. Programs currently monitoring groundwater status and trends include the Public Water Supplier Monitoring, MPCA's Ambient Groundwater Monitoring Program, MDA's Township Testing Program, DNR's Observation Well Network, and DNR's water appropriation permits (MPCA, 2018). The MDA has groundwater sampling locations (two sites in Watowan County), 48 pesticide and/or nutrient water quality samples collected from two river/stream locations, and one pesticide water quality sample collection event from one lake. Current DNR GIS layers indicate that there are greater than 40 active observation wells within the WRW. Most of these wells are owned by DNR and read by the local SWCD, with fewer than 10 of these wells monitored by permitted water users in the watershed. MPCA's Ambient Groundwater Monitoring Program has 138 wells that have been monitored on at least one occasion in the six-county watershed area.

During implementation, the Research and Monitoring Implementation Program will build on the data and information processes already established by plan participants. This program will also be used to fund implementation of actions aimed to build and maintain technical capacity to fully utilize new technology and tools for water resource management. The Research and Monitoring Implementation Program will be operated through the sharing of services (Appendix T).

*Table 7-2: Example means for tracking and documenting implementation progress.*

Level	Description	Example Application
Tracking	Counting number of practices, acres of soil health management practices, number of workshops, etc.	<p>"Output" in targeted implementation schedule (Section 6). Projects will be tracked and reported in eLINK and local database during implementation.</p> <p><i>Example Goal: SW 3.1a - Achieve a 5% reduction in phosphorus</i></p> <p><i>Example Tracking: Number of structural and management practices implemented</i></p>
Estimating	Using lower resolution calculators and tools to give a sense of the individual or collective impacts of projects.	<p>Engineer estimates, existing PTMApp results</p> <p><i>Example Goal: SW 3.1a - Achieve a 5% reduction in phosphorus</i></p> <p><i>Example Estimating: Existing PTMApp phosphorus reduction benefits at the outlet of each planning region for each practice implemented</i></p>
Modeling	Incorporating landscape factors and project information to predict future conditions.	<p>PTMApp, HSPF in WRAPS Cycle 2</p> <p><i>Example Goal: SW 3.1a - Achieve a 5% reduction in phosphorus</i></p> <p><i>Example Modeling: Updates in land use land cover from implementation accounted for in HSPF to evaluate total phosphorus reduction</i></p>
Measuring	Using field-collected information to assess the condition of the water.	<p>Watershed Pollutant Load Monitoring Network, WRAPS Cycle 2</p> <p><i>Example Goal: SW 3.1a - Achieve a 5% reduction in phosphorus</i></p> <p><i>Example Measuring: Measuring total phosphorus reductions in water quality monitoring of planning region streams</i></p>
Proving	Having enough measurements to compare with standards and decide if it's improved.	<p>Analysis of loading at watersheds pour point (Watershed Pollutant Load Monitoring Network), WRAPS Cycle 2</p> <p><i>Example Goal: SW 3.1a - Achieve a 5% reduction in phosphorus</i></p> <p><i>Example Proving: Documenting total phosphorus reductions at the outlet of the planning region, measured by Watershed Pollutant Load Monitoring Network</i></p>

### **Capital Improvements Implementation Program**

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. Capital improvements are beyond the “normal” financial means of WRCWMP entities and therefore require external funding. To be considered a capital improvement for purposes of this plan, a project must have an anticipated cost of at least \$250,000.

Table 7-3 shows proposed capital improvements within the WRW. Projects range from flood control to large scale drainage projects, any of which may be pursued by the implementation activities set forth in this plan. This list of proposed improvements is consistent with the priorities of this plan and established measurable goals. Additional discussions are needed among plan participants to develop the specific process for implementing capital improvements. Specifically, members of the Policy Committee or WRCWMP individual entities and representative Boards are expected to discuss the means and methods for funding new capital improvements with potential funding partners before an implementation timeline can be established. This includes engagement of drainage authorities to ensure large scale multi-purpose drainage priorities are in line with the goals of this plan.

Front-end engagement of property owners will be critical when pursuing implementation of permanent protection projects. This plan prioritizes land for permanent protection as part of the Structural and Management Practices Cost Share Initiative. Within this program, 20% of each planning region's structural and management practices budget is allocated to easements in each planning region.

### **Operations and Maintenance Implementation Program**

Entities within the WRW are engaged in the inspection, operation, and maintenance of capital projects, stormwater infrastructure, public works, facilities, and natural and artificial watercourses, and legal drainage systems. Operation and maintenance of legal ditches, impoundments, and small dams will continue under regular operations and maintenance plans of the entities with jurisdiction over these systems. Capital improvement projects will be operated and maintained by the owner of the project for the lifespan of the project as specified in Table 7-3, but projects will be pursued collaboratively as watershed-wide collaborations. Budget information pertaining to the Operations and Maintenance Program can be found in Section 6.

Table 7-3: Potential capital improvement projects in the WRCWMP area.

Capital Improvement Project/ Program	Description	Project Owner	Information Source	Years Start/ End	Estimated Cost	
Blue Earth County	Mitigation	Remove riparian hazards and restore Watonwan streambank (3 dwellings)	County	County	2021	\$450,000
	Mitigation	Remove riverine erosion hazards and restore Watonwan River bluff	County	County	2021-2031	\$450,000
	Repair	Repair public water access on Watonwan River	County	County	2020-2022	\$200,000
Brown County	Bridge Replacement	Replace 2 existing bridges in Albin Township	County	Highway Department	2020-2029	\$390,000
	CD44	Feasibility study in progress, considering water storage	County	Drainage Authority	2021	\$250,000
	CD33	Landowner interest in retention/sediment pond	County and SWCD	County	2021	\$250,000
Cottonwood County	Mountain Lake Wastewater Treatment	Install 2 new treatment ponds	City	City	2020-2022	\$250,000
	Bingham Lake Stormwater	Install stormwater drainage and holding pond	City	City	2021-2023	\$250,000
	Replace Bridges	Replace 3 bridges in the WRW	County	County	2020-2025	\$750,000 (3)
Martin County	Perch Creek	Streambank restoration	Martin SWCD/DNR	Martin SWCD/DNR	2021-2022	\$250,000
Watonwan County	Storm water retention	Towns in the county	City/County/EPA	County	TBD	\$1,500,000
	Upgrade stormwater discharge	La Salle	City of La Salle, County, Feds	Contacts with La Salle	2022-2024	\$250,000
	La Salle – Upgrade city water supply	Upgrade city water supply	City of La Salle	La Salle & MDH	2020-2023	\$996,000
	Darfur – Upgrade city water supply	Upgrade city water supply	Darfur/MDH/Homeowners	Darfur & MDH	2020-2021	\$750,000
	Madelia Flood Control	Protect property and infrastructure	City of Madelia/DNR/County/FEMA/Landowners	Local reports, DNR maps, Updated floodplain	2022-2027	\$1,000,000
	Wetland restoration	Restore 5 wetlands of various sizes	SWCD/BWSR/ACOE/Landowners	County	2021-2030	\$1,000,000
	Stabilize Roads Bordering Wetland	Antrim and Adrian township	County	County	2021-2023	\$400,000
	JD-8	Storage	County	County	2021-2023	\$300,000
	JD-11	Storage	County	County	2021-2023	\$300,000
	JD-18	2 Storage Basins	County	County	2021-2023	\$475,000
	JD-26	Storage	County	County	2020-2022	\$300,000

### **Regulatory Administration Implementation Program**

Many of the issues impacting resources in the WRW can be addressed in part through the administration of statutory responsibilities and local ordinances. These actions are categorized as “regulatory” in the targeted implementation schedule and are funded by the Regulatory Administration Implementation Program. Table 7-5 (at the end of this section) shows the relationship between statutory obligations and local ordinances administered by WRCMP entities. Further, this table (7-5), along with descriptions below show areas of regulation and enforcement that are potentially duplicative within the WRW, identifying potential opportunity for shared services.

Currently WRCWMP entities share services for the administration of WCA. Watowan and Cottonwood share the same LGU for administration of the Wetland Conservation Act (WCA). For feedlot representation, Brown and Watowan County share the same service. As part of implementation, WRCWMP entities will hold joint discussions with watershed partners that enforce ordinances and permit programs to provide consistency, effectiveness, and efficiency across the watershed to benefit water quality and habitat vitality.

### **Statutory Responsibilities**

The state statutes administered by the counties involved in this plan are described below. In many cases, local regulations and ordinances have been adopted to conform to the standards and requirements of the state statutes (Table 7-5). The responsibility for implementing these programs will remain with the respective counties or appointed LGUs.

### **Buffer and Soil Loss Legislation**

During the 2015 legislative session, the State of Minnesota passed the Buffer and Soil Loss Legislation (Minnesota Statute 2018, section 103F.48-Riparian Protection and Water Quality Practices), commonly referred to as the Minnesota Buffer Law. The legislation requires a 50-foot average, 30-foot minimum width, continuous buffer of perennial vegetation or an approved alternative water quality practice based on the Natural Resources Conservation Service Field Office Technical Guide (FOTG) for all public waters identified on the public waters inventory, and a 16.5-foot minimum width continuous buffer of perennial vegetation for public drainage systems established under chapter 103E. Local SWCDs are required to assist landowners with implementation of the Buffer Law requirements, which includes planning, technical assistance, implementation of approved alternative practices, and tracking progress towards compliance. Counties can elect jurisdiction of enforcement or allow for state enforcement through BWSR. Counties who elected jurisdiction can incorporate the water resources riparian protection requirements of the Buffer Law into an existing county ordinance or develop a revised ordinance which follows the minimum restriction as stated in statute. SWCDs are required to notify the enforcement agency of a noncompliance parcel upon determination.

As part of the Buffer and Soil Loss Legislation, other water courses were identified by the local SWCDs and incorporated into County Water Plans prior to the development of this plan. These watercourses are shown on Figure 4-9.

### **Feedlots**

Feedlot rules, regulations, and programs were established under MN Rules Ch 7020 and are administered through the MPCA. Counties participating in the WRCWMP are delegated by the MPCA to provide feedlot regulatory oversight and technical assistance programs and maintain a feedlot inventory. Counties also have local ordinances that address feedlots. For example, feedlot size and location are regulated by county zoning ordinances.

### **Floodplain Management**

Floodplain zoning regulations are enforced in all counties through county zoning ordinances. These regulations are intended to guide development in the floodplain consistent with the magnitude of the flood threat to minimize loss of life and property, disruption of commerce and governmental services,

extraordinary public expenditure for public protection and relief, and interruption of transportation and communication.

The DNR and FEMA are in the process of updating floodplain maps on a county basis. Current flood maps can be found on the DNR website at [https://www.dnr.state.mn.us/waters/watermgmt\\_section/floodplain/access-flood-maps.html](https://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/access-flood-maps.html). Counties are required to have these maps and county ordinances so citizens can participate in FEMA flood insurance programs. However, FEMA floodplain maps are not representative of all flooding in the counties.

### ***Hazard Management***

Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390, codified at 42 USC Sections 5121 et seq. Hazard Mitigation Planning, 44 CFR Part 201, established criteria for state and county hazard mitigation planning. Counties participating in the WRCWMP have developed hazard mitigation plans because of DMA 2000. Some counties have incorporated hazard management in their zoning ordinances.

### ***Subsurface Sewage Treatment Systems (SSTS)***

Counties participating in the WRCWMP administer Minnesota Rules Chapter 7080 through 7083 for SSTS. The program provides technical assistance, education, plan review, and inspections to protect water quality, prevent and control water borne diseases, and prevent or eliminate nuisance conditions.

### ***Shoreland Management***

The Minnesota Legislature has delegated responsibility to LGUs to regulate the subdivision, use, and development of shorelands along public waters to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources. This statute is described in M.S. Statutes 103F and 394 as well as MN Rules Ch 6120.250-6120.3900. This statute is administered and enforced as a zoning ordinance or state statute, requiring an average of 50-foot buffer around public waters. Additional setback may apply per local ordinance.

### ***Solid Waste Management***

Counties participating in the WRCWMP operate solid waste management systems as directed by M.S. 115A and 400. These programs may include:

- ✦ Waste reduction and waste education programs;
- ✦ Curbside recycling and publicly owned and operated recycling center;
- ✦ Yard waste composting sites; and
- ✦ Regional hazardous waste management facility.

Additionally, all the WRW counties have either solid waste plans or ordinances for local implementation.

### ***Wetland Conservation Act (WCA)***

The Minnesota Legislature passed the Wetland Conservation Act of 1991 which is intended to result in “no net loss” of wetlands through filling, draining, excavating, or converting wetlands to other uses. This regulation is mandated by MN Rules Ch 8420. LGUs are responsible for administering, regulating, and educating landowners on WCA.

### ***Wellhead Protection***

The Minnesota Department of Health (MDH) administers the state wellhead protection rule, Minnesota Rules, Chapter 4720.5100 – 4720.5590, that sets standards for wellhead protection planning.

Municipalities within the watersheds have completed or will be completing wellhead protection plans. The most recent listing of completed wellhead protection plans can be obtained from MDH.



### **Local Ordinances**

Local ordinances are used by the counties in the WRW to address issues specific to their county. Table 7-5 shows the counties which have ordinances related to managing water and resources. The responsibility for implementing these ordinances will remain with the respective counties.

### **Aggregate Management**

Individual counties regulate aggregate mining and reclamation. The State of Minnesota manages aggregates through M.S. 103 A-I.

### **Agricultural Soil Erosion**

The State of Minnesota manages soil erosion through Minnesota's Soil Erosion Law (M.S. 103F.401-455). The law, enacted in 1984, states, "A person may not cause, conduct, contract for, or authorize an activity that causes excessive soil loss," where 'Excessive soil loss' is defined as "soil loss that is greater than the soil loss limits" and 'soil loss limits' is defined as "the maximum amount of soil loss from water or wind erosion, expressed in tons per acre per year, that is allowed by county regulations on a particular soil" (Section 103F.401). This law does not mandate local enforcement of a state-wide limit, but instead provides counties the opportunity to develop a soil loss ordinance specific to their area.

### **Bluff Protection**

Many counties specifically target bluffs due to their disproportionate impact on sediment erosion when the bluff becomes unstable. All six WRW counties address bluff protections in their shoreland and/or zoning ordinances.

### **Erosion Control**

Blue Earth, Brown, and Jackson Counties have erosion control regulations within their zoning ordinances/rules that address general erosion and sediment control measures. Statewide, the State of Minnesota requires permits through the National Pollutant Discharge Elimination System (NPDES) for construction activity disturbing one acre or more in size.

### **Forestland Management**

Jackson County manages trees and woodland through their zoning ordinances. This includes restrictions for structures being built in a wooded area to preserve trees, and standards for the harvesting of timber and associated reforestation or conversion of forested use to a non-forested use. Brown and Cottonwood Counties manage forest removal, shoreland alterations and bluff impact zones. Watonwan and Brown Counties have forest management standards in both impact bluff zones and as a provision for water quality for shoreland management.

### **Land Use**

Counties and municipalities within the WRW are responsible for land use planning, which is administered through local zoning ordinances. Five counties have comprehensive land use plans:

- ✦ Blue Earth County Land Use Plan (2018);
- ✦ Brown County Comprehensive Plan (2019);
- ✦ Cottonwood County (2005);
- ✦ Jackson County Comprehensive Plan (2010); and
- ✦ Martin County Land Use Plan (2003).

Watonwan and Cottonwood Counties have land use guidance built into their zoning ordinances.

### **Stormwater Runoff**

As part of Minnesota's administrative rules, chapter 7090 pertains to the storm water regulatory program and is administered by the MPCA. Stormwater runoff is managed for certain development through permits, dependent upon location in the watershed. Blue Earth, Brown, Jackson, and Watonwan

County zoning ordinances contain general and specific standards stormwater management (retain runoff and minimize erosion by natural or man-made structural means). In addition to the standards, Jackson County ordinances require compliance with the MPCA Stormwater Permit Program. Specific information pertaining to stormwater development triggers can be found on WRW county websites.

**Drainage Authority**

Drainage authority is granted to counties through MN Statute Chapter 103E to establish, construct, and in perpetuity maintain drainage systems (Table 7-4). Further, the designated Drainage Authority aims to improve public drainage by improvements, reroutes, repair, and ensuring buffer compliance. In Blue Earth County, the county drainage authority, ditch manager and drainage specialist manage public drainage and house documents and ditch maps on their DrainageDB website. In Brown County, the drainage system guidelines serve as the public drainage rules/regulations which are managed by the county board. Documents and ditch maps are housed on their DrainageDB website. In Cottonwood County, the ditch authority manages public drainage. In Jackson County, the drainage authority is the county public works department. Martin County has two drainage staff, however the County Board is still the drainage authority. In Watonwan County, the public works department manages a database of aerial photos within townships with public tile information. Additionally, Brown and Martin Counties have either drainage system guidelines or multipurpose drainage water management plans to provide further drainage guidance.

*Table 7-4: Drainage authority by WRW LGU.*

Entity	Drainage Authority (Y/N)
Blue Earth County	Yes - County Board
Brown County	Yes - County Board
Cottonwood County	Yes - Ditch Authority
Jackson County	Yes - Public Works
Martin County	Yes - County Board
Watonwan County	Yes - County Board

Table 7-5: Statutory responsibilities and regulations, rules, and ordinances administered by the counties participating in the WRCWMP. This list is not intended to be all-inclusive.

	Rule, Ordinance, or Statute Name	Blue Earth	Brown	Cottonwood	Jackson	Martin	Watonwan
Statutory Responsibilities	Buffers	M.S. 103F.48					
		Blue Earth County Code of Ordinances Chapter 6 Article VIII, and Chapter 14	Default to state	Cottonwood County Ordinance Section 42	Jackson County Development Code Section 736	Martin County Buffer Ordinance	Default to State
	Feedlots	MN Rules Ch 7020					
		Blue Earth County Code of Ordinances Chapter 6, Article II	Brown County Zoning Ordinances Section 724	Cottonwood County Zoning Ordinance 2, Sect. 13	Jackson County Development Code Section 727	Martin County Feedlot Ordinance	Watonwan County Zoning Ordinance Section 6
	Floodplain Management	MN Rules Ch 6120.5000-6120.6200					
		Blue Earth County Code of Ordinances Chapter 8 and Chapter 14, Article II	Brown County Zoning Ordinances Section 609	Cottonwood County Zoning Ordinance 28, Sect. 12F-1	Jackson County Development Code Section 609	Martin County Zoning Ordinance	Watonwan County Zoning Ordinance Section 11
	Hazard Management	Blue Earth County Code of Ordinances Chapter 16	Brown County All Hazard Plan (2020)	Cottonwood County Zoning Ordinance 28, Sect. 26	Jackson County Solid Waste Ordinance 101	Martin County All-Hazard Mitigation Plan	Watonwan County All-Hazard Mitigation Plan
	Public Water Courses and Basins (DNR)	M.S. 103G.005					
	Subsurface Sewage Treatment Systems (SSTS)	MN Rules Ch. 7080-7083					
		Blue Earth County Code of Ordinances Chapter 6, Article IV	Brown County Zoning Ordinances Section 7080	Cottonwood County Subsurface Sewage Treatment System (SSTS) Ordinance 38	Jackson County Development Code Section 716	Martin County SSTS Ordinance	Watonwan County Zoning Ordinance Section 12L
Shoreland Management	M.S. 103F and 394 and MN Rules Ch 6120.250-6120.3900						
	Blue Earth County Code of Ordinances Chapter 14	Brown County Zoning Ordinances Section 732	Cottonwood County Zoning Ordinance 28, Section 17	Jackson County Development Code Section 610	Martin County Zoning Ordinance Chapter 13	Watonwan County Zoning Ordinance Section 10	
Solid Waste Management	Blue Earth County Code of Ordinances Chapter 16	Brown County Solid Waste Plan (2019)	Cottonwood County Zoning Ordinance 19	Jackson County Solid Waste Ordinance 101	Martin County Solid Waste Ordinance	Watonwan County Solid Waste Ordinance	
Wetland Conservation Act	MN Rules Ch 8420						
Local Regulations, Rules, and Ordinances	Aggregate Management	M.S. 103 A-I					
		Blue Earth County Code of Ordinances Chapter 24 and Chapter 14	Default to state	Cottonwood County Mining, Extraction, and Excavation Ordinance	Jackson County Development Code Section 730	Martin County Zoning Ordinance	Watonwan County Zoning Ordinance
	Agricultural Soil Erosion	Minnesota Soil Erosion Law (Minnesota State Statute - Chapter 103F.401-.455)					
	Bluff Protection	Blue Earth County Code of Ordinances Chapters 14 and 24	Brown County Zoning Ordinance Section 603	N/A	Jackson County Development Code Section 610	Martin County Zoning Ordinance Chapter 13	Watonwan County Zoning Ordinance
	Erosion Control	MN Rules Ch 7090					
		Blue Earth County Code of Ordinances Chapter 24, Article IV	Brown County Zoning Ordinance Section 714	Default to state	Jackson County Development Code Section 710	Default to state	Default to state
	Forestland Management	Blue Earth County Code of Ordinances Chapters 24 and 12	Brown County Zoning Ordinances Section 741	N/A	Jackson County Development Code Sections 604 & 709	Martin County Zoning Ordinance Chapter 13	Watonwan County Zoning Ordinance Section 10
	Land Use	Blue Earth County Land Use Plan	Brown County Land Use Plan	Cottonwood County Planning and Zoning Office	Jackson County Comprehensive Land Use Plan	Martin County Land Use Plan	Watonwan County Zoning Ordinance
	Public Drainage: Establish, Improve, Reroute, Repair, Impoundments, Buffer Compliance	M.S. 103E					
		Default to state	Brown County Drainage System Guidelines	Default to state	Default to state	Martin County Multi-Purpose Drainage Management Plan	Default to state
Stormwater Runoff	MN Rules Ch 7090						
	Blue Earth County Code of Ordinances Chapter 14	Brown County Zoning Ordinance Section 714	Default to state	Jackson County Development Code Subdivision Regulations	Default to state	Watonwan County Zoning Ordinance Section 10	
Tile Drainage	N/A	Brown County Drainage System Guidelines	N/A	N/A	N/A	N/A	



**8.**

## **Plan Administration and Coordination**

## SECTION 8.0 PLAN ADMINISTRATION AND COORDINATION

### 8.1 Funding

This section describes how priority plan actions and existing efforts within the WRW will be funded. Plan participants expect to pursue grant opportunities collaboratively to fund implementation of the targeted implementation schedule (Section 6). Within the targeted implementation schedule, actions are assigned implementation programs. Table 8-1 (following page) shows the sources of funding that will be used to fund the implementation programs.

This plan sets an ambitious implementation schedule. Current funding sources will not be enough to meet the targeted implementation schedule. As such, the success of implementing the WRCWMP will depend on collaboratively sought state, federal, and private grant dollars (NGOs, Foundations, etc). This plan also envisions reliable allocations from the State of Minnesota's Watershed Based Funding Initiative (WRCWMP Enhanced Funding, Section 6).

Table 8-2 (page 8-3) shows the most used programs and grants for executing the implementation programs described by this plan and used within the targeted implementation schedule. These funding grants and programs are cross-referenced to the Structural and Management Practices Cost-Share Incentive Program, the Education and Outreach Implementation Program, and the Research and Monitoring Implementation Program, thereby showing potential sources of revenue for implementation.

**Table 8-1: Summarized budget for the WRCWMP targeted implementation approach\***

Implementation Program	Local (Baseline)**		State (WBIF)***		Federal		NGOs****		All Sources	
	Annual	Total	Annual	Total	Annual	Total	Annual	Total	Annual	Total
Structural and Management Practices Cost-Share Incentive Program	\$21,500	\$215,000	\$268,500	\$2,685,000	TBD	TBD	TBD	TBD	\$290,000	\$2,900,000
Education & Outreach Implementation Program	\$35,200	\$352,000	\$24,000	\$240,000					\$59,200	\$592,000
Research and Monitoring Implementation Program	\$7,900	\$79,000	\$7,875	\$78,750					\$15,775	\$157,750
Regulatory Administration Implementation Program	\$68,500	\$685,000	\$0	\$0					\$68,500	\$685,000
Capital Improvements Implementation Program	\$18,000	\$180,000	\$37,000	\$370,000					\$55,000	\$550,000
Operations and Maintenance	\$530,000	\$5,300,000	\$0	\$0					\$530,000	\$5,300,000
<b>TOTAL</b>	<b>\$681,100</b>	<b>\$6,811,000</b>	<b>\$337,375</b>	<b>\$3,373,750</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>\$1,018,475</b>	<b>\$10,184,750</b>

\* Targeted implementation scenario includes local baseline funding plus enhanced funds from BWSR's Watershed-Based Funding Initiative (Enhanced Scenario). Competitive funds are not shown here, as they are not considered a portion of the targeted implementation scenario. Budget values are estimated totals.

\*\*Inclusive of consistent operational funding from the state.

\*\*\*Watershed-Based Implementation Funding

\*\*\*\*Non-Governmental Organization

**Table 8-2: Prospective implementation programs and related funding sources for the WRCWMP. Refer to each program policy for specific requirements about what is or is not eligible.**

Organization	Program/ Grant Name	Primary Assistance Type	Structural and Management Practices	Research and Monitoring	Education and Outreach
<b>Federal</b>					
NRCS	Conservation Innovation Grant (CIG)	Financial	x		
	Conservation Stewardship Program (CSP)	Financial/Technical	x		
	Environmental Quality Incentives Program (EQIP)	Financial/Technical	x		
	Agricultural Conservation Easement Program (ACEP)	Easement	x		
FSA	Conservation Reserve Program (CRP)	Easement	x		
	Farmable Wetlands Program (FWP)	Easement	x		
	Grasslands Reserve Program (GRP)	Easement	x		
FSA/USDA/ NRWA	Source Water Protection Program (SWPP)	Technical			x
USFWS	Partners for Fish and Wildlife Program (PFW)	Financial/Technical	x		
FEMA	Hazard Mitigation Grant Program (HMGP)	Financial	x		
	Pre-Disaster Mitigation (PDM)	Financial	x		
	Flood Mitigation Assistance (FMA)	Financial	x		
	Risk Mapping, Assessment, and Planning	Technical	x		
EPA	Water Pollution Control Program Grants (Section 106)	Financial			x
	State Revolving Fund (SRF)	Loan	x		
	Drinking Water State Revolving Fund (DWSRF)	Loan	x		
	Section 319 Grant Program	Financial	x		
<b>State</b>					
DNR	Aquatic Invasive Species Control Grant Program	Financial/Technical	x		
	Conservation Partners Legacy Grant Program	Financial	x		
	Pheasant Habitat Improvement Program (PHIP)	Financial	x		
	Flood Hazard Mitigation Grant Assistance	Financial	x		x

Organization	Program/ Grant Name	Primary Assistance Type	Structural and Management Practices	Research and Monitoring	Education and Outreach
	Forest Stewardship Program	Technical	x		
	Aquatic Management Area Program	Easement	x		
	Wetland Tax Exemption Program	Financial	x		
BWSR	Clean Water Fund Grants	Financial	x		x
	Drinking Water Subgrant (Clean Water Fund)	Financial	x		x
	Erosion Control and Management Program	Financial	x		
	SWCD Capacity Funding	Financial	x	x	x
	Natural Resources Block Grant	Financial	x	x	x
	Watershed-Based Implementation Funding	Financial	x	x	x
	Reinvest in Minnesota (RIM)	Financial	x		
MPCA	Surface Water Assessment Grants (SWAG)	Financial		x	x
	Clean Water Funds	Financial	x	x	x
	Clean Water Partnership Loan Program	Financial	x		
MDH	Source Water Protection Grant Program	Financial	x	x	x
MDA	Agriculture Best Management Practices (BMP) Loan Program	Financial	x		
	Minnesota Agricultural Water Quality Certification Program (MAWQCP)	Financial / Technical	x		x
<b>Other</b>					
MN Initiative Foundations	MN Thrive, Farmland Retention	Financial	x	x	x
Pheasants Forever	Pheasants Forever	Financial/Easement	x		x
Ducks Unlimited	Ducks Unlimited	Financial/Easement	x	x	x



### **Local/State Baseline Funding**

The amount of funding needed to implement the actions at Baseline Funding Level (Section 6) from local sources is an estimated \$681,000 annually and \$6,810,000 for the ten-year Plan life cycle. 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. Dedicated state funding is also included in the Baseline Funding level (Natural Resources Block Grant, State Cost Share Program, Conservation Delivery Grants, etc.)

These funds will be used for locally focused initiatives where opportunities for state and federal funding are lacking because of misalignment of an initiatives purpose with state or federal objectives. These funds will also be used for matching grants.

### **State Enhanced Funding**

The amount of funding needed for WRCWMP implementation from the BWSR Watershed-Based Implementation Funding program (WBIF) is \$337,375 annually and \$3,373,750 for the ten-year Plan life cycle. The WBIF will be allocated to the WRW biannually throughout the life of the plan.

While the WRCWMP will 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 WRCWMP as one or more non-competetive implementation grants, namely the WBIF program. Where the purpose of an intitiative 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 Sources**

Federal funding includes all funds derived from the Federal tax base. This includes programs such as the Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), and Conservation Innovation Grants (CIG). The Environmental Protection Agency also has Section 319 funds, which traditionally have been used for implementation to improve water quality.

An opportunity exists to leverage state dollars through federal cost-share programs. Where the purpose of an intitiative aligns with the objectives of various federal agencies, federal dollars will be pursued to help fund the programs described by this in this section.

### **Other: Non-Governmental Organizations (NGOs), Non-Profits, and Private Entities**

Several non-governmental or non-profit organizations may provide technical assistance and fiscal resources to implement the WRCWMP targeted implementation schedule. For example, locally active Pheasants Forever and Ducks Unlimited Chapters are potential funding sources that differ from the other categories. The WRCWMP partners will seek to engage all NGOs and non-profits as a means of exploring opportunities to fund specific aspects of the targeted implementation schedule.

Private sector companies, including those specifically engaged in agribusiness, are often overlooked as a potential source of funding for implementation. Many agribusiness companies are working to improve water quality. Some of the agribusiness companies are providing technical or financial support for the implementation of structural and management practices because they are interested in agricultural sustainability. An example of this is work conducted through Field to Market (<https://calculator.fieldtomarket.org>). The WWPP remains receptive to mutually beneficial interests and funding opportunities with agribusiness.



## 8.2 Plan Administration and Coordination

### Decision-Making and Staffing

The WWPP divided into three committees for purposes of drafting this plan: The Policy Committee, the Advisory Committee, and the Steering Team. The make-up and roles of these committees is expected to shift to three new committees during implementation: The Policy Committee, the WRW Technical Committee, and Greater Blue Earth River Basin Alliance (GBERBA) Staff. During implementation, these committees will be collectively referred to as the Watowan River Watershed Partnership (WRWP).

Presented below (Table 8-3) are the probable roles and functions of the WRWP committees. The WRWP fiscal and administrative duties will be assigned to a planning entity through a Policy Committee decision as outlined in the formal agreement. Responsibilities for annual work planning and serving as the central fiscal agent will be revisited by the WRWP on an annual basis.

Initially, the WRWP anticipates use of a Watershed Coordinator housed within the watershed whose role will be to administer implementation of the plan. Technical Service Areas (TSAs) and GBERBA will be utilized as available. Throughout implementation, each local government will annually evaluate the need for additional technical or administrative assistance to implement the plan.

**Table 8-3: Anticipated roles for WRCWMP implementation.**

Committee Name	Description	Primary Implementation Role/Functions
Policy Committee (Fiscal Agent)	Same as planning Policy Committee (one County Commissioner and one SWCD Board Supervisor appointed from each of the participating counties and SWCDs in the watershed)	<ul style="list-style-type: none"> <li>Approve the annual local workplan and any associated revisions</li> <li>Approve grant workplan(s) and review/approve grant revisions and amendments</li> <li>Review and approve priority issues and projects</li> </ul>
WRW Technical Committee	Same as planning Steering Team (local SWCD and county staff, regional BWSR staff) with state agency representation	<ul style="list-style-type: none"> <li>Prepare annual local workplan</li> <li>Prepare grant workplan(s)</li> <li>Pursue funding opportunities for WRCWMP implementation</li> <li>Review and confirm priority issues and projects</li> </ul>
GBERBA Staff	This organization was not formally part of plan development. However, many of their members were part of the planning Steering Team and Policy Committee.	<ul style="list-style-type: none"> <li>Submit annual local workplan</li> <li>Submit grant applications, workplans, and funding requests</li> <li>Coordinate annual local workplan</li> <li>Coordinate grant workplans</li> </ul>

### Collaboration

#### Collaboration with Other Units of Government

The WRWP will continue coordination and cooperation with other governmental units at all levels. This cooperation and coordination are both horizontal and vertical. Coordination between the WRWP and agencies including but not limited to BWSR, US Army Corps of Engineers, DNR, and the MPCA are mandated through legislative and permit requirements. Cooperation between municipalities, township boards, county boards, soil and water conservation district boards, joint powers boards, and other water

management authorities are a practical necessity to facilitate watershed wide activities. Priorities addressed in this plan will be discussed with federal partners at local work group meetings.

Further, the group intends to explore opportunities to share services in effort to become more efficient in managing WRCWMP implementation. Examples of these types of services already being shared in portions of the WRW include Watowan and Brown Counties feedlot inspections and Watowan and Cottonwood Counties for Wetland Conservation Act (WCA) administration. Examples of services that will be shared as part of future WRCWMP implementation efforts include area 5 and 6 TSA support, and area 5 and 6 Minnesota Agricultural Water Quality Certification Program (MAWQCP) staff outreach support.

The WRWP will exercise intergovernmental coordination and cooperation as an absolute necessity for it to perform its required functions. The content of the WRCWMP aims to foster an environment that enhances coordination and cooperation to the maximum extent possible throughout the implementation of this Plan.

The WRWP has identified that agency goals, objectives, directions, and strategies are generally compatible with the content of the WRCWMP. The implementation actions and goals were defined through a collaborative effort. However, some agency goals, objectives, directions, and strategies for resource management within the WRW have not been selected as priority issues. The responsibility for achieving the goals associated with lower priority tier issues remains with the respective agency or organization. Due to logistical issues that local funding, technology limitations, and other capacities present, Tier 2 issues (Section 4) that were not prioritized are encouraged to be implemented with agency-led efforts.

***Collaboration with Others***

During implementation, plan partners expect to build on existing collaboration with others, including non-governmental organizations. Many of these existing collaborations are aimed to increase habitat and recreational opportunities within the WRW, while providing education and outreach opportunities. Partners for these collaborations include, but are not limited to Pheasants Forever, Ducks Unlimited, and The Nature Conservancy.

Lastly, there are lake associations and other coalitions within the WRW. Planning partners collaborate frequently with these groups for education, outreach, and project implementation. This collaboration will continue through the WRCWMP.

***Work Planning***

***Local Work Plan***

The WRWP strives to ensure collaborative watershed implementation. Therefore, annual work planning is envisioned to align priority issues, the availability of funds, and the roles and responsibilities for implementation.

An annual work plan will be developed by the WRW Technical Committee based on the targeted implementation schedule (Section 6) and any adjustments made through self-assessments. The annual work plan will be presented to the Policy Committee, who will be responsible for approval. The intent of these annual work plans will be to maintain collaborative progress toward completing the targeted implementation schedule.

***State Funding Request***

The WRWP will collaboratively develop, review, and submit a biennial watershed-based implementation funding request to BWSR. This request will be submitted to and ultimately approved by the Policy Committee, prior to submittal to BWSR. The request will be developed based on the targeted implementation schedule and any adjustments made through self-assessments.



## **Assessment and Evaluation**

### **Partnership and Accomplishment Assessments**

During implementation, the Technical Committee will evaluate progress toward plan goals through GBERBA monthly meetings. This information will be compiled via monthly implementation tracking sheets submitted by WRCWMP entities, to ensure accurate characterization of plan progress.

The Technical Committee will also conduct an annual evaluation on the effectiveness of the implementation partnership. This will include fulfillment of committee purposes and roles, efficiencies in service delivery, collaboration with other units of government, and success in securing funding. This information will be provided to the Policy Committee.

During this annual evaluation process, feedback will be solicited from the Policy Committee and local entity boards. The Advisory Committee formed to provide input on WRCWMP development will be allowed to continue to engage in plan implementation by reaching out to members of their local county and SWCD boards during the annual review process. This feedback will be presented to the Policy Committee to set the coming year's priorities for achieving the defined goals and decide on the direction for grant submittals. In addition, this feedback will be documented and incorporated into the five-year evaluation.

### **Five-year Evaluation**

The WRCWMP has a ten-year life cycle beginning in 2021. 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, in 2026, a five-year evaluation will be undertaken to determine if the current course of actions is sufficient to reach the goals of the plan, or if a change in the course of actions is necessary. This five-year evaluation will also consider information gained from initiation of WRAPS Cycle 2, tentatively scheduled for monitoring in 2023/2024.

### **Reporting**

Reporting related to grants and programs developed collaboratively through establishment of the WRCWMP will follow the established mechanism of WRWP work through Policy Committee approval. In addition to annual reports, the WRWP will also develop an annual State of the Watershed Report. Annual partnership and evaluation assessments will serve the basis for an annual State of the Watershed Report. This report will be provided to WRWP entities, distributed through local media publications and the watershed website, and promoted through annual outreach efforts. The WRCWMP will also comply with all grant reporting requirements. The GBERBA and Watershed Coordinator will be the entities responsible for completing these reports.

### **Plan Amendment Process**

This plan extends through 2030. Revision of the WRCWMP may be needed through an amendment prior to update if significant changes emerge in the priorities, measurable goals, administrative procedures, or implementation programs. Revision may also be needed if issues emerge that are not addressed in this version of the WRCWMP.

All amendments to this plan will be initiated by WRW Technical Committee Consensus, and subsequent presentation to the Policy Committee. Only by Policy Committee approval may the amendment process be initiated. All recommended amendments must be submitted to the Policy Committee along with a statement of the problem and need, the rationale for the amendment, and an estimate of the cost to complete the amendment. However, the existing authorities of each LGU within the WRW is still maintained. As such, CIPs need only be approved by a local board to be amended to the plan, with notification to the Policy Committee.



The WRWP recognizes the plan may need to be periodically amended to remain useful as a long-term planning tool. However, the structure and intent of this plan is to provide flexibility to respond to short-term emerging issues and implementation opportunities. The Policy Committee will review and revise its long-range work plan and/or implementation programs through the annual budget and annual and short-range work plan.

Technical information (especially water quality data) will require frequent updating, such as when new, site-specific data is generated by state, federal, and regional agencies, counties, cities, or individuals. Generally, these technical updates and studies are considered part of the normal course of operations consistent with the intent of this plan and not a trigger for an amendment. However, when the technical information results in a significant change of direction from this plan, or implementation results in the achievement of a defined measurable goal (Section 5), an amendment may be required. Amendment process and criteria specific to the WRCWMP can be reviewed in the by-law section in Appendix U.

**Criteria and Format for an Amendment**

Plan participants recognize the large work effort required to manage water-related issues. The WRCWMP provides the framework to implement this work by identifying priority issues, measurable goals, and action items. No amendment will be required for the following situations:

- ✦ Any activity implemented through the normal statutory authorities of an LGU, unless the activity is deemed contrary to the intent and purpose of this plan;
- ✦ The estimated cost of a non-capital improvement project action item is different than the cost shown in the long-range work plan or within the implementation schedule of the WRCWMP; and

The addition or deletion of action items, programs, initiatives or projects, so long as they are consistent with the goals identified in Section 5. Such additions will be proposed, discussed and adopted as part of the annual budgeting process which involves public input.

**Formal Agreements**

The WRWP is a coalition of counties and soil and water conservation districts within southcentral Minnesota. The entities previously entered into a formal agreement through a Memorandum of Agreement for development of the WRCWMP (Appendix A). The parties plan to re-structure an existing Joint Powers Agreement (JPA) under GBERBA (Appendix T) for WRCWMP implementation.

GBERBA is a JPA that contains the entire WRW, in addition to the Blue Earth River and Le Sueur River Watersheds. The GBERBA board is made up of SWCD Supervisors and County Commissioners from each of the WRW member organizations. The GBERBA JPA is currently being redone to accommodate watershed planning and implementation.



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