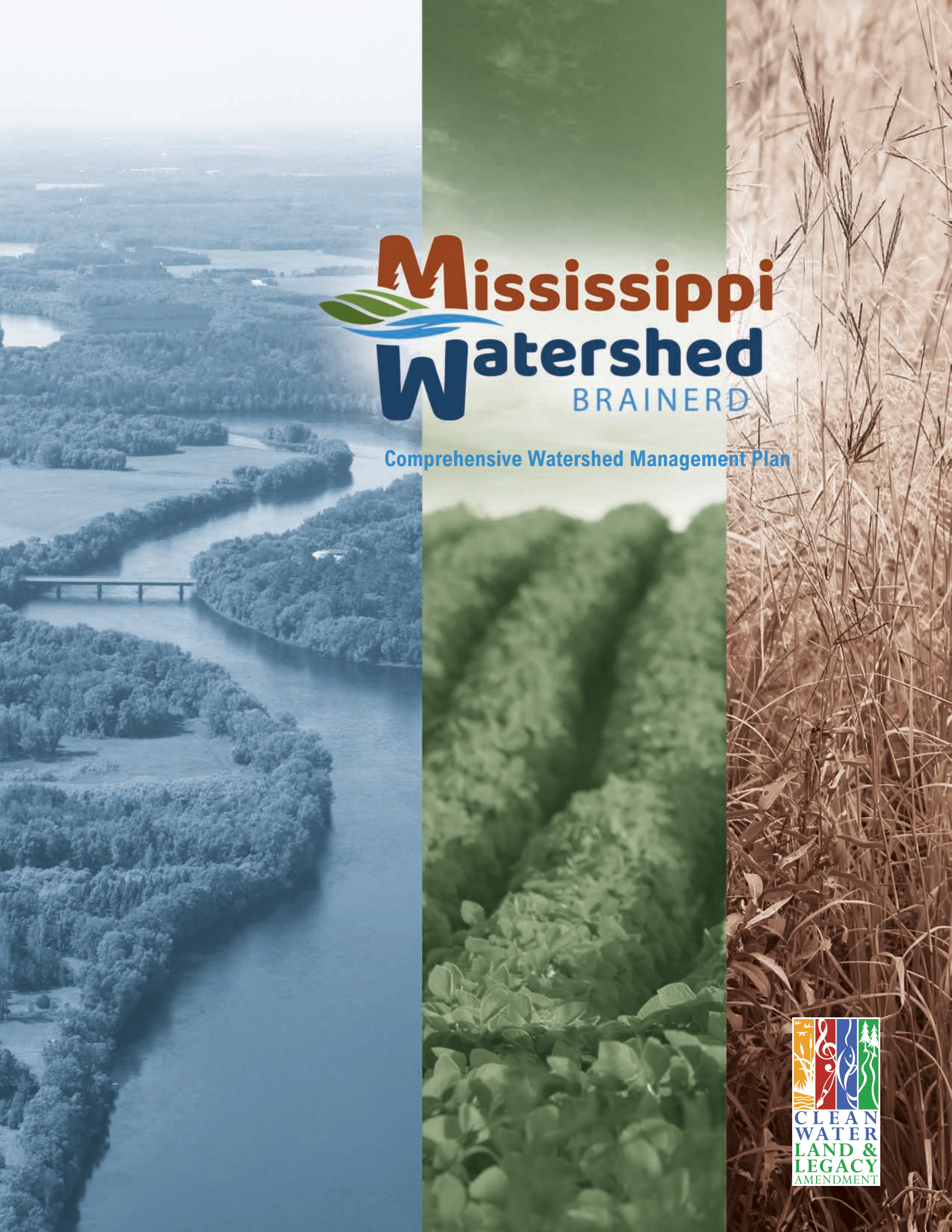

Mississippi Watershed BRAINERD

Comprehensive Watershed Management Plan

CLEAN WATER LAND & LEGACY AMENDMENT

Acknowledgements

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Acronyms

1W1P	One Watershed, One Plan
ACUB	Army Compatible Use Buffer
AIS	Aquatic Invasive Species
BMP	Best Management Practice
BPA	Bisphenol A
BWSR	Board of Water and Soil Resources
CAC	Citizen Advisory Committee
CEC	Contaminants of Emerging Concern
CLC	Central Lakes Center
CMIC	Central Minnesota Irrigators
CRP	Conservation Reserve Program
CSP	Conservation Stewardship Program
CWMP	Comprehensive Watershed Management Plan
DNR	Minnesota Department of Natural Resources
DO	Dissolved Oxygen
DWSMA	Drinking Water Supply Management Area
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency
HEI	Houston Engineering, Inc.
HHW	Household Hazardous Waste
HSPF	Hydrologic Simulation Program – Fortran
HUC	Hydrologic Unit Code
LGU	Local Government Unit
LSP	Landscape Stewardship Plan
MAWQCP	Minnesota Agriculture Water Quality Certification Program
MHB	Mississippi Headwaters Board
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MGLP	Midwest Glacial Lakes Partnership
MnDOT	Minnesota Department of Transportation
MOA	Memorandum of Agreement
MPARS	Minnesota DNR Permitting and Regulatory System
MPCA	Minnesota Pollution Control Agency
MRBCWMP	Mississippi River – Brainerd Comprehensive Watershed Management Plan
MRBW	Mississippi River - Brainerd Watershed
MRWA	Minnesota Rural Water Association
MS4	Municipal Separate Storm Sewer System
MSDC	Minnesota State Demographic Center
NLCD	National Land Cover Dataset

NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High Water Mark
PC	Policy Committee
PFAS	Perfluoroalkyl Substances
PFC	Perfluorochemicals
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanoic Sulfonic Acid
RAQ	Risk Adjacency Quality
RCPP	Regional Conservation Partnership Program
RIM	Reinvest in Minnesota
SAM	Scenario Application Manager
SCORE	Select Committee on Recycling and the Environment
SFIA	Sustainable Forest Incentive Act
SGCN	Species in Greatest Conservation Need
SSTS	Subsurface Sewage Treatment Systems
SWAG	Surface Water Assessment Grant
SWCD	Soil and Water Conservation District
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TP	Total Phosphorus
TSA	Technical Service Area
TSS	Total Suspended Solids
UMN	University of Minnesota
USDA	United States Department of Agriculture
USEPA	Unites States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
W:L	Watershed to Lake Ratio
WBIF	Watershed-Based Implementation Funding
WCA	Wetland Conservation Act
WCTSA	West Central Technical Service Area
WHAF	Watershed Health Assessment Framework
WMA	Wildlife Management Areas
WPLMN	Watershed Pollutant Load Monitoring Network
WRAPS	Watershed Restoration and Protection Strategy
WRP	Wetland Reserve Program

Table of Contents

Section 1

Executive Summary

Section 1. Executive Summary

The Mississippi River - Brainerd Watershed (MRBW) spans 1,687 square miles which contains 2,100 miles of river and over 300 lakes. This watershed is rich with natural resources from the Mississippi River, its many lakes, and northern forests. The protection of watershed natural resources is a priority for watershed planning and is apparent in the watershed vision statement.

The Mississippi River - Brainerd Comprehensive Watershed Management Plan (MRBCWMP) was developed in 2022-2023 through the Board of Water and Soil Resources (BWSR) MN Statues §103B.801, commonly known as the One Watershed, One Plan (1W1P) program. This is an effort through BWSR to encourage statewide watershed planning to be done along watershed boundaries, rather than administrative and legal boundaries.

Throughout 2022 and 2023, the MRBCWMP was developed with a land and water resources narrative that describes the watershed, a list of priority issues that will be addressed through this plan, measurable goals, and implementation actions that will address the issues and make progress towards goals. The purpose of the plan is to guide the watershed managers (local counties and soil and water conservation districts) as they work to protect and restore the watershed's resources for the enjoyment of future generations and for maintaining a healthy local economy.

Planning Area

The watershed extends over four counties: Aitkin, Crow Wing, Morrison, and Todd (Figure 1.1). Major towns include Aitkin, Crosby, Brainerd, Baxter, and Little Falls, along with many other smaller communities such as Deerwood and Randall. From north to south, the watershed land cover transitions from forests to agriculture.

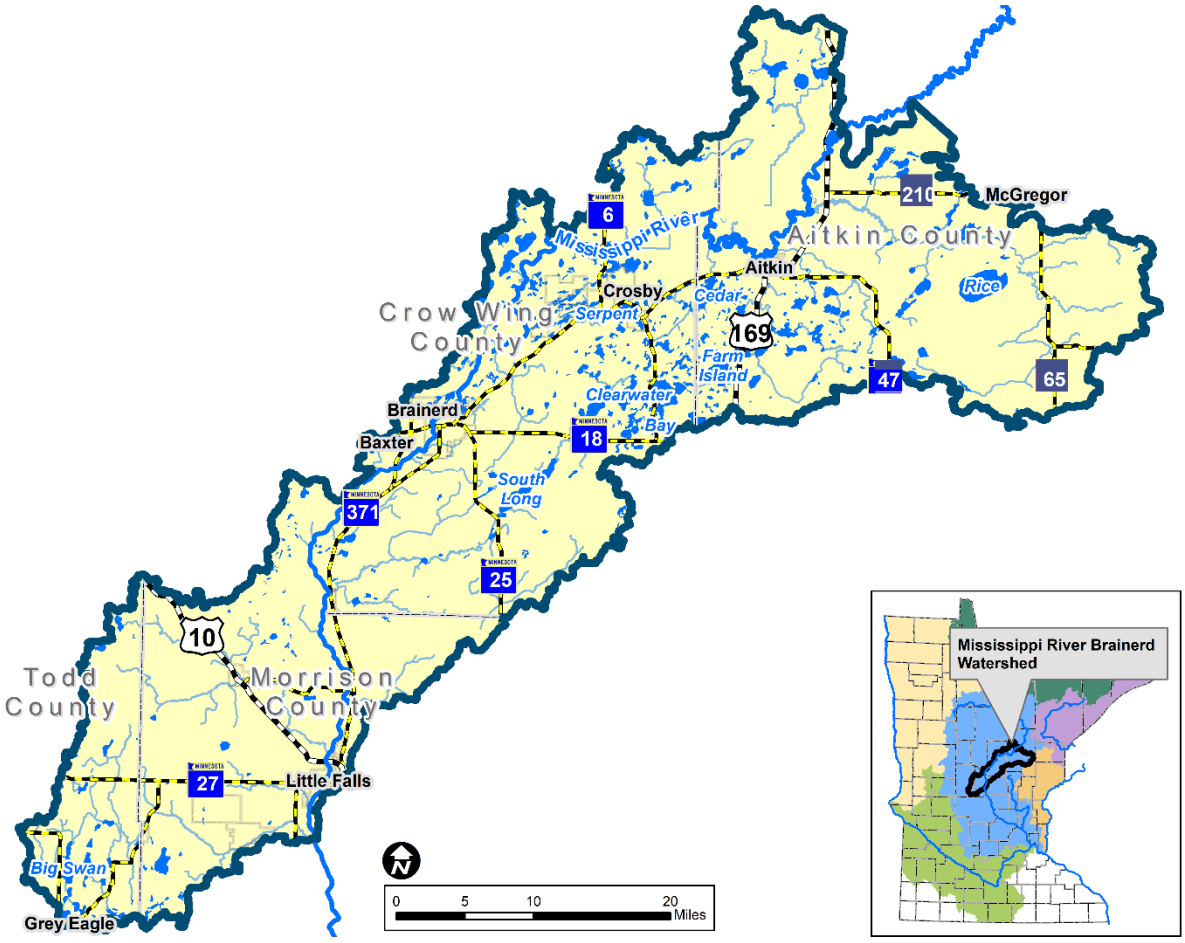


Figure 1.1 Management Zones in the MRBW (MPCA 2020).

Roles and Responsibilities

The MRBCWMP planning effort began with a Memorandum of Agreement (MOA) between Aitkin County, Aitkin Soil and Water Conservation District (SWCD), Crow Wing County, Crow Wing SWCD, Morrison County, Morrison SWCD, Todd County, and Todd SWCD. A representative from each governmental unit was appointed by each county and SWCD board to serve on the Policy Committee, which is the decision-making body for this plan.

The plan content was shaped by the Technical Advisory Committee (TAC), which consisted of the counties and SWCDs in the watershed, State Agencies, Federal Agencies, and other local stakeholders. The Non-Removable Mille Lacs Band of Ojibwe were invited to participate and have

been a valuable partner on the TAC. The Citizen Advisory Committee (CAC), made up of local stakeholders, including lake groups and agricultural producers, provided input on the plan priorities and content.

The Steering Committee guided the planning process, produced the plan content, and developed the details for implementation such as what will be tracked and by whom. The Steering Committee will be the primary implementors of the plan. The Advisory Committees are partners in plan implementation.

Community Engagement

Public Kickoff

Community input was sought at the beginning of the planning process. The MRBCWMP began with a public survey and kick-off meeting in June 2022 at the Environmental Classroom on the Camp Ripley military installation. The event had great attendance; 71 participants learned about the watershed, the planning effort, and provided input on their concerns to be addressed by the plan. Figure 1.2 shows responses to the question "Name three priority concerns in your county that you think should be targeted or addressed by this plan".

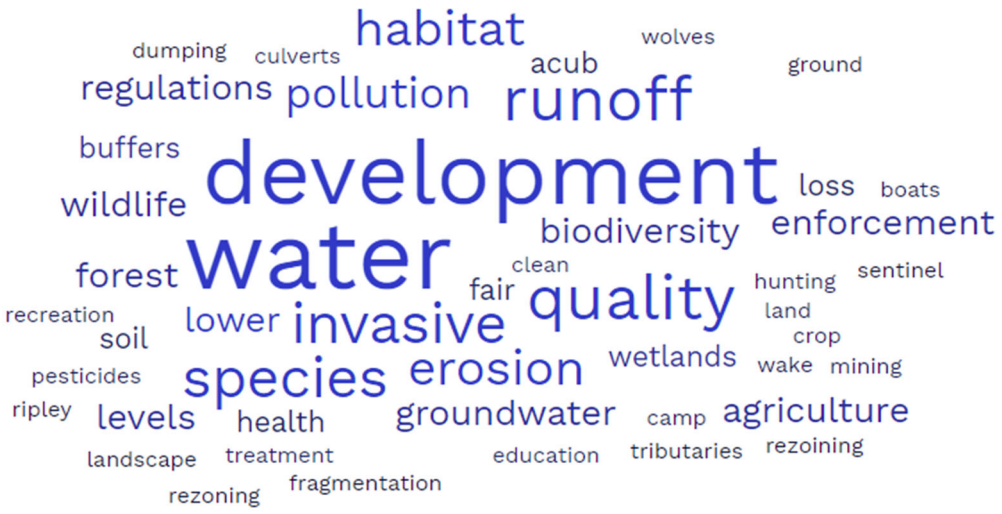


Figure 1.2. Word cloud from the public survey in June 2022.

To see the full results of the survey, see Appendix B.

Citizen Advisory Committee

The CAC met three times throughout the planning process to provide input to plan content (Figure 1.3). For a full report on their input, see Appendix C.

Beginning
- Brainstormed and prioritized issues

Middle
- Developed plan actions

End
- Reviewed full plan

Figure 1.3. Citizen Advisory Committee input throughout the planning process.

Priority Issues

The public and CAC responses, along with issues discussed in watershed reports from Minnesota Pollution Control Agency (MPCA) and committee input, led to prioritization of issues facing the watershed that will be addressed through implementation of this plan.

Priority issues that will be the focus of implementation efforts in the 10-year plan are listed in Table 1.3. The main theme of the issue statement is shown in **bold** text. In Section 3, these issues were prioritized for further targeting of implementation.

Table 1.3. Issues table with resource concern.

Resource Concern	Issues Statement
	**Altered hydrology** (channelized streams and ditch systems) increases peak flows and erosion and has led to biologically impaired streams.
	**Nutrients** from lakeshore development, internal loading, and land use changes contribute to algal growth along with recreational and biological impairments.
	**Stormwater runoff** contributes sediment, nutrients, and pollutants to water bodies.
 	**Sufficient protection** is needed for outstanding resources and sensitive species to maintain water and habitat quality.
	**Groundwater quality** is vulnerable to contamination.
	**Riparian and in-lake alteration** from development impacts water quality, lake health, and fish communities.
	**Forest fragmentation** due to urban and agricultural land use changes impacts water quality, infiltration, and habitat.
	**Forest health** is vulnerable to climate change, pests, and invasive species, which can affect species composition and forest productivity.
	**Soil health** is important for agricultural productivity, water quality, and climate change resilience.
	**Eroding streambanks** contribute to turbidity impairments and reduced habitat quality.

Resource Concern	Issues Statement
SURFACE WATER LAND	**Bacteria** can cause aquatic recreation and aquatic life impairments.
SURFACE WATER	**Wetland restoration and protection** is necessary to store water, provide habitat, and improve downstream water quality.
GROUND WATER	**Groundwater sustainability** is vulnerable to overuse and loss of recharge.
HABITAT/FORESTRY	**Aquatic invasive species** (AIS) decrease biodiversity and impact recreation.

Sebie Lake with the Nokasippi River Flowing into it.

Measurable Goals

Seven measurable goals, listed in Table 1.4, were developed to set a quantifiable change in a resource condition expected by the end of the 10-year plan implementation. Section 5 includes focus area maps showing where efforts will be directed, and additional benefits that progress towards a given goal would make in other areas (water storage, carbon sequestration, protected habitat).

Table 1.4. Short term goals in MRBW.

Goal Name	Goal Description
Protection	Protect and enhance of forest cover, focus lakes and streams, and groundwater through adding **14,765 acres** of conservation easements, Sustainable Forest Incentive Act (SFIA), and acquisitions in priority minor watersheds.
Agricultural Land Management	Implement **7,130 acres** of agricultural best management practices (BMPs) including cover crops, nutrient management, pasture management, and conservation tillage.
Phosphorus Reduction	Reduce phosphorus loading in nearshore focus lakes by **5%** and watershed focus lakes by **10 pounds/year**.
Urban Stormwater Management	Develop a comprehensive stormwater information data set for **8 cities** that have drainage to a priority lake or stream.
Drinking Water Protection	Protect or manage with BMPs **160 acres** in high vulnerability Drinking Water Supply Management Areas (DWSMAs). Seal 10 unused wells per year.
Shoreland Restoration	Enhance **2 miles** of shoreline or streambank around focus lakes and streams.
Water Retention	Build resiliency by adding **400 acre-ft** of storage through cover crops and stormwater management.

Cuyuna Recreational Area

Implementation

The targeted implementation schedule (Section 6) includes tables for each of the seven goals, which includes actions to make progress towards goals, targeted resources, entities responsible for implementation, a timeline, and cost estimate. The estimated total funding available annually for implementation is $1,300,000, plus any additional partner funding (Table 1.5). This includes current funding available in the watershed, plus watershed-based implementation funding from BWSR available upon approval of the MRBCWMP.

Table 1.5. Total estimated costs for implementing the MRBCWMP.

Funding Level	Description	Estimated Plan Total (10 years)	Estimated Annual Average
Level 1	Current Baseline Funding	$6,664,000	$666,400
Level 2	**Baseline + Watershed-Based Funding**	**$13,000,000**	**$1,300,000**
Level 3	Partner funding (i.e., TNC, CRP, NRCS, SFIA)	$28,190,000	$2,819,000
Total Level 2+3*		$41,190,000	$4,119,000

*Level 1 is not included in the overall total because Level 2 includes Level 1

Implementation actions will be carried out through four programs: Planned Landscape Management, Constructed Environmental Enhancements, Protected Lands Maintenance, and Data Collection and Outreach (Figure 1.4).

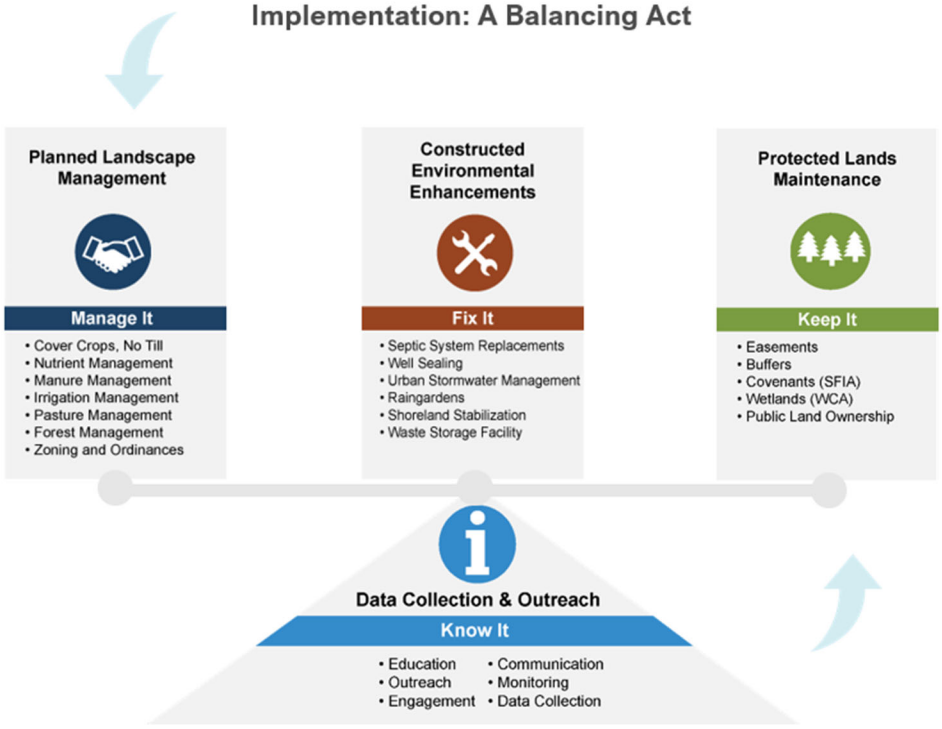


Figure 1.4. Implementation Programs in the MRBW.

Plan progress over the 10-year lifespan of the MRBCWMP will be tracked by the MRBW Partnership through tracking metrics and annual assessments. A five-year evaluation will take place to assess the plan's progress.

The overall benefits achieved through plan implementation are shown in Table 1.6. While making progress towards specific measurable goals, implementation is expected to result in surface water quality improvements, expanded habitat, and enhanced climate resiliency through water and carbon storage.

Table 1.6. Overall benefits from implementing this 10-year plan.

Surface Water Quality Benefits	**Phosphorus**: the pounds of phosphorus reduced by implementing all plan goals.	**1,069 pounds/year; equivalent to:** **535,000 pounds of algae**
	Sediment: the tons of phosphorus reduced by implementing all plan goals.	**159 tons/year; equivalent to:** **16 dump trucks of sediment**
	Nitrogen: the pounds of nitrogen reduced by implementing all plan goals.	**9,029 lbs/year; equivalent to:** **2,257 bags of nitrogen fertilizer**
Habitat Benefits	**Habitat**: acres of forest protected by implementing all plan goals.	**14,765 acres; equivalent to:** **Area covered by 11,200 football fields.**
	Habitat: length of shoreland and riparian land restored by implementing all plan goals.	**2 miles; equivalent to:** **The length of 30 football fields.**
Climate Resiliency Benefits	**Storage**: the amount of new water storage on the landscape or in the soil by implementing all plan goals.	**400 acre-feet; equivalent to:** **400 football fields covered in 1 foot of water**
	Carbon: the amount of carbon stored and sequestered by implementing plan goals.	**386,000 tons; equivalent to:** **Removing 285,700 gas vehicles driven for one year**

Plan Administration and Coordination

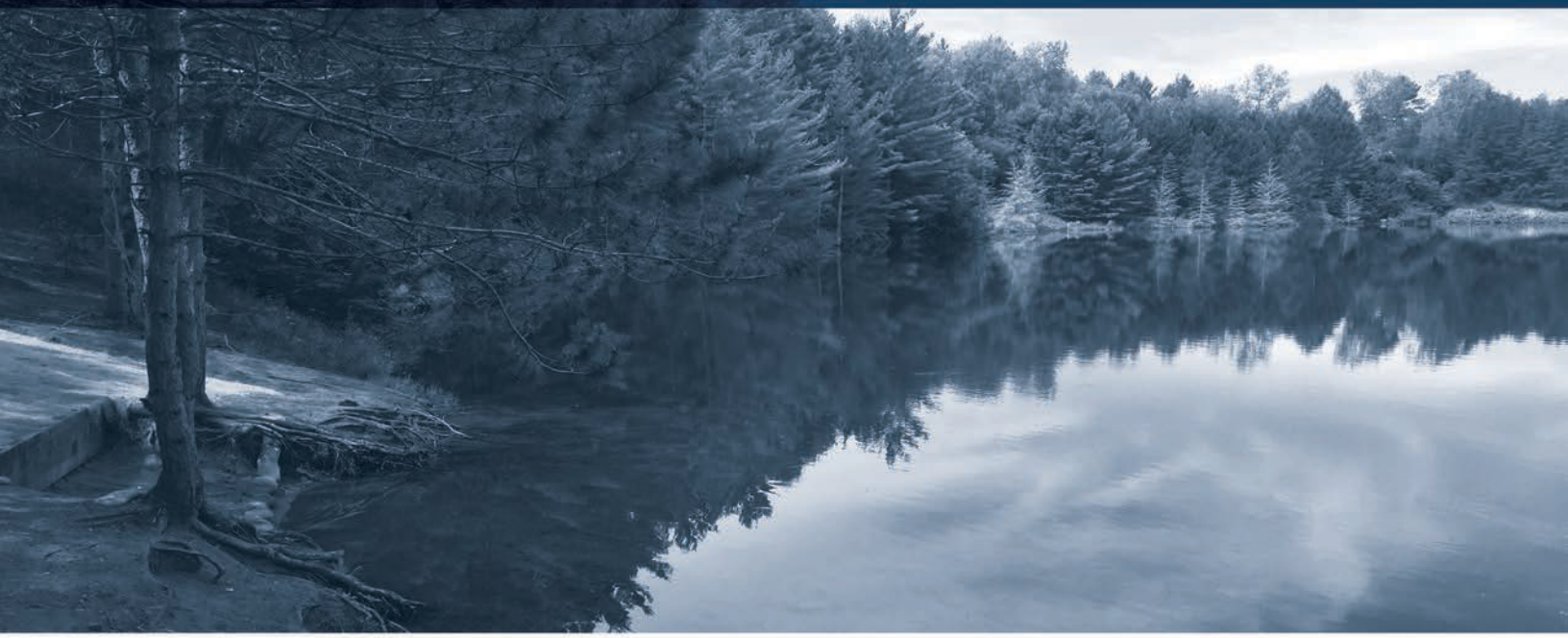
Plan Administration describes how the plan will be implemented, how the watershed partners will work together, how the funding will move between them, and who will handle the administrative duties. The MRBCWMP will be implemented through a MOA between the local governments in Figure 1.5. The local government units (LGUs) in the MOA will be collectively referred to as the MRBW Partnership.

Figure 1.5. Members of the MRBW Partnership.

Implementation of the MRBCWMP is voluntary, and outreach and incentives will be used to assist with voluntary implementation on private lands. Collaboration with local groups continued throughout the planning process and will be critical to the success of the plan. Committees that convened for planning will continue into implementation in the same roles.

Section 2

Land & Water Resource Narrative



Section 2. Land and Water Resource Narrative

The MRBW conjures up thoughts of water-based recreation, tourism, and cabins. This area has been the hub of north-central Minnesota for thousands of years. Everything from cultural significance, to commerce, to recreation is defined by the Mississippi River flowing through this area.

This is not the Mississippi River of Mark Twain, "the big muddy". This is the Mississippi of the Ojibwe and of Zebulon Pike; sky blue waters teeming with fish and endless forests home to a vast array of wildlife and game.

Mississippi River
"Great River"

Derived from the French rendering of the Ojibwe name for the river

Gichi – ziibi
"Big River"

Ojibwe name for the stretch of the Mississippi from the Leech Lake River to the Crow Wing River (Figure 2.1)

The MRBW covers 1,687 square miles, 81% of which is in the Northern Lakes and Forests Ecoregion, the rest in the North Central Hardwood Forests Ecoregion (MPCA 2020a). It spans four counties: Aitkin, Crow Wing, Morrison, and Todd, and includes the large cities of Aitkin, Brainerd, Baxter, and Little Falls (Figure 2.2). With approximately 2,100 river miles and over 200 lakes greater than 10 acres, this watershed is rich with water resources (MPCA 2019).

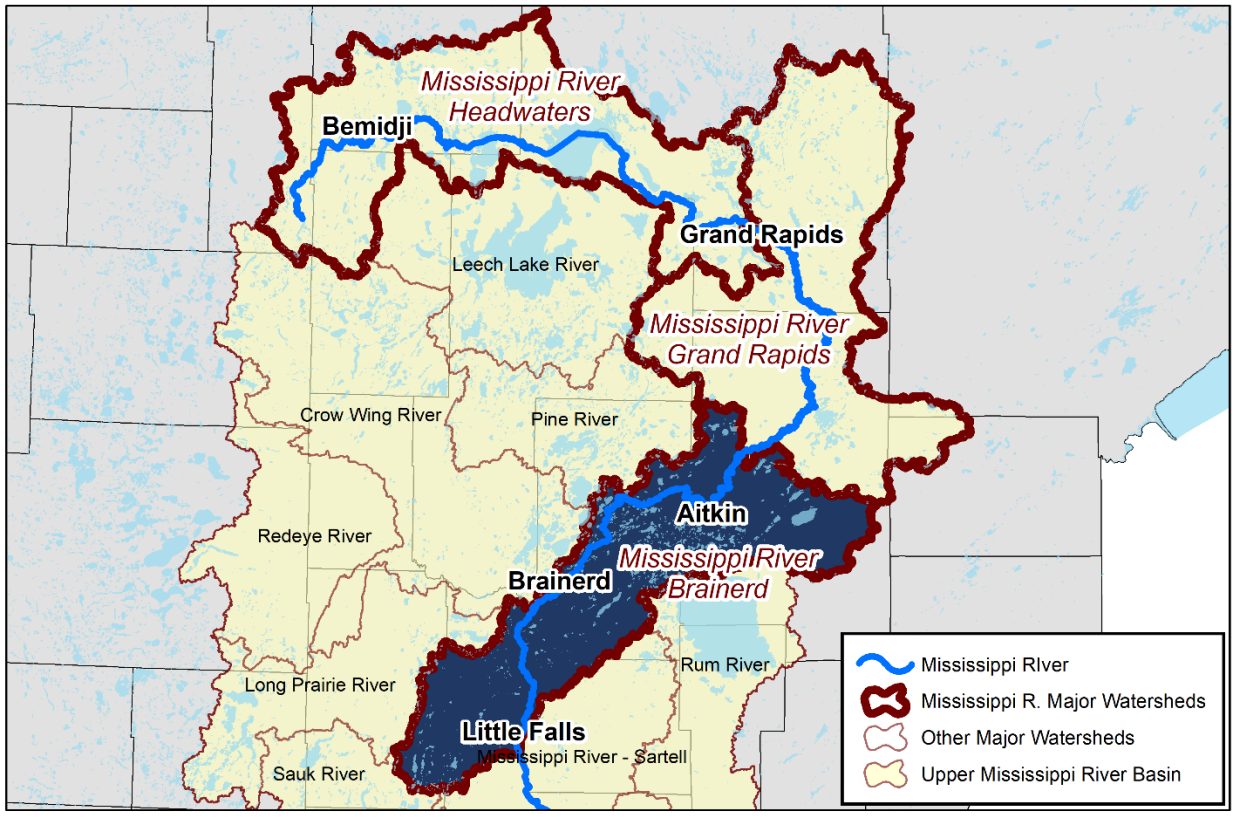


Figure 2.1. Major Watersheds in the Upper Mississippi Basin.

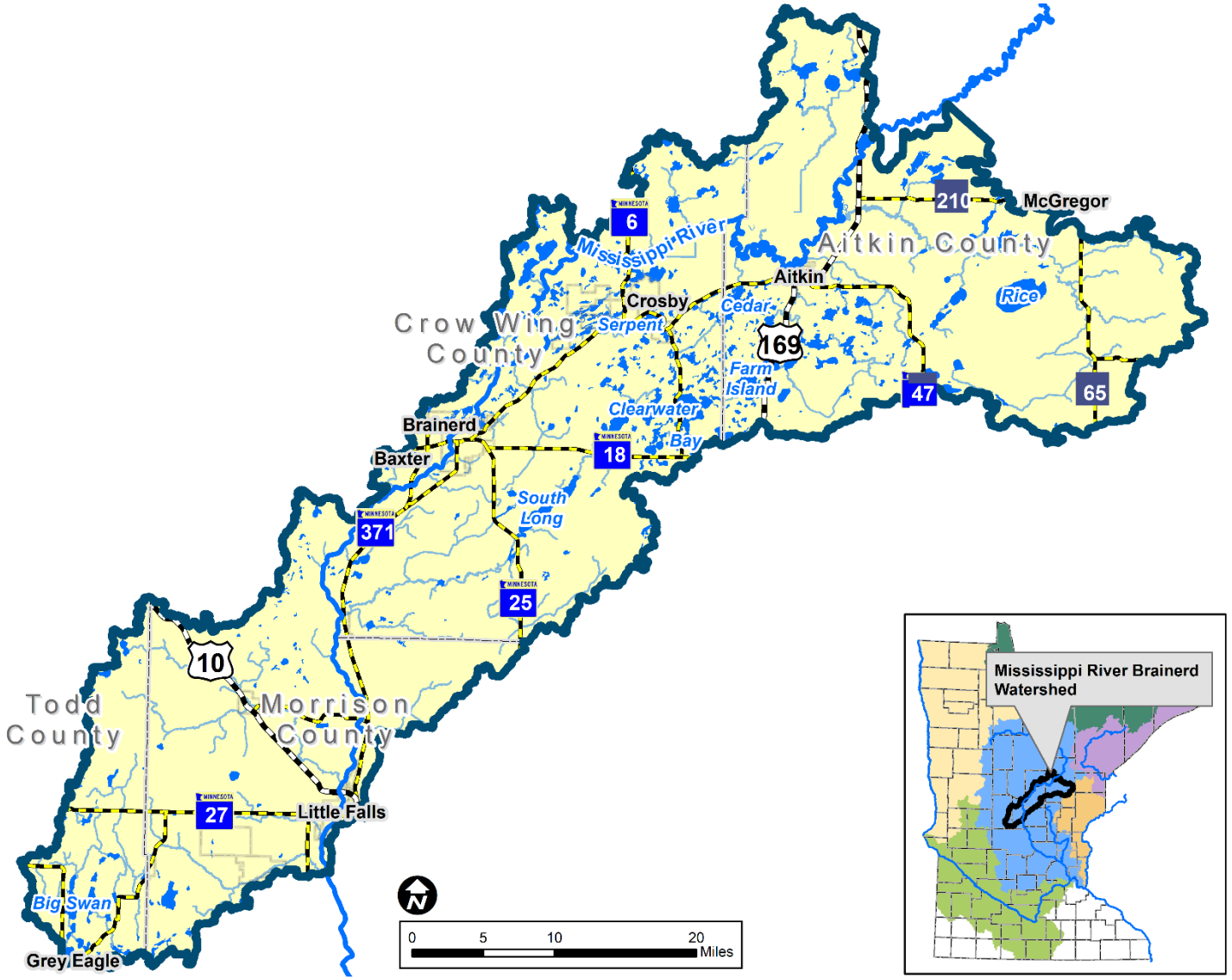


Figure 2.2. Location of the MRBW.

Past

Glaciation and Soils

Glaciation in the last ice age shaped the watershed features and soils found today. Toward the close of the Wisconsin stage of glaciation about 12,000 years ago, the waning lobe of the ice sheet in the Brainerd area retreated westward, leaving in its wake many stagnant ice blocks in a gravel outwash plain. On melting, the detached blocks left permanent, water-filled depressions in the gravel plain thereby forming the many lakes in the watershed (Geological Society of Minnesota). Glacial Lake Aitkin, which was about 20 miles long and five miles wide, formed on the northern border of the St. Louis lobe as it retreated, and now makes up the present-day Mississippi River valley between Grand Rapids and Aitkin (Figure 2.3). The lakebed is now a sandy and clay plain, in addition to peatlands.

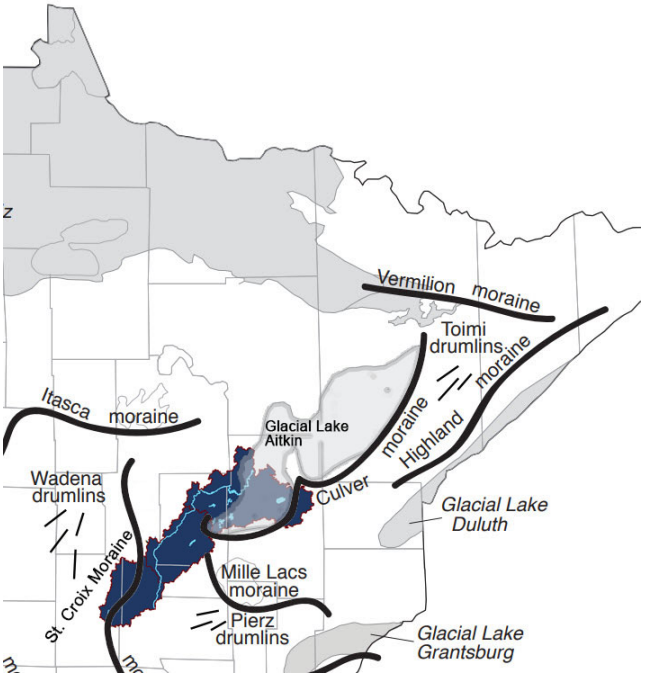


Figure 2.3. Glacial features in Northern Minnesota (Lusardi 1994). The MRBW is highlighted in navy blue.

People

Humans have lived along the banks of the Upper Mississippi River for nearly 12,000 years. Over 10,000 years ago, while megafauna such as mammoths and giant beavers roamed Minnesota, the earliest known people in Minnesota (the Clovis) were nomadic hunters. Following Clovis, the Archaic peoples first appeared in Minnesota around 7000-6000 BC when nearly the entire state would have been prairie. The Woodland people were 1000 BC to 1700 AD. They settled in permanent villages and are known for complex burial mounds and pottery (MN Archeology 2022). Wild rice became important during this time.

As Europeans began settling North America in the 1500-1600s, the Ojibwe began migrating west from the Atlantic coast to the place “where food grows on the water” (wild rice or Manoomin). By the mid-1700s, the Ojibwe had established themselves in north and central Minnesota, including the MRBW. Between 1837 and 1867 a series of treaties were signed by Ojibwe bands in Minnesota ceding vast tribal territories to the United States, but reserved the right to hunt, fish, and gather on the ceded lands. In the treaty of 1855, the United States government set aside 61,000 acres of land south and west of Mille Lacs Lake, which became the Mille Lacs Band of Ojibwe Reservation. In 1862, due to their instrumental role keeping peace among the Ojibwe during the Dakota war in Minnesota, the Mille Lacs Band received a guarantee in the 1863 and 1864 treaties with the United States government that Band members would not be forced to leave the Mille Lacs Reservation, becoming henceforth the Non-Removable Mille Lacs Band of Ojibwe (https://millelacsband.com/).

Today, the Non-Removable Mille Lacs Band of Ojibwe remain a sovereign nation.

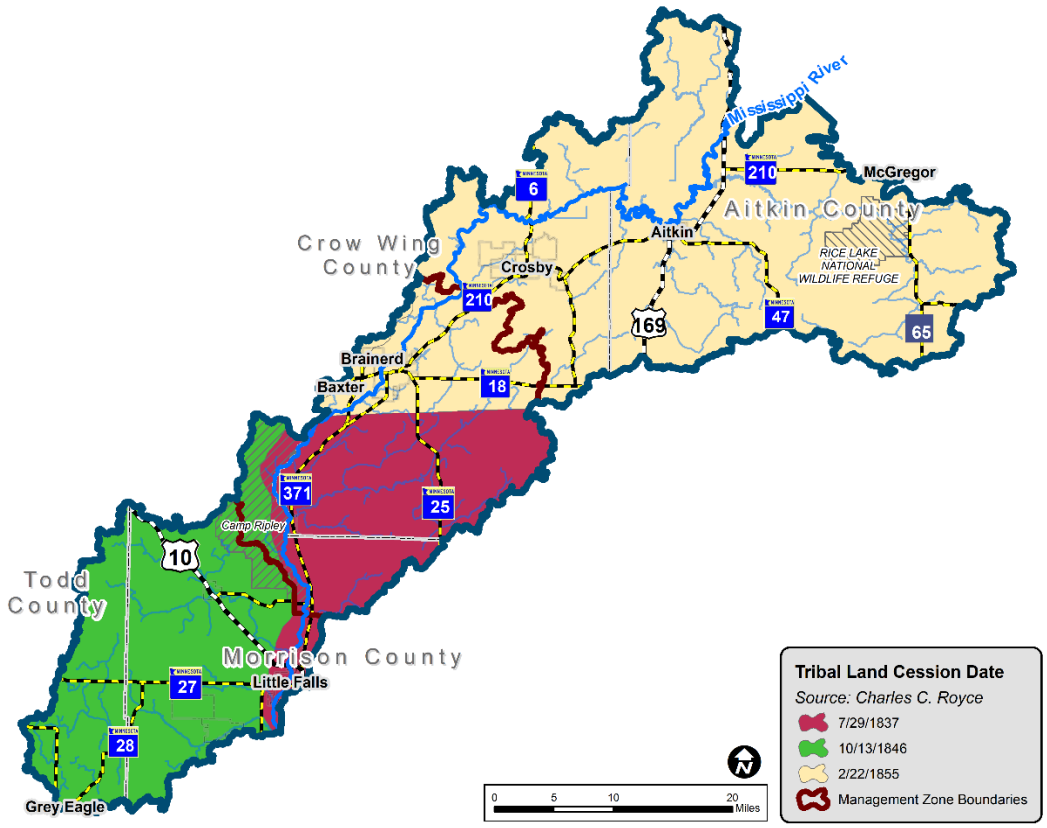
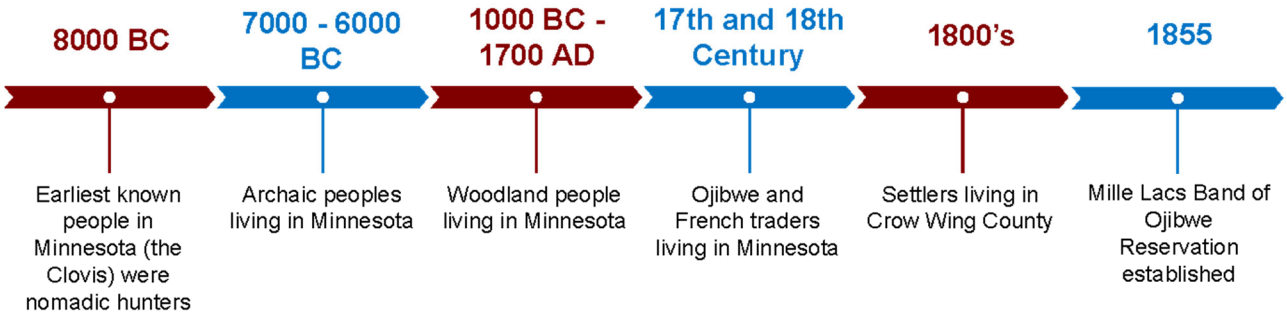


Figure 2.4. Tribal Land cession dates in the MRBW.

The Ojibwe were living in the watershed during the arrival of French traders to Minnesota in the late 17th and early 18th century. This brought settlers to Crow Wing County in the early 1800s and logging of the dense pine forest fueled the local economy. Early logging and agriculture resulted in straightening of streams and large losses of soil that is carried down the Mississippi in a sediment load that is still elevated today.



Present

Climate

The climate of the MRBW is characterized by cold winters and warm summers, which influence the fish, wildlife, and tree species in the watershed. This climate has been changing, becoming warmer and more variable in precipitation (Figure 2.5). Minnesota winters are warming the most quickly, which translates to less ice cover on lakes. Frozen ground conditions have already declined by 12-24 days per winter and are expected to shrink by another 20 days per winter by the end of the century. This change means less snow and more winter rain. Black spruce, Quaking aspen and Paper birch could be replaced by Sugar maple and White oak (Handler et al. 2017). If these changes continue, the Brainerd area's climate would become more like Des Moines, Iowa by the year 2070 (National Geographic 2020).

	Winter	Spring	Summer	Fall	Annual Precipitation
Current Averages (1895-2018)	14F	41F	67F	44F	28.5 Inches
Observed Changes (1989-2018)	+3F	+1.3F	+0.8F	+1.4F	+1.9 Inches

Figure 2.5. Current climate averages and observed changes (DNR 2022).

Surface Water

The MRBW is brimming with water above and below the surface. A third of the surface area of the watershed is covered by water (6% open water and 28% wetlands). This surface water includes more than 300 lakes (>10 acres), and 2,100 river miles (MPCA 2019).

The **Mississippi River** enters the watershed after its confluence with the Willow River, just north of Hassman, MN. It then flows 119 miles southwesterly through Aitkin and Brainerd/Baxter, turning south at Fort Ripley to Little Falls and its confluence with the Swan River (Figure 2.2). Major tributaries include the Rice River, Ripple River, Little Willow River, Little Elk River, Nokassippi River, and Swan River.

The Mississippi River provides **drinking water** to over one million people in Saint Cloud, Minneapolis, and Saint Paul. Minneapolis alone pumps approximately 21 billion gallons of water from the Mississippi River annually. Aquifer depletion accelerated by population growth in these metro areas is forcing communities to increase their usage of the river as a drinking water source.

Due to the relatively flat nature of Aitkin County and a large "U" turn in the river, the area is prone to flooding. Following a severe flood in 1950, the U.S. Army Corps of Engineers designed a diversion across the top of the "U" that is 6.25 miles long and cuts off 24 miles of river. The purpose is to carry flood water away from Aitkin. Many tributaries to the diversion channel have drop structures installed at their outlets to prevent high water in the diversion channel from backing up and flooding the surrounding landscape. While these structures help with flood reduction, many of them act as fish barriers by limiting fish migration into upstream habitats (MPCA 2019). Approximately 31% of the streams are considered altered from their natural state, with most of these alterations occurring north and east of Aitkin. Straightening of streams in this area helped in getting logs downstream to the sawmills in the early 1900s (MPCA 2020a).

Credit: Mitch Brinks

The **lakes** in the watershed are regionally significant for recreation and tourism, forming much of the reason Crow Wing County's tagline is "Minnesota's Favorite Place". In fact, six lakes are over 1,000 acres including Cedar, Farm Island, and Rice lakes in Aitkin County, and Serpent, Bay, and South Long lakes in Crow Wing County. Many of these lakes house sensitive species, including 49 lakes with Outstanding Biological Significance, seven Cisco lakes, and 91 Wild Rice lakes (Figure 2.6).

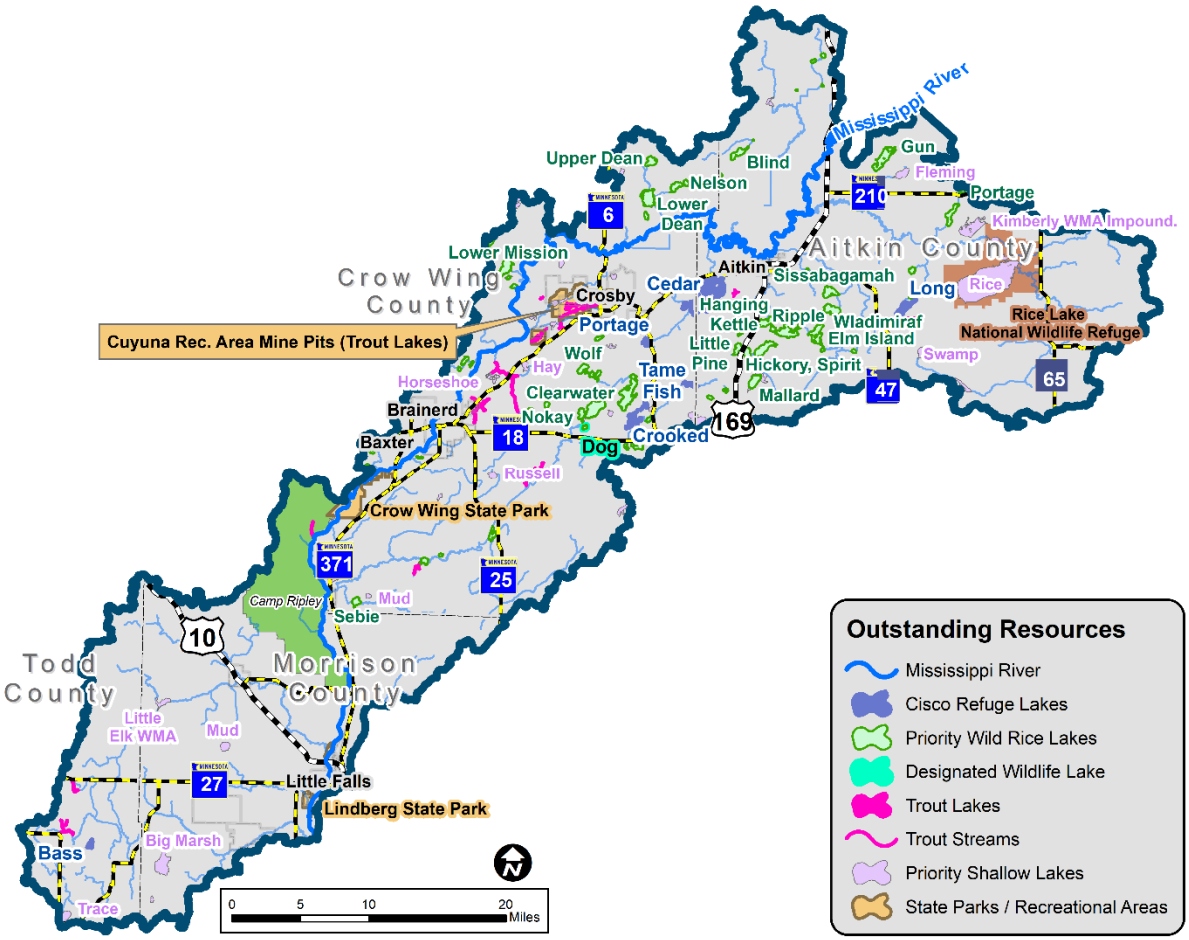


Figure 2.6. Outstanding resources in the MRBW.

In 2020 the MPCA completed a **Watershed Restoration and Protection Strategy** (WRAPS). This study involved intensive lake and stream monitoring and resulted in 18 lakes not supporting aquatic recreation (excess nutrients), nine stream reaches not supporting aquatic recreation (*E.coli*), and 16 stream reaches not supporting aquatic life (fish and macroinvertebrates). In addition, the stretch of the Mississippi River from Aitkin to Camp Ripley is impaired for sediment. Non-point pollution sources in the watershed include fertilizer and manure runoff, feedlots, urban stormwater, shoreland development, septic systems, internal loading in shallow lakes, and livestock overgrazing along streambanks (MPCA 2020).

Groundwater

In addition to the vast amount of surface water, the MRBW is rich with groundwater. As a result of past glaciations, the area has shallow sand aquifers in thick sandy and clayey glacial drift (MPCA 2019). These surficial aquifers have high potential **recharge** from precipitation since the depth from the surface to the aquifer can be as shallow as 10 feet. The average annual potential recharge rate to surficial minerals averages five inches per year. The statewide potential recharge is estimated to be four inches per year; therefore, the MRBW receives roughly an inch greater average potential recharge per year (Smith and Westenbroek, 2015).

This abundant groundwater is **withdrawn** for many purposes, including agricultural irrigation (53.4% of use), water supply (39.1% of use), non-crop irrigation (3.5% of use), water level maintenance (2.3% of use), industrial processing (1.2% of use), and special categories (0.4% of use) (DNR 2022a).

These surficial aquifers can also be vulnerable to contamination. All the **drinking water** in the MRBW is sourced from groundwater including the cities and approximately 8,135 known private wells. Approximately 0.7% of all private wells sampled for nitrate have levels higher than the state standard of 10 milligrams per liter (mg/L). High nitrate levels indicate impacts from land use and tend to occur in shallower wells, with 3% of total samples collected in wells less than 50 feet in depth exceeding the state standard of 10mg/L and 15% of samples exceeding 3 mg/L.

There are 17 DWSMAs in the watershed, and all of them have moderate or high vulnerability (Figure 2.7). The Minnesota Department of Health (MDH) recommends focusing on impacts from land use practices and surface water runoff in these areas.

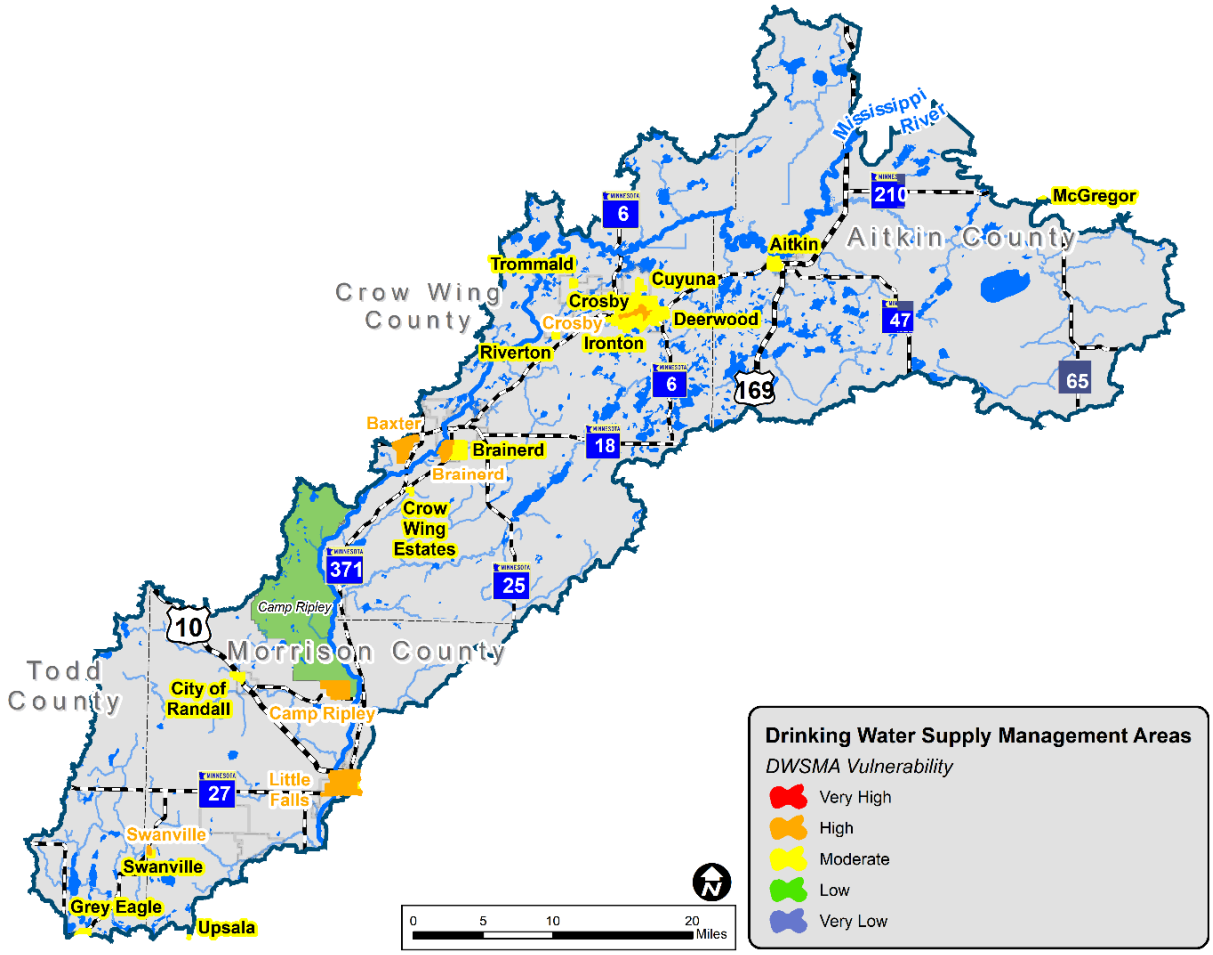


Figure 2.7. Vulnerability of Drinking Water Supply Management Areas in the MRBW.

Land Use

Over half the land in the watershed is forests, wetlands, and water, especially in the northern third of the watershed (Figure 2.8). Though they have been somewhat altered by past logging and human development, keeping these forests and wetlands intact is paramount to the outstanding water quality in the watershed.

Forests act as a giant sponge, with giant tree roots pulling precipitation down into the ground instead of running off the surface. Protecting these forests and reforesting marginal areas is key to maintaining the water quality in the watershed.

The forests transition into **pasture** and **cropland** as the crow flies south along the Mississippi River (Figure 2.9). Areas that were cleared by logging were opened for farming in the mid-1900s. Animal agriculture includes dairy, beef, poultry, and pork. The most common crops grown are cultivated perennials, corn, and soybeans (DNR 2022b).

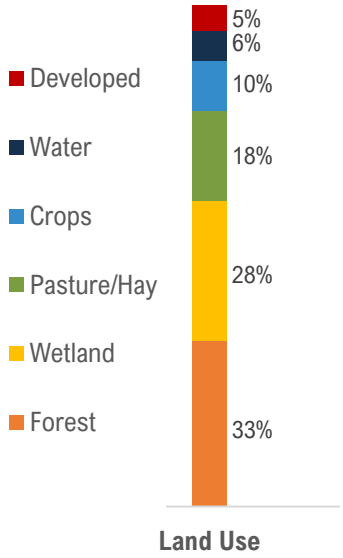


Figure 2.8. Land use percentages in the MRBW.

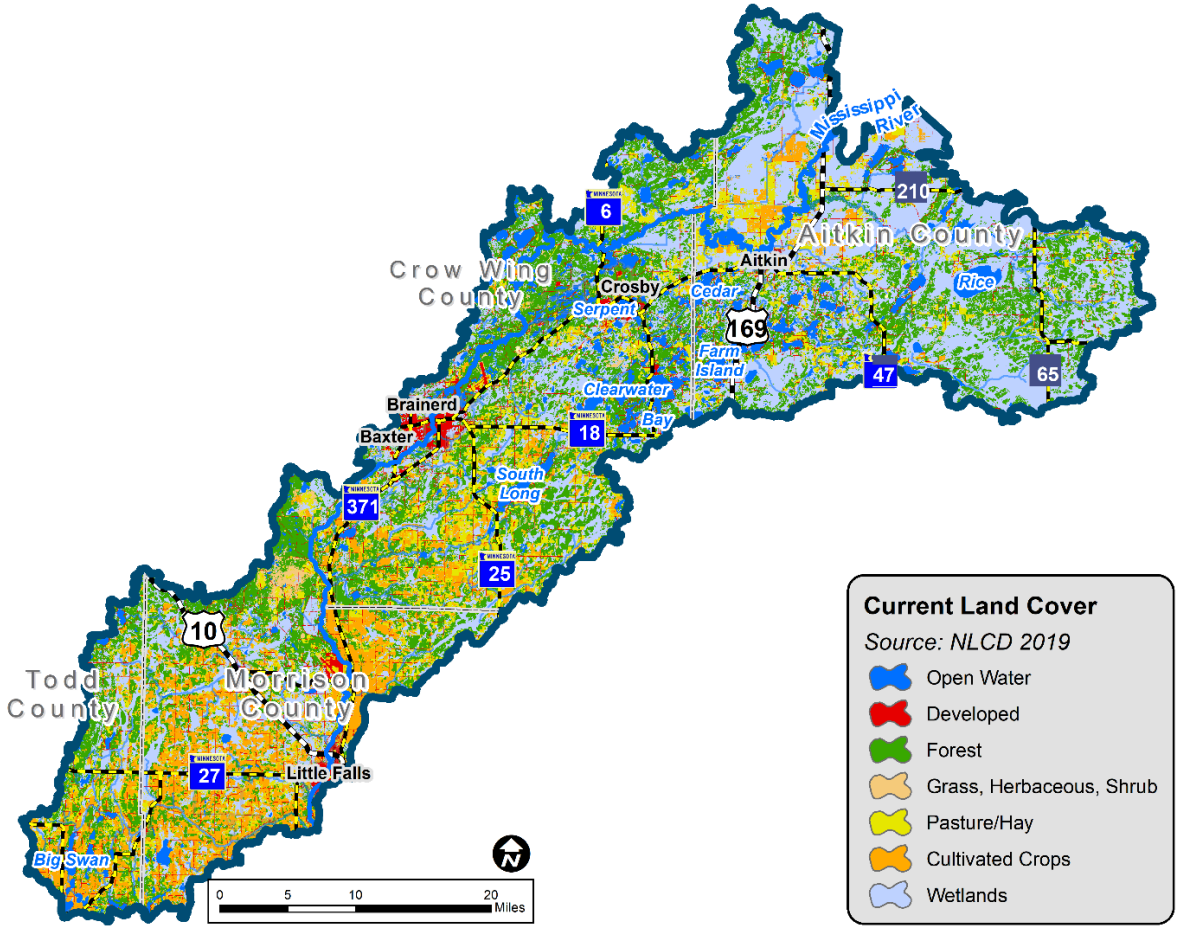


Figure 2.9. Land cover in the MRBW.

Habitat and Recreation

The forests, wetlands, and water resources in the MRBW provide **habitat** to a myriad of fish and wildlife species. The US Fish and Wildlife Service (USFWS) lists the Canada lynx, Gray wolf, and Northern long-eared bat as threatened species under the Ecological Services Program. 22 migratory birds are listed as 'of concern' by the USFWS because their range includes this watershed, or it is protected under the Eagle Act (USFWS 2022). Some areas have been permanently protected to provide resilient sites for climate change, habitat corridors, and larger tracts of habitat such as the Rice Lake National Wildlife Refuge, 36 Wildlife Management Areas, 11 Aquatic Management Areas, and two Scenic and Natural Areas.

Trout and Cisco, which need cold, clean, and well-oxygenated water are present in the lakes and streams of the watershed. These species can be a "canary in the coal mine" and their absence can indicate degrading water quality and climate variability.

Keeping Farms-Farm and Forests-Forests, the **Camp Ripley Sentinel Landscape Army Compatible Use Buffer (ACUB) Protection program**, through local efforts, has permanently protected over 33,000 acres via ACUB conservation easements and over 2,900 acres via ACUB fee title for a total of over 35,900 permanently protected acres within the designated ACUB work area. The ACUB is a three-mile buffer around Camp Ripley to minimize conflicts between military training exercises and residential areas. Of the over 35,900 permanently protected ACUB acres, over 26,000 acres of that permanent protection occur within the MRBW. Also, the ACUB program further supports Minnesota's Wildlife Action Plan 2015-2025 by ensuring the long-term health and viability of Minnesota's wildlife with a focus on species that are rare, declining, or vulnerable to decline. It enhances opportunities to enjoy Species in Greatest Conservation Need (SGCN) and other wildlife by preventing habitat loss, degradation, and fragmentation.

Cuyuna State Recreation Area
Credit: Jeremiah Jazdzewski

Additional efforts within the MRBW have resulted in over 1,000 acres of permanent protection via regular Reinvest in Minnesota (RIM) and Mississippi River Habitat Corridor easements in Morrison County.

These same forest and water resources that provide habitat also provide **recreational opportunities** for humans. The Mississippi River from its source to the Minnesota/Iowa border is designated as a State Water Trail. The Cuyuna State Recreation Area and Crow Wing State Park offer biking, camping, trout fishing, and canoeing.

Demographics

The **demographics** in the watershed reflect the watershed's location in northern Minnesota and the ample lakes that people choose to retire to (USCB 2020).

67,000 total population

48 median age
20% population under 18
26% population over 65

$54,715 median household income
10% in poverty

96% white
2% hispanic
1% native american
1% black

Rapid growth has occurred in the past 50 years because of the tourism and recreational opportunities in the area, especially in Brainerd, Baxter, Aitkin, Little Falls, and along desirable shoreland (Figure 2.10). The tax data of Crow Wing and Aitkin Counties illustrates the prominence of seasonal lake homes, showing the population grows from 37-41% in the summer due to seasonal residents. In addition, 26% of the population is over the age of 65. Minnesota State Highways 371 and 210 are the main conduit to northern Minnesota through this area, with as many as 11,000 daily cars on average in the summer (Crow Wing County).

Crow Wing County

37% of the tax base is seasonal properties

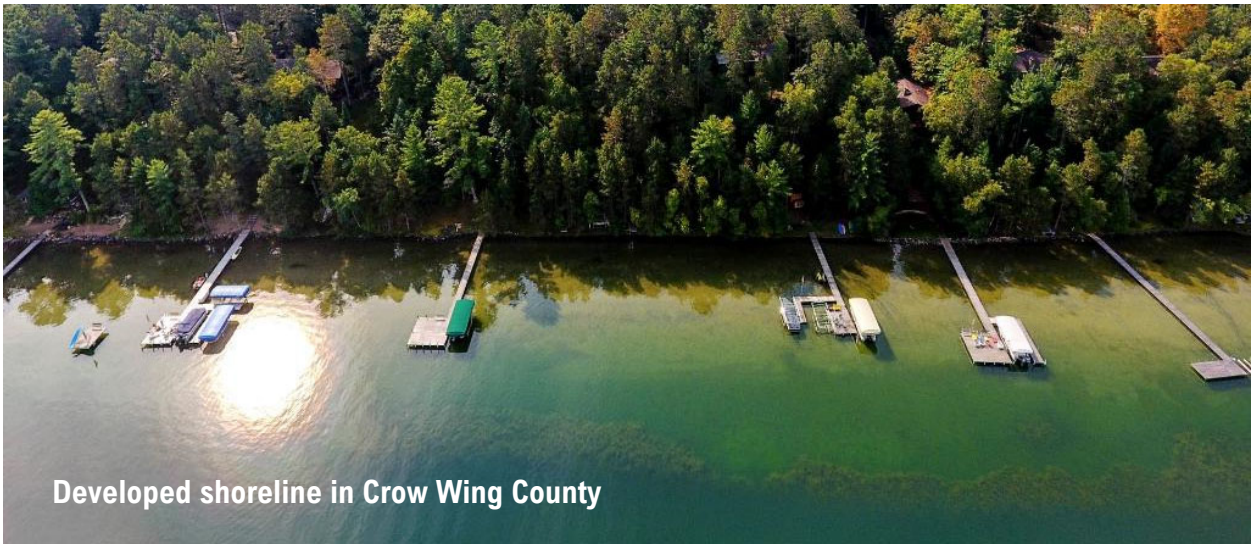
3% of the tax base is agricultural properties

Aitkin County

41% of the tax base is seasonal properties

11% of the tax base is agricultural properties

Tax base data was obtained from the county assessor. Morrison and Todd counties weren't included in this section because they don't have significant seasonal residents.



Developed shoreline in Crow Wing County

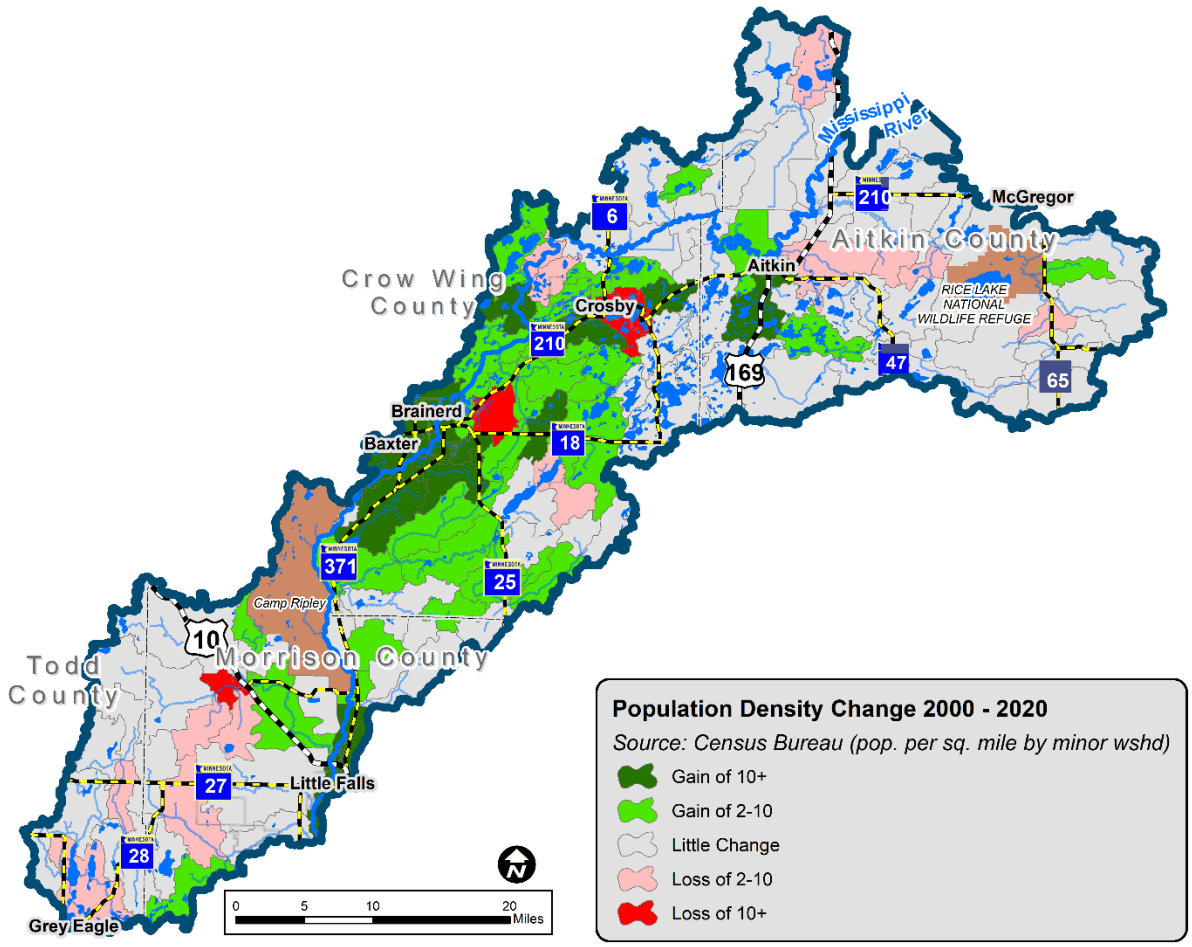


Figure 2.10. Population growth in the MRBW.

Future

Like those who came before, the MRBW continues to be a hub of north-central Minnesota for commerce, recreation, and tourism. The sky-blue waters teeming with fish and endless forests home to wildlife and game are still here, but human impacts are evident. Local, state, and federal partners have spent over $67 million in the watershed since 2004 protecting and restoring lakes and streams (MPCA 2022). In the future, it is essential to continue to protect the resources in the watershed and for we humans to recognize that what we do on the land impacts the water. We all must assume the care of these cherished resources that we all enjoy and ensure their quality for future generations.

Section 3
Priority Issues

Section 3. Priority Issues

Issues are any environmental concern that can be addressed to protect or restore natural resources in the watershed. Issues were compiled and prioritized over the course of three months by compiling information from existing plans and studies; developing and revising the information at Public, Citizen Advisory, Technical Advisory, and Policy Committee meetings; and then determining priority issues (F*igure 3.1*). The priority issues will be the focus of this plan.

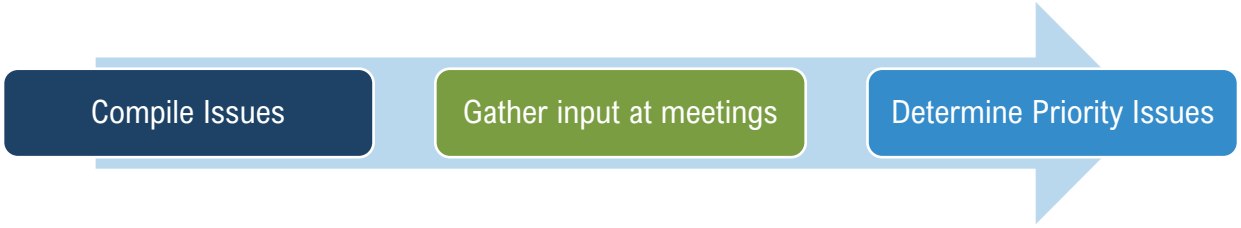


Figure 3.1. Process for determining priority issues.

Compile Issues

In spring of 2022, issues were gathered from numerous sources including existing county water plans, the WRAPS, priority concern letters from state agencies and organizations, an online public survey, and a public kick-off event (Figure 3.2). These issues were synthesized into issue statements by the Steering Committee.

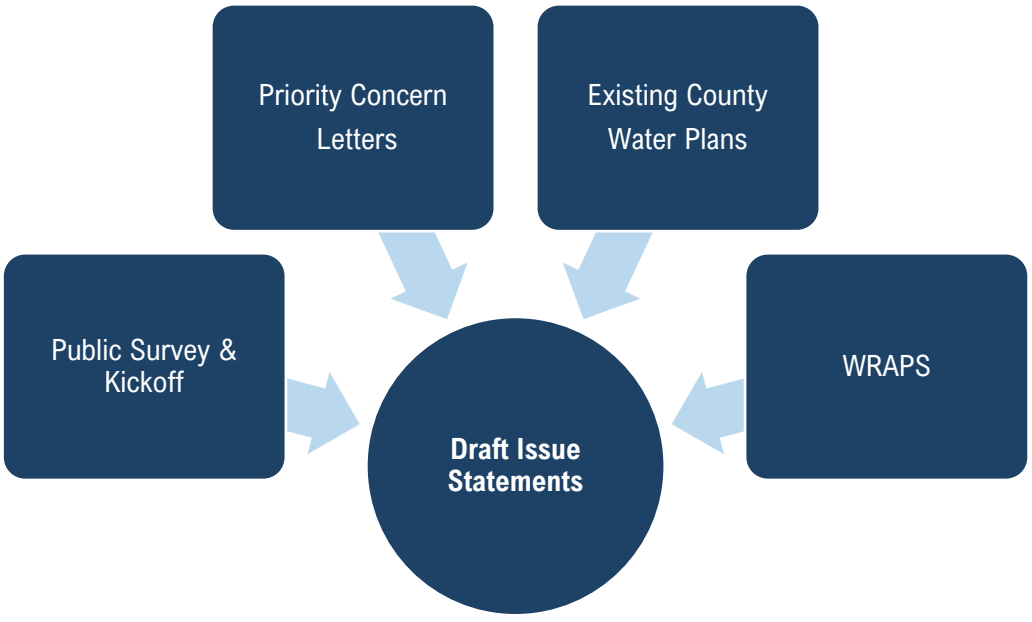


Figure 3.2. Process for developing draft issue statements.

The issue statements were split into four Resource Categories for ease in understanding (Table 3.1).

Table 3.1. Resource categories in the MRBW.

Resource Category	SURFACE WATER	GROUND WATER	HABITAT/FORESTRY	LAND
Resources	Lakes, Streams, Wetlands, Mississippi River	Quality, Quantity	Riparian, Aquatic, Upland	Soil Health, Pasture Management

Gather Input at Meetings

The draft issue statements were revised with information developed at meetings.

Technical Advisory Committee Input

At the June 2022 TAC meeting, watershed issues were brainstormed by meeting participants. These issues were then matched with the issue statements compiled from existing plans and studies, showing consistency in responses.

Public Input

Input from the public was gathered at an event attended by 60 people held on June 6th, 2022. Members of the public were also invited to submit answers to an online survey. Priority issues from the survey included climate change, recreational opportunity, and development pressure on lakes and rivers. The full Public Input Summary Report can be found in Appendix B.

The CAC met on July 26th, 2022, and brainstormed issues related to surface water, groundwater, habitat, and land on sticky notes. Then, they organized the sticky notes under the issue statements developed by the TAC (Figure 3.3). Their responses were consistent with the existing issue statements, showing consensus between the two committees. Most of the citizen concerns were issues that can be addressed with actions that would be implemented by planning partners.

Figure 3.3. Citizen issues organized under issue statements developed by the TAC.

Determine Priority Issues

Staffing and funding resources for addressing issues are limited, so prioritization helps determine where to focus resources over the next 10 years. To focus where to work on a smaller scale, and assign a location to the issues, the TAC divided the watershed into Management Zones.

Management Zones

The watershed is split into three Management Zones developed during the WRAPS process: Northern Forests, Central Mixed, and Southern Prairie (Figure 3.4). Each zone has different land uses and impairments that direct water managers to work towards protection and/or restoration.

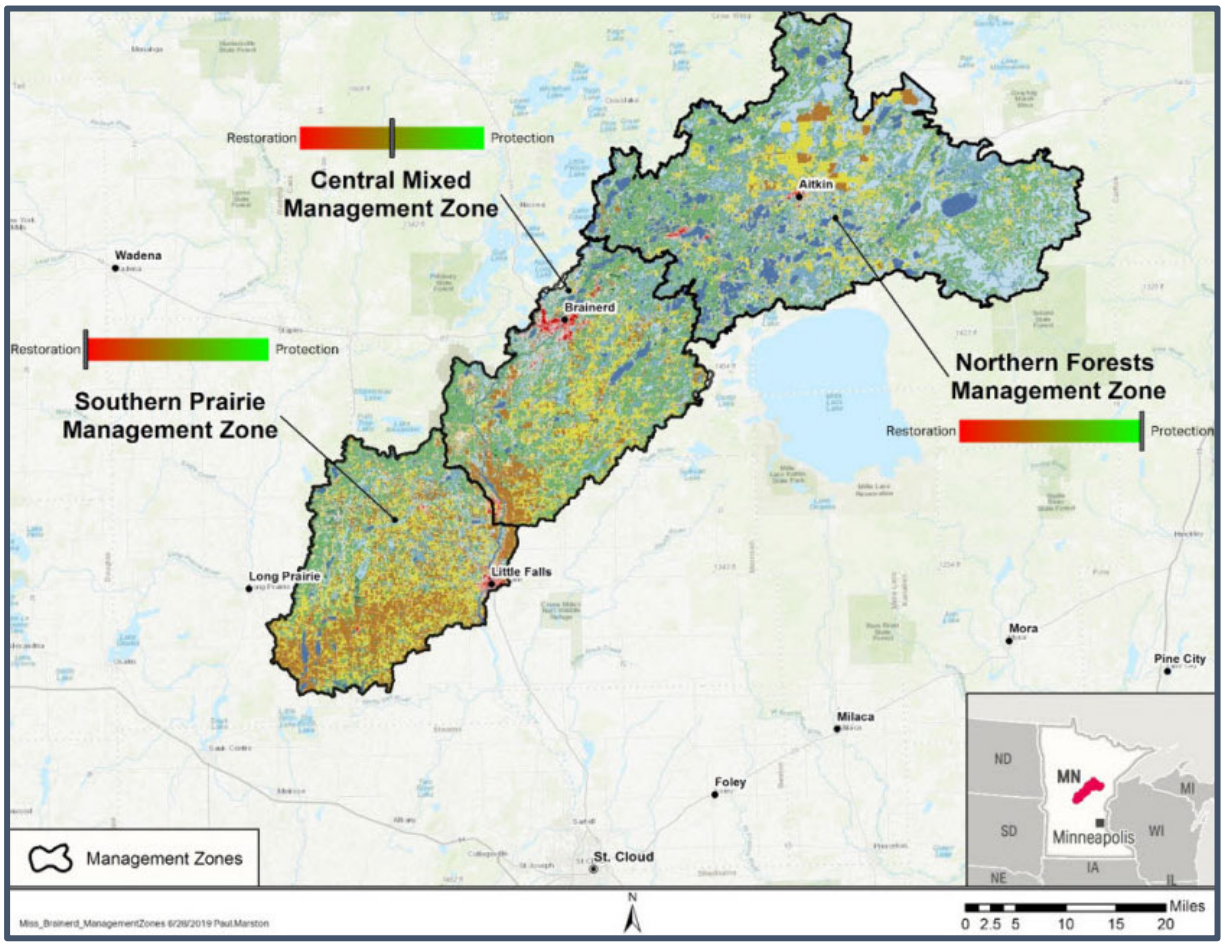


Figure 3.4. Management Zones in the MRBW.

The **Northern Management Zone** is primarily forest and wetlands without major development or land conversion. Overall, the water quality is good, but there are some issues with low dissolved oxygen water discharged from wetlands and barriers to connectivity caused by beaver dams and historical ditching. The City of Aitkin is in this zone.

The **Central Management Zone** covers multiple land uses. It consists of the transition from the forests in the northern zone to the agricultural zone in the south. The water quality decreases as

forest cover declines, with urban and agricultural areas contributing nutrients and sediment into waterbodies. The largest metropolitan area in the watershed, Brainerd/Baxter, is in this zone.

The **Southern Management Zone** primarily consists of agricultural land use, and it contains many animal feedlots. The land use in this zone contributes to bacteria issues in surface waters. The cities of Little Falls and Camp Ripley are in this management zone.

Prioritization

At the TAC meeting in July 2022, participants prioritized the issue statements by Management Zone using maps, data, and local knowledge. Existing data and maps included the Impaired Waters List, altered streams, Landscape Stewardship Plan, groundwater pollution sensitivity, DWSMA vulnerability, and the Minnesota Department of Natural Resources (DNR) Lakes of Phosphorus Sensitivity Significance. This finer scale breakdown of issue prioritization allows for a more targeted effort to address issues and assign funds in the areas that need them. For example, the issue of bacteria in streams is more urgent in areas where there are water quality impairments.

These issue statements and their ranking were discussed in further detail at the August 2022 TAC meeting, with the Policy committee in attendance. Issue prioritization from the July meeting was revised and emerging issues in the watershed were determined. The Policy Committee approved the final issue prioritization with the inclusion of increasing the priority of Soil Health in the watershed. Priority issues and their prioritization by Management Zone are displayed in Table 3.2.


Cattle Grazing

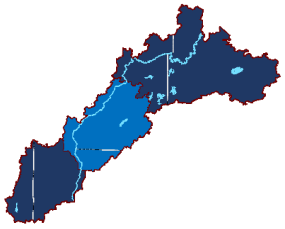
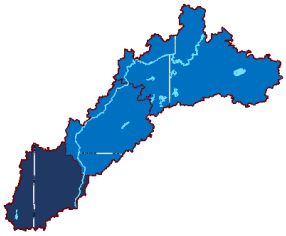
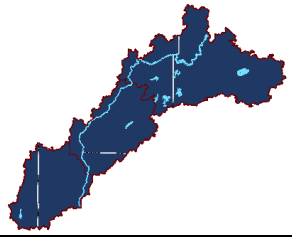
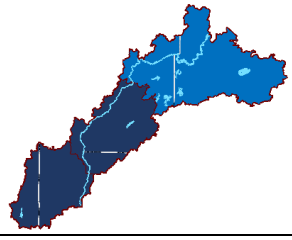
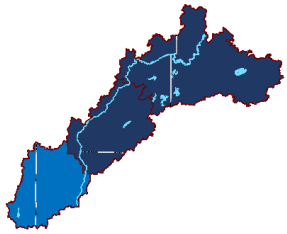

Pine Forest

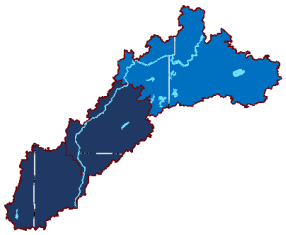
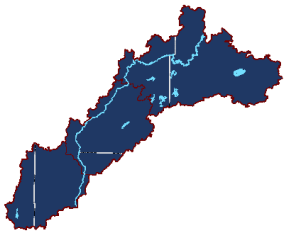
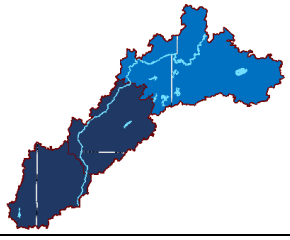
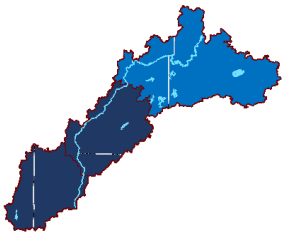
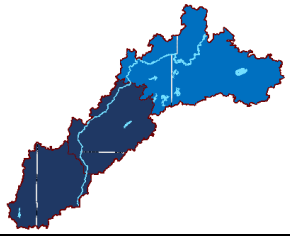
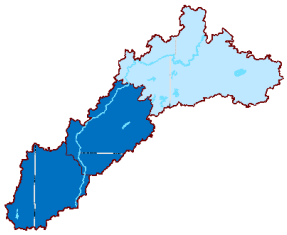
Priority Issues

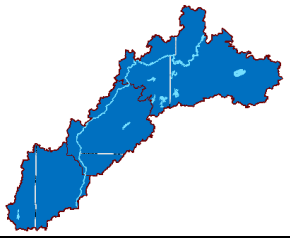
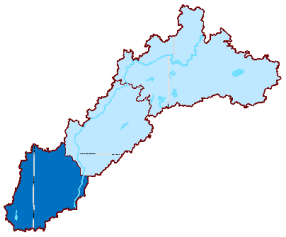
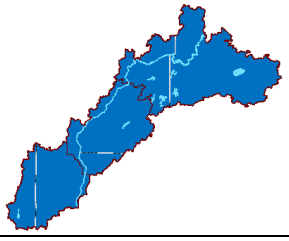
Priority issues that will be the focus of implementation efforts in the 10-year plan are listed in the table below. The main theme of the issue statement is shown in **bold** text. A high ranking in a management zone indicates where this issue will receive the most focus.

Management Zone Prioritization: High Medium As Opportunities Arise

Table 3.2. Issues table with resource concern and management zone prioritization.

Resource Concern	Issues Statement	Management Zone Prioritization
SURFACE WATER	**Altered hydrology** (channelized streams and ditch systems) increases peak flows and erosion and has led to biologically impaired streams.	
SURFACE WATER LAND	**Bacteria** can cause aquatic recreation and aquatic life impairments.	
SURFACE WATER	**Nutrients** from lakeshore development, internal loading, and land use changes contribute to algal growth along with recreational and biological impairments.	
SURFACE WATER	**Stormwater runoff** contributes sediment, nutrients, and pollutants to water bodies.	
SURFACE WATER HABITAT/FORESTRY	**Sufficient protection** is needed for outstanding resources and sensitive species to maintain water and habitat quality.	

Resource Concern	Issues Statement	Management Zone Prioritization
GROUND WATER	**Groundwater quality** is vulnerable to contamination.	
HABITAT/FORESTRY	**Riparian and in-lake alteration** from development impacts water quality, lake health, and fish communities.	
HABITAT/FORESTRY	**Forest fragmentation** due to urban and agricultural land use changes impacts water quality, infiltration, and habitat.	
HABITAT/FORESTRY	**Forest health** is vulnerable to climate change, pests, and invasive species, which can affect species composition and forest productivity.	
LAND	**Soil health** is important for agricultural productivity, water quality, and climate change resilience.	
SURFACE WATER	**Eroding streambanks** contribute to turbidity impairments and reduced habitat quality.	

Resource Concern	Issues Statement	Management Zone Prioritization
SURFACE WATER	**Wetland restoration and protection** is necessary to store water, provide habitat, and improve downstream water quality.	
GROUND WATER	**Groundwater sustainability** is vulnerable to overuse and loss of recharge.	
HABITAT/FORESTRY	**Aquatic invasive species** decrease biodiversity and impact recreation.	

Emerging Issues

Emerging issues are concerns in the watershed that are not included in the issues table but may affect the resources in the watershed in the future. A description of them is outlined below.

Contaminants of Emerging Concern

Contaminants of emerging concern (CECs) are of growing attention worldwide. CECs include a broad class of chemicals, from those found in personal care, cleaning, industrial, and agricultural products to medications. Traces of these compounds are being found in the environment. Some CECs have been shown to be dangerous to aquatic life or to humans, while many others have unknown impacts.

Studies in Minnesota have reported the widespread presence of CECs such as insecticides, pharmaceuticals, detergents, and fire retardants in our lakes and streams. In particular, the pesticide DEET, antibiotics, antidepressants, and bisphenol A (BPA) were commonly detected in Minnesota lakes (MPCA, 2021). These can affect wildlife and potentially human health at very low concentrations. The MDH monitors drinking water for CECs, and information on that initiative can be found here: https://www.health.state.mn.us/communities/environment/risk/guidance/dwec/

Climate Variability

Variability in climate affects the environment as well the lives of people who experience more extreme weather events, such as heat waves, drought, severe rain events, and flooding. Minnesota has seen more intense rains and warming winters. While the number of rain events greater than 1 inch every 24 hours are increasing, the frequency of precipitation is becoming more variable with longer dry periods. Ice-on dates are occurring later while ice-off is occurring earlier in the spring, affecting the ice fishing season. Earlier snowmelt can result in earlier peak flows in streams with drier periods later in the season. Temperature and precipitation trends within the MRBW are shown in Figures 3.5 and 3.6, with the temperature rising an average 0.29°F per decade and precipitation increasing by 0.35 inches per decade (DNR, 2022). This increase in temperature is expected to continue, further changing the climate. Preparation for these changes is essential to be resilient to the changes brought by a more variable climate.

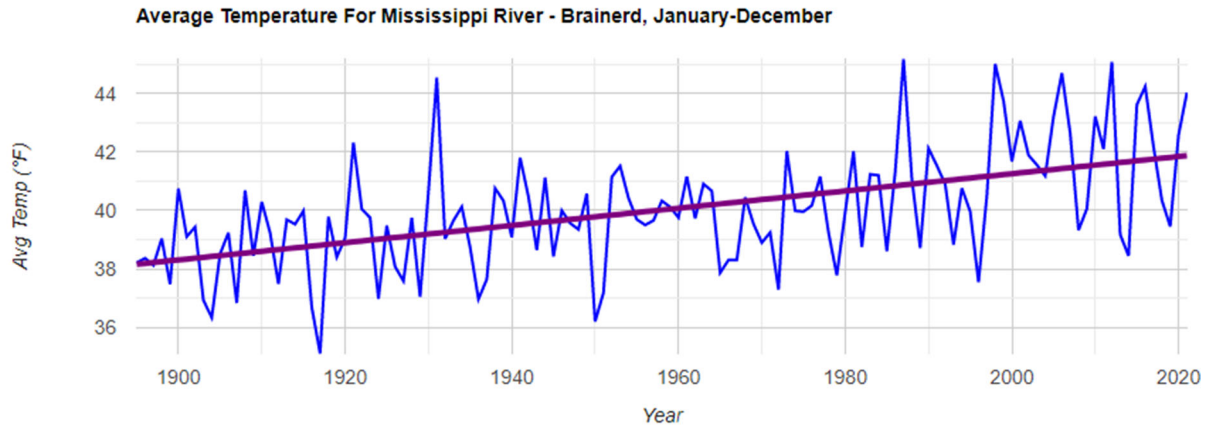


Figure 3.5. Temperature in the watershed 1985-2021. From DNR, 2022.

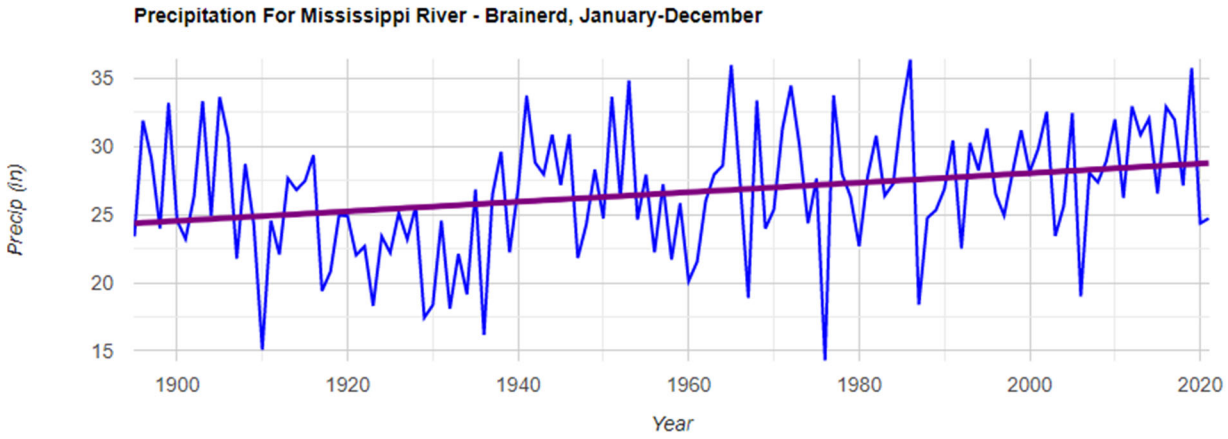


Figure 3.6. Precipitation in the watershed 1895-2021. From DNR, 2022.

Pipelines

Figure 3.7 shows the crude oil and natural gas pipelines running through the MRBW. All four lines of the Koch-operated Minnesota pipeline pass through the southern portion of the watershed carrying crude oil from Canada and North Dakota into refineries in the Twin Cities. The presence of oil pipelines has the potential to threaten both surface and groundwater quality if a spill occurs.

The new route for the Line 3 pipeline, built to replace the aging infrastructure of the original, runs just north of the watershed through Aitkin County. Line 3 is a controversial pipeline, given the potential for oil spills into sensitive waters and tribal lands. The largest inland oil spill in US history occurred on the original Line 3, and the construction of a new route was highly protested. While the pipeline does not pass through the MRBW, it does cross the Mississippi just north of it where a spill would affect the watershed.

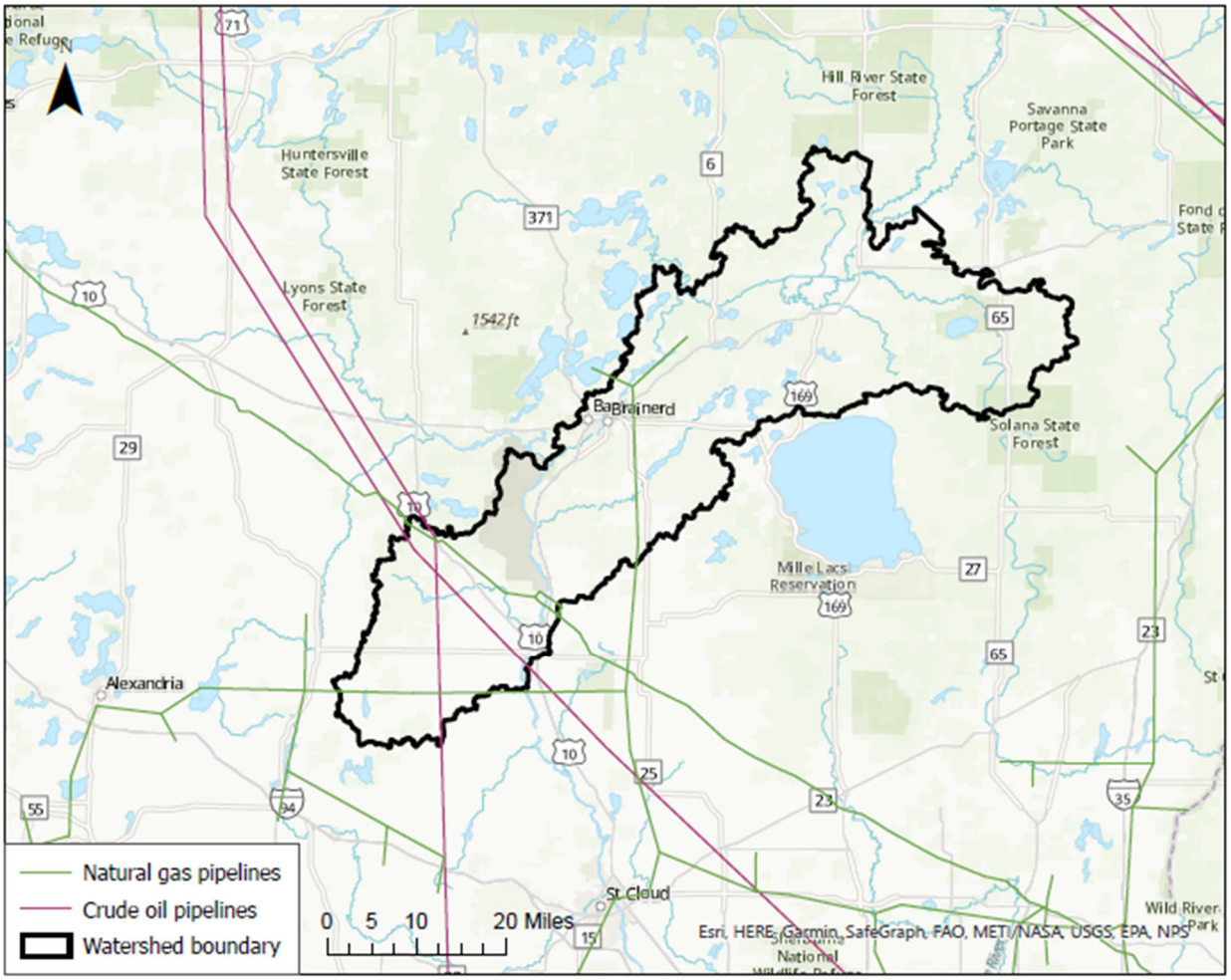


Figure 3.7. Pipelines going through the MRBW. From USEIA, 2020.

Alternative Energy

Hydropower

The Sandy Lake Reservoir Dam and Lock, located on Big Sandy Lake just upstream of the MRBW, is a historically significant dam (Figure 3.8). It was one of the first reservoirs to be installed in the country in 1895, and since then its role in maintaining steady water flow has enhanced navigation, commerce, and tourism in the Mississippi.

Figure 3.8 Sandy Lake Reservoir Lock and Dam.

Of the dams on the Mississippi River, a small number also function to produce hydroelectric power. Two hydropower dams are within the MRBW, one in Little Falls (owned by MN Power) and the other in Brainerd (owned by the city of Brainerd). Concerns about conventional hydropower includes its environmental impact to fish populations and downstream water quality.

Solar Power

In 2020, solar power accounted for 3% of Minnesota's electricity use. Solar is expected to grow significantly in the coming years, with a Minnesota solar electricity standard mandating 10% of electricity must be generated from solar by 2030 (MN DOC, 2020). The expansion of solar energy decreases dependence on fossil fuels and supports 4,000 jobs in MN (MN DOC, 2022). The predicted growth in the solar industry also may lead to an increase in land for solar farms and new utilities across the state. Within the watershed, Camp Ripley has the largest solar farm in Minnesota, covering 60 acres. It is a collaboration between Minnesota Power and the Minnesota National Guard. Local entities working in the watershed should be made aware of the expanding solar industry and can look for collaborative opportunities.

Section 4

Focus Resources

Section 4. Focus Resources

The MRBW has 383 lakes over 10 acres in size, 2,149 river miles, and an abundance of deep and shallow groundwater. In a perfect world, there would be enough time and funding to work on all of the water resources in the watershed. In reality, both staffing capacity and funding are limited. Therefore, this planning process aimed to prioritize water resources and determine where to focus the most time and funding in the next ten years. The prioritization was developed by the Steering Committee, reviewed by the Advisory Committee, and approved by the Policy Committee over the course of five meetings. These Focus Resources are supported by data and are places where measurable changes can be made. Focus Resources will be targeted with outreach and project development effort. Other resources in the watershed will be assisted with projects on an opportunity-basis.

Prioritization Methods

The BWSR's Nonpoint Priority Funding Plan for Clean Water Funding Implementation and Minnesota's Clean Water Roadmap set the following priorities:

- Restore those impaired waters that are closest to meeting state water quality standards ("barely impaired");
- Protect those high-quality unimpaired waters at greatest risk of becoming impaired ("nearly impaired"); and
- Restore and protect water resources for public use and public health, including drinking water.

The resources in the MRBW were evaluated with these priorities in mind; however, there are only a few impaired waters, and only a few of the lakes and streams in the watershed are considered "barely impaired" or "nearly impaired." Therefore, for unimpaired resources, the priorities focus on what has the highest value and the most risk. In protection-focused watersheds, a useful guide for prioritization is the following quote from Peter Jacobson, retired DNR Fisheries Researcher:

"Conservation priority lies at the intersection of risk and value."

Existing data sets, referred to here as "criteria," are used to prioritize resources within the watershed based on what has the most value (ecological and/or financial) and what is most at risk of future change. It is important to keep the prioritization quantitative so that there is sound

reasoning behind why a lake, stream, or groundwater resource area is considered a priority. It is also important to keep it simple and transparent so that the priorities can be clearly communicated with stakeholders and the public.

Management Strategies

Healthy MRBW water resources support excellent water-based cultural activities and recreation: fishing, hunting, canoeing, boating, and sight-seeing. Drinking water for communities and rural areas is sourced from the groundwater in the region, with surface water and groundwater quality interconnected in some areas. Protecting these valuable resources is essential for sustaining the high quality of life that residents in the watershed enjoy.

Converting land use from less-intensive to more-intensive management and use, such as the development of lands for houses and cabins and conversions of forests to agriculture, all have the potential for diminishing lake, stream, and groundwater quality. Therefore, each water body was assigned a Management Strategy that reflects the level of protection and disturbance of the land draining to the water body (Table 4.1).

Table 4.1. Management strategies in the MRBW.

Management Strategy	Description
VIGILANCE	The resource is sufficiently protected (>75% of the minor watershed area). Keep public lands protected.
PROTECT	The resource is in good condition and additional land protection will help maintain the good condition.
ENHANCE	The resource has a significant amount of land conversion and/or disturbance in its drainage area but is not currently impaired.
RESTORE	The resource is on the Impaired Waters List for excess nutrients, *E.coli*, or sediment.

Resource prioritization was completed for lakes, streams, and groundwater (Figure 4.1). Specific criterial were crafted specific to each resource and are described in this section.

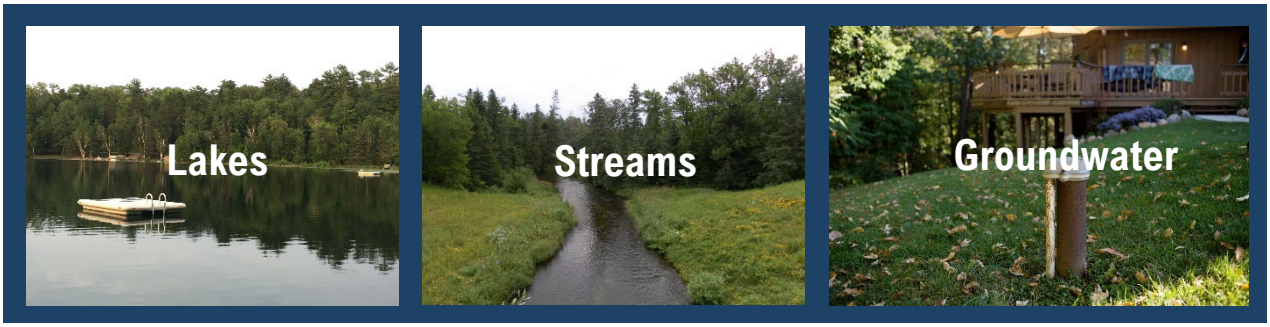


Figure 4.1. Resources prioritized during the planning process.

Lake Prioritization

There are 383 lakes (>10 acres) in the watershed. These lakes were separated into six categories based on the descriptions in Table 4.2. Shallow habitat lakes and mine pits were separated from the other lakes because they are not heavily developed or recreated. Then lakes were prioritized within each category due to the criteria in Table 4.2. The prioritization process is illustrated in Figure 4.2 on the next page.

Table 4.2. Lake prioritization process.

Management Strategy	Description	Focus
VIGILANCE	**Lakes that are sufficiently protected:** • >75% minor watershed permanent protection.	None
PROTECT	**Lakes generally in good condition:** • improving or no water quality trend, and/or • 0-24% minor watershed disturbance (agriculture, development, urban, or mining), and/or • <75% minor watershed permanent protection.	Lakes that had higher or highest phosphorus sensitivity[1] (*Risk*) and high or outstanding biological significance[2] (*Quality*).
ENHANCE	**Lakes at anthropogenic risk:** • degrading water quality trends and/or, • 25-60% minor watershed disturbance (agriculture, development, urban, or mining) and/or, • nearly impaired.	Lakes over 300 acres (or local priority if smaller than 300 acres) that had higher or highest phosphorus sensitivity[1] (*Risk*) and high or outstanding biological significance[2] (*Quality*).
RESTORE	**Lakes impaired for excess nutrients.**	Barely impaired lakes and local priorities.
SHALLOW HABITAT LAKES	**Lakes classified as shallow or Natural Environment lakes.**	Wild rice and habitat priorities for protection.
MINE PITS	**Lakes that were formerly mine pits.**	Local priorities.

[1] *Phosphorus Sensitivity: lakes most sensitive to declining clarity if the phosphorus increases. See Appendix D for more information.*

[2] *Biological Significance: lakes with sensitive fish, plan, bird, and amphibian species. See Appendix D for more information.*

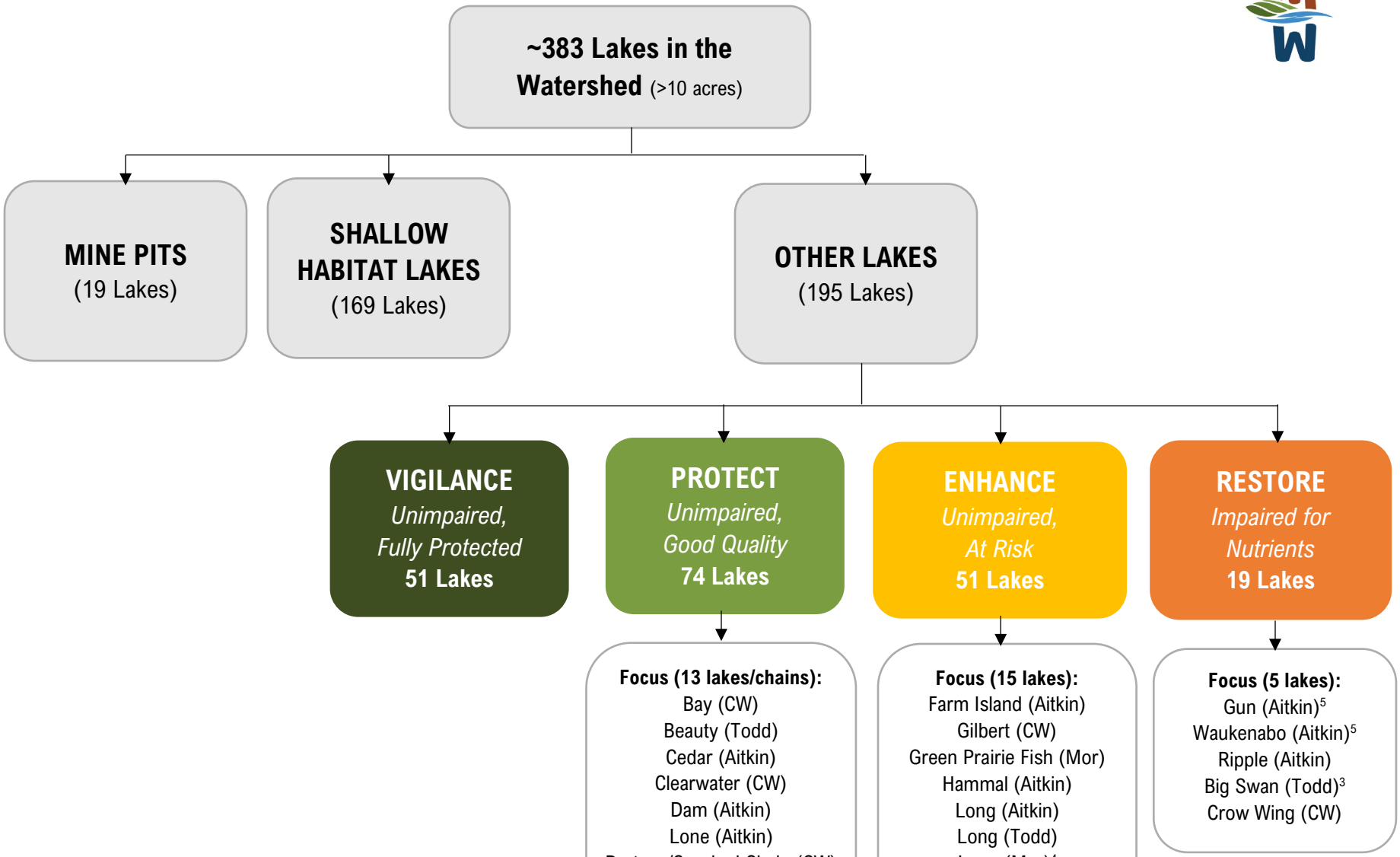


Figure 4.2. Lake prioritization flow chart.

[3]*Protecting Upper Mission will help improve Lower Mission, which is impaired.*
[4]*These lakes are less than 300 acres but meet the phosphorus and biological criteria*
[5]*These lakes are barely impaired.*

Focus Lakes

Protection lakes are a priority for land protection. Enhance and restore lakes are a priority for implementing best management practices and projects to reduce nutrients and sediment.

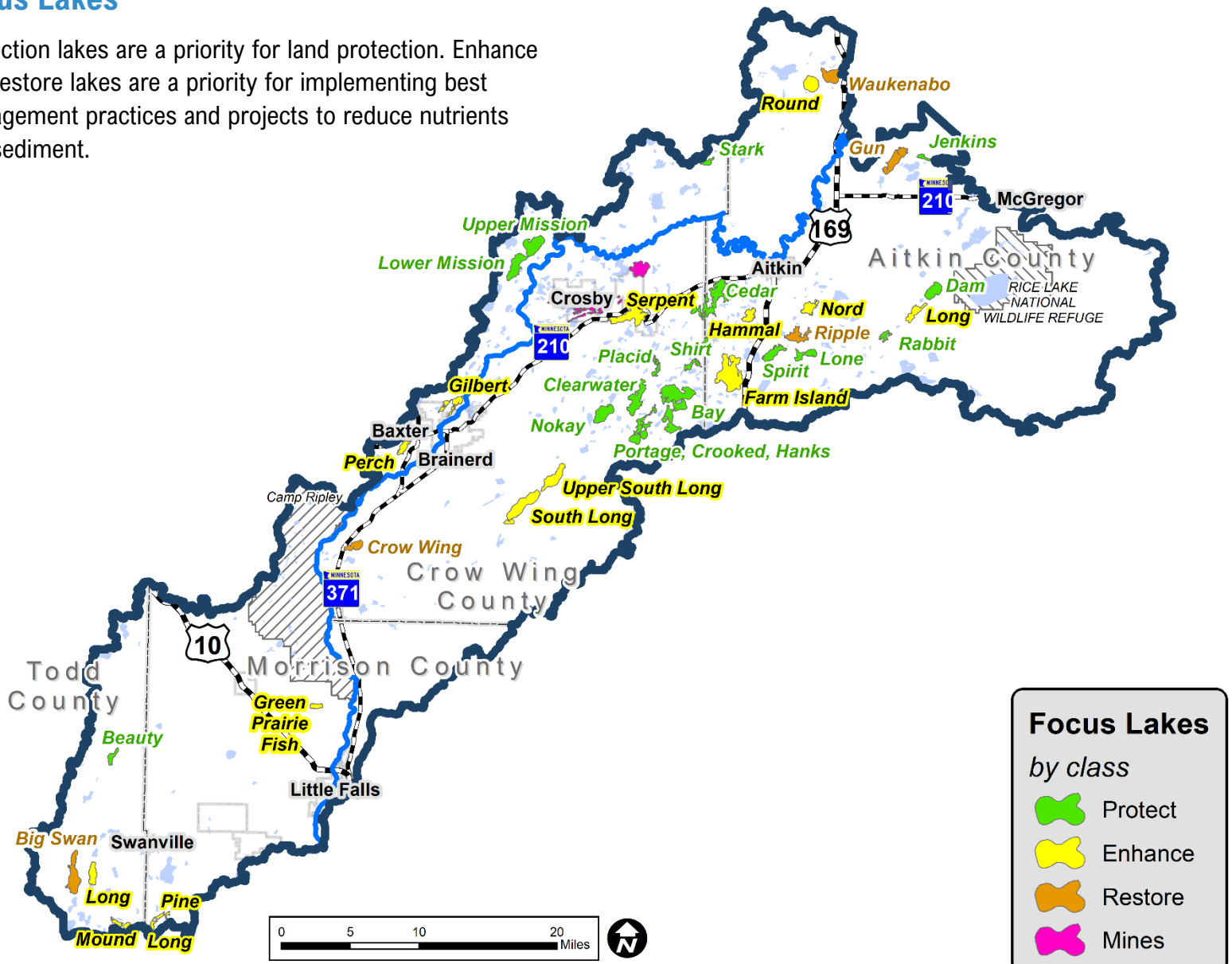


Figure 4.3. Focus lakes in the MRBW.

Stream Prioritization

There are 2,149 miles of streams in the MRBW. Streams were separated into three management strategies based on the descriptions in Table 4.3.

Table 4.3. Stream prioritization.

Management Strategy	Description	Focus
PROTECT	**Unimpaired streams.**	Streams with exceptional use standards[6]: Nokasippi River
ENHANCE	**Streams with biological and/or dissolved oxygen impairments.**	Tributaries to the Mississippi River: Aitkin area, Brainerd/Baxter area, Little Falls area.
RESTORE	**Streams impaired for *E.coli*, TSS, Turbidity.**	Tributaries to the Mississippi River: Aitkin area, Brainerd/Baxter area, Little Falls area.

[6]*Exceptional Use Standards indicate exceptional habitat for fish and macroinvertebrates.*

The Mississippi River is impaired for Total Suspended Solids (TSS). The Total Maximum Daily Load (TMDL) analysis describes the majority of the loading to be from in-channel and bank erosion (MPCA 2020b). In this plan, partners decided to focus on enhancing the water quality and stability of tributaries to the Mississippi River, as that is the most feasible place to make progress. Three tributary focus areas emerged through Steering and Advisory Committee discussions (Figure 4.4):

- Aitkin area and Mississippi Diversion channels (concerns related to altered hydrology and eroding streambanks),
- Brainerd/Baxter area (concerns related to stormwater and eroding streambanks), and
- Little Falls area (concerns related to eroding streambanks and agricultural runoff).

These areas are illustrated in Figure 4.4.

Mississippi River in Morrison County

Focus Areas for Streams

Protection streams are a priority for land protection. Enhance and restore streams are a priority for implementing best management practices and projects to reduce nutrients and sediment.

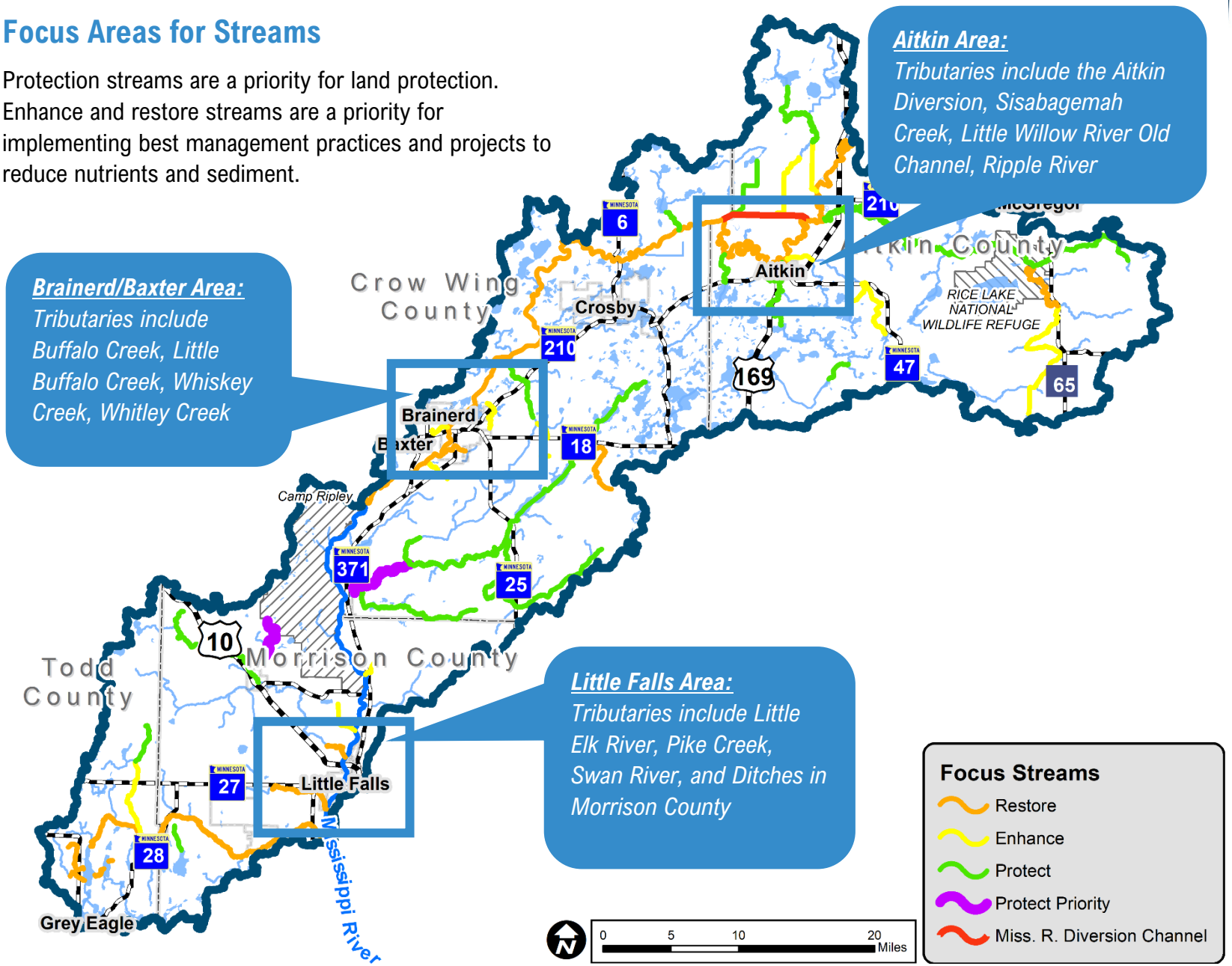


Figure 4.4. Stream prioritization.

Groundwater Prioritization

Land Use and Nitrates

There are many areas of the MRBW that have shallow groundwater and sandy soils. This combination is vulnerable to the leeching of nitrates and other pollutants into the groundwater from land practices. Testing conducted by the MDH showed that high nitrates tend to occur in shallow wells, with 3% of samples in wells less than 50 feet deep exceeding the safe drinking water standard of 10 mg/L. Results also show that 15.2% of shallow wells exceeded nitrate concentrations of 3 mg/L, which indicates some impact. An analysis that determines the risk of nitrogen infiltration to groundwater based on land use practices, soils, and groundwater depth was used to prioritize where to work in plan implementation (Table 4.4, Figure 4.5).

Table 4.4. Groundwater prioritization.

Management Strategy	Description	Groundwater Prioritization
PROTECT	**Groundwater recharge value**	Protect forested land with the highest groundwater recharge value. Protect Drinking Water Supply Management Areas (DWSMAs) with low to moderate vulnerability.
ENHANCE	**Risk of nitrogen infiltration to the groundwater**	Implement practices that reduce nitrogen use such as nutrient management and irrigation water management in agricultural lands with the highest risk of nitrogen infiltrating the groundwater. Implement BMPs and land protection in high vulnerability DWSMAs.

Other Contaminants

There are other contaminants found in groundwater in Minnesota, but most of them don't have a direct connection to land use like nitrates do. Arsenic is found naturally in the ground and isn't human caused. Approximately 7.7% of the 720 arsenic samples collected from wells in the MRBW have levels higher than the safe drinking water standard of 10 µg/L, and 23.7% of wells tested have levels higher than 5 µg/L. The Environmental Protection Agency (EPA) has set a goal of 0 µg/L for arsenic in drinking water because there is no safe level of arsenic in drinking water. Arsenic will be addressed in the plan through testing clinics and outreach.

Other emerging contaminants such as PFOAs and estrogenic compounds are not widely tested yet but will be included in the plan outreach program and emerging issues (Section 3).

Focus Areas for Groundwater Protection

Focus areas for groundwater protection and enhancement are based on risk of nitrogen infiltration and groundwater recharge value (Figure 4.5). Green areas forested areas with high groundwater infiltration rates and are a priority for land protection. Orange and brown areas are agricultural areas with high groundwater infiltration rates and are a priority for implementing best management practices to reduce nitrogen application such as nutrient management and irrigation water management.

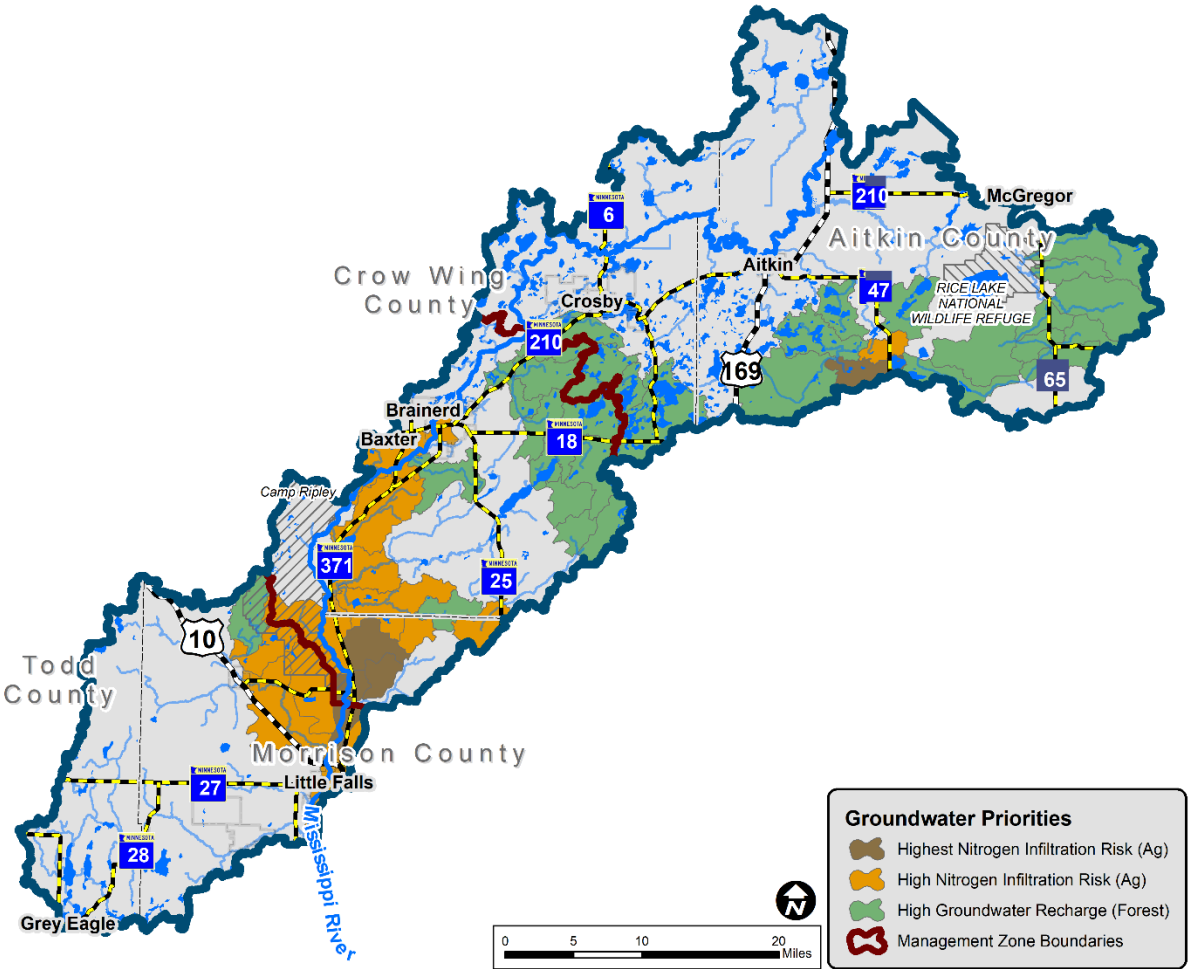


Figure 4.5. Groundwater priorities for management and protection.

Drinking Water Supply Management Areas

A DWSMA is an area most important to the drinking water source for a public water supplier such as a city. DWSMA boundaries establish a protection area through an extensive evaluation that determines the contribution area of a public water supply well, aquifer vulnerability and provide an opportunity to prioritize specific geographic areas for drinking water protection purposes.

Much of the land within DWSMAs is owned privately. While MDH and public water suppliers are responsible for providing safe drinking water, they do not have the authority or capacity to protect drinking water sources on their own. MDH and public water suppliers work with local decision-makers, other state agencies, and many partner organizations to plan and implement activities that protect drinking water sources (MDH 2022).

DWSMAs with high potential contaminant risk due to connection with surface water:

- Brainerd
- Baxter
- Crosby
- Little Falls

DWSMAs with high potential contaminant risk due to land use:

- Camp Ripley
- Swanville

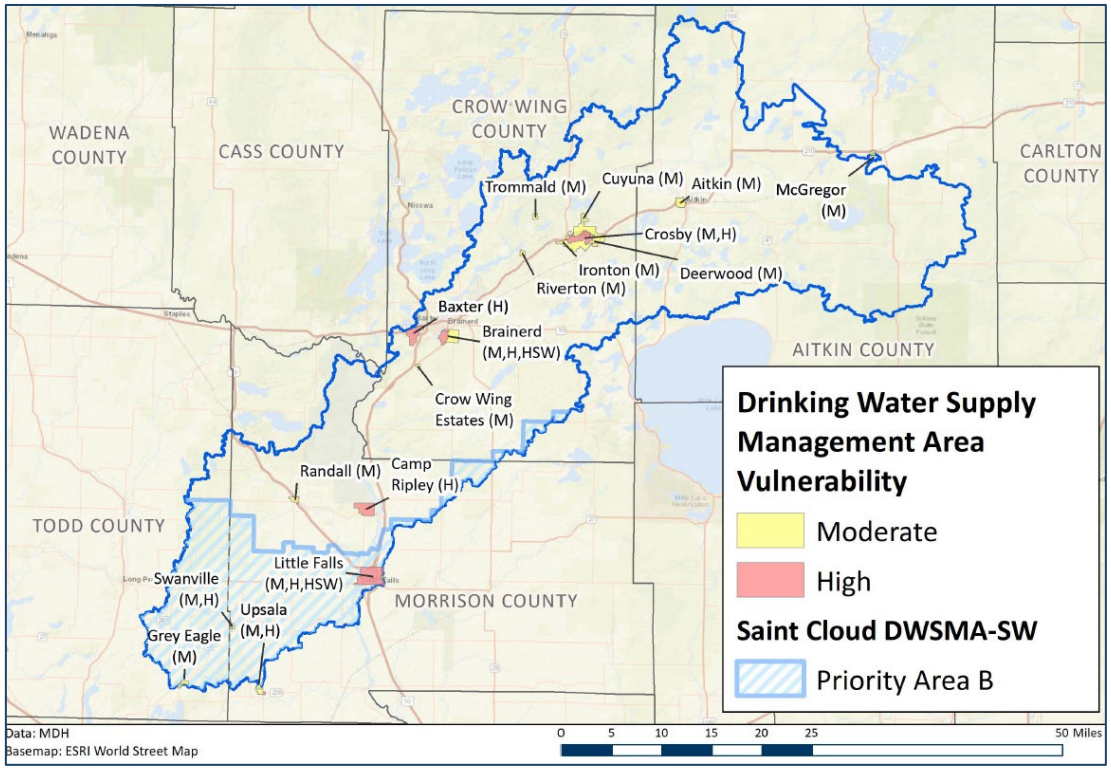


Figure 4.6. MRBW DWSMA vulnerability map (MDH).

Section 5
Measurable Goals

Section 5. Measurable Goals

To determine progress towards alleviating watershed issues described in Section 3, the TAC developed seven measurable goals. Measurable goals identify the desired change in the resource of concern and indicate how progress will be measured during implementation. Goals were developed over a course of three meetings and three subcommittee meetings from existing management plans and data, stakeholder input, public interest, and committee member expertise.

The quantity of how much progress implementation can make toward goals and changes to the resource condition are determined with models and data analysis. In this plan, the MPCA's Healthier Watersheds database and eLINK data were used to determine current BMPs on the landscape; existing monitoring data, the Hydrological Simulation Program FORTRAN (HSPF) model, and the HSPF Scenario Application Manager (SAM) were used to determine the current condition of the natural resources and the potential improvements that can be gained during implementation. HSPF and HSPF SAM are watershed models commonly used in planning in Minnesota.

In this section, each goal is summarized in a couple pages. The pages for each goal can stand alone after the plan is completed. Each goal is described in the four boxes to the right including the short-term goal, what has already been accomplished, the desired future condition, and the big picture story.

Each goal page also includes the following supporting information:

- A description of the issue and why it matters in the MRBW.
- Priority issues addressed.
- Additional (stacking) benefits of working towards the goal (Table 5.1).
- Focus areas showing where outreach and implementation will be concentrated for this goal.

SHORT-TERM GOAL
Describes a quantifiable change in resource condition expected during the 10-year plan.

ALREADY ACCOMPLISHED
What has already been accomplished in the past decade related to this goal. Data sources are from eLINK, MPCA Healthier Watersheds, and local data.

DESIRED FUTURE CONDITION
A long-term goal with no specific timeframe; the eventual condition resource managers hope to achieve.

TELLING THE STORY
The story of what progress towards the goal means overall for watershed health.

Many projects and practices that will be implemented from this plan have stacked benefits and make progress towards multiple plan goals. To make these connections clear, these stacked benefits are highlighted for each goal (Table 5.1). For example, implementing cover crops will be tracked by acre, but it also decreases phosphorus, sediment, and nitrogen, along with storing more water in the soil and sequestering additional carbon from the atmosphere.

Table 5.1. Stacking additional benefits from implementing the 10-year plan goals.

Surface Water Quality Benefits	**Phosphorus**: the pounds of phosphorus reduced by implementing this goal.
	Sediment: the tons of sediment reduced by implementing this goal.
	Nitrogen: the pounds of nitrogen reduced by implementing this goal.
Habitat Benefits	**Habitat**: acres of forest protected by implementing this goal.
Climate Resiliency Benefits	**Storage**: the amount of water stored on the landscape or in the soil in acre-feet. One acre-foot is equivalent to a football field being covered in one foot of water.
	Carbon: the amount of carbon stored in existing forest and sequestered by implementing cover crops.

Coir Logs Installed to Stabilize Shoreline
Credit: Aitkin SWCD

PROTECTION

The MRBW has few impairments, a high number of outstanding water resources, and vast forests. Communities including St. Cloud and the Twin Cities draw their drinking water from the Mississippi River.

Minnesota's state agencies that manage surface water, drinking water, and habitat (DNR, MDH, MPCA, BWSR, MLBO) agree that forest and vegetative cover benefits clean surface water, drinking water, and habitat. This goal was written to include all resource categories (surface water, ground water, and habitat) because the implementation actions for the goal would be the same. More specifically, DNR Fisheries research has shown that once a minor watershed is over 25% disturbed (urban, agriculture, mining), the water quality is negatively affected. Therefore, the measurement of 75% of the minor watershed being in protected land uses is used in this goal. Protected land uses are defined as surface water, public land, private wetlands, conservation easements, and Sustainable Forest Incentive Act lands. The desired future condition is to reach 75% protection in each priority minor watershed. The short-term goal is to make progress towards the desired future condition in priority minor watersheds. To see more details on how the goal was calculated, see Appendix D.

An LSP was developed in 2022 that set goals and priority areas of where to implement land protection. Numerous data sets on quality fish and plant communities were incorporated into the priority areas including the State's Wildlife Action Plan, terrestrial biodiversity scores, Cisco refuge lakes, and priority wild rice lakes.

SHORT-TERM GOAL

Protect and enhance of forest cover, focus lakes and streams, and groundwater through adding **14,765 acres** of conservation easements, SFIA, and acquisitions in priority minor watersheds.

ALREADY ACCOMPLISHED

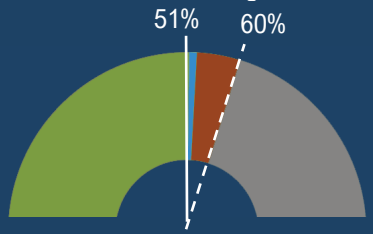
Currently, 219,754 acres are protected in priority minor watersheds.

DESIRED FUTURE CONDITION

An additional 83,666 acres of conservation easements, SFIA, and acquisitions in priority minor watersheds (Figure 5.1) based on the Landscape Stewardship Plan (LSP).

TELLING THE STORY

Implementing this goal will move the needle from 51% of watershed acres protected to 53%. The Desired Future Condition is to get to 60%.



PRIORITY ISSUES ADDRESSED

- Nutrients
- Sufficient protection
- Forest fragmentation
- Forest health
- Wetland protection
- Groundwater quality

PRIORITY RESOURCES

- Focus Lakes and Streams
- Mississippi River
- Groundwater Recharge

MEASURING

Progress will be measured in acres of forest stewardship plans, SFIA, conservation easements, acquisitions, and reforestation implemented in each Management Zone. Acres will be targeted with RAQ scoring (Riparian, Adjacency, Quality).

Management Zone	10-Year Milestones (acres) Protection	10-Year Milestones (acres) Forest Plans
North	4,633 (~463/yr)	40
Central	4,288 (~428/yr)	36
South	5,844 (~584/yr)	50
Total	**14,765**	**126**

STACKING BENEFITS

Work toward this goal also makes progress towards protecting water storage in the forest soils, protecting carbon storage in the existing trees, and providing habitat.

Habitat Benefits	Protected Habitat = 14,765 acres
Climate Resiliency Benefits	Protected Storage = 1,880-2290 acre-feet
	Protected Carbon = 385,000 tons

FOCUS AREAS

Priority minor watersheds were identified during the LSP process. These LSP areas were split into two tiers. Tier 1 minor watersheds have LSP priority and focus lakes or groundwater recharge quality. Tier 2 minor watersheds have just LSP priority or focus lakes (Figure 5.1).

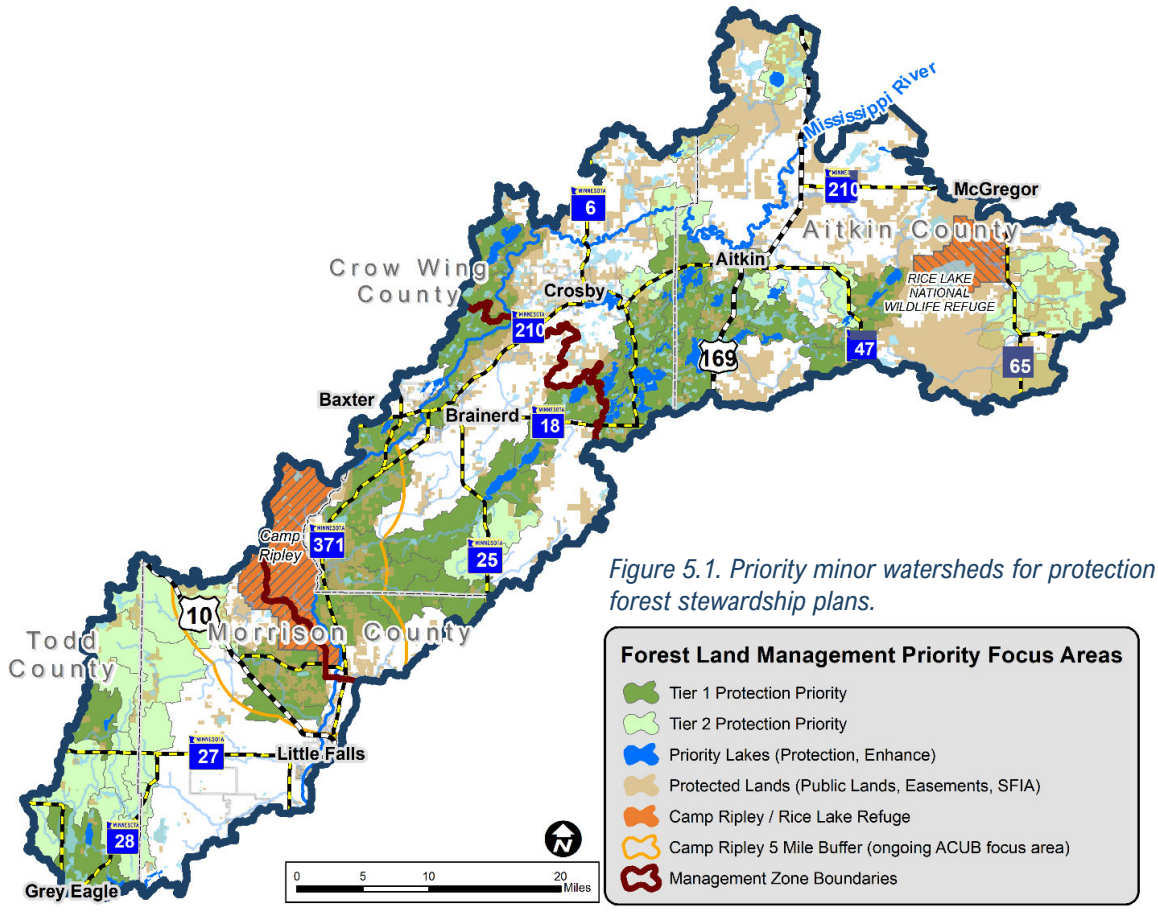


Figure 5.1. Priority minor watersheds for protection and forest stewardship plans.

AGRICULTURAL LAND MANAGEMENT

As 18% of land in the MRBW is pasture/hay and 10% is cropland, agricultural production is an important part of the local economy. Animal and crop production supplies food, creates jobs, boosts investment in local businesses, and generates tax revenue.

Managing agricultural land to improve soil health is essential for downstream water quality. Soil health is defined as the ability of soil to function as a vital living ecosystem and is supported by some basic principles:

- minimize soil disturbance,
- keep soil covered,
- increase crop diversity,
- maintain living roots,
- integrate livestock.

Biologically active soil sequesters carbon in the soil, improves the ability of soil to infiltrate and hold water in the soil profile, and improves nutrient cycles, making nutrients available to plants while stabilizing them in the soil profile. Agricultural BMPs are tools that can support the soil heath principles. They work to stop erosion and minimize the need for fertilizer applications.

Currently, 12% of the agricultural land in the watershed have BMPs that have been installed through state and/or federal cost share programs and 1% of land is enrolled in the Conservation Reserve Program (CRP) (Known BMPs). This goal aims to add BMPs on another 3% of agricultural land to bring the total up to 16%. The remaining agricultural land may have BMPs but there is no local record because they didn't use cost share programs (Unknown BMPs).

SHORT-TERM GOAL

Implement **7,130 acres** of agricultural BMPs including cover crops, nutrient management, pasture management, and conservation tillage.

ALREADY ACCOMPLISHED

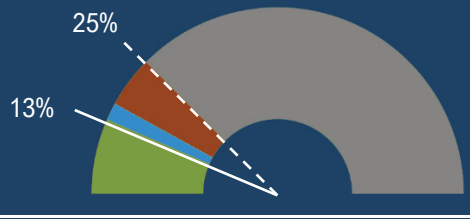
- 2,337 acres of CRP (as of 2023)
- 28,479 acres of agricultural BMPs (NRCS and eLINK, 2007-2022)

DESIRED FUTURE CONDITION

BMPs on an additional 21,465 acres of agricultural land in the watershed and agricultural lands that contribute to clean water, food, and air.

TELLING THE STORY

Implementing this goal will move the needle from 13% of the watershed acres having BMPs or CRP enrollment to 16%. The Desired Future Condition is to get to 25%. Acres of BMPs is the way to measure goal progress, but the real outcome we are looking to achieve is improved soil health.



PRIORITY ISSUES ADDRESSED

- Soil health
- Nutrients
- Groundwater quality

PRIORITY RESOURCES

- Soil
- Focus Lakes and Streams
- Mississippi River

MEASURING

Progress will be measured in acres of agricultural land management practices implemented (acres managed or treated) or acres of drained peatland restored identified in each Management Zone. Acres with the highest risk for nitrogen infiltration into the groundwater and the highest phosphorus runoff to surface water will be targeted for implementation.

Management Zone	10-Year Milestones Pasture & Cropland
North	2,300 acres (~230/yr)
Central	1,790 acres (~179/yr)
South	3,040 acres (~304/yr)
Total	**7,130 acres**

(*HSPF SAM scenario is based on implementing approximately 30% cover crops, 30% nutrient management, 20% rotational grazing, 10% reduced tillage, and 10% structural agricultural practices by acre*).

STACKING BENEFITS

Work toward this goal also makes progress towards reductions in phosphorus, sediment, and nitrogen to surface and groundwater; stores water in the soil; and sequesters carbon.

Surface Water Quality Benefits	Phosphorus = 781 lbs/yr
	Sediment = 159 tons/yr
	Nitrogen = 9,029 lbs/yr
Climate Resiliency Benefits	Storage = 300 acre-feet
	Carbon = 1,000 tons

FOCUS AREAS

Existing data on four criteria: phosphorus runoff, nitrogen risk to groundwater, *E. coli* impairments, and focus lakes and streams, were combined to determine the priority areas to focus work for this goal (Figure 5.2). Tier 1 areas have at least two criteria, Tier 2 areas have at least one criterion.

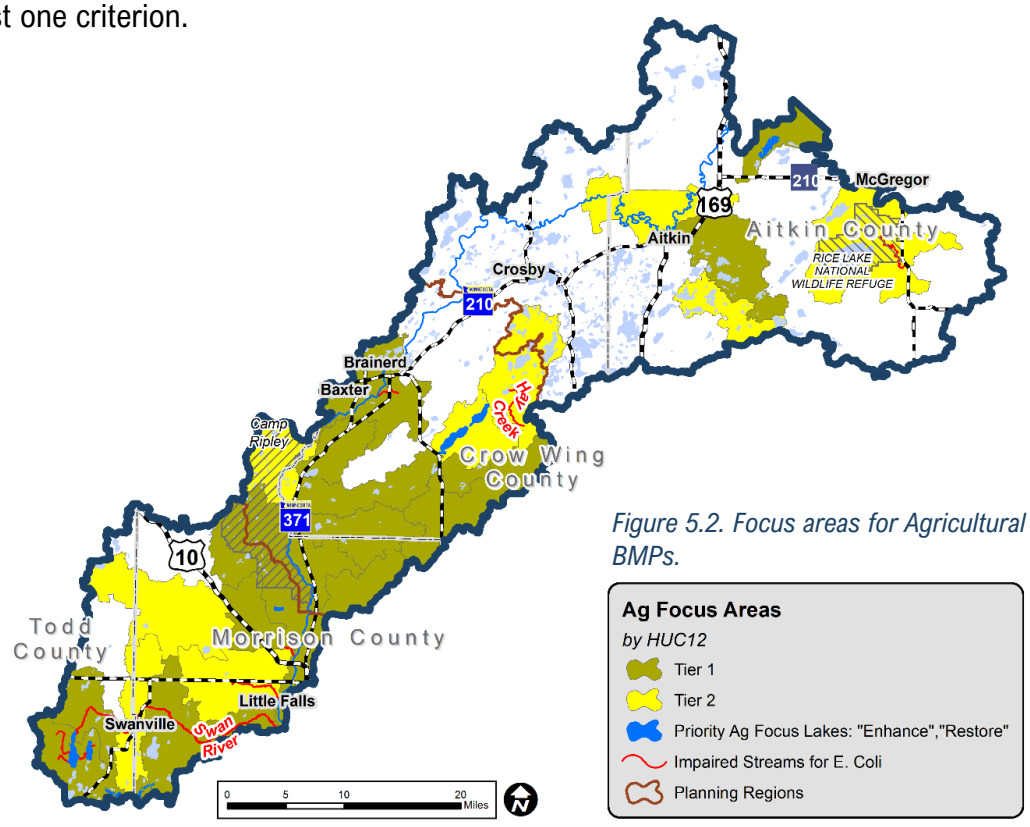


Figure 5.2. Focus areas for Agricultural BMPs.

DRINKING WATER PROTECTION

Aquifers are a valuable resource whose quality needs to be protected to continue providing a source of drinking water for Minnesota residents. Groundwater contamination occurs when surface water containing some pollutant infiltrates through the soil and into an aquifer, or groundwater can be contaminated via an unused and unsealed well.

All residents in the MRBW get their drinking water from groundwater. Aquifer sensitivity to pollution varies throughout the watershed from low to high (WRAPS), but all DWSMAs in the watershed are categorized as moderate or high vulnerability to pollution by MDH, making groundwater protection a high priority for public health.

The majority of groundwater withdrawals are for agricultural irrigation (53%), with the next largest use for drinking water (39%) (WMAR). The MRBW has a slightly higher groundwater recharge rate than the state average. It is still important to ensure that water is not being overdrawn, especially in the Southern Management Zone.

The Mississippi River supplies drinking water to downstream cities including St. Cloud and the Twin Cities metro area (serving over 1 million people). In addition, a portion of the St. Cloud surface water DWSMA and the Minneapolis Source Water Protection Watershed are in the MRBW.

This goal aims to improve the protection (easements) and management (BMPs) of lands within vulnerable DWSMAs, and seal unused wells.

SHORT-TERM GOAL

Protect or manage **160 acres** in high vulnerability DWSMAs (Figure 5.3).
Seal 10 unused wells per year.

ALREADY ACCOMPLISHED

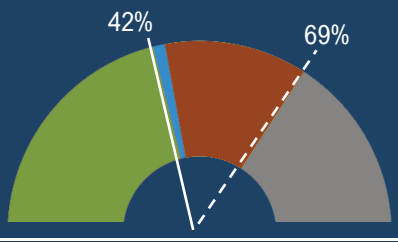
There are already 2,795 acres protected in high vulnerability DWSMAs.

DESIRED FUTURE CONDITION

Protect or manage an additional 1,600 acres in high vulnerability DWSMAs.

TELLING THE STORY

Implementing this goal will move the needle from 42% of the DWSMA acres protected or managed to 44%. The Desired Future Condition is to get to 69%.



PRIORITY ISSUES ADDRESSED

- Groundwater quality
- Sufficient protection
- Groundwater sustainability

PRIORITY RESOURCES

- Brainerd, Baxter, Crosby, and Little Falls DWSMAs have high potential contamination risk due to connection with surface water.
- Camp Ripley and Swanville DWSMAs have high potential contamination risk due to land use.
- St. Cloud DWSMA for surface water
- Minneapolis Source Water Protection Watershed

MEASURING

The short-term well-sealing goal was determined using *eLINK* data to see what has been implemented in the past 10 years. Progress will be measured in wells sealed per year. Acres of BMPs and protection practices (RIM easements) in vulnerable DWSMAs can be guided by land use within the DWSMA. The 160 acre goal does not include land in the St. Cloud surface water DWSMA.

Goals	10-Year Milestone
Well Sealing	100 unused wells sealed (~10 wells/year)
DWSMA land	160 acres of BMPs and land protection

STACKING BENEFITS

Other goals in this plan also aim to enhance and protect drinking water:

- The **Agricultural Land Management** goal includes nutrient management and irrigation water management to reduce nitrate reaching the groundwater and Mississippi River.
- The **Protection** goal includes forest protection in high groundwater recharge areas to protect groundwater and the Mississippi River.

FOCUS AREAS

Sealing unused wells is a priority watershed-wide. DWSMA land management and protection is a priority in DWSMAs with high vulnerability and the St. Cloud surface water DWSMA (Figure 5.3). See zoomed in maps of land use in each DWSMA in Appendix D.

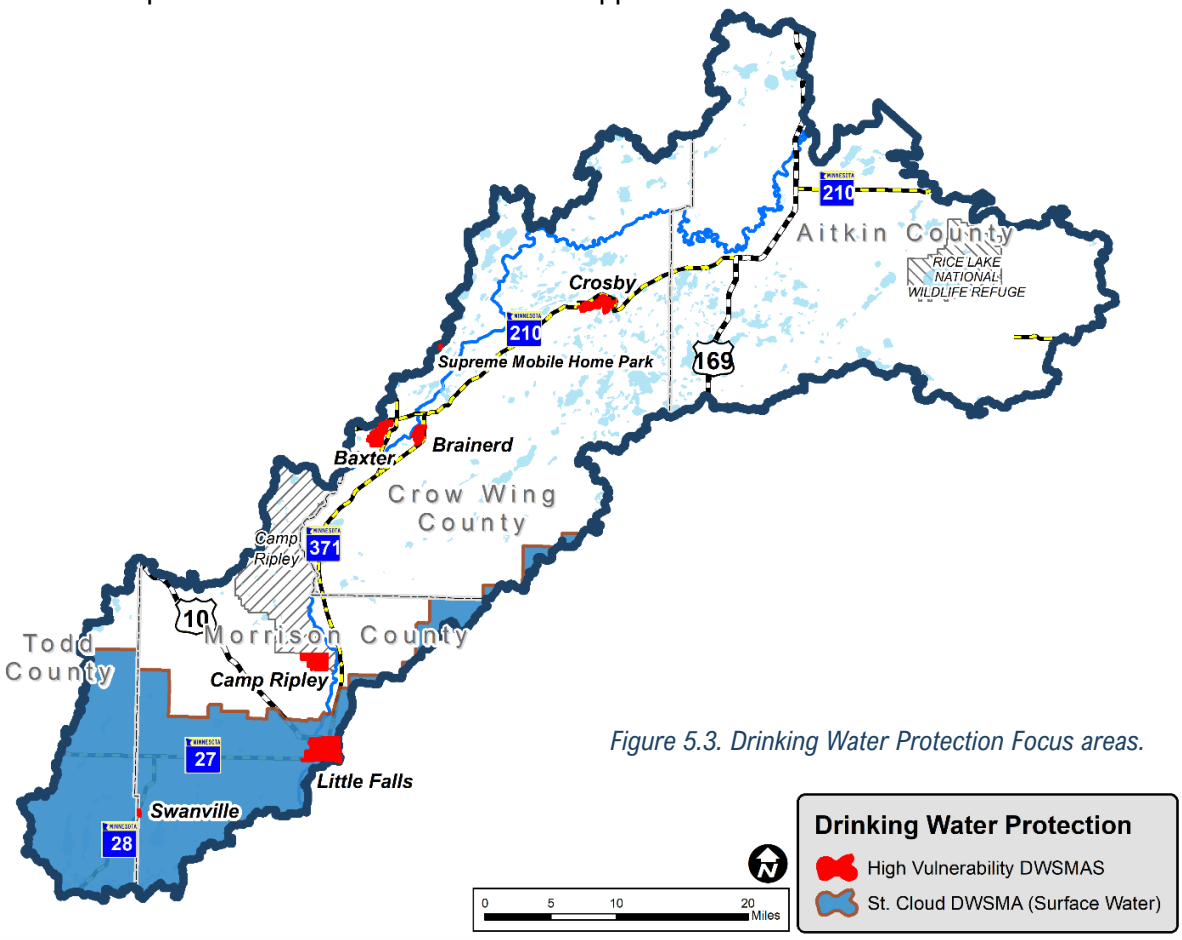


Figure 5.3. Drinking Water Protection Focus areas.

PHOSPHORUS REDUCTION

The MRBW has many regionally significant lakes that are important for fishing, tourism, and recreation. Shoreland development in Crow Wing and Aitkin Counties is valued at $3.3 billion (Crow Wing and Aitkin County Assessors). It is important to protect and improve the water quality in these lakes to maintain their recreational quality, fisheries, and property values.

This goal aims to reduce phosphorus loading to priority focus lakes. Phosphorus is a limiting nutrient for algae, meaning small amounts of phosphorus in a lake can lead to algal blooms and eutrophication. Algal blooms are very undesirable for recreation and can pose a health risk if a harmful algal bloom forms.

See Section 4 for the lake prioritization process. There are five focus lakes that are designated as impaired for excess nutrients (Table 5.2). In MPCA terminology, the words "Restore" and "Restoration" describe lakes that are impaired. This does not mean that these lakes will be fixed or fully restored in the next 10 years, but projects can be implemented to work towards water quality improvement.

Implementation actions for reducing phosphorus include stormwater management projects, agricultural BMPs, local ordinances, septic system maintenance, and continued water quality monitoring.

Working towards the other goals in this plan will reduce phosphorus in focus lakes: Agricultural Land Management, Protection, Shoreland Restoration, and Urban Stormwater Management.

SHORT-TERM GOAL

Reduce phosphorus loading in nearshore focus lakes by **5%** and mixed and watershed focus lakes by **10 pounds/year**.

ALREADY ACCOMPLISHED

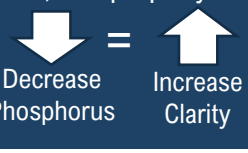
Serpent Lake has already met its phosphorus reduction goal, thanks to a comprehensive project implemented that included community improvements to stormwater, an Alum treatment in Cranberry Lake, and Ordinance updates.

DESIRED FUTURE CONDITION

Prevent degradation from current conditions in **Protect** and **Enhance** focus lakes (5% reduction), reach TMDL reductions in **Restore** lakes, and make progress towards the MN Nutrient Reduction strategy benefitting downstream resources such as Twin Cities Metro Area drinking water sourced from the Mississippi River (31.7% reduction in nitrogen and 18.6% reduction in phosphorus).

TELLING THE STORY

When phosphorus increases in a lake, it feeds the algae and makes the lake more green, that in turn causes the water clarity to decline. Reducing phosphorus in the lake can improve the lake clarity, making the lake better for recreation, enjoyment, and property values (Figure 5.5).



PRIORITY ISSUES ADDRESSED

- Nutrients

PRIORITY RESOURCES

- Focus Lakes

MEASURING

The short-term goals for nearshore lakes are based on a 5% reduction from the Lakes of Phosphorus Sensitivity Significance (DNR 2022), the short-term goal for mixed and watershed lakes is 10 pounds/year. Progress in the short-term goal will be measured in pounds of phosphorus reduced to each priority lake on project estimates. For a table of short-term goals for each individual water body see Table 5.2 on the next page.

STACKING BENEFITS

Reducing phosphorus also makes progress towards reducing algae and improving lake water clarity.

Surface Water Quality Benefits	One pound of phosphorus can produce 500 pounds of algae. See clarity benefits in Figure 5.5

FOCUS AREAS

The focus lakes for this goal were determined through a prioritization process in Section 4 (Figure 5.4).

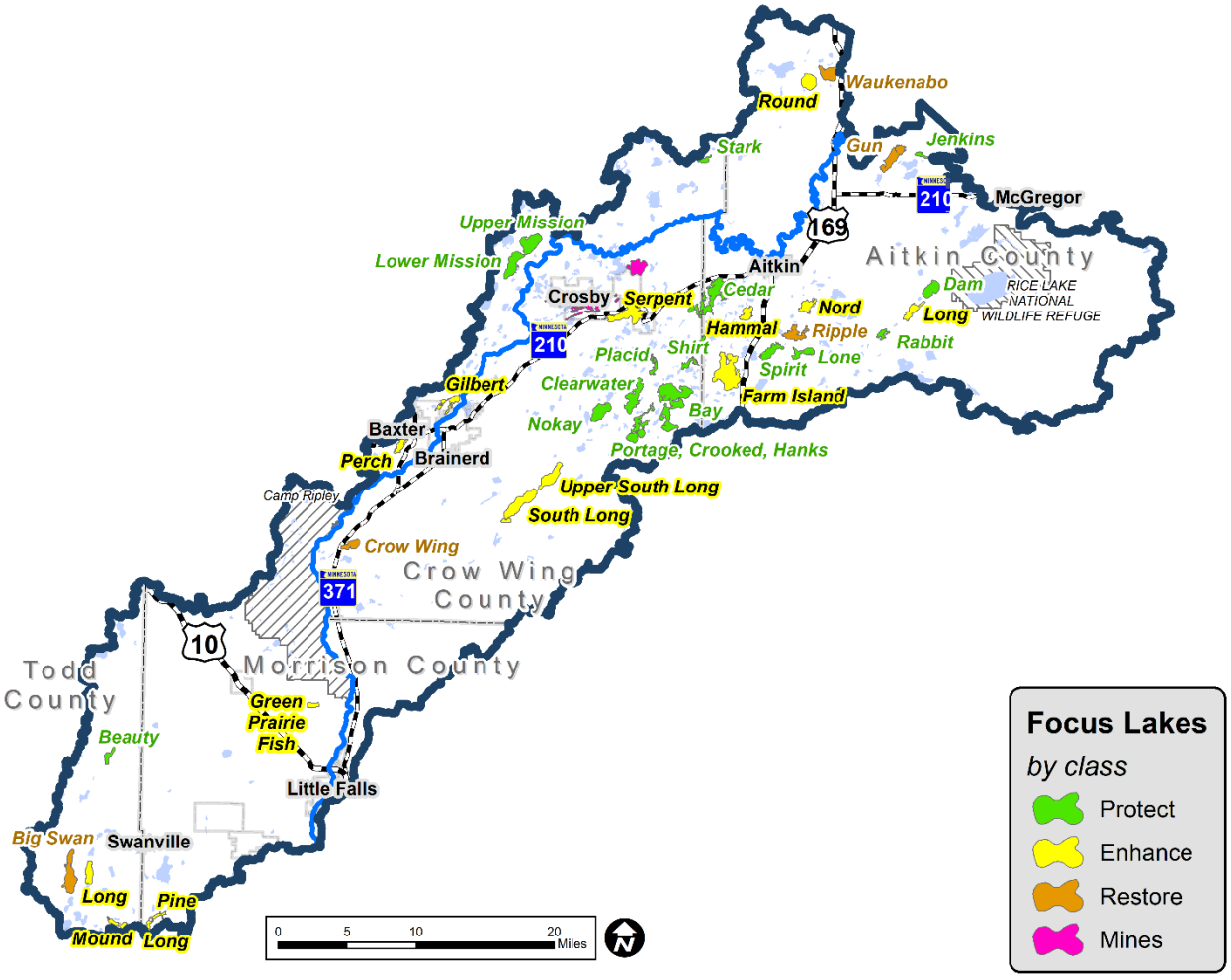


Figure 5.4. Focus lakes in the MRBW.

LAKE GOALS

The focus lakes were determined in Section 4, and each lake has a short-term phosphorus reduction goal assigned (Table 5.2). The DNR Lakes of Phosphorus Sensitivity Significance dataset (DNR 2022) was used to determine the current lake phosphorus load, the phosphorus reduction goal, the watershed to lake ratio, and the improvement in water clarity gained by reaching the phosphorus goal (Figure 5.5).

The watershed to lake ratio (W:L) can be used to determine where to focus BMPs around lakes (Table 5.2). Lakes with a small W:L have a small drainage area and therefore a nearshore focus. These lakes usually have a smaller phosphorus load. Lakes with a large W:L have many lakes upstream and a watershed focus. The W:L ratios used in this plan are from

- Nearshore (0-12): focus BMPs along the shoreline and in the direct drainage area to the lake.
- Mix (13-30): focus BMPs along the shoreline and upstream in the watershed.
- Watershed (>30): focus BMPs upstream in the watershed.

Nearshore projects include shoreline stabilization, protecting and enhancing shoreline vegetation, and stormwater management. These practices can be targeted with runoff flow path data in GIS and shoreline inventories. Watershed projects include agricultural BMPs, forest management and protection, tributary stream stabilization and stormwater and wastewater management in upstream cities.

Table 5.2. Lake goals and phosphorus loading focus. "Enhance" lakes are at risk due to declining water quality trends or being nearly impaired, "Protect" lakes are in good condition, and "Restore" lakes are impaired for nutrients.

Lake Name	Lake ID	Manage-ment Approach	Current Load (lbs/year)	Short-Term Goal (lbs/year)	Watershed: Lake Ratio	Phosphorus Loading Focus
Farm Island	01-0159-00	ENHANCE	2,458	10	13	Mix
Gilbert (East)	18-0320-01	ENHANCE	271	10	23	Mix
Gilbert (West)	18-0320-02	ENHANCE	335	10	89	Watershed
Gr. Prairie Fish	49-0035-00	RESTORE	332	10	15	Mix
Hammal	01-0161-00	ENHANCE	119	6	5	Nearshore
Long	01-0089-00	ENHANCE	538	10	17	Mix
Long	77-0027-00	ENHANCE	675	10	14	Mix
Long	49-0086-00	ENHANCE	181	9	17	Mix
Mound	77-0007-00	ENHANCE	46	2	4	Nearshore
Nord	01-0117-00	ENHANCE	120	6	4	Nearshore
Perch	18-0371-00	ENHANCE	46	2	3	Nearshore
Pine	49-0081-00	ENHANCE	49	2	5	Nearshore
Round	01-0137-00	ENHANCE	52	3	2	Nearshore
Serpent	18-0090-00	ENHANCE	456	10*	6	Nearshore
L. South Long	18-0136-00	ENHANCE	5,635	10	38	Watershed
U. South Long	18-0096-00	ENHANCE	3,383	10	49	Watershed
Bay	18-0034-00	PROTECT	1,237	10	7	Nearshore
Beauty	77-0035-00	PROTECT	169	8	7	Nearshore
Cedar (Main)	01-0209-01	PROTECT	1,842	10	17	Mix
Clearwater	18-0038-00	PROTECT	152	8	3	Nearshore

Lake Name	Lake ID	Manage-ment Approach	Current Load (lbs/year)	Short-Term Goal (lbs/year)	Watershed: Lake Ratio	Phosphorus Loading Focus
Crooked	18-0041-02	PROTECT	295	10	11	Nearshore
Dam	01-0096-00	PROTECT	880	10	15	Mix
Hanks	18-0044-00	PROTECT	197	10	20	Mix
Lone	01-0125-00	PROTECT	35	2	2	Nearshore
Nokay	18-0104-00	PROTECT	1,485	10	22	Mix
Placid	18-0076-00	PROTECT	96	5	7	Nearshore
Portage	18-0050-00	PROTECT	215	11	11	Nearshore
Shirt	18-0072-00	PROTECT	61	3	4	Nearshore
Spirit	01-0178-00	PROTECT	1,509	10	58	Watershed
Stark	18-0169-00	PROTECT	226	11	10	Nearshore
Upper Mission	18-0242-00	PROTECT	654	10	7	Nearshore
Big Swan	77-0023-00	RESTORE	4,168	10	24	Mix
Crow Wing	18-0155-00	RESTORE	1,776	10	29	Mix
Gun	01-0099-00	RESTORE	1,200	10	13	Mix
Ripple	01-0146-00	RESTORE	6,298	10	102	Watershed
Waukenabo	01-0136-00	RESTORE	949	10	12	Nearshore

*The goal for Serpent Lake has been exceeded through a comprehensive project implemented that included community improvements to stormwater, an Alum treatment in Cranberry Lake, and Ordinance updates

The Lakes of Phosphorus Sensitivity Significance analysis also estimates the inches of water clarity gained if 5% of the phosphorus in the lake is reduced (DNR 2022). Lakes with small phosphorus loads and numerous inches of clarity gained have the best return on investment (right side of Figure 5.5).

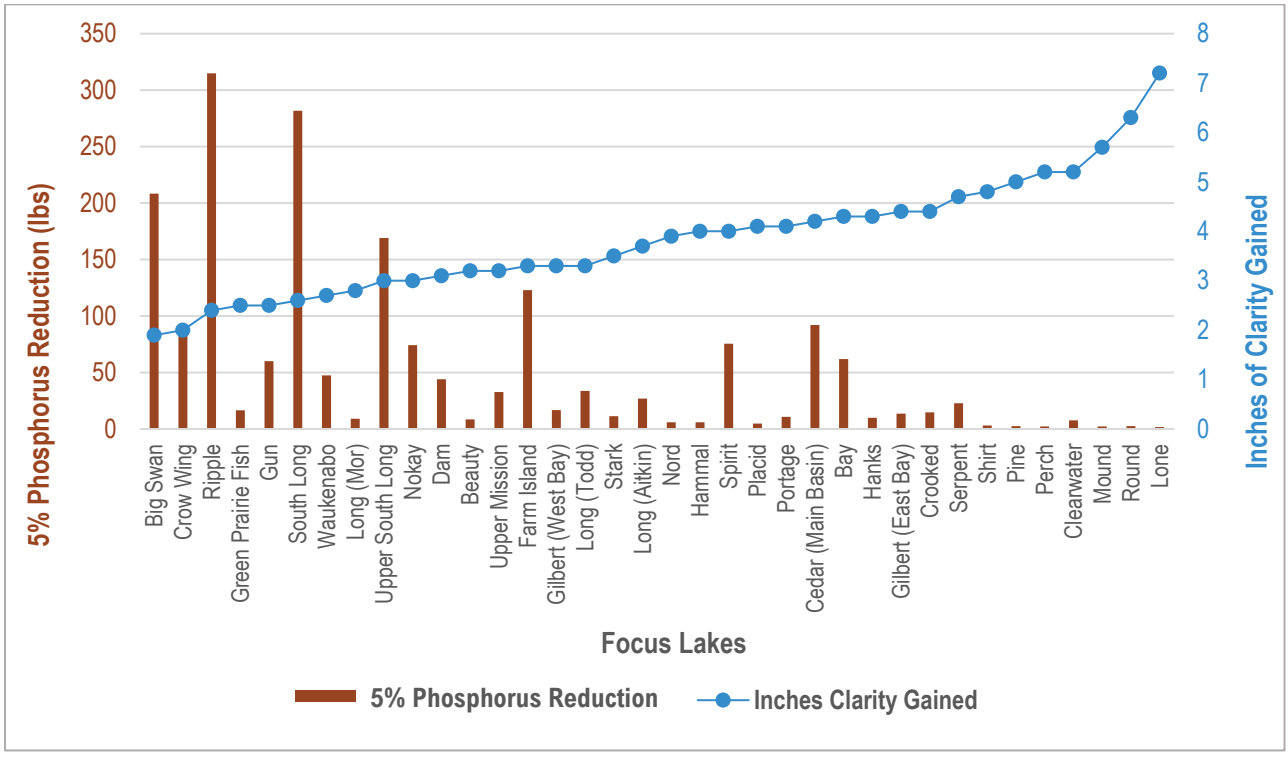


Figure 5.5. Inches of clarity gained in each lake if 5% of the phosphorus is reduced (DNR 2022).

URBAN STORMWATER MANAGEMENT

Urban and developed areas have impervious surface areas, such as pavement and roofs, which increase runoff from precipitation rather than infiltrate water as soils can do. This urban runoff often carries pollutants from human activities such as fertilizers, chloride, and other pollutants from roads. Stormwater runoff can also cause temperature problems in streams, as water temperatures can rise with large contributions of warmer stormwater to streams after a precipitation event.

The MRBW has three Municipal Separate Storm Sewer Systems (MS4s) (Brainerd, Baxter, and Little Falls), an MS4 is a network of structures that conveys stormwater through the city and eventually into receiving water bodies. These larger cities are regulated; smaller communities are not regulated but may still have structures that drain to receiving water bodies.

Reducing the volume of stormwater entering rivers and improving the quality of the water can be achieved through a variety of practices. including permeable pavement, infiltration basins, stormwater treatment ponds, biofiltration systems, and encouraging low impact development.

This goal aims to first obtain a comprehensive stormwater data set for each community that drains to a focus lake or stream including a stormwater infrastructure map, subwatershed prioritization, and targeted projects list. Once this data set is obtained, projects can be implemented from the targeted projects list. Therefore, the work done can be directly tied to water quality improvements.

SHORT-TERM GOAL

Develop a comprehensive stormwater information data set for **8 cities** that have drainage to a priority lake or stream.

ALREADY ACCOMPLISHED

The cities of Baxter and Brainerd (two cities) already have plans and grant funds to address stormwater (Whiskey Creek Stormwater Treatment Facility and Little Buffalo Creek Gully Stabilization).

DESIRED FUTURE CONDITION

Use the comprehensive stormwater information data set to implement stormwater management projects in the 10 communities that drain to focus lakes and streams in the watershed.

Meet WLAs for Mississippi River TMDL.

TELLING THE STORY

There are five cities that have stormwater drainage to the Mississippi River and another five cities that have stormwater drainage to other focus lakes and streams. Gathering the data needed to manage this stormwater will enable watershed partners to implement projects to improve and protect water quality.

PRIORITY ISSUES ADDRESSED

- Nutrients
- Stormwater runoff
- Bacteria

PRIORITY RESOURCES

- Focus Lakes and Streams
- Mississippi River

MEASURING

Progress will be measured by completing a comprehensive stormwater study for each community that drains to a priority resource.

Key: ● Complete, ◐ Partially Complete, ○ Not Complete

Community	Priority Resource	Stormwater Information
Aitkin	Ripple River, Miss. River	◐
Baxter	Whisky Cr, Miss. River	●
Brainerd	Buffalo R, Little Buffalo Cr, Mississippi River	●
Crosby	Serpent Lake	◐
Deerwood	Serpent Lake	◐
Fort Ripley	Mississippi River	○
Little Falls	Mississippi River	◐
Randall	Little Elk River	○
Sobieski	Swan River	○
Swanville	Swan River	○

STACKING BENEFITS

Work toward this goal also makes progress towards reductions in phosphorus, sediment, and nitrogen to surface and groundwater; and retains water runoff to surface water. Actual pollutant reductions will be estimated per project designed during implementation.

Surface Water Quality Benefits	Phosphorus = 250 lbs/yr*
	Sediment = 250 tons/yr*
Climate Resiliency Benefits	Storage = 47.1 acre-feet from the Whiskey Creek Stormwater Treatment Facility

** Estimated benefits from completing the Little Buffalo Creek Gully Stabilization project.*

FOCUS AREAS

The first priority focus areas for this goal are the urban communities that are located along the Mississippi River (Aitkin, Brainerd, Baxter, Little Falls), and Crosby, which is located on the shore of Serpent Lake (Figure 5.6). Second priority focus areas are all other cities that drain to priority resources.

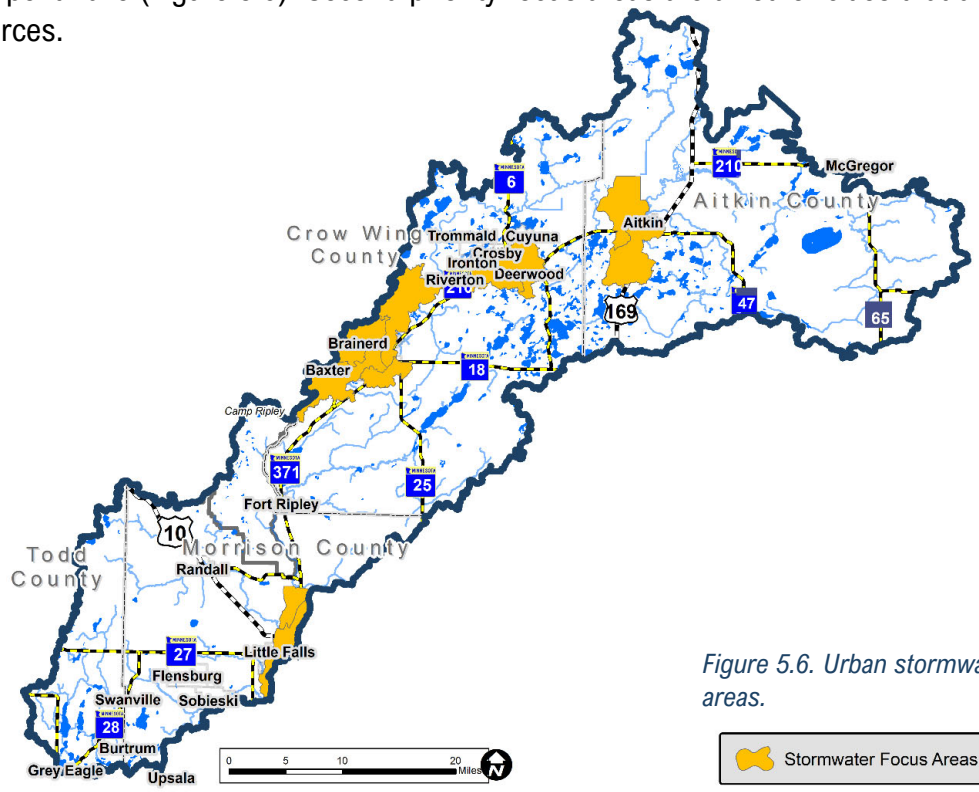


Figure 5.6. Urban stormwater focus areas.

SHORELAND MANAGEMENT

Shoreland and streambank erosion is a natural process in which the velocity of the stream or the changing water levels in lakes slowly erode the shore. However, human activities such as shoreland development, removal of native plants and trees, removal of in-lake and riparian vegetation, and altered hydrology (straightening and ditching streams) speed up this process.

A 'lawn to lake' shoreline allows seven to nine times more phosphorus to enter the lake than a more naturally vegetated shoreline (Radomski and Ashe 2014). Minnesota has currently lost 40 to 50% of its natural shorelands, and they are being degraded at a rate of 1-2% more each decade. At this rate, a majority of Minnesota shorelines will soon be unable to protect water quality and provide fish and wildlife habitat (Radomski 2006). Shoreland degradation has the most direct effect on nearshore-loading lakes (Table 5.2).

The impact of unstable streambanks and shorelands include soil loss into streams and lakes due to erosion, which degrades habitat and water quality. Increased sediment can cover the bottom of streams and lakes, affecting macroinvertebrate and fish habitat. Erosion increases nutrient loading as well, as phosphorus is bound in streambank and shoreland soils.

SHORT-TERM GOAL

Enhance **2 miles** of shoreline or streambank around focus lakes and streams.

ALREADY ACCOMPLISHED

In the past 10 years, 1.6 miles of lakeshore has been enhanced in the watershed with assistance from the SWCDs.

DESIRED FUTURE CONDITION

Halt the 1-2% of shoreline loss per decade in the watershed and achieve a net gain instead of loss. This includes implementing the county shoreline ordinances.

TELLING THE STORY

There are 247 miles of shoreline in the focus lakes, which at a rate of 1-2% lost would mean a loss of 2.5-5 miles in the past decade. The restoration already accomplished in the past decade (1.5 miles) has not kept up with the loss. The ultimate goal is to halt this deficit in the next decade and achieve a net gain.

PRIORITY ISSUES ADDRESSED

- Riparian and in-lake alteration
- Eroding streambanks
- Nutrients

PRIORITY RESOURCES

- Focus Lakes
- Focus Streams

Streambanks and shorelands can be stabilized via enhancement projects, cattle exclusion fencing, soft armor stabilization, and a native vegetation buffer planted along the shore, where roots hold soil in place. Shoreland restoration also provides benefits such as improving aquatic and riparian habitat, capturing, slowing, and infiltrating upslope stormwater runoff from the uplands, and filtering out pollutants and nutrients. Riparian vegetation can provide a corridor and habitat for species along the water body such as pollinators (bees, butterflies, and other insects), birds (loons, songbirds, and shorebirds), frogs, turtles, and small mammals (otters, mink, muskrats).

MEASURING

Progress will be measured by adding the shoreline and riparian length of restoration projects. The goal was estimated by implementing approximately 10 projects per year of 100 feet each.

Management Zone	10-Year Milestone (miles)
North	0.6
Central	0.6
South	0.6
Total	**2.0**

STACKING BENEFITS

Work toward this goal also makes progress towards reductions in phosphorus, sediment, and nitrogen to surface water, and enhances aquatic and riparian habitat.

Surface Water Quality Benefits	Phosphorus*
	Sediment*
	Nitrogen*
Habitat Benefits	Miles of aquatic and riparian habitat = 2.0

** As estimated per project designed and implemented.*

FOCUS AREAS

The focus areas for this goal are the focus lakes and streams determined in Section 4 (Figure 5.7).

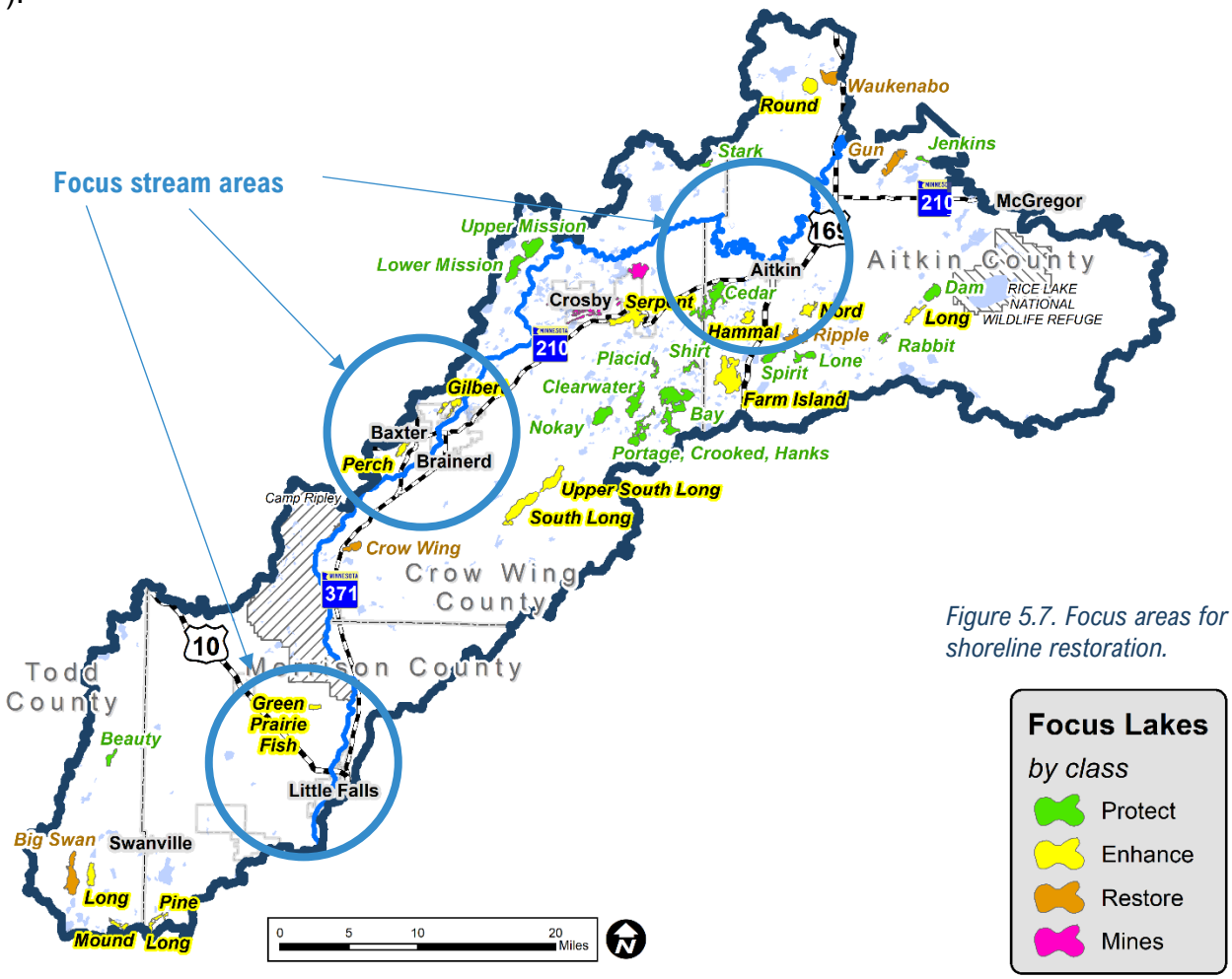


Figure 5.7. Focus areas for shoreline restoration.

WATER RETENTION

Human alteration of the landscape, including draining wetlands, channelizing streams, and removing forests and perennial vegetation have caused precipitation to runoff more in present times than pre-European settlement in Minnesota. Historically, ditches were created, and streams were channelized to move water from soils for agriculture or development. Now, the importance of soil, wetlands, and forests in retaining and storing water are better understood. More water retention on the landscape reduces peak flows in streams, which decreases bank erosion and improves habitat and water quality. Storing additional water in the ground and soil also decreases the severity and occurrence of floods and droughts.

Increased water retention is important not only for the reasons above, but also because of the changing precipitation trends in the watershed. The DNR reports an additional 4 inches of precipitation per year since pre-2001, and more heavy rain events (greater than three inches of rain in 24 hours). This additional precipitation is not increasing flows in the Mississippi River, but that could be muted by the large number of lakes, the Aitkin Diversion, and the Brainerd Hydro-electric dam (DNR 2023). An additional 16,621 acre-feet of water retention is needed in the next 10 years just to keep up with this increasing precipitation trend. This is roughly the volume of Nokay Lake.

The short-term goal aims to build watershed resiliency towards climate variability by restoring wetland and/or forest habitat, implementing cover crops on agricultural land, urban stormwater management and retention, and restoring floodplains in streams.

SHORT-TERM GOAL

Build resiliency by adding **400 acre-ft** of storage through cover crops and stormwater management.

ALREADY ACCOMPLISHED

The new Whiskey Creek Storm Water Treatment Facility is designed to provide 41.7 acre-feet of temporary storage during a 1.1 inch storm event (Crow Wing SWCD and City of Baxter).

DESIRED FUTURE CONDITION

Build resiliency and add water storage to capture the extra 16,621 acre-feet of runoff needed to keep up with increasing precipitation trends (roughly the volume of Nokay Lake).

TELLING THE STORY

Water storage is measured in acre-feet. An acre-foot is equivalent to a football field covered in one foot of water. Acre-feet storage benefits can be calculated for many actions in this plan, and all projects can be built to future precipitation estimates instead of today's (where applicable), to ensure resiliency in the face of a changing climate.

PRIORITY ISSUES ADDRESSED

- Altered hydrology
- Nutrients
- Wetland restoration and protection

PRIORITY RESOURCES

- Focus Lakes and Streams
- Mississippi River

MEASURING

Progress will be measured in acre-feet of resiliency added through other goals.

Plan Goal	Resiliency Benefits
Agricultural Land Management	300 acre-feet (cover crops)
Agricultural Land Management	Restoration of drained peatlands with carbon, storage, and habitat benefits.
Stormwater Management	100 acre-feet (stormwater retention)
Protection	Reforestation contributes to water retention.

STACKING BENEFITS

Reducing runoff in the watershed also reduces the amount of sediment, phosphorus, and nitrogen reaching streams and lakes. In addition, keeping forested areas forested protects current storage in the soil. This protected storage is the amount that would be lost if forest was cleared for development or agriculture in this watershed.

Climate Resiliency Benefits	Protected Storage from the Forest Goal = 1,880-2,290 acre-feet

FOCUS AREAS

Focus areas for increasing climate resiliency and storage are areas with the most runoff and altered hydrology (dark blue areas, Figure 5.8).

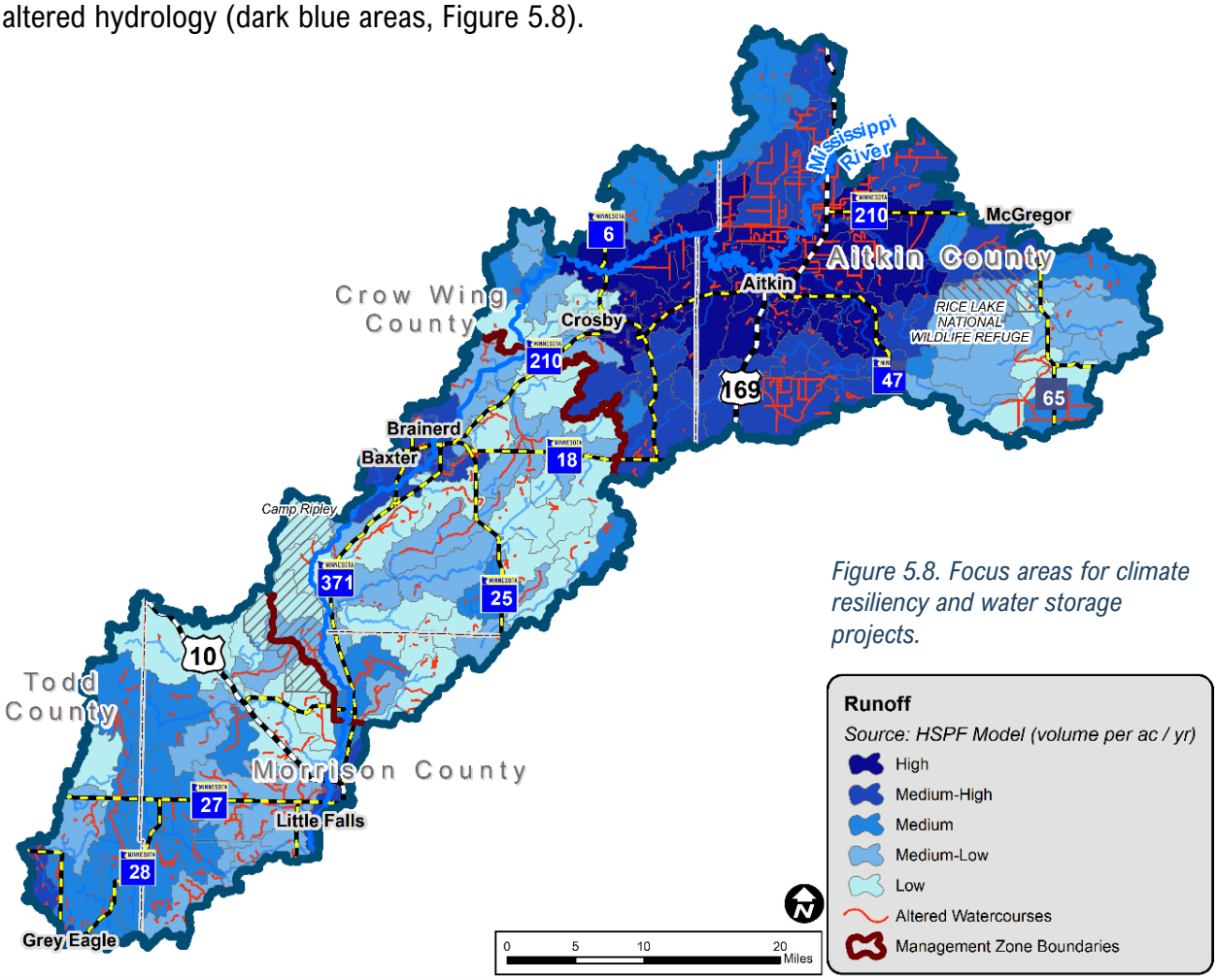


Figure 5.8. Focus areas for climate resiliency and water storage projects.

OVERALL BENEFITS

With current funding available plus the new watershed-based funding that will be acquired upon completion of this plan, planning partners aim to achieve the following overall improvements in the watershed.

Table 5.3. Overall benefits from implementing this 10-year plan.

Surface Water Quality Benefits	**Phosphorus**: the pounds of phosphorus reduced by implementing all plan goals.	**1,069 pounds/year; equivalent to:**  **535,000 pounds of algae**
	Sediment: the tons of phosphorus reduced by implementing all plan goals.	**159 tons/year; equivalent to:**  **16 dump trucks of sediment**
	Nitrogen: the pounds of nitrogen reduced by implementing all plan goals.	**9,029 lbs/year; equivalent to:**  **2,257 bags of nitrogen fertilizer**
Habitat Benefits	**Habitat**: acres of forest protected by implementing all plan goals.	**14,765 acres; equivalent to:**  **the area covered by 11,200 football fields**
	Habitat: length of shoreland and riparian land enhanced by implementing all plan goals.	**2 miles; equivalent to:**  **the length of 30 football fields.**
Climate Resiliency Benefits	**Storage**: the amount of new water storage on the landscape or in the soil by implementing all plan goals.	**400 acre-feet; equivalent to:**  **400 football fields covered in 1 foot of water**
	Carbon: the amount of carbon stored and sequestered by implementing plan goals.	**386,000 tons; equivalent to:**  **Removing 285,700 gas vehicles driven for one year**

Section 6

Targeted Implementation Schedule

Section 6. Targeted Implementation Schedule

The targeted implementation schedule contains a table for each goal identified in Section 5, which lists actions that planning partners will implement over the 10-year timeframe of this plan. The tables describe where the action will be focused, who will be in charge of implementation, and funding associated with each action. These tables are the culmination of the planning process, bringing together the work done in selecting priority issues, setting goals, and determining management zone needs.

Already Accomplished

The actions contained in the implementation schedule are not all new to the watershed. Implementation will build off of previous projects and partnerships already underway in the watershed. Progress towards each plan goal so far was identified in the "Already Accomplished" box in Section 5. The MPCA tracks BMPs implemented in watersheds by SWCDs and by the Natural Resources Conservation Service (NRCS) in the Healthier Watersheds tool, a few of which are shown in Figure 6.1. For a full list and map of projects implemented see the MPCA's Healthier Watersheds page at https://www.pca.state.mn.us/business-with-us/healthier-watersheds-tracking-the-actions-taken

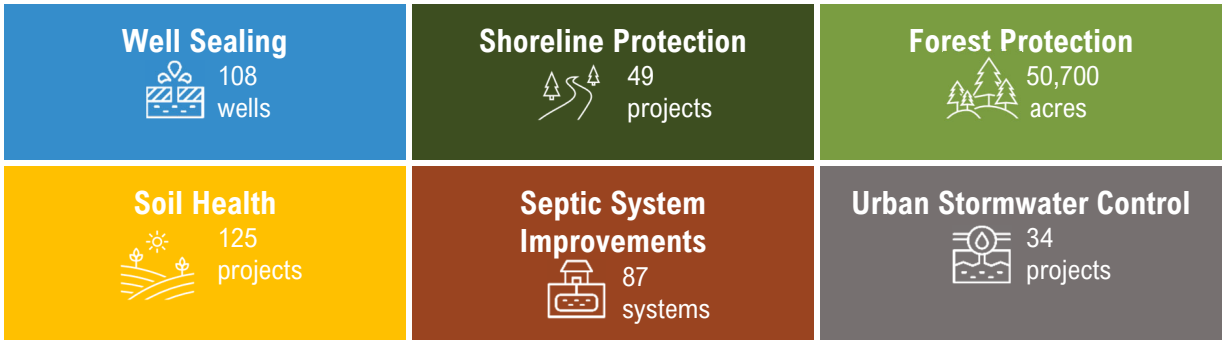


Figure 6.1. Actions implemented in the watershed 2004-2021, from Healthier Watersheds and local data.

Local conservation projects – rain garden and shoreline protection

Implementation

Targeting Practices

Targeting includes where projects should be done and with whom. For the MRBW, targeting data is available to the individual parcel level for use in outreach. These data sets are meant to target the root causes of watershed issues. For example, land protection practices are targeted to where land protection would have the best impact on water and habitat quality. See Appendix D for more information on these targeting analyses. HSPF SAM is a water quality modeling tool.

Table 6.1. Targeting data for each plan goal.

Goal	Targeting Data	Scale
Protection	Riparian Adjacency Quality (RAQ) maps: where privately-owned forests have the best impact on water and habitat quality. A score from 1-3 is developed for how close the parcel is to a lake or stream (Riparian), how close it is to already protected land (Adjacency), and quality plant and animal species (Quality). For more details and example maps see Appendix D.	Parcel
Agricultural Land Management	HSPF SAM: where there is the most phosphorus runoff. Nitrogen Infiltration Risk: where there is the most risk of nitrogen infiltrating to the groundwater. Parcels: where there is agriculture in the watershed.	Subwatershed and Parcel
Phosphorus Reduction	HSPF SAM: where there is the most phosphorus runoff. Focus Resources: lakes and streams that were determined a focus for implementation in Section 4.	Subwatershed and water body
Urban Stormwater Management	City stormwater drainage areas.	Catchment
Drinking Water Protection	Well sealing watershed-wide. DWSMAs.	Parcel
Shoreland Restoration	Impervious surface maps, New LiDAR.	Parcel
Water Retention	Restorable wetlands analysis: where there is suitable soil for wetland restoration.	Parcel

Where to Work First

The long-term goals detailed in Section 5 represent the desired future condition for the MRBW and its resources given time, funding, and capacity. The short-term goals represent what is possible to accomplish in 10 years, and that means putting efforts and funding toward areas that need it most.

To prioritize where to work first overall, the focus areas for the goals were stacked together to determine overall watershed priorities. The outcome is shown below in Figure 6.2 and indicates where outreach and funding will be focused in the first five years of plan implementation.

A scoring sheet will be developed by the Steering Committee that has criteria to use in selecting projects and dispersing funds in implementation. Projects that address priority issues in priority areas along with the best pollutant reductions and cost effectiveness will be prioritized.

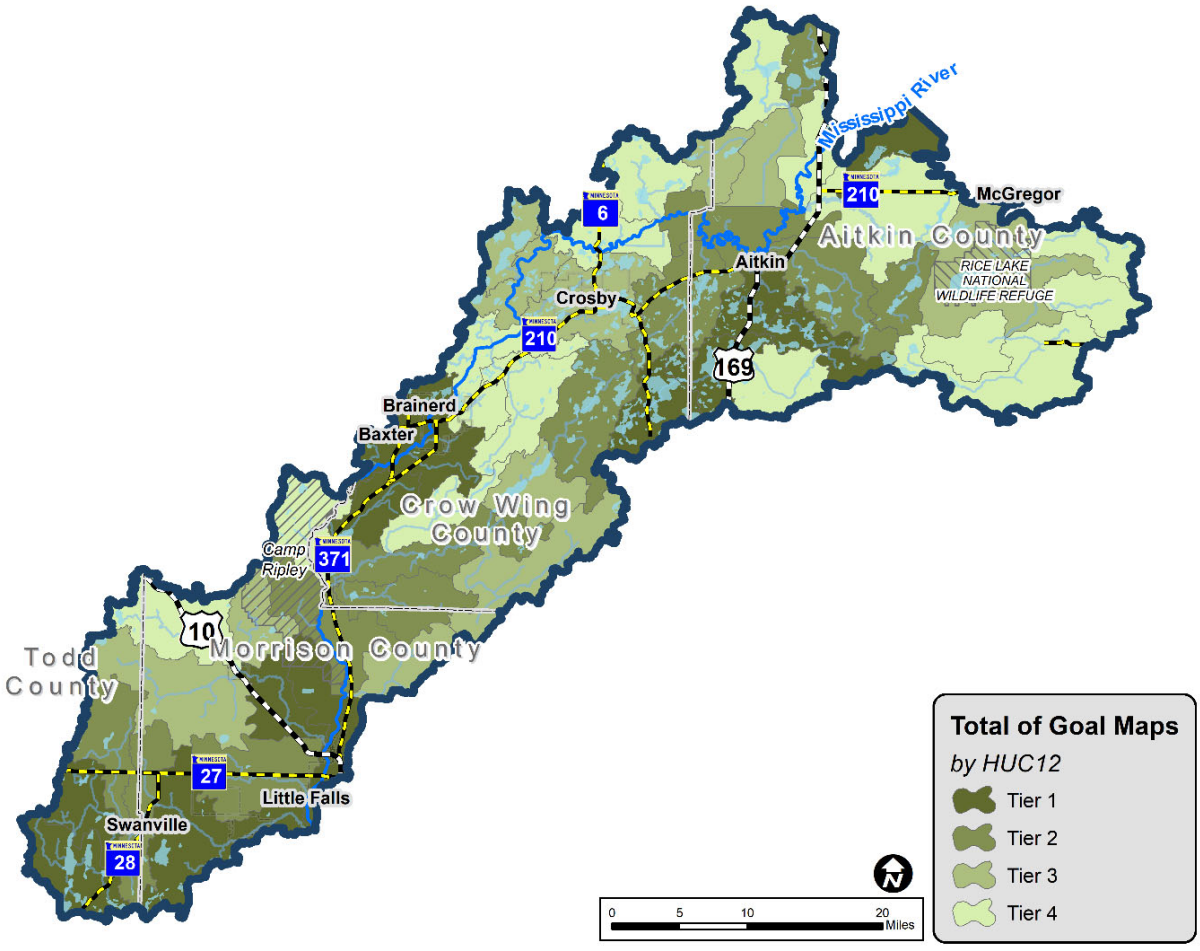


Figure 6.2. Overall watershed priorities combining all goals.

Funding

The local partners' ability to implement actions depends on funding availability. The actions developed in this plan were selected to have the greatest impact on watershed issues with available funding.

Funding is organized into three levels, shown in Table 6.2. Level 1 funding consists of current funding available, which includes county tax levies, funding for counties (DNR Shoreline, MPCA Subsurface Sewage Treatment Systems [SSTS]), and state programs such as BWSR Capacity Funding for SWCDs.

Level 2 funding is the level that planning partners will operate at during implementation- it is Level 1 plus Watershed-Based Implementation Funding (WBIF). WBIF is non-competitive funding from the Clean Water Fund of the Land and Legacy Amendment that planning partners will receive for implementation of this plan.

Level 3 is partner funding and funding that occurs outside of the local government units such as federal funding (i.e., CRP, Environmental Quality Incentives Program [EQIP]), state programs (SFIA), and grants (Lessard Sams, 319, Midwest Glacial Lakes Partnership). There is likely much more project funding occurring in the watershed addition to these totals as it is difficult to document projects by all entities, including private landowners and lake associations. Funding is described in more detail in Section 9.

In the implementation tables, each action is assigned a funding level. Some actions can be funded by Level 2 or Level 3, or a combination of multiple levels. For simplicity in estimating costs, one of the Levels (2 or 3) is usually indicated in the implementation table by the colors in Table 6.1. These are all just estimates and the costs for implementation will be more specific in each biennial work plan.

Table 6.2. Funding in the MRBW.

Funding Level	Description
Level 1	Current Baseline Funding for the watershed for all programs.
Level 2	**Baseline + WBIF**
Level 3	Partner funding (NRCS, SFIA, CRP, Lessard Sams Outdoor Heritage Fund, The Nature Conservancy (TNC), DNR, MPCA)

Programs

Implementation of actions will fall into one of four programs: Manage It, Fix It, Keep It, or Know It (Figure 6.3). These programs are described in more detail in Section 8. In the MRBW, the focus is fairly balanced between Manage It, Fix It, and Keep It. Each action in the implementation tables has an implementation program icon indicated which program is associated with that action.

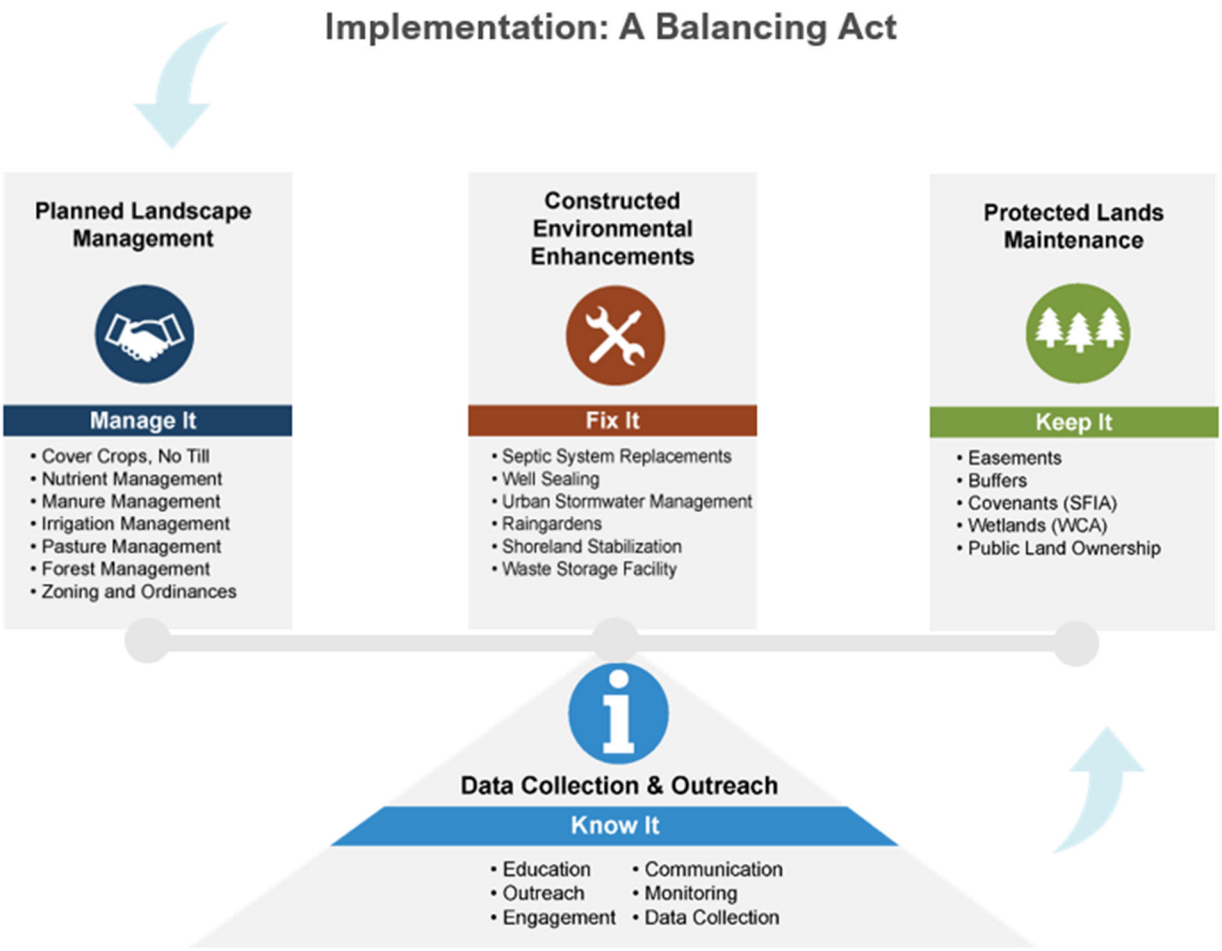


Figure 6.3. Implementation programs.

Local conservation projects – pollinator planting along a stormwater pond in Baxter, MN

Targeted Implementation Schedule

A targeted implementation schedule for each goal is presented on the following pages.

- Protection
- Agricultural Land Management
- Phosphorus Reduction
- Urban Stormwater Management
- Drinking Water Protection
- Shoreland Restoration
- Water Retention

Each table lists actions that will help make progress towards the goal, the implementation program for that action, where and when it will be done, who will lead implementation, and estimated cost for the action.

The numbers, cost, and locations of practices in the Targeted Implementation Schedule represent a best-case scenario for planning. Due to voluntary participation, field verification, and funding availability, prioritized projects may not be feasible, in which case the next highest priority project will be targeted. In addition, projects may emerge that were not identified in the Targeted Implementation Schedule. These projects will still be pursued if environmental and economic benefits are comparable to those identified in the Targeted Implementation Schedule.

A variety of factors will ultimately determine where implementation occurs, including but not limited to the following:

- Voluntary participation by landowners and residents
- Field verification of practice type and location
- Amount of funding available for implementation
- New data on resource conditions
- Emerging practices
- Practices/projects ready to implement
- Effectiveness of education and outreach and research initiatives

Local conservation projects – agricultural BMPs

GOAL: PROTECTION

Protect and enhance of forest cover, focus lakes and streams, and groundwater through adding **14,765 acres** of land protection.

GROUND WATER HABITAT/FORESTRY SURFACE WATER

What		Where	Management Zone 10 yr Outputs				Who	When					Costs
Action	Program	Priority Resources	North	Central	South	Output for Goal Tracking	Responsibility (Bold = Lead)	2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Estimated Total 10-Year Cost
Forest and Land Protection *SFIA, Easements, Acquisition, ACUB, on priority private uplands, riparian, and shorelands.*		Focus Lakes and Streams, LSP Priorities	4,633 acres	4,288 acres	5,844 acres		**SWCDs**, **DNR**, BWSR, TNC, Mississippi Headwaters Board (MHB), TPL, Minnesota Land Trust, Northern Waters Land Trust, Counties	●	●	●	●	●	$18,036,000
Forest Stewardship Plans		Focus Lakes and Streams, LSP Priorities	40 plans	36 plans	50 plans		**SWCDs**, **DNR**, **Forest Consultants,** TNC, BWSR	●	●	●	●	●	**$220,500**
Forest Health Management *Forest Stand Improvement, Tree Planting, Climate Assisted Migration, Reforestation*		Focus Lakes and Streams, LSP Priorities	100 acres	100 acres	100 acres		**SWCDs**, **DNR, Counties,** NRCS, BWSR, Minnesota Timber/Logging Association	●	●	●	●	●	**$150,000**
Noxious Weeds & Terrestrial Invasive Species Management *Coordinate invasive species management activities on private lands adjacent to state managed lands, Noxious Weed Program*		LSP Priorities	Continue current program				**SWCDs**, **DNR, Counties,** NRCS	●	●	●	●	●	*Cost included in local programs*
DWSMA Protection *RIM easements*		Crosby, Baxter, Brainerd, Camp Ripley and Little Falls DWSMAs	160 acres with Ag BMPs or permanent protection				**Cities, MDH,** SWCDs, BWSR	●	●	●	●	●	**Drinking Water Protection Goal**
Outreach Program *Networking, local foresters, workshops, social media*		Focus Lakes and Streams, LSP Priorities	Quarterly Forestry Technical Team meetings One workshop in the watershed per year				**SWCDs**, **MHB**, Counties, UMN Extension, Woodland Co-ops	●	●	●	●	●	**$50,000**
Data Collection *Identification of sensitive shoreland communities (i.e. white cedar, tamarack, black spruce) for protection.*		Sensitive plant and animal communities	Complete data set				**SWCDs, DNR,** Counties		●	●	●		**$50,000**
												Level 2 Total (Baseline + WBIF)	**$470,500**
												Level 3 Total (SFIA, Lessard Sams)	**$18,036,000**

GOAL: AGRICULTURAL LAND MANAGEMENT

Implement **7,130 acres** of agricultural BMPs.

LAND SURFACE WATER GROUND WATER

What		Where	Management Zone 10 yr Outputs				Who	When					Estimated Costs
Action	Program	Priority Resources	North	Central	South	Output for Goal Tracking	Responsibility (Bold = Lead)	2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Estimated Total 10-Year Cost
Agricultural Land Management Practices *cover crops, irrigation water management, nutrient management, pasture management, perennial agriculture, filter strips, water and sediment control basins, wind breaks, manure storage*		Focus Lakes and Streams, Groundwater Recharge areas	2,300 acres	1,790 acres	3,040 acres		**NRCS, SWCDs**, Soil Health Coalition, Regional Conservation Partnership Program (RCPP) Irrigation, Minnesota Department of Agriculture (MDA)	●	●	●	●	●	**$2,200,000**
Bacteria Reduction Projects *waste pit closures, manure storage, livestock fencing and crossing, agricultural waste systems, silage treatment, manure management plans, land application, feedlot runoff controls*		Hay Creek, Buffalo Creek, Little Elk River, Pike Creek, Swan River, Schwanke Creek	2 projects	2 projects	8 projects		**NRCS**, **SWCDs**, Counties	●	●	●	●	●	**$1,000,000** $1,000,000
Ag Water Quality Certification		Watershed-wide	10 farms	5 farms	10 farms		**MDA**, SWCDs, NRCS	●	●	●	●	●	$250,000
Land Retirement Programs *CRP, Conservation Reserve Enhancement Program*		Watershed-wide	Maintain current CRP acres (2,337 acres in 2023)				**Farm Service Agency (FSA),** SWCDs, NRCS	●	●	●	●	●	$2,000,000
Feedlot Ordinances		Watershed-wide	Aitkin and Crow Wing County: MPCA	Morrison County Ordinance	Morrison & Todd County Ordinances		**MPCA, Counties**, SWCDs	●	●	●	●	●	**$460,000**
Outreach Program *Farm visits, workshops, peer-to-peer network, marketing locally produced foods, social media*		Watershed-wide	One workshop in the watershed per year				**NRCS, SWCDs, UMN Extension,** local co-ops	●	●	●	●	●	**$50,000**
Data Collection *Improve understanding of where manure is applied, where cattle have access to streams, updated feedlot inventory.*		Watershed-wide	Data set for priority areas				**SWCDs,** NRCS			●	●	●	**$50,000**
												Level 2 Total (Baseline + WBIF)	**$3,760,000**
												Level 3 Total (NRCS, FSA, MDA)	**$3,250,000**

GOAL: PHOSPHORUS REDUCTION

Reduce phosphorus loading to nearshore focus lakes by **5%** and mixed and watershed focus lakes by **10 pounds/year** (page 50).

What		Where	Management Zone 10 yr Outputs				Who	When					Estimated Costs
Action	Program	Priority Resources	North	Central	South	Output for Goal Tracking	Responsibility (Bold = Lead)	2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Estimated Total 10-Year Cost
Near-shore Stormwater BMPs *rain gardens, technical assistance*		Focus Lakes	Meet lake phosphorus goals (page 74)				**Cities**, **Counties**, **SWCDs,** Lake Associations	●	●	●	●	●	**$1,000,000** $1,000,000
In-Lake Management *feasibility study to manage internal phosphorus loading, alum treatment, lake modeling*		Focus Lakes	Meet lake phosphorus goals (page 74)				**DNR**, **MPCA**, BWSR, Lake Associations, SWCD			●	●	●	**$200,000** $500,000
Agricultural Management Practices *cover crops, nutrient management, pasture management, perennial agriculture, filter strips, water and sediment control basins*		Focus Lakes	Meet lake phosphorus goals (page 74)				**SWCDs, NRCS**, BWSR, MDA	●	●	●	●	●	**Agricultural Land Management Goal**
Urban Stormwater Projects *stormwater treatment facilities, stormwater retention basins, biofiltration*		Focus Lakes	Meet lake phosphorus goals (page 74)				**SWCDs, Cities,** Crow Wing County Highway Department, Minnesota Department of Transportation (MnDOT)	●	●	●	●	●	**Urban Stormwater Goal**
Lakeshore Restoration *buffers, soft armor, capture upslope water, coir logs, willow wattles, technical assistance*		Focus Lakes	Meet lake phosphorus goals (page 74)				**SWCD**, Cities, Counties, DNR, Lake Associations	●	●	●	●	●	**Shoreline Restoration Goal**
Riparian Enhancement *stabilize gullies, capture upslope water, soft armor*		Tributaries to Focus Lakes	Meet lake phosphorus goals (page 74)				**SWCDs**, DNR	●	●	●	●	●	**Shoreline Restoration Goal**
Subsurface Sewage Treatment Systems *replace noncomplying systems, survey and inspect systems*		Focus Lakes	1. Inspect 4% of SSTS each year 2. Replace 3 SSTS each year with Level 2 funds 3. Replace all other SSTS with Level 3 funds				**Counties**, MCPA, SWCD, Ag BMP Loan	●	●	●	●	●	**$450,000** $3,000,000
AIS Prevention & Management *monitoring, inspection, decontamination, treatment of AIS*		Watershed-Wide	Implement AIS Plan	Implement AIS Plan	Implement AIS Plan		**Crow Wing County, Aitkin SWCD, Todd County, Morrison County, Lake Associations, MHB, DNR,** Aitkin County	●	●	●	●	●	$2,930,000
SSTS Ordinance *Enforce SSTS ordinances for greater compliance*		Watershed-Wide	Aitkin County Ordinances	Crow Wing County Ordinances	Morrison & Todd County Ordinances		**Counties**, **MHB**, SWCDs, MPCA	●	●	●	●	●	**$460,000**
Water Quality Monitoring *Monitoring and lake studies*		Watershed-Wide	10-year trend analysis	10-year trend analysis	10-year trend analysis		**Lake Associations**, SWCDs, MPCA	●	●	●	●	●	$195,000
Outreach Program *Workshops, realtors, contractors, landowners, mini lake plans, social media*		Watershed-Wide	One workshop in the watershed per year				**SWCDs, UMN Extension, Lake Associations, Lake Improvement Districts, MHB,** Contractors, Realtors, Landowners, Counties	●	●	●	●	●	**$50,000**
													Level 2 Total (Baseline + WBIF) **$2,160,000**
													Level 3 Total (NRCS, FSA, MDA, Clean Water Fund, Midwest Glacial Lakes) **$7,625,000**

GOAL: URBAN STORMWATER MANAGEMENT

Develop a comprehensive stormwater data set for **8 cities** that have drainage to a priority lake or stream.

What		Where	Management Zone 10 yr Outputs				Who	When					Estimated Costs
Action	**Program**	**Priority Resources**	**North**	**Central**	**South**	**Output for Goal Tracking**	**Responsibility (Bold = Lead)**	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Estimated Total 10-Year Cost**
Comprehensive Stormwater Data Sets *complete a comprehensive study for eight cities (subwatershed prioritization, stormwater infrastructure mapping, targeted project list, consider new stormwater ordinances)*		Mississippi River, Ripple River, Whiskey Creek, Buffalo River, Little Buffalo Creek, Serpent Lake, Little Elk River, Swan River, Pike Creek, Trace Lake	Comprehensive study for: Aitkin, Crosby, Deerwood	Comprehensive study for: Fort Ripley	Comprehensive study for: Randall, Little Falls, Sobieski, Swanville, Grey Eagle		**Cities**, SWCDs, Counties, MHB		●	●	●	●	**$800,000**
Urban Stormwater Projects *stormwater treatment facilities, stormwater retention basins, biofiltration, parking lot retention*		Mississippi River, Ripple River, Whiskey Creek, Buffalo River, Little Buffalo Creek, Serpent Lake, Little Elk River, Swan River, Trace Lake	Complete at least one project identified in the studies above	Complete at least Whiskey Creek Stormwater Treatment Facility, Little Buffalo Creek Gully Erosion Project	Complete at least one project identified in the studies above		**City of Baxter, City of Brainerd, City of Aitkin, City of Little Falls, SWCDs,** MHB, BWSR, MPCA, businesses	●	●	●	●	●	**$600,000** $1,000,000
Chloride Management *road salt/dust suppressant ordinances, smart salting equipment, explore alternatives for water softeners, etc.*		Mississippi River, Ripple River, Whiskey Creek, Buffalo River, Little Buffalo Creek, Serpent Lake, Little Elk River, Swan River	In order of priority: 1. Develop a policy for salt use in each city, 2. Level 1 Smart Salting Certified staff in each city, 3. Purchase Smart Salting Equipment.				**Cities**, businesses, MPCA, Townships, Counties, SWCD		●	●	●	●	**$500,000**
Street Sweeping & Sand Use *develop comprehensive program, street sweepers, appropriate sand use in winter*		Mississippi River, Ripple River, Whiskey Creek, Buffalo River, Little Buffalo Creek, Serpent Lake, Little Elk River, Swan River	-	Compliance with Brainerd & Baxter MS4s	Compliance with Little Falls MS4		**Cities**, SWCDs, Counties, MPCA, Road Authorities		●	●	●	●	**$200,000**
Road Authorities *ensure proper stormwater treatment for new road improvements*		Hwy 371, 169, 10, and 210 Corridors	Annual meeting to share information on Hwy 169 and 210	Annual meeting to share information on Hwy 210 and 371	Annual meeting to share information on Hwy 371 and 10		**MnDOT, Counties, Cities, Townships, Road Authorities**	●	●	●	●	●	**$50,000**
Outreach Program *storm drain stenciling, rain barrels, workshops, social media*		Watershed-wide	One workshop in the watershed per year				**Cities, SWCDs, Counties, UMN Extension**	●	●	●	●	●	**$50,000**
													Level 2 Total (Baseline + WBIF) **$2,200,000**
													Level 3 Total (Clean Water Fund) $1,000,000

GOAL: DRINKING WATER PROTECTION

Protect or manage with BMPs **160 acres** in high vulnerability DWSMAs. Seal **10 unused wells** per year.

GROUND WATER

What		Where	Management Zone 10 yr Outputs			Output for Goal Tracking	Who	When					Estimated Costs
Action	Program	Priority Resources	North	Central	South		Responsibility (Bold = Lead)	2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Estimated Total 10-Year Cost
Seal abandoned wells		Aquifer, Drinking Water	Watershed-wide: Seal 100 wells (~10 wells/year progress)				**MDH, SWCDs, Counties,** NRCS	●	●	●	●	●	**$100,000**
DSWMA protection *RIM easements, wellhead protection in DWSMA and cone of influence*		First priority: Crosby, Baxter, Brainerd, Camp Ripley and Little Falls DWSMAs Second priority: all other DWSMAs in the MRBW	160 acres with Ag BMPs or permanent protection				**Cities, MDH, SWCD,** BWSR	●	●	●	●	●	$178,000
Groundwater monitoring		Groundwater observation wells, private wells	Continue data set for three observation wells	(no wells)	Continue data set for one observation well		**DNR, MDA, MDH,** SWCDs	●	●	●	●	●	$1,600
Emergency Response Plans *implement Emergency Response Plans for hazardous spills along highway and railroad corridors*		DWSMAs and Groundwater priority areas	Implement Aitkin and Crow Wing County Emergency Response Plans	Implement Crow Wing and Morrison County Emergency Response Plans	Implement Morrison and Todd County Emergency Response Plans		**Counties,** MPCA	●	●	●	●	●	**$460,000**
Outreach Program *drinking water testing clinics, septic pumping, wellhead protection, household hazardous waste, private well management, well sealing, social media*		Watershed-wide	One workshop in the watershed per year				**SWCD, MDH**, Cities, MPCA	●	●	●	●	●	**$50,000**
Subsurface Sewage Treatment Systems *replace noncomplying systems, training*		Aquifer, Drinking Water	1. Inspect 4% of SSTS each year 2. Replace 3 SSTS each year with Level 2 funds 3. Replace all other SSTS with Level 3 funds				**Counties**, **MPCA,** SWCD, UMN Extension Maintenance Workshop	●	●	●	●	●	**Phosphorus Reduction Goal**
Agricultural Land Management Practices *cover crops, irrigation water management, nutrient management, perennial agriculture*		Groundwater priority areas	2,300 acres	1,790 acres	3,040 acres		**SWCDs, NRCS**, BWSR, MDA, RCCP Irrigation	●	●	●	●	●	**Agricultural Land Management Goal**
Protection of Surface Drinking Water Sources		Mississippi River and other surface sources	Other goals: Protection, Ag Land Mgmt, Phosphorus Reduction, Urban Stormwater Mgmt, Shoreland Mgmt, Water Retention				**Partners listed in the other goals**	●	●	●	●	●	**See other goals**
													Level 2 Total (Baseline + WBIF) $610,000
													Level 3 Total (DNR, MDH) $179,600

GOAL: SHORELAND MANAGEMENT

Enhance **2 miles** of shoreline or streambank around focus lakes and streams.

SURFACE WATER HABITAT/FORESTRY

What		Where	Management Zone 10 yr Outputs				Who	When					Costs
Action	**Program**	**Priority Resources**	**North**	**Central**	**South**	**Output for Goal Tracking?**	**Responsibility (Bold = Lead)**	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Estimated Total 10-Year Cost**
Lakeshore Restoration (follow NRCS/BWSR standards) *buffers, soft armor, capture upslope water, coir logs, willow wattles, berms, aquatic vegetation, technical assistance, tree sale*		Focus Lakes	0.6 miles enhanced	0.6 miles enhanced	0.6 miles enhanced		**DNR, SWCDs, Counties**, Lake Associations, Private Consultants	●	●	●	●	●	**$1,000,000**
Riparian Enhancement *stabilize gullies, capture upslope water, soft armor, reconnect floodplain*		Focus Streams	Included in above	Included in above	Included in above		**Cities**, SWCD, DNR	●	●	●	●	●	**$528,000**
Soil Loss and Buffer Law (103F) *perennial vegetative buffers of up to 50 feet along lakes, rivers, and streams and buffers of 16.5 feet along public ditches*		Ditches	Maintain 100% Compliance	Maintain 100% Compliance	Maintain 100% Compliance		**Counties, SWCDs**	●	●	●	●	●	**$460,000**
Shoreline Ordinance *see detailed comparison between counties in Table 8.1*		Focus Lakes and Streams	Aitkin and Crow Wing County Ordinances	Crow Wing and Morrison County Ordinances	Morrison and Todd County Ordinances		**Counties**, **Cities**, SWCDs, MHB, Townships	●	●	●	●	●	**$460,000**
Outreach Program *give away native grass seeds, shoreland workshops/educational presentations, social media*		Watershed-wide	One workshop in the watershed per year				**Counties**, **SWCDs**, **Cities, UMN Extension**, Lake Associations, 4-H	●	●	●	●	●	**$50,000**
Data Collection *complete impervious surface maps for all lakes in the watershed, develop DNR Shoreline Disturbance Tool, inventory stream crossings*		Focus Lakes	Completed maps	Completed maps	Completed maps		**SWCDs, County**	●		●		●	**$50,000**
Update Shoreline and Riparian Inventory *use new LiDAR to measure shoreline changes since the last LiDAR and target projects*		Focus Lakes and Streams	Complete shoreline and riparian inventory for Aitkin County	Complete shoreline and riparian inventory for Crow Wing County	Complete shoreline and riparian inventory for Todd and Morrison Counties		**SWCDs, DNR**	●	●	●	●	●	**$200,000**
Social Awareness of Natural Shoreline *Explore development of a shoreland incentives program*		Focus Lakes	Meet at least twice to explore possible programs and gather information on successful programs in other states.				**SWCDs, Counties,** DNR		●	●			**staff time**
Drainage systems *inventory drainage systems and current status and locations for channel restoration and remeander, bank stabilization*		Drainage systems	Inventory at least one drainage system	-	Inventory at least one drainage system		**Drainage Authorities**, DNR, BWSR			●	●	●	**$40,000**
							Level 2 Total (Baseline + WBIF)						**$2,788,000**
							Level 3 Total (DNR, Lessard Sams Outdoor Heritage Fund, Midwest Glacial Lakes)						Anything above could also be paid for by Level 3

GOAL: WATER RETENTION

Build resiliency by adding **400 acre-ft** of storage through cover crops and stormwater management.

GROUND WATER SURFACE WATER

What		Where	Management Zone 10 yr Outputs				Who	When					Estimated Costs
Action	**Program**	**Priority Resources**	**North**	**Central**	**South**	**Output for Goal Tracking?**	**Responsibility (Bold = Lead)**	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Estimated Total 10-Year Cost**
Wetland Conservation Act (WCA)		Wetlands	Implement WCA				**DNR, BWSR, SWCDs, Counties**	●	●	●	●	●	**$460,000**
Peatland Protection and Restoration *channel restoration and remeander, ditch abandonment and plugging, reconnect floodplain, restore to natural state*		Peatlands	Complete one feasibility study	-	-		**Aitkin County, Aitkin SWCD, DNR**				●	●	**$60,000**
Culverts and Crossings *Utilize the DNR's culvert inventory application to help collect and store data, when replacing culverts, partner with state agencies to maintain or increase stream connectivity for fish passage.*		Focus Streams	Maintain culvert inventory and use in projects				**SWCDs, Counties, DNR, Townships, Cities**	●	●	●	●	●	*Included in local projects*
Outreach Program *education on wetlands, wetland banking, building projects near wetlands, social media*		Wetlands	One workshop per year				**SWCDs, Counties**		●	●	●	●	**$50,000**
Agricultural Land Management Practices *cover crops, irrigation water management, nutrient management, pasture management, perennial agriculture, filter strips, water and sediment control basins*		Focus Lakes and Streams	300 acre-feet of storage from cover crops *(meeting the Agricultural Land Management Goal)*				**SWCDs, NRCS**, MDA	●	●	●	●	●	**Agricultural Land Management Goal**
Forest and Land Protection *SFIA, 2c, easements, acquisition*		Focus Lakes and Streams, LSP Priorities	1,880-2290 acre-feet of protected storage *(storage that would be lost if forest was cleared for other land uses in the watershed)*				**SWCDs,** BWSR, The Nature Conservancy (TNC), DNR, MHB	●	●	●	●	●	**Protection Goal**
Stormwater Projects/Plans *stormwater treatment facilities, stormwater retention basins, biofiltration, road projects that incorporate storage*		Mississippi River, Ripple River, Whiskey Creek, Buffalo River, Little Buffalo Creek, Serpent Lake, Little Elk River, Swan River	100 acre-feet of storage from stormwater retention projects				**Cities, Counties, SWCDs,** MHB			●	●	●	**Stormwater Goal**
Lakeshore Restoration and Riparian Enhancement *to minimize erosion and increase upslope retention during high water and storm events*		Focus lakes and streams	0.6 miles enhanced	0.6 miles enhanced	0.6 miles enhanced		**SWCDs, NRCS,** DNR, Crow Wing County	●	●	●	●	●	**Shoreland Restoration Goal**
							Level 2 Total (Baseline + WBIF)						**$570,000**
							Level 3 Total						Anything above could also be paid for by Level 3

LAKE IMPLEMENTATION REFERENCE TABLE

Lake Name	Lake ID	Management Approach	Current phosphorus Load	Long-Term Goal (lbs of P/yr)	Short-Term Goal (lbs of P/yr)	Phosphorus Loading Focus	GOALS: Agricultural Land Management (from HSPF SAM)	GOALS: Nearshore Best Management Practices (lbs of P/yr)	GOALS: Protection (15% progress towards Landscape Stewardship Plan goal)	GOALS: Shoreline Management
Farm Island	01-0159-00	ENHANCE	2,458	123	**10**	Mix	-	10	370 acres	Stormwater management from ordinances, Shoreline buffer enhancements
Gilbert (East)	18-0320-01	ENHANCE	271	14	**10**	Mix	-	10	-	
Gilbert (West)	18-0320-02	ENHANCE	335	17	**10**	Watershed	-	10	-	
Green Prairie Fish	49-0035-00	ENHANCE	332	17	**10**	Mix	-	10	28 acres	
Hammal	01-0161-00	ENHANCE	119	6	**6**	Nearshore	-	6	269 acres	
Long	01-0089-00	ENHANCE	538	27	**10**	Mix	-	10	218 acres[2]	
Long	77-0027-00	ENHANCE	675	34	**10**	Mix	1,840 acres, 134 lbs P[3]	10	445 acres[3]	
Long	49-0086-00	ENHANCE	181	9	**9**	Mix	-	9		
Mound	77-0007-00	ENHANCE	46	2	**2**	Nearshore	-	2	445 acres[3]	
Nord	01-0117-00	ENHANCE	120	6	**6**	Nearshore	-	6	104 acres	
Perch	18-0371-00	ENHANCE	46	2	**2**	Nearshore	-	2	88 acres	
Pine	49-0081-00	ENHANCE	49	2	**2**	Nearshore	-	2	719 acres	
Round	01-0137-00	ENHANCE	52	3	**3**	Nearshore	-	3	45 acres[4]	
Serpent	18-0090-00	ENHANCE	456	*achieved*	***achieved***	Nearshore	*Goal achieved*	*Goal achieved*	933 acres	
Lower South Long	18-0136-00	ENHANCE	5,635	282	**10**	Watershed	-	10	425 acres	
Upper South Long	18-0096-00	ENHANCE	3,383	169	**10**	Watershed	343 acres, 52 lbs P	10	61 acres	
Bay	18-0034-00	PROTECT	1,237	62	**10**	Nearshore	-	10	496 acres[1]	
Beauty	77-0035-00	PROTECT	169	8	**8**	Nearshore	-	8	478 acres	
Cedar Lake	01-0209-00	PROTECT	1,842	92	**10**	Mix	-	10	451 acres	
Clearwater	18-0038-00	PROTECT	152	8	**8**	Nearshore	-	8	116 acres	
Crooked	18-0041-02	PROTECT	295	15	**10**	Nearshore	-	10	496 acres[1]	
Dam	01-0096-00	PROTECT	880	44	**10**	Mix	-	10	218 acres[2]	
Hanks	18-0044-00	PROTECT	197	10	**10**	Mix	-	10	496 acres[1]	
Lone	01-0125-00	PROTECT	35	2	**2**	Nearshore	-	2	272 acres	
Nokay	18-0104-00	PROTECT	1,485	74	**10**	Mix	34 acres, 11 lbs P	10	304 acres	
Placid	18-0076-00	PROTECT	96	5	**5**	Nearshore	-	5	383 acres	
Portage	18-0050-00	PROTECT	215	11	**10**	Nearshore	-	10	496 acres[1]	
Shirt	18-0072-00	PROTECT	61	3	**3**	Nearshore	-	3	370 acres[5]	
Spirit	01-0178-00	PROTECT	1,509	75	**10**	Watershed	-	10	370 acres[5]	
Stark	18-0169-00	PROTECT	226	11	**11**	Nearshore	-	11	10 acres	
Upper Mission	18-0242-00	PROTECT	654	33	**10**	Nearshore	-	10	237 acres	
Big Swan	77-0023-00	RESTORE	4,168	208	**10**	Mix	1,840 acres, 134 lbs P	10	445 acres[3]	
Crow Wing	18-0155-00	RESTORE	1,776	89	**10**	Mix	300, 23 lbs P	10	425 acres	
Gun	01-0099-00	RESTORE	1,200	60	**10**	Mix	108 acres, 8 lbs P	10	32 acres	
Ripple	01-0146-00	RESTORE	6,298	315	**10**	Watershed	7 acres, 11 lbs P	10	272 acres	
Waukenabo	01-0136-00	RESTORE	949	47	**10**	Nearshore	-	10	45 acres[4]	

[1]Bay, Portage, Crooked, Sugar Bay, and Hanks are in the same minor watershed
[2]Dam and Long lakes are in the same minor watershed
[3]Big Swan, Long, and Mound lakes are in the same minor watershed
[4]Round and Waukenabo lakes are in the same minor watershed
[5]Spirit, Shirt and Farm Island Lakes are in the same minor watershed

Section 7

Mississippi River

Section 7. Mississippi River

Introduction

The Mississippi River is the fourth longest river on earth (3,900 miles), slicing the Unites States into east and west portions. The first 400 miles of the Mississippi River, called the Mississippi Headwaters, are wild and scenic, stretching from its source in Lake Itasca in Clearwater County to the southern boundary of Morrison County, just south of Royalton, MN (Figure 7.1).

The topography of the Mississippi Headwaters was shaped by the glaciers and the river. A major feature that formed from the melt water of glacial retreat was Glacial Lake Aitkin. The soils associated with Glacial Lake Aitkin are fine, interbedded layers of silt and clay. As Glacial Lake Aitkin began to drain, peat deposits developed in the bog areas that remained (MGS 2004). These fine-grained soils are highly susceptible to erosion when disturbed, especially along stream banks where there is a slope. This area is also very flat and was ditched in the 1940s to drain water for agriculture.

The stretch of the Mississippi River that flows from Grand Rapids to Brainerd has a water quality impairment for TSS, which means the water is cloudier than it should be (MPCA 2020) (Figure 7.1).

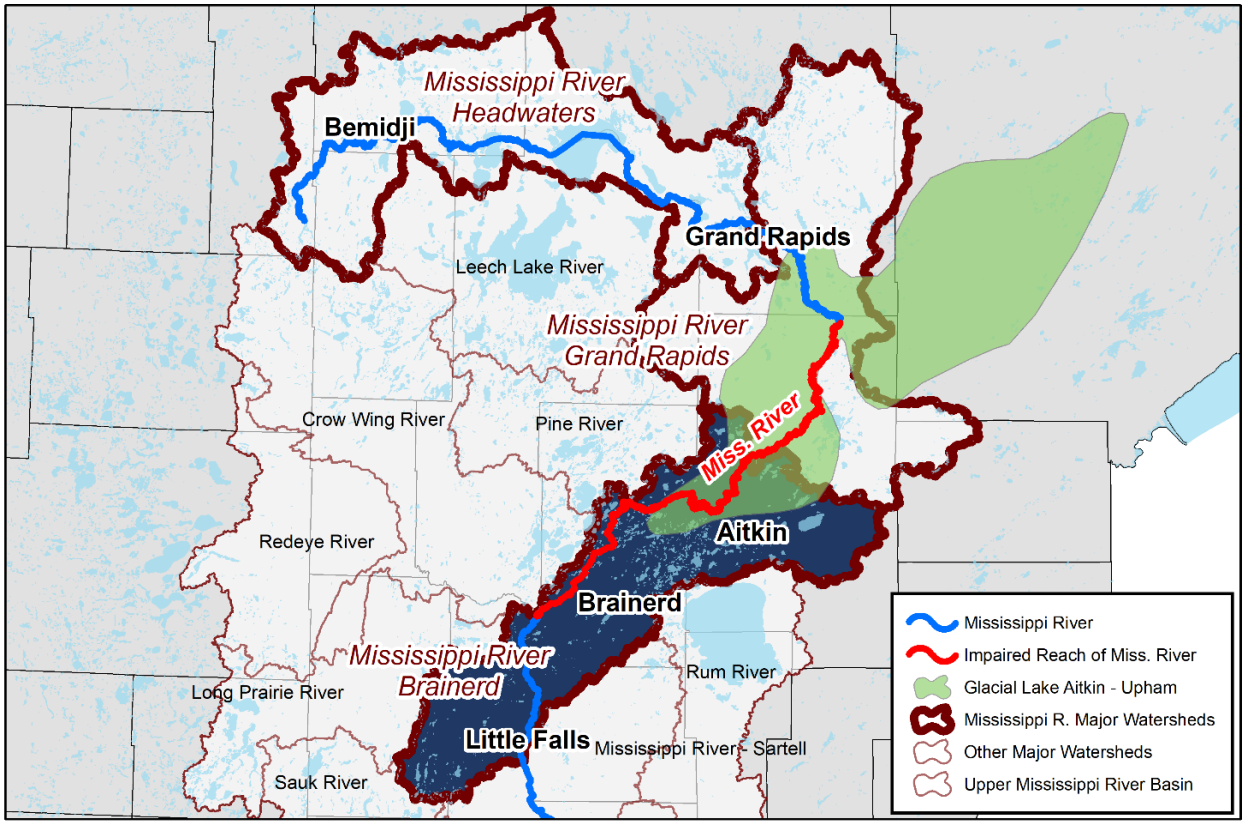


Figure 7.1. Upper Mississippi River Basin, containing the first 400 miles of the Mississippi River.

The portion of the Mississippi River that flows through Glacial Lake Aitkin soils is the only portion of the Upper Mississippi River that has high levels of TSS; TSS levels in the Mississippi River upstream of Grand Rapids and downstream of Brainerd are below the TSS standard. This suggests that the high erodibility of Glacial Lake Aitkin soils contributes TSS to the Mississippi River in this stretch. In addition, the biological scores for fish and bugs are good in this portion of the Mississippi River suggesting that high TSS levels are not a recent change and causing stress to the fish community (MPCA 2020).

Land use conversions near the river channel also contribute sediment through greater soil erosion from physical trampling of the banks from livestock, less stabilization of the soil from shallow rooted plants, more areas of exposed soil, and more concentrated runoff. Watershed runoff and regulated wastewater and stormwater sources contribute a small fraction of the total sediment to this part of the Upper Mississippi River (MPCA 2020).

In 2020, the MPCA completed a study to quantify the sources of TSS to the river called a **Total Maximum Daily Load** report (TMDL).

This TMDL report helps guide local, state, and federal partnerships to develop and implement strategies to minimize sediment impairments, including:

- Land conservation through easements and acquisition.
- Working with landowners to exclude livestock from direct access to riverbanks.
- Riparian buffers and filter strips along riverbanks.
- Stormwater best management practices.

Regional and National Implications

The Mississippi River is an important waterway for the southern portion of Minnesota as well as all the way to its outlet into the Gulf of Mexico. Communities along the Mississippi River Corridor, including St. Cloud, Minneapolis, and St. Paul are dependent on the quality of the water maintained in the Mississippi Headwaters for their drinking water. In all, the Mississippi Headwaters provides drinking water for 2.5 million Minnesotans and delivers 57 million gallons of water a day to customers in Minneapolis and beyond – more than 44% of the state's residents (TNC).

In addition, numerous cities downstream from Minnesota also use the Mississippi River as a drinking water source, from Wisconsin to Louisiana. As a result, the significance of protecting and enhancing the Mississippi Headwaters impacts the drinking water of more than 20 million people in 50 cities (American Rivers).

Priority Issues

Priority issues for the MRBW were determined through the planning process and are detailed in Section 3. The issues that apply to the Mississippi River are summarized in Table 7.1. Stormwater runoff is an issue related to the cities located on the Mississippi River – Aitkin, Brainerd, Baxter, and Little Falls. Eroding streambanks and altered hydrology are some of the main stressors of the TSS impairment along the river. Protecting land along the river and its tributaries will help protect the water quality and habitat in the river.

Table 7.1. Priority issues specific to the Mississippi River.

Resource Category	Issue Statement
SURFACE WATER	**Stormwater runoff** contributes sediment, nutrients, and pollutants to water bodies.
SURFACE WATER	**Eroding streambanks** contribute to turbidity impairments and reduced habitat quality.
SURFACE WATER	**Altered hydrology** (channelized streams and ditch systems) increases peak flows and erosion and has led to biologically impaired streams.
SURFACE WATER HABITAT/FORESTRY	**Sufficient protection** is needed for outstanding resources and sensitive species to maintain water and habitat quality.

Mississippi River in winter.

Focus Areas for Mississippi River

During the planning process, the TAC identified three focus areas for implementation along the Mississippi River (Figure 7.2). The priority issues apply to these areas, as summarized in the boxes on the right.

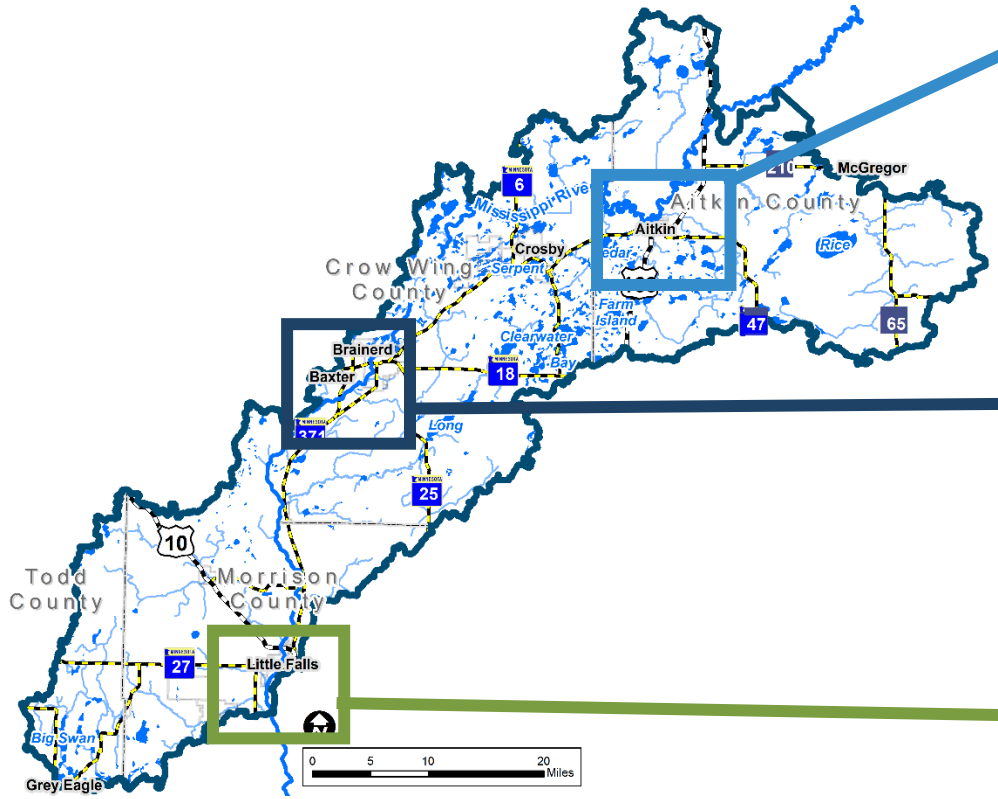


Figure 7.2. Focus Areas for the Mississippi River.

AITKIN AREA:

Main Issues: Altered hydrology, Eroding streambanks

Tributaries: Aitkin Diversion, Sisabagamah Creek, Little Willow River Old Channel, Ripple River

BRAINERD/BAXTER AREA:

Main Issues: Stormwater, Eroding streambanks

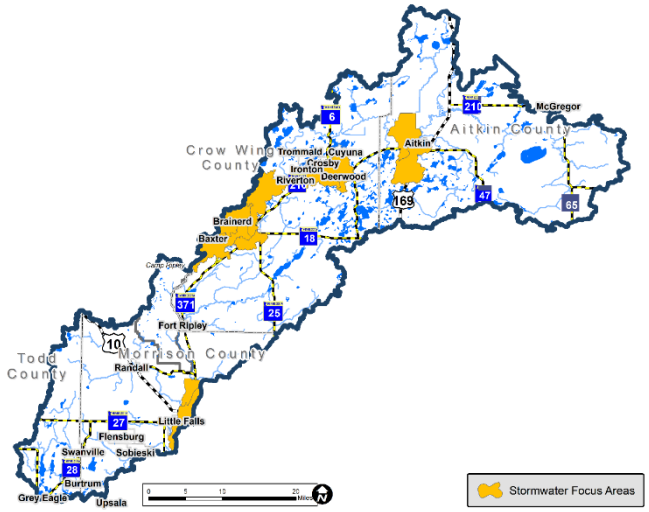
Tributaries: Buffalo Creek, Little Buffalo Creek, Whiskey Creek, Whitley Creek

LITTLE FALLS AREA:

Main Issue: Eroding streambanks

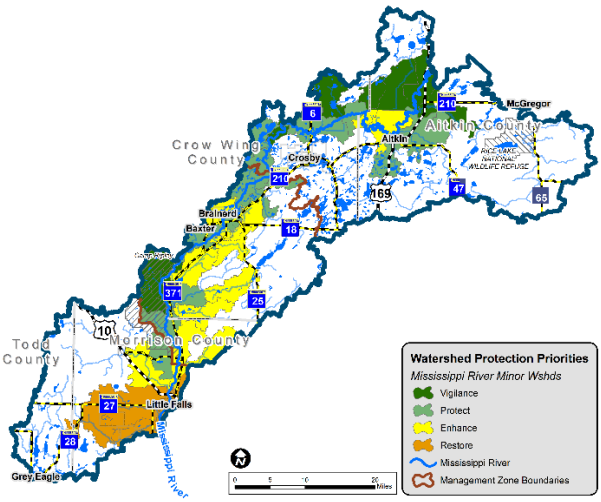
Tributaries: Little Elk River, Pike Creek, Swan River, and ditches

MISSISSIPPI RIVER GOALS



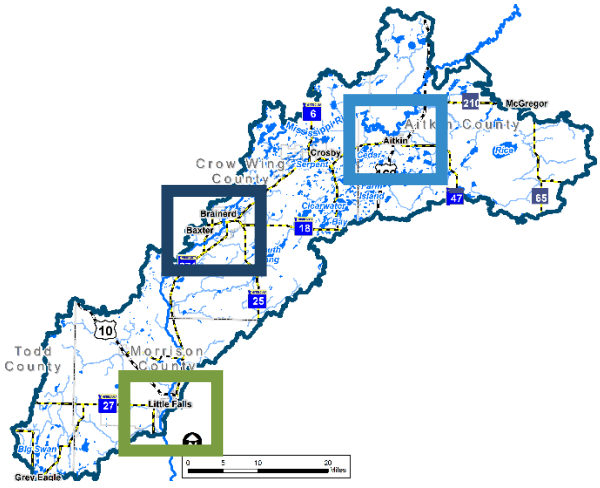
URBAN STORMWATER

Develop a comprehensive stormwater information data set for **2 cities** that have drainage to the Mississippi River: Aitkin and Little Falls. Brainerd and Baxter already have comprehensive stormwater data sets. Next, implement priority stormwater projects identified in the studies.



PROTECTION

Protect and enhance forest cover and aquatic and terrestrial habitat by adding **4,558 acres** of conservation easements, SFIA, and acquisitions in priority minor watersheds in the Mississippi River Corridor and CRSL.



STREAM STABILIZATION

Enhance or restore **0.2 miles** (1,000 feet) of streambank on priority tributaries to the Mississippi River.

These goals are meant to both protect the current water quality in the Mississippi River and its tributaries, and make progress towards the Mississippi River TSS TMDL, outlined in Table 7.2. In addition, protection projects will enhance aquatic and terrestrial connectivity, riparian areas, and recreational opportunities.

Some progress is already being made towards the TSS TMDL in the stretch from the Pine River to the Crow Wing River - the Whiskey Creek Project and Little Buffalo Creek projects implemented by the Crow Wing SWCD, Mississippi Headwaters Board, and cities of Baxter and Brainerd.

STACKING BENEFITS

Work toward these goals also makes progress towards reductions in phosphorus and sediment to the Mississippi River; retains stormwater (storage) and sequesters carbon in trees. For details see Appendix D.

Surface Water Quality Benefits	Phosphorus = 250 lbs/yr
	Sediment = 250 tons/yr
Climate Resiliency Benefits	Water Storage = 100 acre-feet
	Carbon Storage= 118,850 tons

The Minnesota Nutrient Reduction Strategy set a statewide goal of reducing Minnesota's phosphorus and nitrogen nutrient contribution to waters outside of the state by 45% by the year 2040. The load reductions are needed so that Minnesota can do its part to restore and protect the downstream waters such as the Gulf of Mexico. Comprehensive plans such as this are the means of achieving this broad goal. The specific goal for the MRBW's contribution to the Mississippi River is a 31.7% reduction in nitrogen and an 18.6% reduction in phosphorus leaving the watershed.

Upon the completion of this plan, additional funding will be available for projects to make more progress in the future.

Table 7.2. Mississippi River TSS TMDL.

Reach	County Area	TMDL	Progress
Willow River to Pine River (07010104-655)	Aitkin: 70% Crow Wing: 30%	59% reduction, 13,096 tons of sediment	
Pine River to Crow Wing River (07010104-656)	Crow Wing: 100%	25% reduction, 3,056 tons of sediment	Whiskey Creek Project, Little Buffalo Creek Project

Mississippi River in Brainerd

Where to Work First

To prioritize where to work first, the focus areas for all the plan goals (Section 5) were stacked together to determine overall priorities for the Mississippi River Corridor. The outcome is shown below in Figure 7.3 and indicates where outreach and funding will be focused in the first five years of plan implementation.

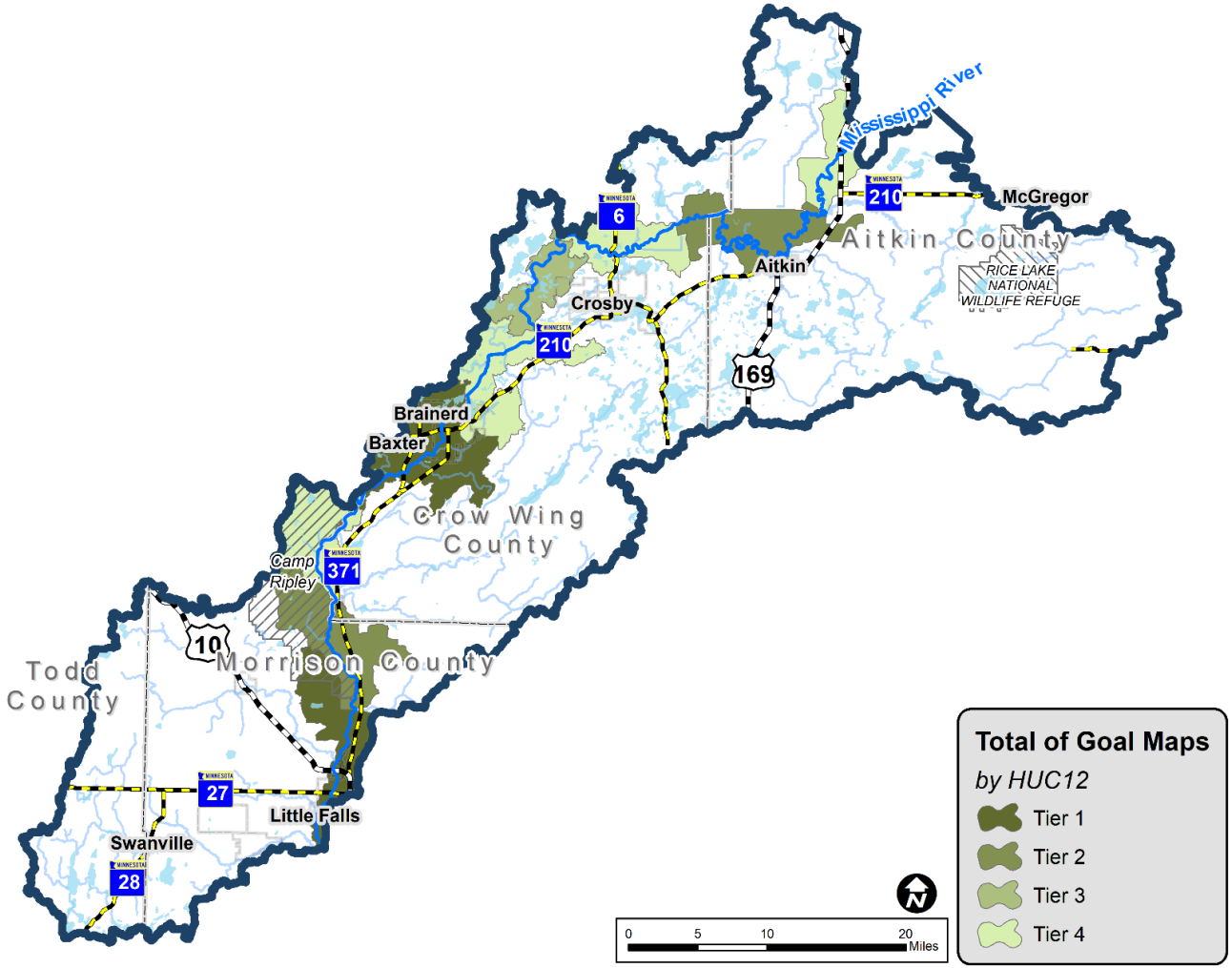


Figure 7.3. Overall priority map for the Mississippi Headwaters Corridor.

Implementation

Projects in the Mississippi River Corridor will be implemented by the SWCDs, Counties, Mississippi Headwaters Board, and Camp Ripley Sentinel Landscape. Specific actions are outlined in Section 7. Targeted Implementation Schedule, and incentive programs are outlined in Section 8. Plan Programs.

Mississippi Headwaters Board

Formed in 1980 as an alternative to designation of the river into the National Wild and Scenic River System, the MHB works to protect and preserve the first 400 miles of the Mississippi River in Minnesota. A joint powers board of Clearwater, Beltrami, Cass, Hubbard, Itasca, Aitkin, Crow Wing and Morrison Counties, the MHB is mandated by Minnesota Statutes 103F.361-377 to enhance and protect the natural, cultural, historic, scientific and recreational values of the headwaters region.

MHB achieves its goal of river protection through cooperative land use planning and voluntary programs in the eight counties, in conjunction with the Chippewa National Forest and the Leech Lake Indian Reservation. MHB promotes easement and acquisition oversight and resource recreational activities in MHB counties, and embraces the efforts of local citizens, students and government groups who work together to protect the river in their community and preserve the splendor of this national treasure.

Regulatory Authority

The Minnesota Legislature has empowered the MHB to protect the Mississippi Headwaters Corridor through regulation of land use above the Ordinary High Water Mark (OHWM). Some activities on the shoreland are permitted by the DNR and other agencies with certification by the MHB to promote consistent administration of minimum standards.

- The standards of the MHB supersede all provisions that are less restrictive than any other zoning ordinances that apply to the Mississippi Headwaters Corridor.
- In this watershed, the boundary of the Mississippi Headwaters Corridor extends 500 feet from the OHWM on both sides of the Mississippi River (Scenic River).
- Specific MHB standards can be found in Section 8. Plan Programs.

The full **Mississippi Headwaters Comprehensive Plan** can be found here:
https://www.mississippiheadwaters.org/comprehensiveManagementPlan.asp

Section 8

Plan Implementation Programs

Section 8. Implementation Programs

This section of the plan describes the programs that will be used for implementing this plan. There are four main categories: Planned Landscape Management ("Manage It"), Constructed Environmental Enhancements ("Fix It"), Protected Lands Maintenance ("Keep It"), and Outreach and Information. For the MRBW, the scale is evenly balanced between programs. These programs balance on Data Collection and Outreach ("Know It") (Figure 8.1).

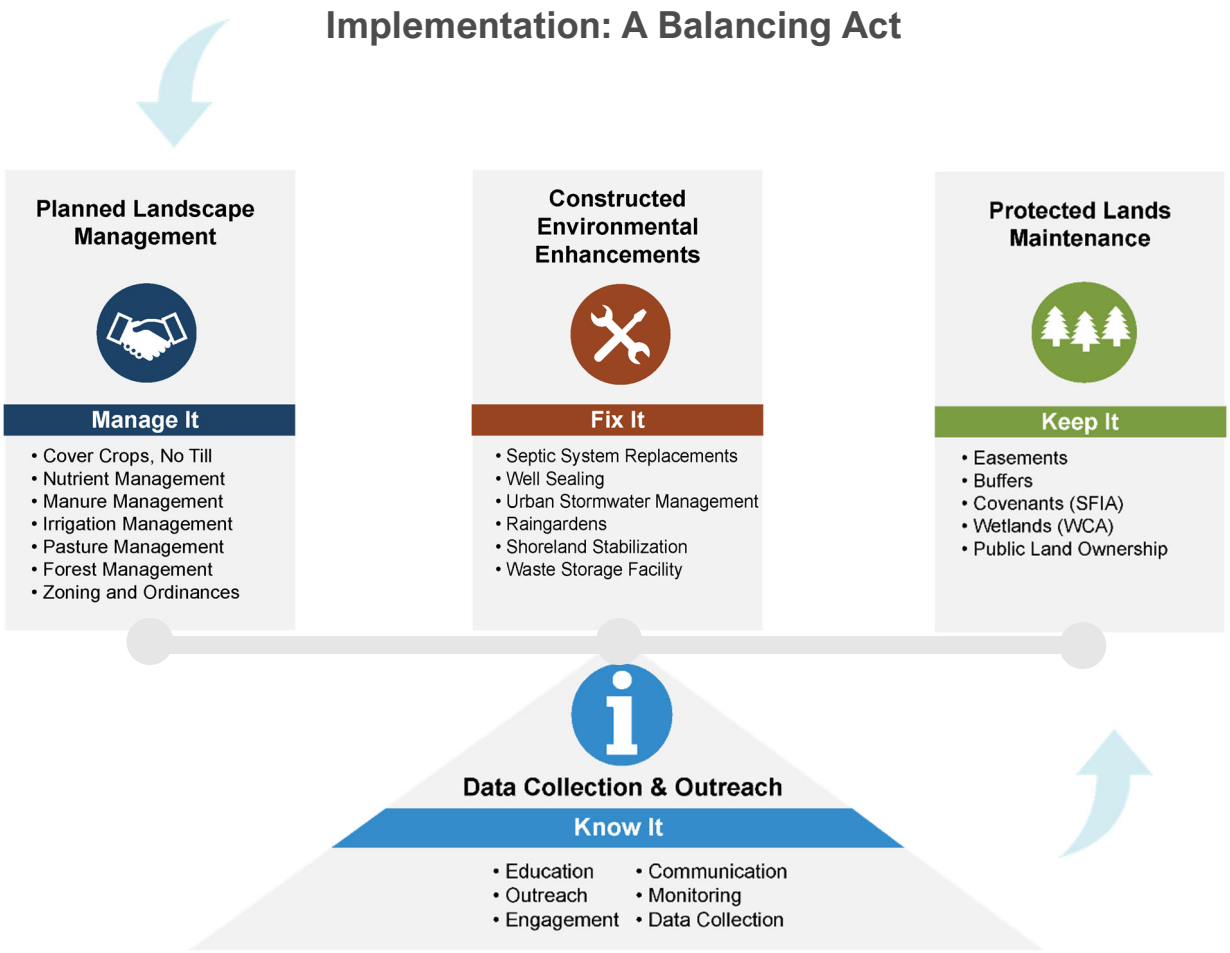


Figure 8.1. Implementation Programs for the MRBW Watershed.

Equity and Resiliency

Water is a universal, free-flowing entity and a requirement for all life. Shaped by the glaciers and the people, the story of this watershed flows in the Mississippi River, weaving a history of connectivity to the water, to places, and to each other.

The water belongs to everyone, so the work belongs to everyone.

Environmental Justice and Health Equity

Environmental justice describes the effort to make sure that pollution does not have a disproportionate impact on any group of people. This means that all people - regardless of their race, color, national origin, or income - benefit from equal levels of environmental protection and have opportunities to participate in decisions that may affect their environment or health. When health is affected, such as through drinking water contamination, 'health equity' is the term used to understand disparities.

Equity throughout communities and in larger geographies is important because of increasing temperature and precipitation trends and the development of sustainable and resilient communities. Though particular goals or actions directly addressing equity are not specifically prescribed in this plan, it is encouraged to be considered during plan implementation.

Figure 8.2 highlights areas to focus on environmental justice in the MRBW. The MPCA and MDH have additional information available at the links below.
https://www.pca.state.mn.us/about-mpca/environmental-justice
https://www.health.state.mn.us/communities/equity

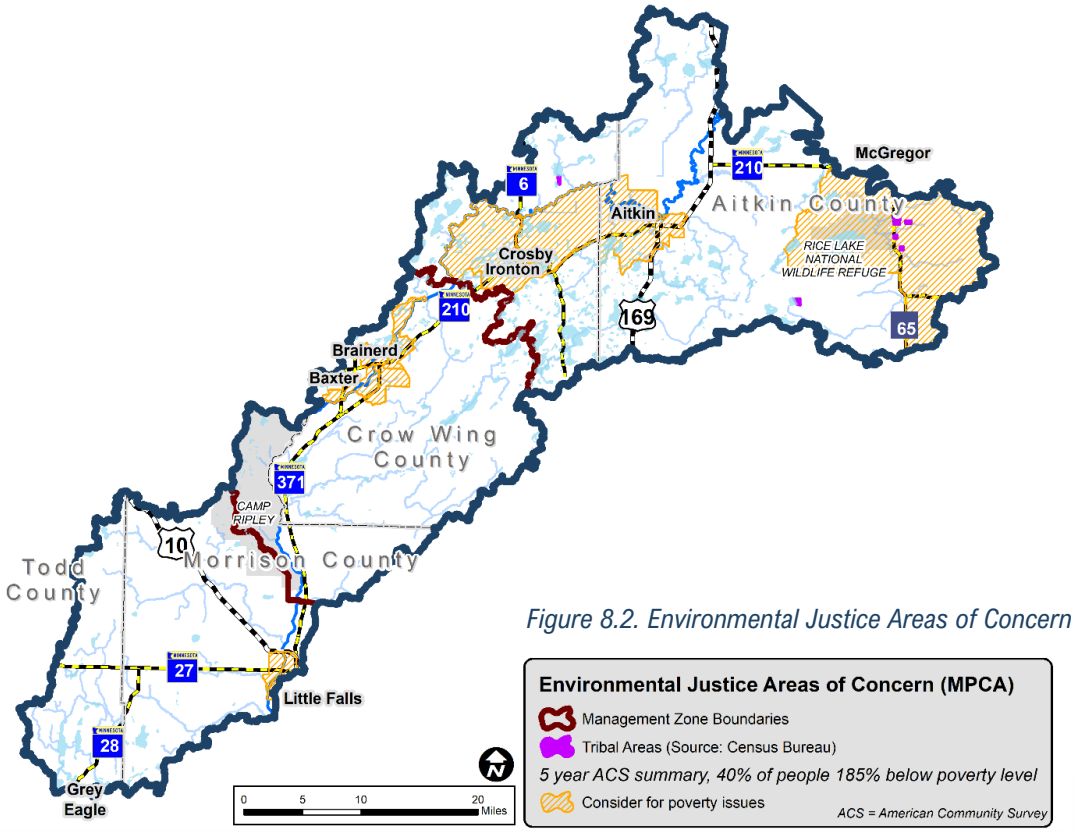


Figure 8.2. Environmental Justice Areas of Concern in MRBW.

Resiliency

Resilience is the ability of a system to experience change but not be affected. Resilience can be both social and ecological (MGLP, 2021). Social resilience is organization and regulation. For example, having a Lake Association or Lake Improvement District builds social framework to implement lake projects. Ecological resilience includes forest protection, water retention, and agricultural BMPs. For example, protecting forests at the watershed and landscape scale provide resilience to increasing precipitation trends. This plan includes actions and programs that build both social and ecological resilience. Figure 8.3 shows an example of social and ecological resilience scales for a lake.

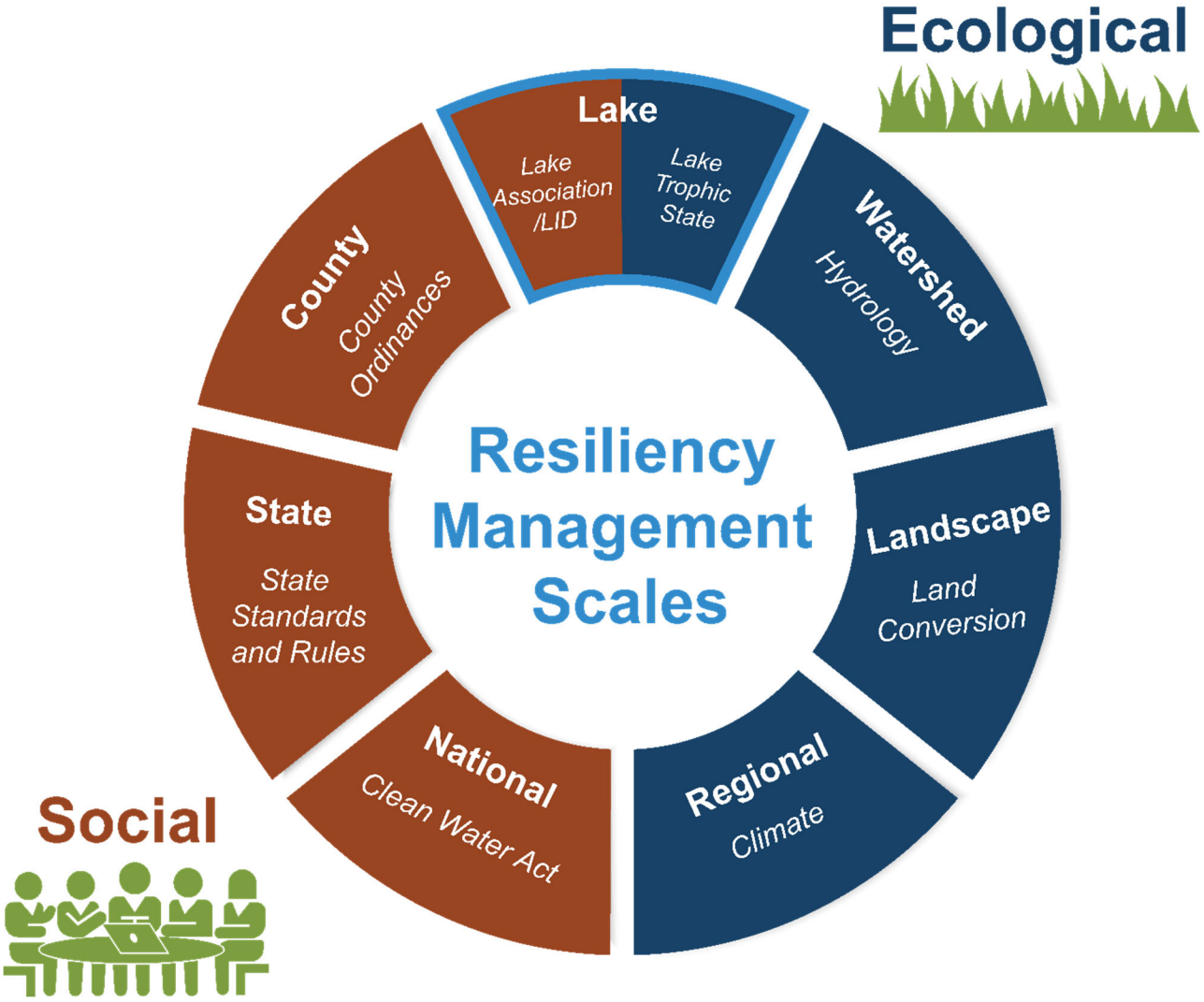


Figure 8.3. An example of social and ecological resilience scales for a lake.

Throughout this plan section, opportunities for equity and resilience are highlighted in these call out boxes.

Manage It

PLANNED LANDSCAPE MANAGEMENT

"Manage it" programs involve continual management of the landscape including soil health practices such as cover crops and reduced tillage, nutrient management, pasture management, irrigation management, forest stewardship plans, and ordinances.

Implementation of this plan will involve programs that will be actively targeted to prioritized areas for management (Section 4. Focus Resources). Non-priority areas will be considered on an opportunity basis.

Management of the following programs, plans, and ordinances deals with the relationship between people and land. This will be done by planning partners with a focus on equitable management, with a search for opportunities to enhance watershed resiliency into programs and ordinances.

Cost-Share Programs

Cost-share programs or projects are those where the cost of installing a project is shared with the landowner(s). Implementing soil health practices such as cover crops and reduced tillage, forest enhancement, or irrigation water management are applicable examples that meet plan goals.

Private Forest Management

Forest Stewardship Plans

Forest owners can manage their woods through Woodland Stewardship Plans through coordination with the DNR's Forest Stewardship Program. Forest goals can be developed in coordination with trained foresters to create wildlife habitat, increase natural beauty, enhance environmental benefits, or harvest timber. Use of voluntary site level guidelines is encouraged. Plans must be prepared by a DNR-approved plan writer, which may include SWCD staff and private foresters.

Forest 2C Designation

Landowners with DNR-registered Woodland Stewardship Plans are then eligible for 2C Classification, which is a state program that provides a reduced tax rate to forested property of 20 acres or more. This is an annual program.

Conservation Reserve Program (CRP)

CRP is administered by the FSA of the United States Department of Agriculture (USDA). It is a voluntary program that contracts with agricultural producers so that environmentally sensitive agricultural land is not farmed or ranched, but instead devoted to conservation benefits. CRP participants establish long-term, resource-conserving plant species to control soil erosion, improve water quality, and develop wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance. The CRP's contract duration is 10-15 years.

Regulatory Programs

Watershed partners will explore ways to better integrate this watershed management plan into all of the county comprehensive land use plans. Counties, cities, and the MHB will meet once a year to discuss ordinances and counties will notify each other of any proposed ordinance amendments. The MHB provides consistent zoning controls along the Mississippi River corridor. Activities will be tracked by the individual counties. An effort will be made to compile the information watershed-wide. A full comparison of Aitkin, Crow Wing, Morrison, and Todd County Ordinances is provided in Appendix I.

Historically, regulatory action has enforced disparities. Planning partners reviewing and enforcing ordinances will keep the MPCA environmental justice regions of the watershed in mind (Figure 7.2) to work towards improving equity through regulatory programs.

Aggregate Management

The MPCA oversees air permits, hazardous waste licenses, stormwater and wastewater management, and storage tanks (https://www.pca.state.mn.us/regulations/aggregate-sand-and-gravel). The DNR suggests LGUs consider using existing land use ordinances to create mining districts that include BMPs for developing and redeveloping mining operations and associated water use. This could help build or retain the economic benefits of mining while minimizing long-term impacts to water quality and habitat. Additionally, there may be opportunities within the watershed to reclaim abandoned aggregate pits to protect water quality and enhance habitat value.

Regulations: Minnesota Statutes 298.75, 394.25

Bluffland Protection

Blufflands are managed under several State programs, including programs for shoreland management and Wild and Scenic Rivers. Minimum structure setbacks from bluffs and related development standards apply to land in shoreland for this watershed. The Statewide shoreland program includes land within 1,000 feet of any public water body, 300 feet of any public water river or stream, or the landward extent of their floodplains. Only land around public waters with a shoreland classification are regulated. Aitkin, Crow Wing, and Morrison Counties have bluffland ordinances, while Todd County administers a bluffland protection program without an ordinance. There are differences between the ordinances between each county (setback, height, practices allowed, etc.) (Appendix I).

Construction Soil Erosion

Temporary construction erosion control is the practice of preventing and/or reducing the movement of sediment from a site during construction. All construction projects should follow construction BMPs, but projects disturbing one acre or more of land will require a National Pollutant Discharge Elimination System (NPDES) Permit and Stormwater Pollution Prevention Permit from the MPCA. Todd County writes construction soil erosion-related conditions into county-issued permits and approvals. Morrison and Crow Wing Counties have an ordinance for construction erosion control.

Regulations: Minnesota Rules, chapter 7090

Feedlots

MPCA rules govern the collection, transportation, storage, processing, and land application of animal manure and other livestock operation wastes. The MPCA administers the feedlot program in Crow Wing and Aikin Counties. Morrison and Todd Counties are delegated to administer the MCPA feedlot program.

Regulations: Minnesota Rules Chapter 7020

Groundwater Use

The DNR administers groundwater appropriation permits for all users who withdraw more than 10,000 gallons of water per day or 1 million gallons per year. SWCDs, counties, and municipalities cooperate with the state and are offered the opportunity to comment on landowners' permit applications.

Regulations: Minnesota Statute 103G for appropriation; 103H, 1989 Groundwater Act

Groundwater Protection Rule

The MDA administers the Groundwater Protection Rule, which went into effect on June 24, 2019. The rule has two parts: Part 1 restricts the application of nitrogen fertilizer in the fall and on frozen soils, and applies in the MRBW. Part 2 does not apply to the MRBW.

Regulations: Minnesota Statute 14.16

Hazard Management

Hazard mitigation may be defined as any action taken to eliminate or reduce the future risk to human life and property from natural and human-caused hazards. Climate change adaptation also plays a part in hazard management. These requirements direct the state to administer cost-sharing. Hazard Mitigation Plans/Emergency Management Plans are deployed in each of the MRBW counties as well as Federal Emergency Management Agency (FEMA) hazard mitigation programs.

Regulations: Minnesota Statute, chapter 12

Invasive Species

Aquatic and terrestrial invasive species can cause ecological and economic damage to water resources and forests. The DNR has regulatory authority over aquatic plants and animals as well as terrestrial animals. For aquatic species, permits are required by the general public for transporting lake water and invasive species and for treating invasive species. Crow Wing, Morrison, and Todd County administers the AIS program. Counties partner with SWCDs, MHB, and DNR for AIS programs and education.

Regulations: Minnesota Statute 84D

Noxious Weed Law

Noxious weeds affect the natural, native balance of ecological functions. The Noxious Weed Law in Minnesota is administered by the MDA through SWCDs. Todd County and the Crow Wing Land Commissioner also enforce state noxious weed law through the Public Works Department. The State maintains noxious weed lists of those species to eradicate, control, restrict, and specially regulated plants.

Regulations: Minnesota Statutes 18.75-18.91

Public Drainage Systems: Establishment, Improvement, Re-routing, Repairs, and Impoundments

Minnesota Drainage Law enables multiple landowners to collectively construct, improve, and repair drainage systems across property boundaries and governmental boundaries. These drainage systems can be open ditches and/or subsurface tile. Drainage systems have their own laws and requirements that LGUs must uphold. These ditches are managed by the county for the benefit of the landowners.

Regulations: Minnesota Statute 103E

Shoreland Management

Minnesota has shoreland management rules that are administered by the DNR. LGUs are required to have land use controls that protect shorelands along lakes and rivers, and they can adopt stricter ordinances than the state's, if desired. All counties in the MRBW have shoreland ordinances (Table 8.1). The DNR published an Innovative Shoreland Standards Showcase website that may be helpful to local governments as they implement this plan: https://www.dnr.state.mn.us/waters/watermgmt_section/shoreland/innovative-standards.html.

Regulations: Minnesota Statute 103F and Minnesota Rules 6120.2500-3900

Table 8.1. Comparison of Shoreline Ordinances per county.

	General Development	Recreational Development	Natural Environment
Definition (DNR)	Generally large, deep lakes with high levels and mixes of existing development. These lakes often are extensively used for recreation and are heavily developed around the shore.	Generally medium-sized lakes often characterized by moderate levels of recreational use and existing development. Development consists mainly of seasonal and year-round residences and recreationally oriented commercial uses.	Generally small, shallow lakes. They often have adjacent lands with substantial constraints for development such as wetlands and unsuitable soils. These lakes usually do not have much existing development or recreational use.
Minimum Water Frontage and Lot Width	*Morrison:* 120 feet *Todd, Aitkin, Crow Wing:* 100 feet	*Morrison:* 175 feet *Todd, Aitkin, Crow Wing:* 150 feet	*All:* 200 feet
Minimum Lot Area (single home)	*Morrison, Crow Wing:* 30,000 feet^2 *Todd, Aitkin:* 20,000 feet^2	*Morrison:* 50,000 feet^2 *Todd, Aitkin, Crow Wing:* 40,000 feet^2	*Morrison, Todd, Aitkin, Crow Wing:* 80,000 feet^2
Minimum Setback from Ordinary High Water Level	*All:* 75 feet	*All:* 100 feet	*All:* 150 feet

Minimum Lot Sizes and Dwelling Density

Minimum lot sizes and dwelling densities for subdividing parcels also varies per county (Figure 8.3). Larger tracts of land (20-40 acres) could be protected by forest stewardship, while smaller lot sizes (1 acre or less) are poised for future subdivision for development.

This map is for planning purposes only and is subject to change. Please contact individual counties and cities for their zoning maps.

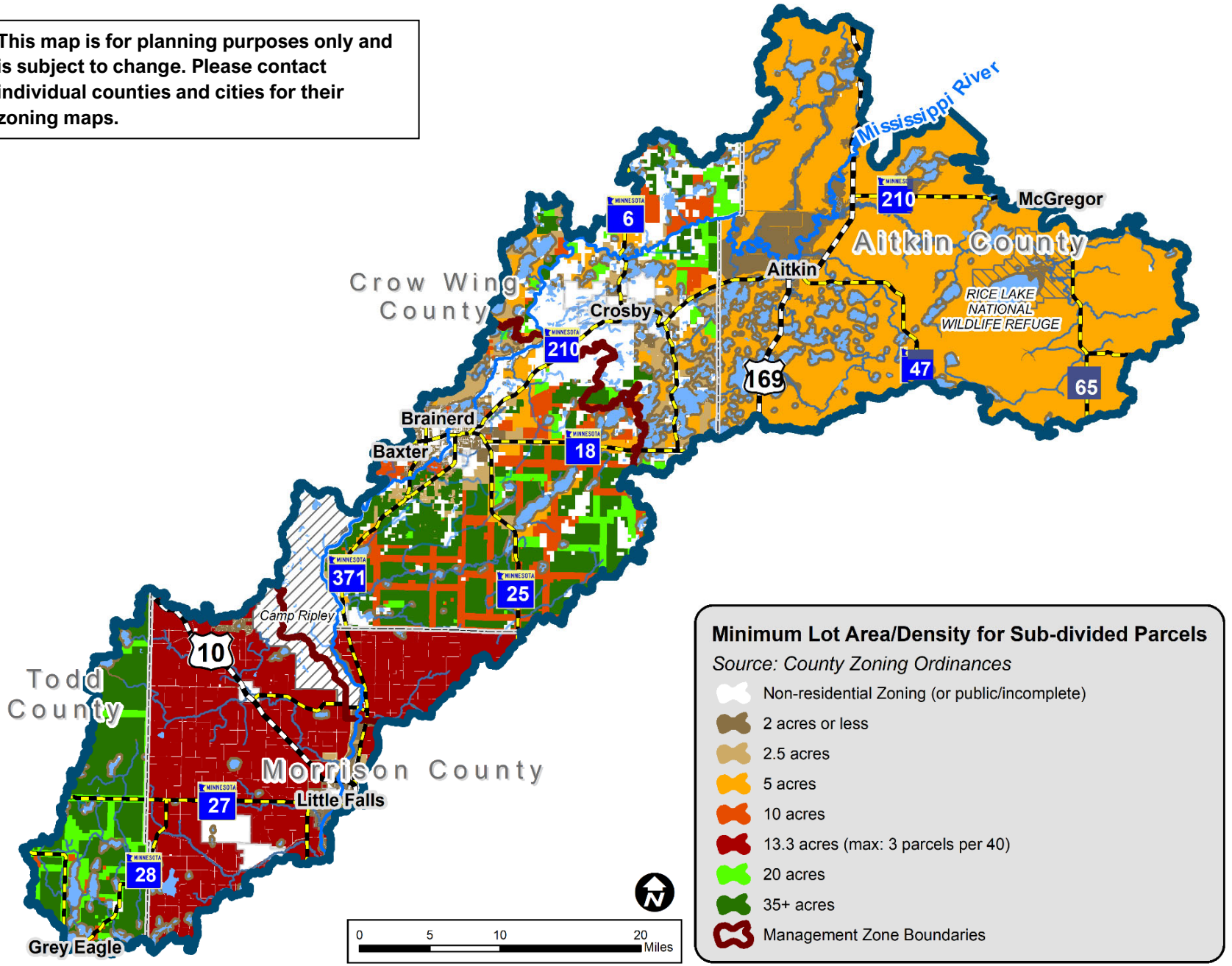


Figure 8.3. Minimum lot size comparisons between counties in the MRBW.

Stormwater Management – Municipal Separate Storm Sewer System (MS4)

The MS4 general permit is designed to reduce the amount of sediment and other pollutants entering state waters from stormwater systems. Entities regulated by the MS4 general permit must develop a stormwater pollution prevention program and adopt best practices. Brainerd, Baxter, and Little Falls have stormwater management programs required through the MPCA MS4 General Permit.

Regulations: Minnesota state rule Minn. R. 7090

Subsurface Sewage Treatment Systems

The SSTS Programs are required by Minnesota State Statute in order to protect the public health and environment. Counties are required to have an ordinance that regulates SSTS enforced at the county level. Cities and townships may administer their own programs but must be as strict as their county's ordinance. Low-interest loans and low-income grants are available through the SWCD, county, or Region 5. Todd County require SSTS inspections on point-of-sale.

Regulations: Minnesota Statutes 115.55 and 115.56; Minnesota Rules Chapters 7080, 7081, 7082, and 7083

Waste Management

Each county has a Solid Waste Management Plan (10-year Plan) that is approved by the MPCA. Solid Waste Management in Minnesota is managed at the county level and includes programs related to mixed municipal solid waste, industrial waste, and non-landfill programs such as recycling to include paper, plastics, metal, tires, electronics, appliances, and other recyclable items. As part of this plan, each county manages a household hazardous waste (HHW) program that receives some state funding to implement. Counties also received SCORE funds from the state to help cover some of the cost of recycling.

Regulations: Minnesota Statutes 115.55; Minnesota Rules Chapters 7001, 7035, 7045, 7150, 7151, 9215, and 9220

Wellhead Protection

The purpose of the Wellhead Protection Program is to prevent contamination of public drinking water supplies by identifying water supply recharge areas and implementing management practices for potential pollution sources found within those areas. MDH is responsible for statewide administration. The program has since expanded to Source Water Protection to include supplies that rely on surface water. Wellhead Protection is mostly administered at the city level, with various cities in the MRBW having a Wellhead Protection Plan.

Regulations: Minnesota Statutes, chapter 103I; Minnesota Rules, chapter 4720; Federal Safe Drinking Water Act, US Code, Title 42, Chapter 6A, Subchapter XII, Part E, Section 300j-13; Minnesota Rules, chapter 4725

Well Construction Standards

Well construction standards are an MDH Program.

Regulations: Minnesota Well Code/ Minnesota Rules Chapter 4725

Mississippi Headwaters Board Standards

The MHB administers standards within 500 feet of the OHWM on either side of the Mississippi River.

Classification	Minimum Lot Size	Structure Setback from OHWM	SSTS Setback from OHWM	Lot Width at OHWM and at Building Line	Shore Impact Zone	Structure Height
Scenic River	5 acres	150 feet	125 feet	330 feet	75 feet	35 feet

Operations and Maintenance

After projects are installed, regular on-site inspections and maintenance to ensure the project's continued function and success are required by the BWSR Grants Administration Manual. These details, along with records, including notes and photos, should be included with each project's Operations and Maintenance Plan. BWSR's recommended inspection plans, according to the Grants Administration Manual, include inspections during years 1, 3, and 9 after the certified completion.

Comprehensive Plans

County/City comprehensive plans are required to implement land use regulatory ordinances and provide the framework of the ordinance requirements. It is recommended that when a County/City updates its comprehensive plan, that at a minimum the County/City adopt all comprehensive watershed management plans (CWMPs) within the County/City by reference. One step further would be for the County/City to utilize specific goals and strategies from the CWMP when developing a comprehensive plan.

Current Water Plans in the MRBW

- Aitkin County Water Management Plan (2009)
- Crow Wing County Water Plan (2013)
- Todd County Water Plan (2016)
- Morrison County Water Plan (2017)
- Mississippi Headwaters Board Comprehensive Plan (2019)

Current Comprehensive Land Use Plans in the MRBW

- Aitkin County Comprehensive Land Use Management Plan (2000)
- Morrison County Comprehensive Plan (2016)
- Todd County Comprehensive Plan (2009)
- City of Brainerd Comprehensive Plan (2021)
- Crow Wing County Comprehensive Plan (2003)
- Township Comprehensive Plans (Long Lake, Daggett Brook, Ideal, Center, Garrison, Little Pine, St. Mathias, and Mission)

Keep It

PROTECTED LANDS MAINTENANCE

"Keep it" programs are those that involve permanent landscape protection. This includes sustainable forest incentive act covenant lands, conservation easements, aquatic management areas, and public land ownership.

Implementation of this plan will involve programs that will be actively targeted to prioritized areas for protection (see Protection Goal focus areas). Non-priority areas will be considered on an opportunity basis.

Land enrolled in protection efforts will improve watershed resilience including storing carbon in the trees and retaining water in the soil which reduces flooding and runoff.

Conservation Easements

Conservation easements are voluntary, legal agreements between a landowner and governmental or nonprofit organization, whereby land use and development are limited on a property while conserving natural values that reside upon that landscape. The easements are individually tailored agreements with an organization such as BWSR, DNR, MHB, Minnesota Land Trust, or TNC.

Sustainable Forest Incentive Act

SFIA provides annual incentive payments for the landowner recording a covenant taking away some of the rights of the land (development and farming, for example). Private landowners can receive a payment for each acre of qualifying forest land they enroll in SFIA. In return, they follow the covenant for a set period of time: either 8, 20, or 50 years. Data on current enrollees shows that landowners who start with an 8-year covenant commonly move up to a 50-year covenant (DNR), which is why this program is considered under "Keep It."

Wetlands

Wetlands are protected by the Minnesota WCA. The overall goal of the act is no net loss of wetlands. Draining, filling, and in some cases excavating in wetlands is prohibited unless (a) the drain, fill, or excavation activity is exempt from requiring replacement or (b) wetlands are replaced by restoring or creating wetland areas of at least equal public value. Replacement can be buying credits or creating/restoring a wetland (usually credits are encouraged over an on-site replacement). Aitkin, Crow Wing, and Todd Counties enforce the WCA, while SWCDs restore wetlands.

Regulations: Minnesota Rules, part 8420.0105

Buffers

In 2015, Minnesota enacted legislation requiring buffers of perennial vegetation of an average of 50 feet with a minimum of 30 feet on public waters and 16.5 feet for public drainage systems. This program is regulated by BWSR and implemented at the county level. Each county has an ordinance for buffer management, and SWCDs conduct buffer compliance checks. Currently, all counties are near 100% compliance.

Regulations: Minnesota Statutes 103B and 103F.48 Subd. 4

Land Acquisition

For areas with unique and important resources that meet state goals, the DNR, USFWS, counties, cities, townships, and other entities may purchase and manage the land. Examples include Aquatic Management Areas that are used for fish spawning habitat and Wildlife Management Areas (WMAs) that are used for small game hunting and waterfowl migration.

Army Compatible Use Buffer

A unique partnership has developed around Camp Ripley in the form of an Army Compatible Use Buffer (ACUB). This ACUB benefits both the Army's training mission and the natural resources by protecting the designated area from development. Land protection is achieved through a variety of programs, including private conservation easements, public lands, and SFIA.

Sentinal Landscape

In 2015, the area surrounding Camp Ripley was designated a Sentinel Landscape forging a partnership between the Department of Defense, Department of Interior, Department of Agriculture, and USFWS to dedicate resources to the landscape, which ultimately protect and enhance natural resources within the landscape.

Fix It

CONSTRUCTED ENVIRONMENTAL ENHANCEMENTS

"Fix it" programs include installation of on-the-ground, usually permanent or long-term constructed enhancements, including septic system upgrades, stormwater control, capital improvement projects, and well sealing.

This program addresses environmental justice by providing low income financial assistance for septic system replacements. This program builds resiliency through Capital improvements, which can be built for future precipitation events instead of today's.

Low-Interest Loans

Low-interest loans may be made available for septic system replacement, small community wastewater treatment systems, agricultural BMPs, and other projects that meet eligibility criteria for funding.

Cost-Share Programs

Cost-share programs can also be used for structural practices. Implementing fencing and water sources for grazing cattle away from streams, shoreline enhancements on lakeshore, and well sealing are applicable examples that meet the goals of this plan. Implementation of this plan will involve cost-share programs that will be actively targeted to prioritized areas for projects. Non-priority areas will be considered on an opportunity basis.

Capital Improvements

Capital improvements are large projects that require significant investment and have a longer lifespan than cost-share programs. The BWSR Grants Administration Manual considers capital improvement projects to have a minimum effective life of 25 years. These types of projects and activities often require feasibility studies before design and construction can proceed. Capital improvement projects often involve collaboration amongst multiple public and private organizations or governmental departments and are often good candidates for state or federal grant funding. Urban stormwater control projects are an example of capital improvement projects within the plan boundary.

Operations and Maintenance

After projects are installed, the BWSR Grants Administration Manual requires regular on-site inspections and maintenance to ensure the project's continued function and success. These details, along with records, including notes and photos, should be included with each project's Operations and Maintenance Plan. BWSR's recommended inspection plans for capital improvement projects with a minimum effective life of 35 years, according to the Grants Administration Manual, includes inspection after years 1, 8, 17, and 24.

Know It

OUTREACH & INFORMATION

"Outreach & information" programs are integral to achieving the plan's goals. Programs are those that include inventories, monitoring, and public outreach and engagement efforts.

Data Collection and Analysis

Data collection, inventories, and monitoring are crucial for determining where projects are needed, investigating problems, and tracking progress towards the measurable goals of this plan. Current data collection and monitoring efforts are described, along with data gaps that have actions for implementation, in this plan.

Current Data Collection and Monitoring Efforts

Currently, a wide variety of monitoring is carried out on multiple government and local organization levels (Table 8.2). These existing data helped determine the current conditions of surface water, groundwater, and habitat in this plan and developed a starting point for measuring goals moving forward. Because these are already established projects, they don't cost additional funds for this plan.

Table 8.2. Summary of ongoing water quality and quantity monitoring programs. RS = rivers and streams, L = lakes, W = wetlands, and GW = groundwater.

Parameters	MPCA	DNR	MDH	MDA	County and SWCD	Lake Associations
Nutrients	RS, L, W	RS, L		RS, GW	GW	RS, L
Suspended Solids	RS, L, W	RS		RS		
Productivity	RS, L	RS				RS, L
Pesticides				RS, L, W, GW		
Bacteria	RS, L		GW		RS	
Biology	RS, L, W	RS, L				
Water level/Flow	RS, L	RS, L				
Algal Toxins	L					
Invasive Species		RS, L			L	RS, L
Fish Contaminants	RS	L				
Chlorides	RS, L, W	RS	RS, L, GW		L, RS	
Sulfates	RS, L, W	RS, L	RS, L, GW			

Figure 8.4

As part of the Intensive Watershed Approach, the MPCA conducts lake and stream monitoring in each watershed on a 10-year cycle. This assessment includes water chemistry and biological parameters, any Total Maximum Daily Loads (TMDL) needed, and results in comprehensive reports. The MRBW is scheduled for monitoring in 2027.

There are many active Lake Associations and Lake Improvement Districts that conduct general condition monitoring annually, including total phosphorus, chlorophyll-a, and transparency parameters (Figure 8.4). This data is crucial for tracking trends in lake water quality.

The MPCA Watershed Pollutant Load Monitoring Network (WPLMN) provides funding to local partners to assist with intensive water quality monitoring at long-term sites. Monitoring at these sites can be used to track progress towards reduction of phosphorus, sediment, nitrogen, and water outflow during plan implementation (Figure 8.4).

To track pollutant reductions from plan implementation actions (Section 6) and point source improvements, it would be beneficial to continue monitoring sites in focus lakes and streams.

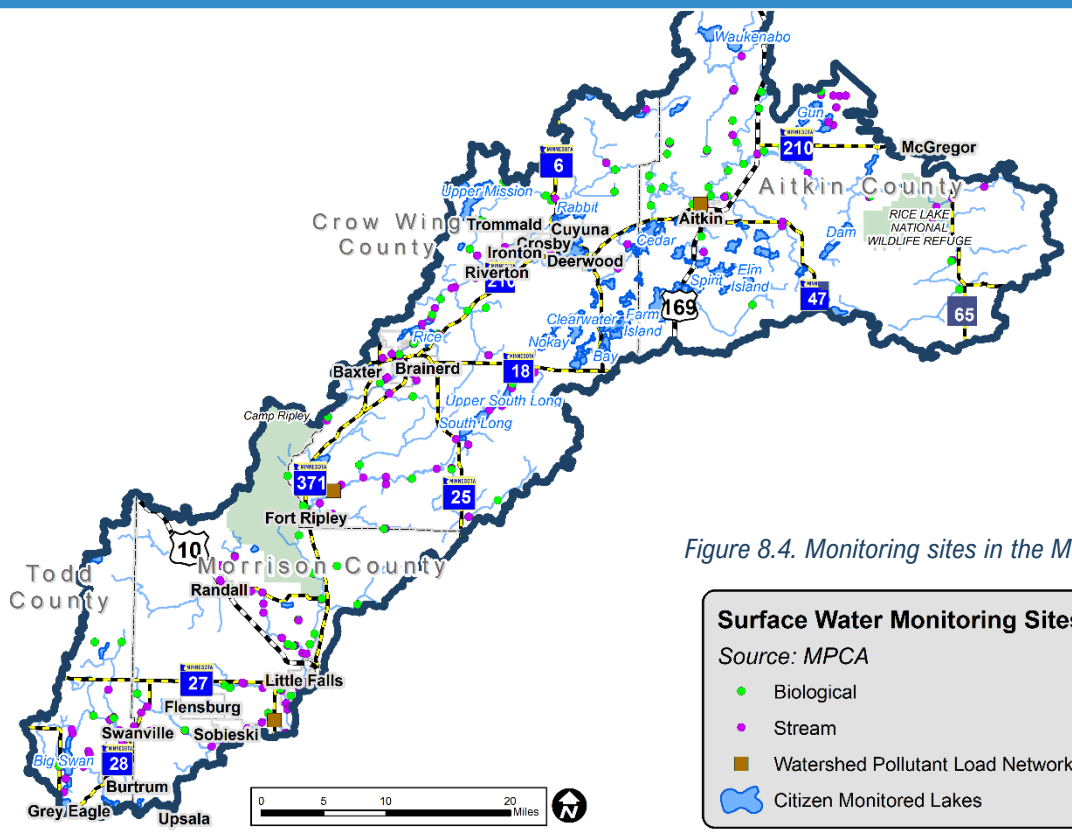


Figure 8.4. Monitoring sites in the MRBW.

GROUND WATER

The DNR monitors groundwater availability and ecological impacts through the Cooperative Groundwater Monitoring network. There are four DNR monitoring observation wells in the MRBW.

The MDA monitors groundwater for agricultural chemicals and fertilizer contamination.

The MPCA monitors groundwater for industrial contamination. There are 20 MPCA ambient groundwater monitoring wells in the MRBW.

The MDH monitors wells and drinking water supplies for public health, including bacteria, nitrates, and arsenic.

Townships in Todd and Morrison Counties have participated in the MDA's Township Testing Program, and Todd, Morrison, and Crow Wing Counties participated in Central Sands Private Well Network that works with property owners to test their wells.

HABITAT/FORESTRY

During the MPCA's intensive monitoring cycle, the rivers in the watershed are tested for biological parameters. The DNR monitors fish and MPCA monitors macroinvertebrates (Figure 8.4). Any biological impairments are assigned a stressor that is likely causing the reduction in diversity. Stressors include loss of habitat, loss of connectivity, sediment, dissolved oxygen, and altered hydrology.

Forest habitat is described in the MRBW LSP. Areas for enhancement and recommended species assemblages are outlined in the plan.

LAND

Monitoring the soil organic matter improvements from planned practices can be done by the University of Minnesota Extension.

Filling Data Gaps

This planning process has identified data gaps to be filled through implementation of this plan or further into the future (Table 8.3). The following inventory and study activities were developed by the Technical Advisory Committee and the associated Plan Goal (Section 5) is noted.

Table 8.3. Data gaps identified in the MRBW.

GOAL: PROTECTION
Identification of sensitive shoreland communities (i.e. white cedar, tamarack, black spruce) for protection.
GOAL: AGRICULTURAL LAND MANAGEMENT
Improve understanding of where manure is applied, where cattle have access to streams, updated feedlot inventory.
GOAL: PHOSPHORUS REDUCTION
Continue water quality monitoring and conduct trend analysis, lake studies for lake management. Better understanding of impaired lakes.
GOAL: URBAN STORMWATER MANAGEMENT
Explore best management practices for smart salting and find alternatives for water softeners. Complete comprehensive stormwater dataset for eight cities.
GOAL: DRINKING WATER PROTECTION
Continue monitoring groundwater quality.
GOAL: SHORELAND MANAGEMENT
Develop impervious surface maps for lakes in the watershed. Develop DNR shoreline disturbance tool. Use new LiDAR to target new projects. Inventory drainage systems and locations for channel restoration. Inventory stream crossings within the watershed.

Outreach and Project Development

Public participation and engagement are essential for successfully implementing this plan. The implementation of actions in this plan is voluntary and requires willing landowner participation. Landowners have varying levels of understanding of conservation practices, programs, and funding opportunities available. Many times, the first step towards adopting conservation practices is outreach. Outreach can be conducted in a variety of ways, including mailings, workshops, and social media. It can be targeted to landowners in priority areas to help target conservation practices in those areas to reach plan goals. Outreach can be conducted with partners as well such as NGOs and tribal partners.

Outreach will also be done with a focus on reaching watershed residents in different social and economic backgrounds.

Outreach

Watershed partners already implement numerous outreach strategies. Existing and new strategies are detailed in Section 6. A summary of the outreach actions is provided in Table 8.4.

Table 8.4. Outreach actions in the MRBW.

GOAL: PROTECTION
Networking, local foresters, workshops, social media.
GOAL: AGRICULTURAL LAND MANAGEMENT
Farm visits, workshops, peer-to-peer network, marketing locally produced foods, social media.
GOAL: PHOSPHORUS REDUCTION
Workshops, realtors, contractors, landowners, social media.
GOAL: URBAN STORMWATER MANAGEMENT
Storm drain stenciling, rain barrels, workshops, social media.
GOAL: DRINKING WATER PROTECTION
Drinking water testing clinics, outreach on well sealing and private well management, workshops on septic pumping, wellhead protection, and household hazardous waste, social media.
GOAL: SHORELAND MANAGEMENT
Give away native grass seeds, shoreland workshops, and educational presentations.
Estimated 10-Year costs for Outreach Implementation: $300,000

Project Development

The second step is project development; including site visits, technical assistance, peer-to-peer networks, and demonstration plots. Sometimes the outreach and project development can take years before landowners adopt the practices. Once the landowner is interested in adopting practices, incentives and cost-share programs can help them get started.

Example: incentives for farmers to adopt cover crops from the SWCD or the EQIP program can help them implement the practice for a few years to ensure profitability.

Example: incentives for private landowners to develop a forest stewardship plan makes them eligible for enrollment in the SFIA, which provides payments to landowner to keep forests forested.

Achieving Plan Goals

Overall plan progress towards goals will be tracked by watershed partners. The Steering Committee will develop ranking criteria to develop projects during work planning, with the assumption that projects identified in this plan will be prioritized for funding.

Figure 8.5 summarizes the different levels of measuring progress and how it will be implemented in this plan. Projects will be tracked during plan implementation using a system set up for the watershed.

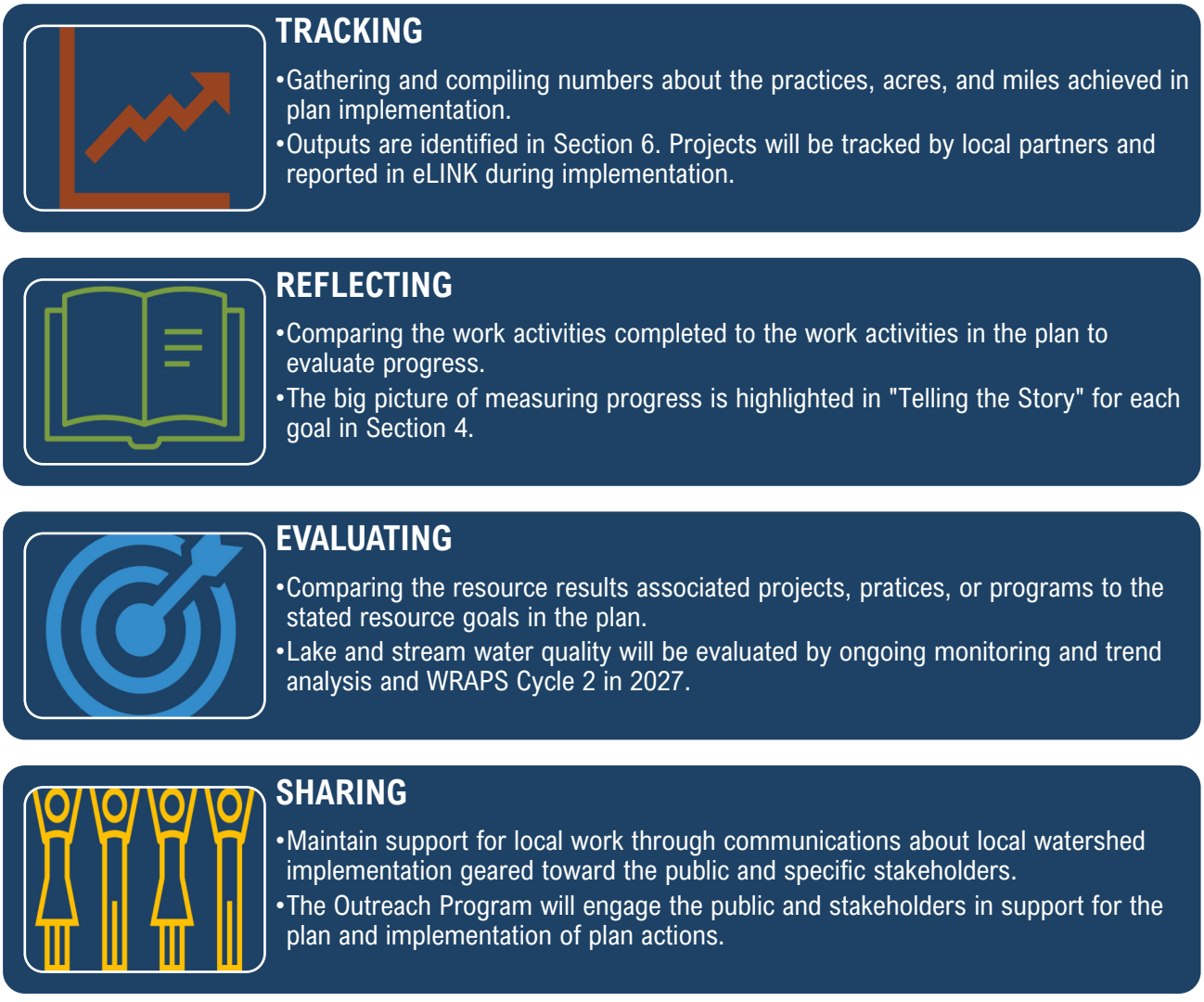


Figure 8.5. Description of how different activities will be measured during plan implementation.

Section 9

Plan Administration

Section 9. Plan Administration

Plan Administration describes how the plan will be implemented, how the watershed partners will work together, how the funding will move between them, and who will handle the administrative duties. The MRBCWMP will be implemented through a MOA between the local governments in Figure 9.1. The LGUs in the MOA will be collectively referred to as the MRBW Partnership.

Figure 9.1. Members of the MRBW Partnership.

Decision-making and Staffing

Implementation of the MRBCWMP will require increased capacity of plan partners, including increased staffing, funding, and coordination from current levels. Successful plan implementation will depend on generating active interest and partnerships within the watershed.

The decision-making and staffing for implementing the MRBCWMP will be conducted based on the concepts outlined in this section of the plan. Presented below are the probable roles and functions related to plan implementation (Table 9.1). Expectations are that the roles of each committee will shift and change during implementation to best meet the needs of the MRBW Partnership. Fiscal and administrative duties for plan implementation will be assigned to an LGU through a Policy Committee decision as outlined in the formal agreement. Responsibilities for work planning and serving as the central fiscal agent will be revisited by the Policy Committee on a biennial basis.

Table 9.1. Roles for MRBCWMP Implementation. The LGUs will be collectively referred to as the MRBW Partnership.

Committee Name	Description	Primary Implementation Role and Functions
Policy Committee	One board member from each MOA entity.	• Meet twice a year or as needed • Annual review and confirmation of Steering and TAC recommendations • Direction to Steering Committee on addressing emerging issues • Recommend approval of the annual work plan by the individual boards of the MOA members • Review the implementation funds from plan participants
Local Fiscal Agent and Coordinator	One or two of the participating LGUs as decided by the Policy Committee.	• Convene committee meetings • Prepare the annual work plan • Prepare and submit grant applications/funding requests • Research opportunities for collaborative grants • Report on how funds were used • Compile annual results for annual assessment
Steering Committee	Staff each MOA entity and local BWSR Board Conservationist.	• Meet monthly or as needed to review projects • Review the status of available implementation funds from plan participants • Review opportunities for collaborative grants • Review annual fiscal reports • Review annual reports submitted to BWSR • Biennial review and confirmation of priority issues • Evaluate and recommend response to emerging issues • Prepare plan amendments • Implement the targeted implementation schedule
Advisory Committee	State Agencies and local stakeholders appointed by the Policy Committee.	• Meet annually or as needed • Review and provide input for the annual work plan • Review and identify collaborative funding opportunities • Recommendations to Steering Committee on program adjustments • Assist with execution of the targeted implementation schedule • Provide input for the annual work plan • Communicate the needs of local landowners • Be a local supporter for the plan

Collaboration

Collaboration between Planning Partners

The MRBW Partnership acknowledges the value of collaboration between planning partners to achieve successful plan implementation. Benefits of successful collaboration for the MRBW Partnership include consistent implementation of actions watershed-wide, increased likelihood of funding, and resource efficiencies gained.

There is already some collaboration within the SWCDs through two Technical Service Areas (8 & 2). This collaboration is an advantage for implementation in the watershed. Where possible and feasible, the MRBW Partnership will pursue opportunities for collaboration with fellow TSA members to gain program efficiencies, pursue collaborative grants, and provide technical assistance.

There are some shared duties between planning partners including the ACUB Easement Program, the Camp Ripley Sentinel Landscape, and Nutrient Management.

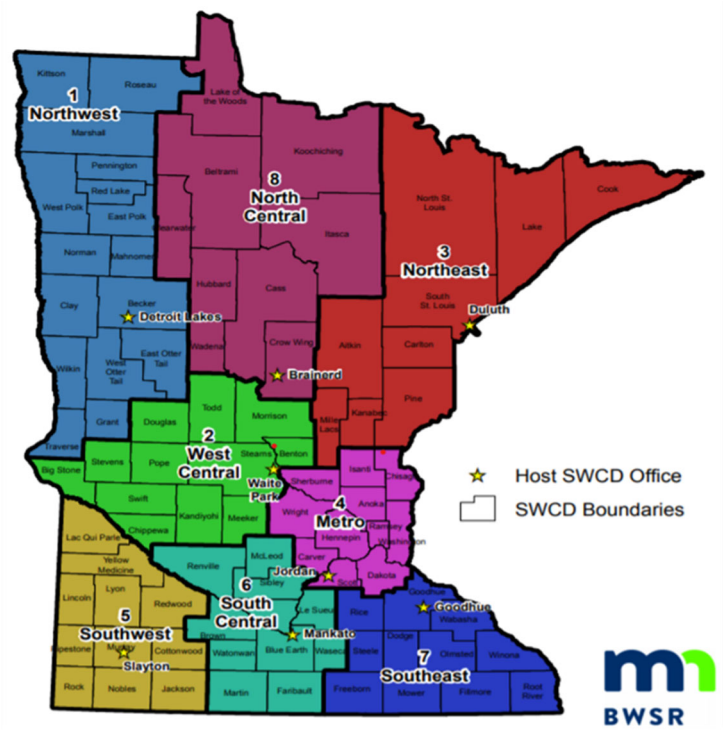
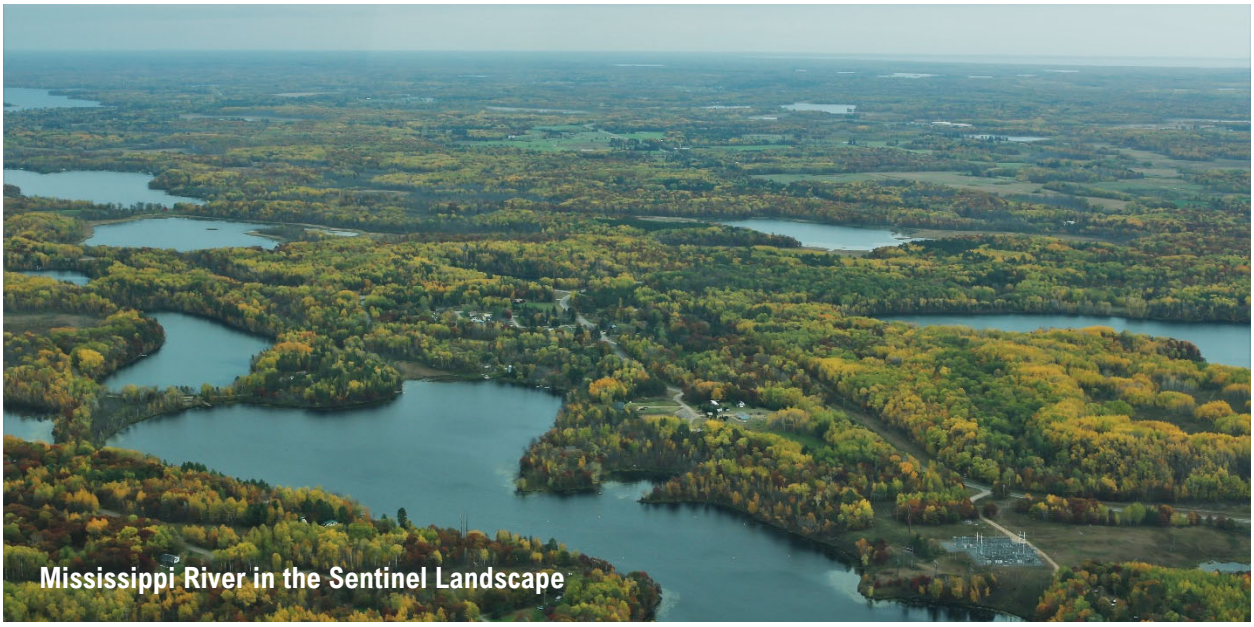


Figure 9.2. Counties and Technical Service Areas.



Mississippi River in the Sentinel Landscape

Collaboration with Other Units of Government

The MRBW Partnership will continue to coordinate and cooperate with other governmental units at all levels. Coordination with state agencies, including BWSR, DNR, MDH, MDA, and the MPCA, will continue as they are experts in many of the topic areas included in this plan, have been participating members of the planning Advisory Committee, and will be members of the implementation Advisory Committee. Cooperation with units of government such as NRCS, municipalities, city councils, township boards, county boards, joint powers collaboration, and other water management authorities are a practical necessity to facilitate watershed-wide activities. Examples of collaborative programs in the watershed include EQIP (NRCS), CRP (FSA), Minnesota Agriculture Water Quality Certification (MDA), Targeted Township Testing (MDA), Wellhead Protection for Community Water Suppy DWSMAs (Minnesota Rural Water Association [MRWA] and MDH), and Minnesota Forest Resource Council and WRAPS (MPCA).

MRBCWMP implementation actions and goals were developed through a collaborative process. Some agency goals, objectives, directions, and strategies for resource management within the plan area 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. Lower priority (as opportunties arise) and emerging issues are outlined in Section 3.

Collaboration with Others

Local support and partnerships will drive the success of final outcomes of the actions prescribed for implementing this plan. Because this plan's focus is voluntary land stewardship practices, collaborations with landowners in the watershed is of vital importance. There are many actions in the plan that describe working with individual landowners and providing cost share and technical assistance for implementing land stewardship practices (Section 6). Many of the existing collaborations in the watershed have been involved in the development of this plan and are committed to protecting and enhancing the watershed resources. Partners for these collaborations include, but are not limited to, Lake Associations, Lake Improvement Districts, TNC, Central Minnesota Irrigators (CMIC), Central Lakes College Agriculture and Energy Center (CLC), Ducks Unlimited, Trout Unlimited, MN Deer Hunters Association, Pheasants Forever, Sportsman's Clubs, National Wild Turkey Federation, Freshwater Society, local co-ops, University of Minnesota Extension, civic groups, private businesses, individuals, and foundations. The MRBW Partnership collaborates with these groups for education, outreach, monitoring, and project implementation.

Center pivot irrigation

Regional Collaborations

Three notable regional collaborations between local, state, and federal governments as well as local organizations are:

Regional Conservation Partnership Program

Implementing Innovative Irrigation Practices to Protect Groundwater Quality and Quantity. This project, sponsored by the MDA, is a partnership of 20 Minnesota SWCDs, Central Lakes College Ag and Energy Center, AgCentric, Northern Center of Agricultural Excellence, Mille Lacs Band of Ojibwe, Irrigators Association of Minnesota, Central Minnesota Irrigators, Todd-Wadena Electric Coop, Reinke Manufacturing, RD Offutt Farms, RESPEC Consulting, University of Minnesota, Minnesota BWSR, and MDH. https://www.agcentric.org/rcpp-precision-irrigation/

Camp Ripley Sentinel Landscape

Partners in protecting and enhancing natural resources within the landscape include US Army National Guard, FSA, Forest Service, NRCS, US Department of Defence, USFWS, National Park Service, BWSR, MDA, Minnesota Department of Military Affairs, DNR, Forest Resource Council, MPCA, City of Baxter, Crow Wing SWCD, Morrision SWCD, MHB, Sylvan Township, Great River Greening, The Conservation Fund, and TNC. In the future, partners could explore expanding the sentinel landscape borders to enhance protection benefits in the region.
https://sentinellandscapes.org/landscapes/camp-ripley/

Mississippi Headwaters Habitat Corridor Program

Another partnership developed around the Mississippi River, tributaries, and headwaters lakes and reservoirs in the form of the Mississippi Headwaters Habitat Corridor Program. For areas that meet important habitat and water quality goals, agencies may purchase, transfer, and/or manage the acquired land for resource protection.

Formed in 1980 as an alternative to designation of the river into the National Wild and Scenic River System, the **Mississippi Headwaters Board (MHB)** works to protect and preserve the first 400 miles of the Mississippi River in Minnesota. A joint powers board of Clearwater, Beltrami, Cass, Hubbard, Itasca, Aitkin, Crow Wing and Morrison Counties, the MHB is mandated by Minnesota Statutes 103F.361-377 to enhance and protect the natural, cultural, historic, scientific and recreational values of the headwaters region.

MHB achieves its goal of river protection through cooperative land use planning in the eight counties, in conjunction with the Chippewa National Forest and the Leech Lake Indian Reservation.
MHB promotes water quality monitoring, education and stewardship activities for shoreland property owners, and embraces the efforts of local citizens, students and government groups who work together to protect the river in their community and preserve the splendor of this national treasure.

Funding

The MRBW Partnership will pursue funding opportunities collaboratively in order to implement the activities prescribed in the targeted implementation schedule (Section 6). Current programs and funding (Level 1) will not be enough to meet the full targeted implementation schedule. The success of plan implementation will hinge on reliable non-competitive watershed-based funding being available for plan implementation in addition to competitive state, federal, and private grant dollars. The MRBW Partnership acknowledges that additional staffing may be necessary to meet plan goals. Because implementation is occurring under an MOA, staff will be hired by existing local government units in the watershed.

The current funding level (Level 1) is based on the annual revenue and expenditures for the following counties and SWCDs: Aitkin, Crow Wing, Morrison, and Todd. The current level of investment by each local government unit is expected to remain the same during the MRBCWMP 10-year time period. It includes local funds such as county allocations for SWCD support, in-kind match for office space, tree sale, and state funds such as state programs and conservation delivery grants, including the Natural Resources Block Grant and SWCD Local Capacity Building Grants (Table 9.2).

Table 9.2. Level 1 funding for the MRBW.

Funding Level	Annual Local Estimate	Annual State Estimate	Annual Federal Estimate	Annual Total Estimate
Level 1	$295,400	$371,000	$0	$666,400

Level 2 funding describes the baseline funding plus additional funding that could be obtained to implement the plan, including noncompetitive watershed-based funding and competitive grants (Table 9.3). The total estimated funding for Level 2, which is just the funding that is administered by the MRBW Partnership, is $1,300,000 annually and $13,000,000 over the 10-year life of the MRBCWMP (Table 9.3). Administration costs are estimated at 10% of the Watershed-Based Funding annually (~$50,000).

Level 3 funding consists of funding that is administered outside of the MRBW Partnership by partners, including TNC, CRP, SFIA, NRCS, ACUB, Lessard Sams Outdoor Heritage Fund, and state agency projects There is likely much more project funding occuring in the watershed in addition to these totals as it is difficult to document projects by all entities, including private landowners.

Table 9.3: Estimated implementation funding for the MRBW (per Levels 1-3)

Funding Level	Description	Estimated Plan Total (10 years)	Estimated Annual Average
Level 1	Current Baseline Funding	$6,664,000	$666,400
Level 2	**Baseline + Watershed-Based Funding**	**$13,000,000**	**$1,300,000**
Level 3	Partner funding (i.e. TNC, CRP, NRCS, SFIA)	$28,190,000	$2,819,000
Total Level 2+3*		$41,190,000	$4,119,000

*Level 1 is not included in the overall total because Level 2 includes Level 1

Table 9.4 lists the most used programs and grants for executing the implementation programs described by this plan and used within the targeted implementation schedule. The funding grants and programs are cross-referenced to plan implementation programs, thereby showing potential sources of revenue for implementation. Programs will be coordinated uniformly throughout the watershed where possible.

Table 9.4: Funding sources available for implementing the MRBCWMP.

	Agency	Program/Fund Name	Type of Assistance	Form of Assistance				
STATE FUNDING	BWSR	Clean Water Fund	Financial	Grant	●	●	●	●
	BWSR	Reinvest in Minnesota	Financial	Easement			●	
	BWSR	Natural Resources Block Grant	Financial	Grant	●	●		
	BWSR	SWCD Government Aid	Financial	Grant	●	●	●	●
	BWSR	Erosion Control & Water Management Program	Financial	Grant	●	●		●
	DNR	Conservation Partners Legacy	Financial	Grant	●		●	
	DNR	Aquatic Invasive Species Control	Financial/ Technical	Grant		●		
	DNR	Forest Stewardship Program	Technical	Cost Share		●	●	
	DNR	Aquatic Management Area, Wildlife Management Area	Financial	Fee Title Acquisition			●	
	DNR/Revenue	Sustainable Forest Incentive Act	Financial	Incentive payment			●	
	MPCA	Clean Water Partnership	Financial	Grant	●			
	MPCA	State-Revolving Fund	Financial	Grant	●			
	MPCA	Surface Water Assessment Grant	Financial	Grant				●
	MDH	Source Water Protection Grant	Financial	Grant	●	●	●	
	MDA	Nitrate Testing	Technical	Monitoring				●
	MDA	Agricultural BMP Loan Program	Financial	Loan	●	●		
	LSOHC	Outdoor Heritage Funds	Financial	Grant			●	
	LCCMR	Environmental Trust Fund	Financial	Grant	●		●	
	Legislature	Bonding	Financial	Bond	●			
FEDERAL FUNDING	FSA	Conservation Reserve Program	Financial	Cost Share		●	●	
	FSA	Grassland Reserve Program	Financial	Cost Share		●	●	
	NRCS	Conservation Innovation Grant	Financial	Grant	●			
	NRCS	EQIP	Financial	Cost Share	●	●		
	USGS	Stream Gaging Network	Technical	Monitoring				●
	USACE	Planning Assistance	Technical	Planning		●		

	Agency	Program/Fund Name	Type of Assistance	Form of Assistance				
	EPA	State Revolving Fund	Financial	Loan	•			
OTHER FUNDING	Ducks Unlimited		Financial/ Technical	Easement/Cost Share	•		•	
	Trout Unlimited		Financial/ Technical	Easement/Cost Share	•		•	
	Muskies, Inc		Financial/ Technical	Easement/Cost Share	•		•	
	The Nature Conservancy		Financial	Easement			•	
	Minnesota Land Trust		Financial	Easement			•	

Local Funding

Funding derived from either the local property tax base or in-kind services of any personnel funded from the local tax base is local revenue. Local funding excludes general operating funds obtained from BWSR, fees for service and grants, or partnership agreements with the federal government or other conservation organizations.

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

Water Planning Authority for Special Projects (Minnesota Statute 103B.355):

- Counties have the authority to levy funds for priority projects and assist SWCDs with program implementation.

Road Authorities:

- Counties can provide limited local funding to assist with the local share of road retention and other floodwater-retention projects.

Drainage System Costs (Minnesota Statute 103E):

- Funding of all costs related to construction, maintenance, and improvement of drainage systems is apportioned to property owners within the drainage system based on the benefits received from the improved drainage.
- A drainage authority can accept and use funds from sources other than assessments from benefitted landowners for the purposes of flood control, wetland restoration, or water quality improvements. Minnesota Statutes Chapter 103E, Section 15, subdivision 1a requires drainage authorities to investigate the potential use of external funding for the purposes identified in Minnesota Statutes Chapter 103E, Section 11, subdivision 5.

State Funding

Leadership from the state agencies that are tasked with protection and restoration of Minnesota's water resources came together and agreed on a set of high-level state priorities that align their programs and activities working to reduce nonpoint source pollution. The resulting Nonpoint Priority Funding Plan outlines a criteria-based process to prioritize Clean Water Fund investments. These high-level state priority criteria include:

- Restoring those waters that are closest to meeting state water quality standards
- Protecting those high-quality unimpaired waters at the greatest risk of becoming impaired
- Restoring and protecting water resources for public use and public health, including drinking water

State funding includes funds derived from the State tax base for state cost-share and regulatory purposes. State funding excludes general operating funds obtained from BWSR, counties, fees for service and grants, or partnership agreements with the federal government or other conservation organizations.

Collaborative Grants

The fiscal agent will apply for collaborative grants on behalf of the MRBW Partnership, which may be competitive or non-competitive. The assumption is that future base support for implementation will be provided to the MRBCWMP as one or more non-competitive implementation watershed-based funding allocations. Where the purpose of an initiative 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. Funding sources that are currently available at the time of developing this plan are listed in Table 9.4.

Federal Funding

Federal funding includes all funds derived from the federal tax base. This includes programs such as the EQIP administered by NRCS. Federal funding does not include general operating funds obtained from BWSR, counties, fees for service and grants or partnership agreements with state government or other conservation organizations.

Federal agencies can be engaged following the approval of this plan and prior to implementation, to create an avenue to access federal resources for implementation. Opportunity may exist to leverage state dollars through some form of federal cost-share program. Where the purpose of an implementation program aligns with the objectives of various federal agencies, federal dollars will be used to help fund the implementation programs described by this plan. For example, the NRCS will likely provide support for agricultural BMPs, while the FSA may provide land-retirement program funds such as CRP (Table 9.4).

Other Funding Sources

Foundations, nonprofit organizations, and private contributions (including landowners and corporate entities) will be sought for plan implementation activities. Local foundations may fund education, civic engagement, and other local priority efforts. Several conservation organizations are active in the watershed, such as TNC, Lake Associations, Ducks Unlimited, Trout Unlimited, MN Deer Hunters Association, Pheasants Forever, Sportsman's Clubs, National Wild Turkey

Federation, Freshwater Society, CLC Ag Center, and local co-ops. These organizations acquire funding of their own and may have project dollars and technical assistance that can be leveraged. Major cooperators and funding sources are private landowners who typically contribute 25% of project costs and many donate land, services, or equipment for projects or programs.

Work Planning

This plan envisions collaborative implementation. Biennial work planning will be completed to align the priority issues addressed, the availability of funds, and the roles and responsibilities for implementation.

Local Work Plan

The MRBW Partnership will be responsible for completing a biennial work plan based on the targeted implementation schedule. Adjustments to the biennial work plan will be made through self-assessments. Then the biennial work plan will be presented to the Policy Committee, who is ultimately responsible for its approval. The purpose of these biennial work plans is to obtain BWSR WBIF, maintain collaborative progress towards completing the targeted implementation schedule and reaching the outcomes prescribed in the plan.

Funding Request

The MRBW Partnership will collaboratively develop, review, and submit a watershed-based funding request from this plan. This request will be submitted to and ultimately approved by the Policy Committee prior to submittal to BWSR. The watershed-based funding request will be developed based on the 2024-2025 priority projects outlined in the targeted implementation schedule and any adjustments made through self-assessments.

Mississippi River in winter.

Assessment, Evaluation, and Reporting

Accomplishment Assessment

The Steering Committee will provide the Policy Committee with an annual update on the progress of the plan's implementation. For example, any additional acres of land BMPs will be tracked so that each year the Steering Committee will report how many additional acres were managed in the watershed. A tracking system will be used to measure progress and will serve as a platform for plan constituents and the public. Tracking these metrics will also make them available for supporting future work plan development, progress evaluation, and reporting.

Partnership Assessment

Biennially, the Steering Committee, with the help of the Advisory Committee, will review the MRBCWMP goals and progress toward implementation, including fulfillment of committee purposes and roles, efficiencies in service delivery, collaboration with other units of government, and success in securing funding. During this review process, feedback will be solicited from the boards, Policy Committee, Citizen Committee, and partners such as state agencies and non-governmental organizations. This feedback will be presented to the Policy Committee to set the coming biennium's priorities for achieving the plan's goals and to decide on the direction for grant submittals. Also, this feedback will be documented and incorporated into the 5-year evaluation. The MRBW Partnership intends to pursue watershed-based funding to meet goals and plan implementation schedules.

Mid-Point Evaluation

Beginning in 2024, this plan will be in effect for 10 years. Over the course of the plan's life cycle, progress toward reaching goals and completing the implementation schedule may vary. New issues may emerge as the plan progresses, and/or new monitoring data, models, or research may become available. Therefore, in 2029-2030, a mid-point 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. At the 10-year mark, and every 5 years after, the plan will be fully re-evaluated.

Reporting

LGUs have several annual reporting requirements. Some of these reporting requirements will remain a responsibility of the LGUs. Reporting related to grants and programs developed collaboratively and administered under this plan will be reported by the plan's fiscal agent (Table 9.1). In addition to annual reporting, the MRBW Partnership will also develop a biennial *Watershed Report* to present to the Policy Committee. This report will document progress toward reaching goals and completing the targeted implementation schedule and will describe any new emerging issues of priorities. The information needed to biennially update the *Watershed Report* will be developed through the annual evaluation process.

The fiscal agent is responsible for submitting all required reports and completing annual reporting requirements for MRBW Partnership as required by state law and policy. The Steering Committee will assist in developing the required reports and roles and responsibilities will be defined in the MOA Bylaws.

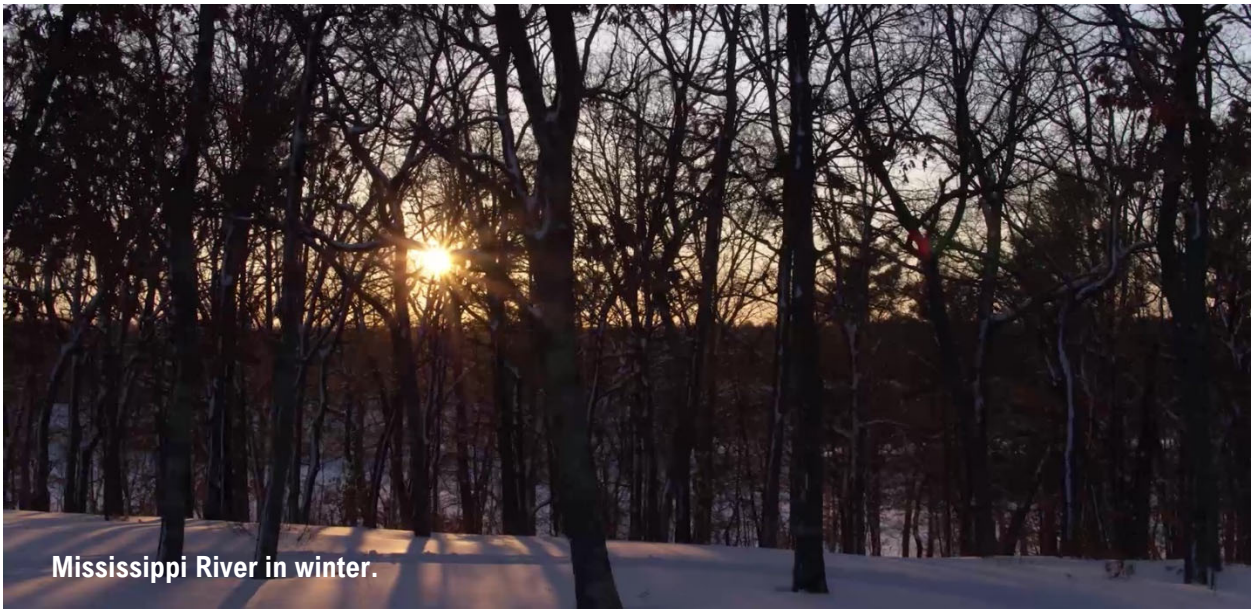
Plan Amendments

The MRBCWMP is effective through 2033 per the BWSR Order approving it. Activities described in this plan are voluntary, not prescriptive, and are meant to allow flexibility in implementation. An amendment will not be required for addition, substitution, or deletion of any of the actions, initiatives, and projects if those changes will still produce outcomes that are consistent with achieving the plan goals. This provision for flexibility includes changes to the activities except for those of capital improvement projects.

During the time this plan is in effect, it is likely that new data giving a better understanding of watershed issues and solutions will be generated, especially with MPCA's Cycle 2 starting in summer of 2027. Administrative authorities, state policies, and resource concerns may also change. New information; significant changes to the projects, programs, or funding in the plan; or the potential impact of emerging concerns and issues may require activities to be added to the plan. If revisions are required or requested, the Policy Committee will initiate a plan amendment process consistent with Minnesota Statute 103B.314, Subd. 6.

Formal Agreements

The MRBW Partnership is a coalition of Aitkin SWCD, Aitkin County, Morrison SWCD, Morrison County, Crow Wing SWCD, Crow Wing County, Todd County, and Todd SWCD (Figure 9.1). The Policy Committee previously entered into a MOA for planning the 1W1P for the MRBW (Appendix H). The entities will enter into a joint powers collaboration implemented through a memorandum of agreement for purposes of implementing this plan. The Policy Committee is advisory to the individual county and SWCD boards under the umbrella of the MOA.



Mississippi River in winter.