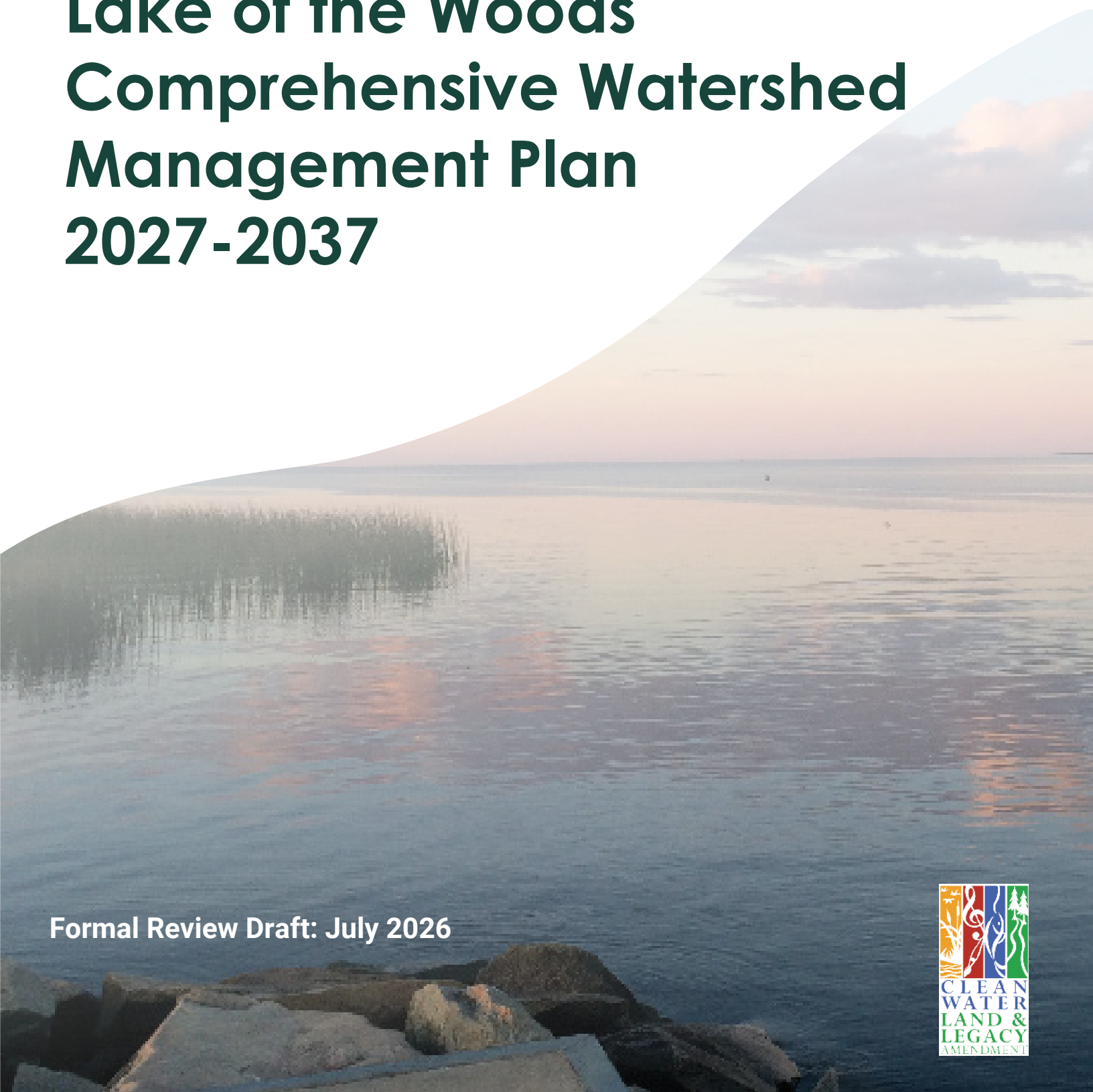
LAKE OF THE WOODS
Comprehensive Watershed Management Plan

Lake of the Woods Comprehensive Watershed Management Plan 2027-2037



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CLEAN WATER LAND & LEGACY AMENDMENT

Plan Acknowledgements

Planning Partnership

Lake of the Woods County
Lake of the Woods Soil and Water Conservation District
Roseau County
Roseau County Soil and Water Conservation District
Warroad Watershed District

Advisory Committee

City of Warroad
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Minnesota Board of Water and Soil Resources
Minnesota Department of Health
Minnesota Department of Natural Resources
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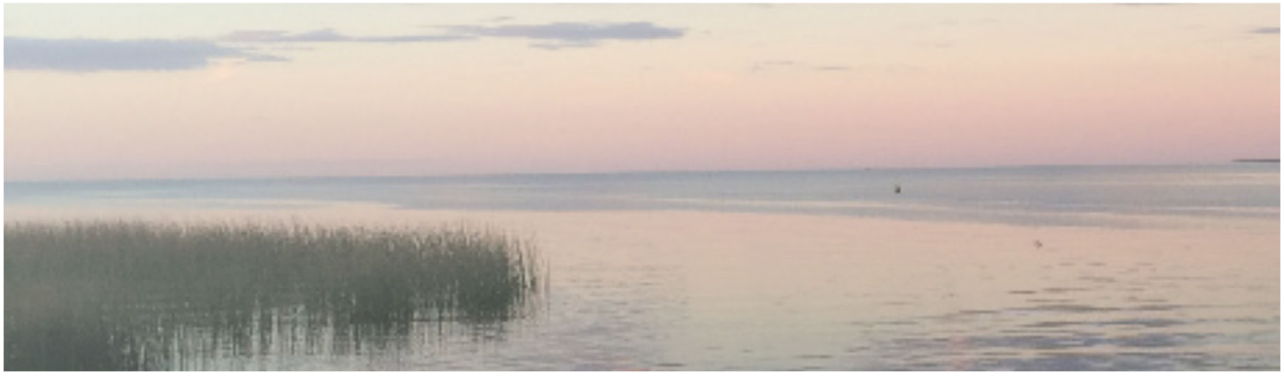

Acronyms

AIG	Accelerated Implementation Grant
AIS	Aquatic Invasive Species
BMP	Best Management Practice
BWSR	Board of Soil and Water Resources
CIP	Capital Improvement Project
CWF	Clean Water Fund
CWMP	Comprehensive Watershed Management Plan
CIG	Conservation Innovation Grant
CRP	Conservation Reserve Program
CSP	Conservation Stewardship Program
CD	County Ditch
DWSMA	Drinking Water Supply Management Area
DU	Ducks Unlimited
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency
FEMA	Federal Emergency Management Agency
GRAPS	Groundwater Restoration and Protection Strategies
IWM	Intensive Watershed Monitoring
JD	Judicial Ditch
LOW	Lake of the Woods
LOWW	Lake of the Woods Watershed
LOWWJPB	Lake of the Woods Watershed Joint Powers Board
LGU	Local Government Unit
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
DNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
NRCS	Natural Resource Conservation Science
NWA	Northwest Angle
1W1P	One Watershed, One Plan
PFAS	Per- and polyfluoroalkyl substances
PWD	Public Works Department
PWG	Planning Working Group
PTMApp	Prioritize, Target and Measure Application
ROW	Right-of-way
RAQ	Risk, Adjacency, and Quality
SNA	Scientific Natural Area

SWCD	Soil and Water Conservation District
SSTS	Subsurface Sewage Treatment System
SWAG	Surface Water Assessment Grants
SFIA	Sustainable Forest Incentive Act
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solid
USACE	United States Army Core of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
UMN	University of Minnesota
WWD	Warroad Watershed District
WRAPS	Water Restoration and Protection Strategy
WBIF	Watershed Based Implementation Funding
WD	Watershed District
WCA	Wetland Conservation Act
WSP	Woodland Stewardship Plans

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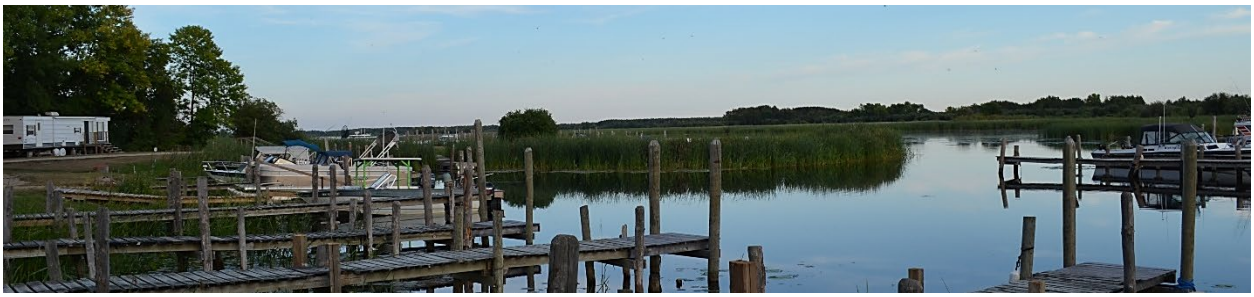
1. Executive Summary



1.0 Executive Summary

The Lake of the Woods Watershed (LOWW) Comprehensive Watershed Management Plan (CWMP) planning area is located in north-central Minnesota, encompassing portions of Roseau and Lake of the Woods (LOW) Counties (including the Northwest Angle) and all of the Warroad Watershed District (WWD). The plan area encompasses approximately 1,172 square miles and includes three municipalities (Roosevelt, Warroad, and Williams) (Figure 1.1).

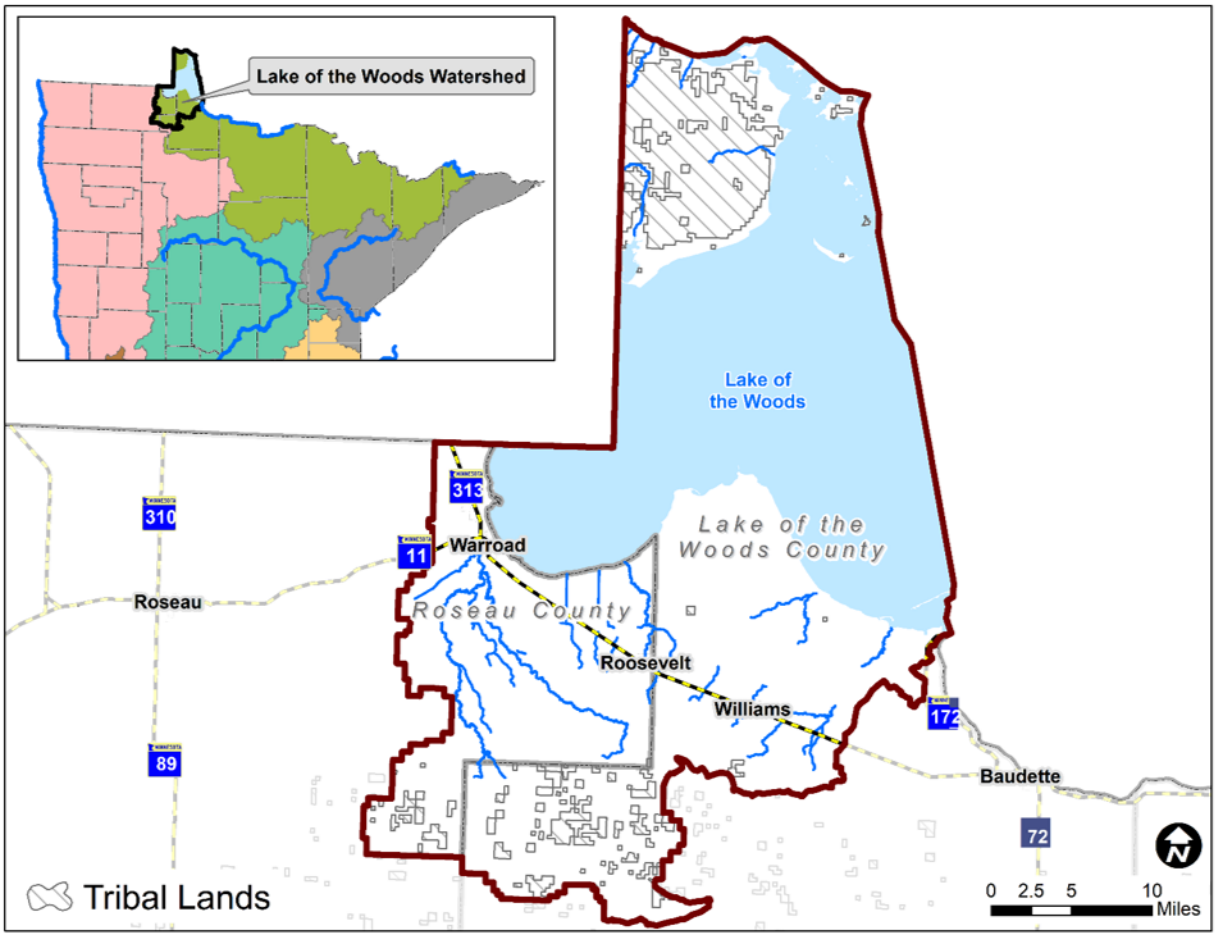


Figure 1.1. LOWW plan area.

The southern portion of the watershed is primarily wetlands with areas of forest and shrubs interspersed. The northern portion of the watershed, nearest the south shore of LOW, is comprised of agricultural areas and rangeland. There is very little urban and commercial land use in the watershed. The watershed consists of a series of smaller drainages which all drain into Lake of the Woods (LOW). The economic drivers within the area include agriculture, forestry, and Marvin Windows and Doors, but is also largely centered around recreation and tourism related to LOW, dubbed the "Walleye Capital of the World." The watershed is unique in that a large portion of the watershed (approximately 59%, excluding LOW) is either public or tribal lands.

In 2017, the members of the two counties, two Soil and Water Conservation Districts (SWCDs), and one watershed district (WD) within the LOWW joined together to create the LOWW Planning Partnership. The purpose of the LOWW Planning Partnership was to unite local entities—who would otherwise have individual local plans—under one CWMP, creating a cohesive vision for implementing actions to improve locally prioritized water-related issues and concerns. The first generation of this plan was the result of that vision, and was adopted in 2019. This is the second generation of the LOWW CWMP, as amended in 2026.

This plan reflects the resource diversity of the watershed itself and works towards improving a range of issues, most notably; restoration and protection of water quality, environmental degradation, water-related infrastructure, and education. The plan includes some goals that may be achieved with the implementation of just a few actions, while other goals will be progressive and realized through the implementation of multiple actions over time.

The objective of this plan is to serve as an everyday resource for local managers, providing them with science-based planning direction and guidance during something as focused as a grant application or as large-scale as the annual workplan development. The plan is purposefully designed by the LOWW Planning Group to easily identify how current and future funding is allocated, what actions and types of projects are a priority, what programs the actions and projects are funded through, and how their implementation achieves the plan's goals.

This plan is designed to be both aspirational and practical, setting a path forward for the partners to work together and ultimately achieve a vision for a watershed capable of supporting good water quality, abundant fish and wildlife habitat, and productivity and profitability for residents.

Loon (Credit: Lake of the Woods SWCD)

1.1 Plan Structure

This plan is structured around a set of principles adopted by the LOWW Planning Group designed to:

- Identify priority issues for the watershed and establish measurable goals that will have a positive impact on those issues;
- Establish detailed actions that are organized by implementation programs;
- Clearly define how funding will be distributed generally across the watershed; and
- Identify how to evaluate progress towards actions and measurable goals, aiding in plan progress reporting and accountability as the actions are implemented.

1.2 Priority Issues

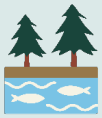
If everything is a priority, then nothing is a priority. With its diverse land use and unique resources, the partners and stakeholders in the LOWW have a wide range of issues to manage. Recognizing limitations in staffing, time, and resources, the LOWW Planning Group needed to prioritize issues as the focus of implementation efforts (and therefore funding) during the 10-year lifespan of this plan.

In the original 2019 CWMP, the LOWW Planning Group developed a comprehensive inventory of 48 issues impacting the watershed, using a combination of existing plans and reports, data, and stakeholder input. As part of this second generation, 2026 CWMP, the list of issues was refined and further narrowed issues into four themes and four issue descriptions (Table 1.1).

Arnesen's Rocky Point Resort

Sunset on Lake of the Woods

Table 1.1. Priority issues for the LOWW CWMP.

Issue Theme	Issue Description
Groundwater & Drinking Water 	Groundwater and drinking water need protection from contamination due to activities on the land and underlying geology. Of particular concern in LOWW are nitrates, arsenic, bacteria, and unused wells.
Water Quality 	Water quality in the LOWW can be impacted by stormwater and agricultural runoff, septic systems, and erosion from streambanks, lakeshores, and ditches. These sources can increase sediment, nutrient, bacteria, and contaminant loading and degrade habitat. Impaired waters in the LOWW include LOW (nutrients) and other waterbodies noted on Figure 4.4 (page 58).
Habitat Health 	Fish and wildlife thrive when habitats are protected, connected, and supported by clean water. Aquatic habitat, peatlands, and forest health in the LOWW are challenged by climate variability, fragmentation, degradation, and invasive species.
Hydrology 	Past ditching and stream straightening have altered natural hydrology in streams, floodplains, wetlands, and peatlands. With today's shifting precipitation patterns, these disrupted systems now have less natural water storage capacity, and experience increased flashiness, erosion, and greater lake level fluctuations.

1.3 Measurable Goals

Measurable goals were established to address each LOWW priority issue. Measurable goals describe the desired condition of a resource impacted by an issue over a determined timeline and are presented as either short-term or long-term goals:

- Short-term measurable goals describe the interim conditions to accomplish or make progress toward during the 10-year lifespan of this plan.
- Long-term measurable goals describe the desired future condition to accomplish, regardless of timeframe.

Short-term and long-term goals set milestones for resource improvement and allow for resource management flexibility during implementation efforts. The original 2019 plan had 21 measurable goals. The 2026 amendment condensed the number of goals to five goal categories (Table 1.2).

Table 1.2. List of plan measurable goals.

PROTECT DRINKING WATER	Measures
Implement groundwater protection practices.	**50** drinking water best management practices (BMPs).
REDUCE CONTAMINANTS	**Measures**
Protect waterbodies from contaminants such as nutrients, sediment, and bacteria.	**3,000 pounds per year** phosphorus reduction to LOW.
STABILIZE BANKS	**Measures**
Stabilize streambanks, ditch banks, and lakeshore to reduce erosion.	**Six miles** of drainage system stabilization **1,000 feet** of lakeshore and stream bank stabilization
ENHANCE HABITAT	**Measures**
Maintain and enhance terrestrial and aquatic habitat and recreational opportunities.	**1,000 acres** of forest protection **2,000 acres** of Woodland Stewardship Plans (WSPs) (including renewals)
RESTORE HYDROLOGY	**Measures**
Maintain storage, and restore connectivity and natural flow timing.	**Maintain** storage, and restore connectivity and natural flow timing.

Sunset on Bostic Bay

Swamp Milkweed in Lake of the Woods County

1.4 Targeted Implementation

This plan uses a targeted implementation strategy to identify the most cost-effective and measurable actions to make progress towards achieving measurable goals for effectively addressing priority issues.

The implementation actions in this plan are organized into schedules within each goal they most directly address. Example actions are shown in Table 1.3. Many actions have multiple benefits- for example, stream bank stabilizations are an action under the 'Stabilize Banks' goal, but doing so will also reduce phosphorus and sediment loading and improve aquatic habitat.

Table 1.3. Actions for each goal.

PROTECT DRINKING WATER  **Implement groundwater protection practices.**	**Example actions** • Seal unused wells • Source water protection • Testing clinics
REDUCE CONTAMINANTS  **Protect waterbodies from contaminants such as nutrients, sediment, and bacteria.**	**Example actions** • Agricultural BMPs • Stormwater management • Septic system upgrades • Chloride management
STABILIZE BANKS  **Stabilize streambanks, ditch banks, and lakeshore to reduce erosion.**	**Example actions** • In-channel stabilization • Lakeshore stabilization • Tile outlet stabilization • Vegetative buffers
ENHANCE HABITAT  **Maintain and enhance terrestrial and aquatic habitat and recreational opportunities.**	**Example actions** • Woodland stewardship plans • Forest management • Sustainable Forest Incentive Act (SFIA) & easements • Fish passage • County Aquatic Invasive Species (AIS) Program • Keep it Clean
RESTORE HYDROLOGY  **Maintain storage, and restore connectivity and natural flow timing.**	• **Example actions** • Peatland restoration • Wetland restoration • Floodplain restoration • Drainage water management • Stormwater management (volume)

1.4.1 Plan Programs

Each action will be implemented through one of four implementation programs: Planned Landscape Management ("Manage It"), Data Collection and Outreach ("Know It"), Constructed Environmental Enhancements ("Fix It"), and Protected Lands Maintenance ("Keep It") (Table 1.4).

Table 1.4. Plan Programs

Icon	Program
	"Manage It" Planned Landscape Management County and city ordinances, soil health practices, forest management
	"Know It" Data Collection and Outreach Actions that support direct implementation, gathering knowledge, education to LOWW residents
	"Fix It" Constructed Environmental Enhancements Engineered projects, i.e. Subsurface Sewage Treatment System (SSTS) upgrades, well sealing, stormwater projects
	"Keep It" Protected Lands Maintenance Land protection and restoration actions

1.4.2 Funding

The ability to achieve measurable goals is largely dependent on the amount of funding available to implement actions. However, the amount of funding (combined local, state, and federal) for implementing this plan is uncertain. To address this challenge, the plan considers more than one implementation funding source. The LOWW Planning Group felt this was a realistic and defensible approach. It allowed them to build out scenarios for a plan cost that communicates to decision makers (in the planning area and at the state level) realistic expectations for achieving results.

Willow Creek

- **Baseline Funding** - The baseline funding level has been designed to fund plan implementation costs at or near the estimated 2017 local funding level, recognizing that annual funding may fluctuate greatly between years.

- **Watershed Based Implementation Funding (WBIF)** – WBIF is allocated to watersheds from the Board of Water and Soil Resources biennially for CWMP implementation
- **Other Funding** – Many actions cost beyond what is estimated to be available through baseline funds or WBIF. If the cost of an action surpasses these, or if there are too many actions to cover with baseline + WBIF, actions are fully or partially marked as needed outside funding. This could be grants from federal agencies or non-profits.

The anticipated cost for implementing this plan is shown in Table 1.5. Watershed-based Implementation Funding (WBIF) is allocated biennially from the Clean Water Fund of the Clean Water Land and Legacy Amendment.

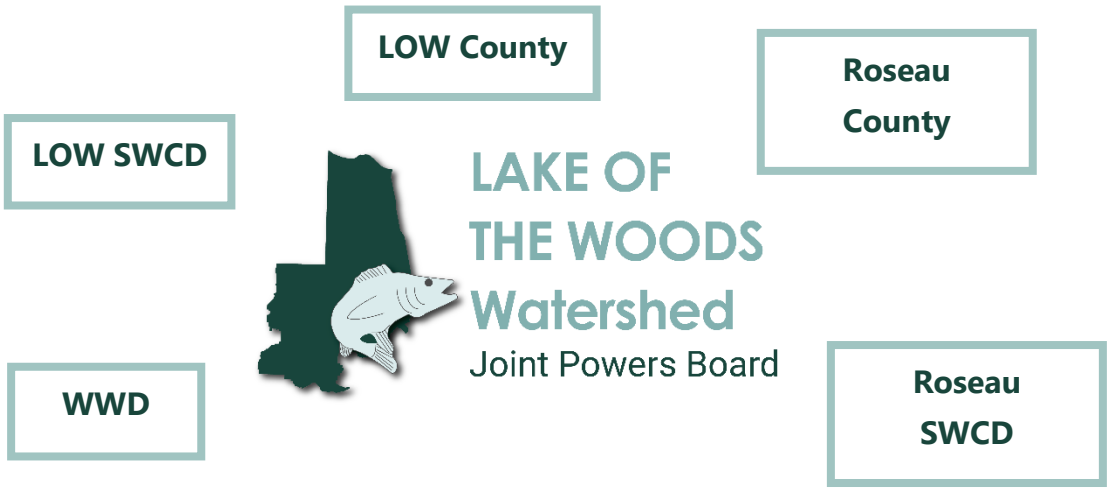
CLEAN WATER LAND & LEGACY AMENDMENT

Table 1.5. Funding levels for the LOWCWMP.

Funding Level	Annual	10 Year Total
Baseline	$712,000	$7,120,000
WBIF	$274,500 *(2025-2026 allocation)*	$2,745,970
Other	$1,047,600	$10,476,000

1.5 Plan and Administration and Coordination

Upon the completion of the original plan in 2019, the LOWW Planning Group formed the LOW Watershed Joint Powers Board (LOWWJPB), made up of LOW County, LOW SWCD, Roseau County, Roseau SWCD, and the WWD (https://www.lowwjpb.org). The formation of the LOWWJPB signified an important step in local efforts to manage, restore, and protect water and natural resources within the Minnesota portion of the LOWW. This entity will continue to guide implementation of the 2026 plan amendment.



Implementation of this plan will be guided by a collaborative governance structure consisting of several committees that carry out decision-making, coordination, and day-to-day implementation responsibilities. The roles of these committees may evolve over time to meet implementation needs, but collectively they ensure accountability, coordination, and progress toward achieving plan goals.

1.5.1 Joint Powers Board

The Joint Powers Board serves as the primary decision-making body for the plan. It provides oversight of implementation by approving annual work plans, budgets, and reports. The Board is responsible for confirming priority issues, approving plan amendments, reviewing funding allocations, and ensuring that implementation aligns with statutory responsibilities and local objectives.

1.5.2 Advisory Committee

The Advisory Committee provides technical input and recommendations to support implementation. This group assists with development of the annual work plan, identifies and advises on funding opportunities, and recommends program adjustments. The Advisory Committee also supports coordination among partners and helps carry out elements of the implementation schedule.

1.5.3 Implementation Committee

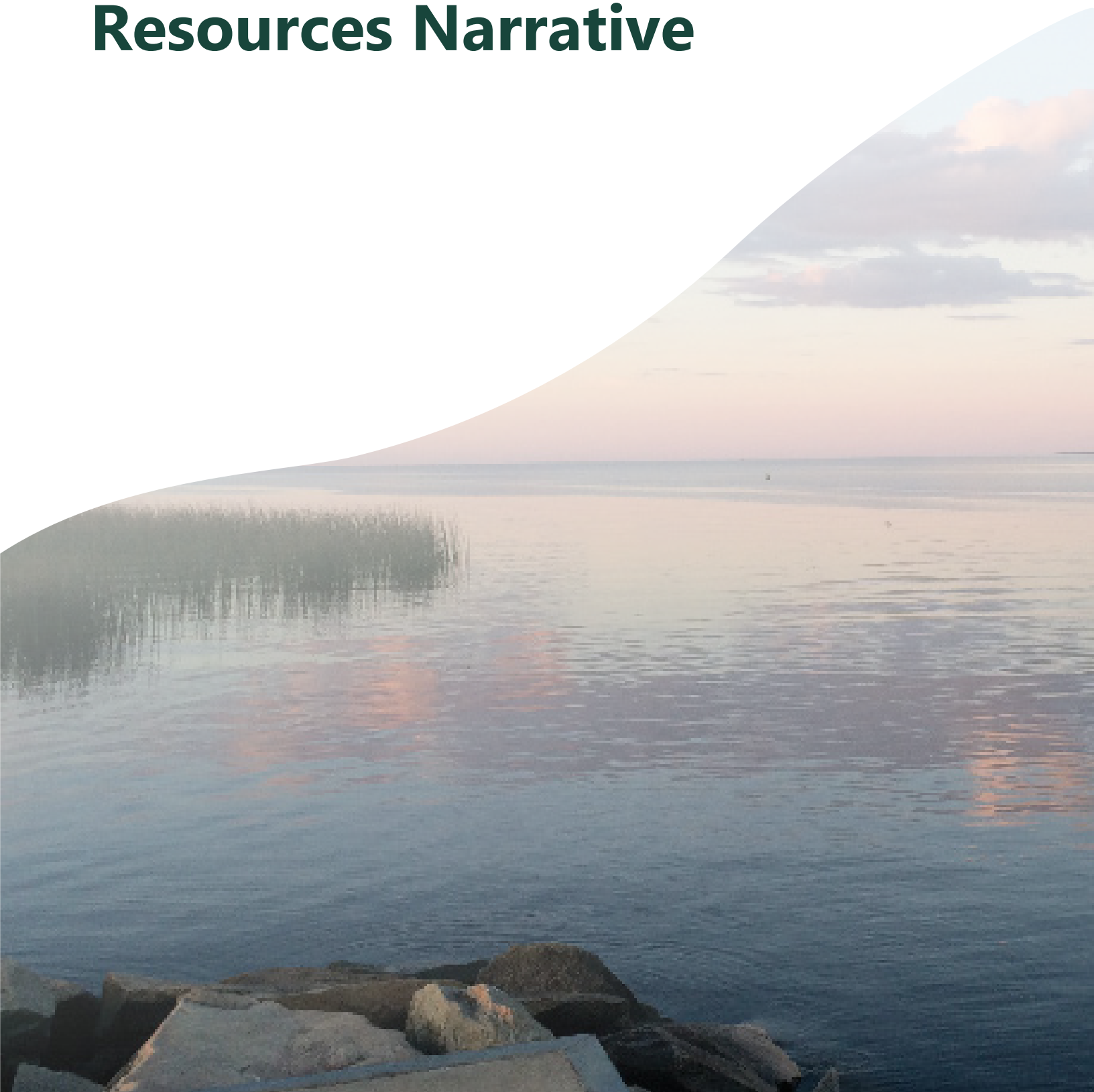
The Implementation Committee is responsible for coordinating and executing plan activities. This includes preparing and implementing the annual work plan, tracking funding and progress, reviewing reports, and evaluating emerging issues. The committee plays a central role in translating plan goals to on-the-ground actions and recommending adjustments as needed.

1.5.4 Local Fiscal/Administrative Agent

The Local Fiscal/Administrative Agent provides administrative and logistical support for implementation. Responsibilities include convening committee meetings, preparing annual work plans, submitting grant applications, funding requests, and compiling annual results for reporting and evaluation. This role ensures efficient coordination and management of plan resources and requirements.

Credit: Lake of the Woods SWCD

2. Land and Water Resources Narrative



2.0 Land and Water Resources Narrative

The LOWW is home to natural features found in few places on Earth—its namesake lake, expansive peatlands, a shared international boundary, and fisheries renowned across the globe. This watershed has unique natural resource opportunities to offer while posing some challenges for management because of its topography and history. Not only is Lake of the Woods Watershed the receiving body for this HUC 8 watershed, it is also the receiving waterbody for the entire Rainy River - Lake of the Woods Watershed which drains into Lake of the Woods. This entire drainage area including Lake of the Woods is 26,857 square miles (Figure 2.1).

Located in northern Minnesota, the LOWW planning area is about 1,172 square miles (750,111 acres) and incorporates the entire WWD and portions of Lake of the Woods and Roseau Counties. There are three municipalities in the watershed, Williams, Roosevelt, and Warroad. The major water features include Lake of the Woods, 57 stream segments, and more than 340,000 acres of wetlands and peatlands (USGS NLCD, 2024).

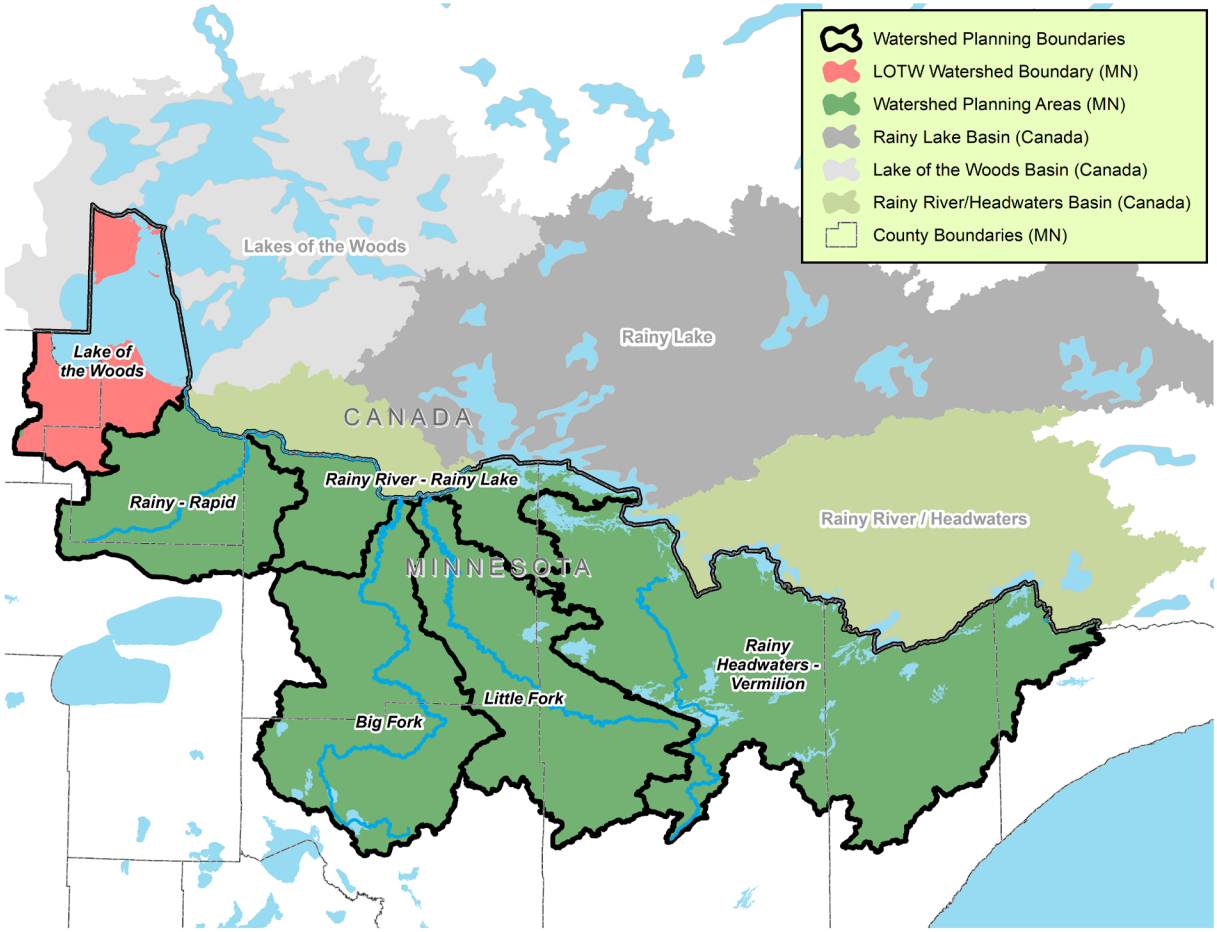


Figure 2.1. LOWW boundary and location.

2.1 Topography, Soils, and Geology

The LOWW was shaped extensively by repeated glaciations, and most notably the presence of Glacial Lake Agassiz, which occupied northwestern Minnesota about 11,000 years before present (Figure 2.2). LOW is a remnant lake from Glacial Lake Agassiz. Glacial lake sediment formed the base of landscapes in the region – much of these sediments then developed peat after the retreat of the glaciers (Figure 2.3). Other than peat, sand and gravel beach ridges from Lake Agassiz are common, as is glacial till from the western-sourced Des Moines Lobe glacier that has been re-worked by Lake Agassiz, either through the coating and lamination of multiple layers of lake sediment, or re-working via wave action. Thus, topography is very flat in the region, and soils are mostly organic, followed by clay lacustrine deposits and sandy beach-ridge deposits. Most of the watershed is covered by a thin layer of glacial sediment, and in many places the bedrock is exposed at the surface. The glacial sediment is thickest in the southern part of the watershed and becomes much thinner closer to the lake. The bedrock in this area formed during the Precambrian era and includes granite, gneiss, volcanic rock, and sedimentary rock.

Figure 2.2. Glacial Lake Agassiz and remnant lakes (Credit: DNR).

East Branch of the Warroad River (Credit: MPCA)

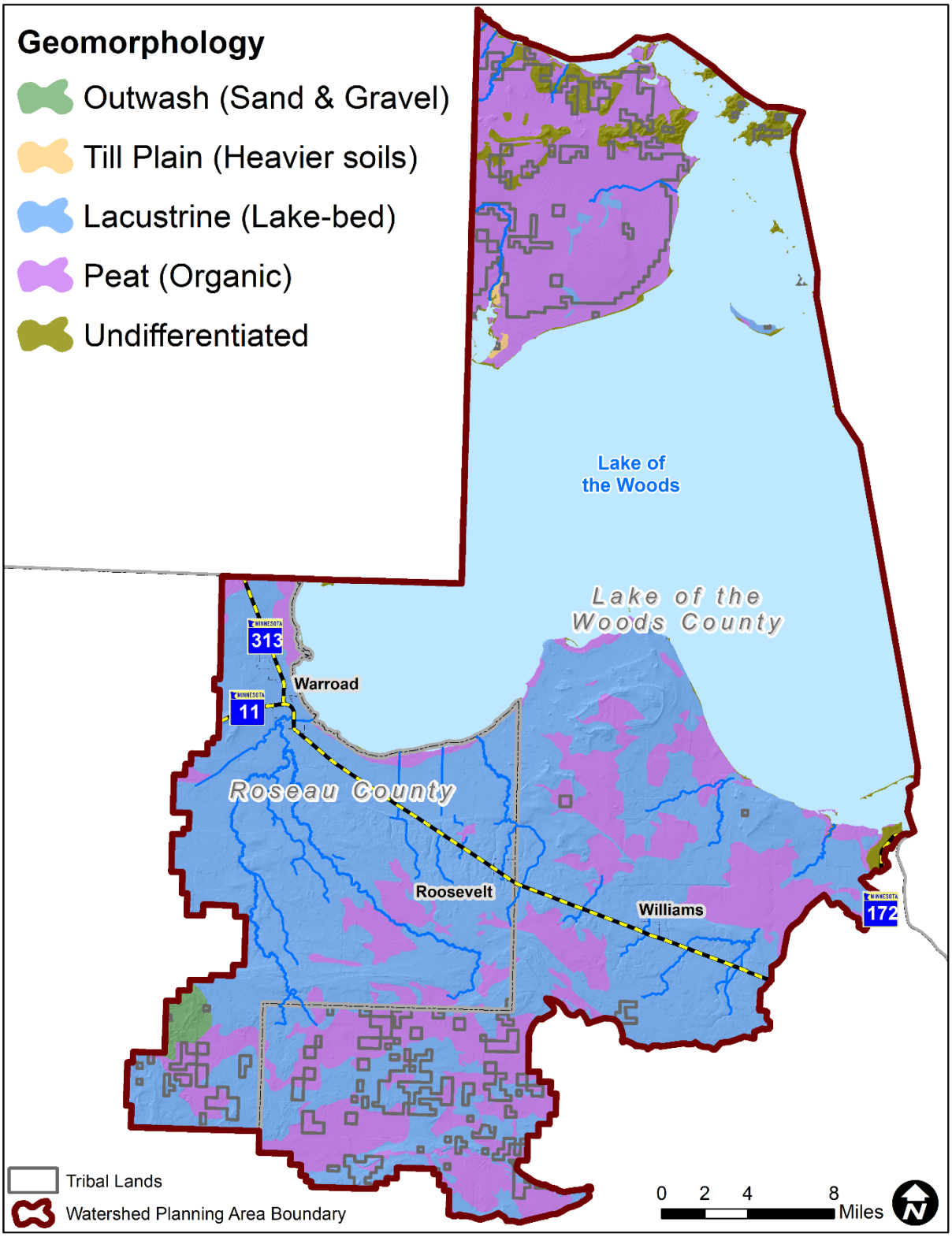


Figure 2.3 Geomorphology of the LOWW.

2.2 Human History

The first people entered the region about 10,000 years ago after the glaciers receded. Several cultures existed in the region from the time of the glacial retreat. In the late 17th century, the area was home to Cree, Assiniboine, and Dakota peoples. Wild rice, waterfowl, fish (including lake sturgeon), and wildlife formed a substantial portion of the diet of local Indigenous peoples. The Ojibwe people migrated west into northern Minnesota throughout the 17th and 18th century and were the primary inhabitants of the LOWW before widespread colonization by Euro-American settlers. The first people of European descent in the area were primarily fur trappers and traders pursuing beaver to sell in the European market. When settlers arrived in the 19th and early 20th centuries, they cleared forests and dug large drainage ditches in an attempt to turn wetlands into farmland (Lake of the Woods County Historical Society, 1997).

One of the largest human influences in the watershed was the installation of the Norman Dam at the Canadian outlet of LOW in the 1890's. The dam raised the lake level by over 3.5 feet and has had a significant impact on the resources in the watershed as the lake is operated as a reservoir.

2.3 Precipitation

Minnesota sits between the wetter climate of the eastern United States and the drier climate to the west, giving the state warm summers and very cold winters. The average yearly temperature has risen in recent decades and is now approximately 38-42°F. In the LOWW, summer temperatures typically reach mid 70°F, while winter temperatures often fall below 0°F. Precipitation remains a key component of the watershed's water supply. The average precipitation total for the watershed is 23.5 inches annually. In the last decade, the watershed has experienced a significant precipitation deficit in 2017, 2018, 2020, and 2023, with annual precipitation totals at or below 20 inches. The LOWW is part of the North Central precipitation region, where rainfall has fluctuated somewhat over the past 20 years but still has shown a strong long-term increase over the past century (DNR Climate Trends, 2026).

Cover Crops in the LOWW

2.4 Land Cover

The LOWW is largely defined by its extensive wetlands and peatlands that show up as Woody Wetlands and Emergent Wetlands in Figure 2.4 (page 15), covering 77% of the terrestrial watershed area.

Changes in land use from pre-settlement to today are largely the result of deforestation and draining wetlands for agricultural production. Current land use percentages are shown in Figure 2.4 and in Table 2.1 (page 16). This region is sparsely populated with 13,762 acres of developed land. Though the largest land use classification is wetlands, the second largest is rangeland and croplands. Most of the range and croplands are close to the southern edge of the lake; both the southern part of the watershed and the Northwest Angle are predominantly wetlands. (MPCA, 2016).

Agricultural land is located primarily in a west to east band just south of LOW. Figure 2.4 shows the extent and type of agricultural production in the LOWW. Despite extensive ditching, the majority of the land in the LOWW remains unsuitable for agriculture due to extensive wetland cover, hydric soils, and poor drainage. In the early to mid-20th century, hay, flaxseed and oats were the primary crops produced in the LOWW. The mid-1970s saw a shift to wheat and hay/alfalfa. Though crop production in the watershed had peaked in the 1980s and has since steadily declined, soybean production has increased (MPCA, 2016). Top crop acres include soybeans, wheat, hay, grass seed, canola, and barley (USDA NASS, 2022). In addition to crop cultivation, there are approximately 40 active feedlots in the watershed. According to the 2022 Census of Agriculture County Profiles, there are approximately 242 farms in the watershed.

Lake of the Woods

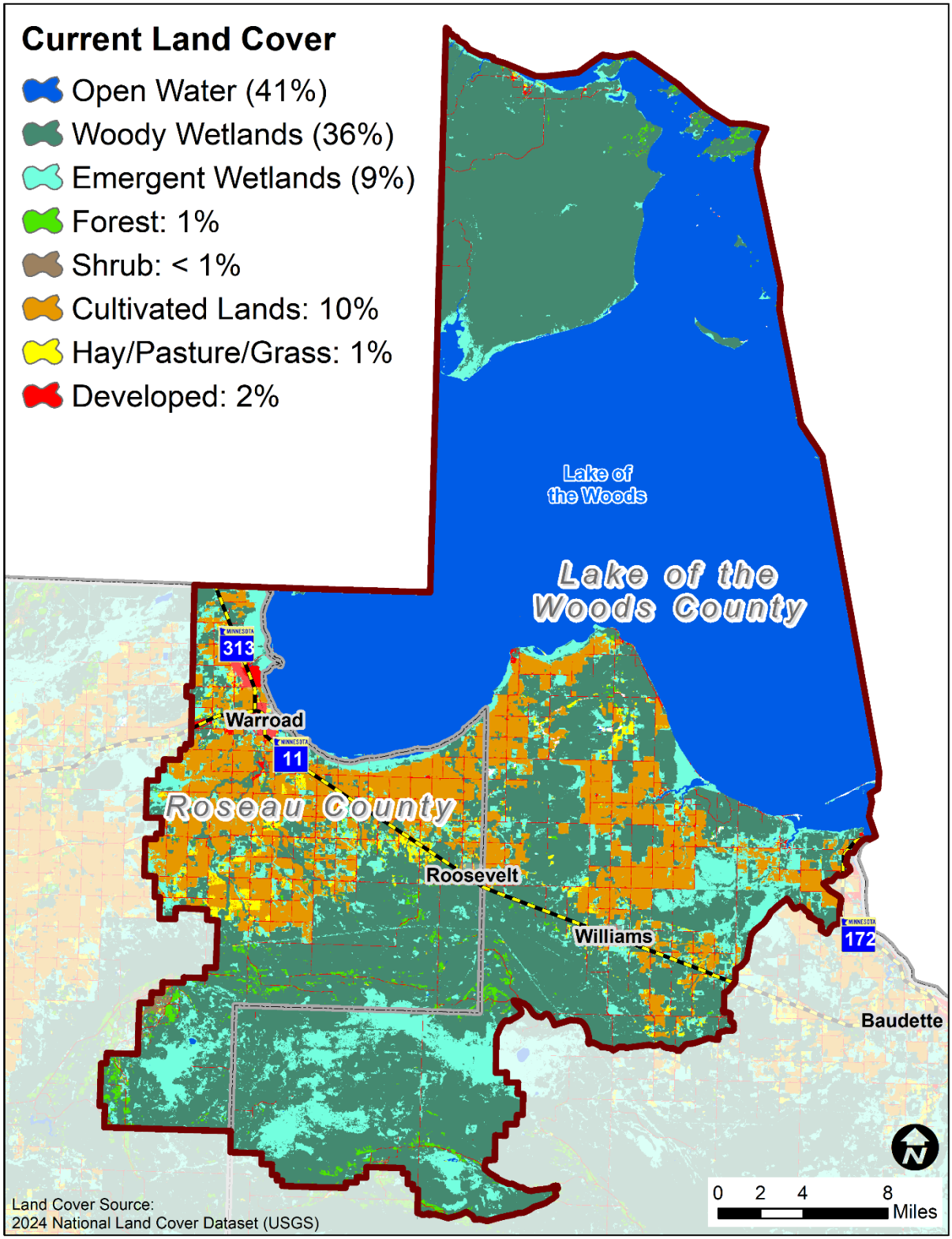


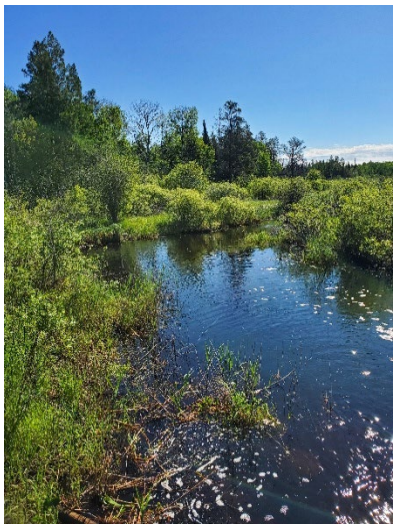
Figure 2.4. Current Land Cover for the LOWW.

Table 2.1. Alternative Land Use Percentages for LOWW.

Land Use	Percentage including LOW	Percentage excluding LOW	Acres excluding Lake of the Woods
Open Water	40.9%	0.2%	807
Woody Wetlands	36.0%	60.7%	270,024
Emergent Wetlands	9.5%	16.1%	71,404
Forest	0.9%	1.5%	6,497
Shrub	0.1%	0.2%	1,043
Cultivated Lands	9.8%	16.5%	73,541
Hay/Pasture/Grass	0.8%	1.4%	6,806
Developed	1.8%	3.1%	13,7612
Barren	0.1%	0.1%	632
Total	**100%**	**100%**	**444,516**

Note: Lake of the Woods Acreage 305,722

Source: Land Cover 2024 NLCD



East Branch Warroad River

2.5 Water Resources

LOW is the main surface water feature in the watershed, covering about 305,722 acres. Three small lakes and 540 small ponds lie within the planning area in addition to vast wetlands. The LOWW contains 172 miles of intermittent streams, 166 miles of intermittent drainage ditches, 157 miles of perennial drainage ditches, 95 miles of perennial streams, and 64 miles of rivers (MPCA, 2020). Several rivers flow directly into LOW, including the Warroad River, Willow Creek, Pine Creek, and the branches of Zippel and Bostic Creeks. Much of the flow begins in southern wetlands and moves north toward the lake. Some channels have been straightened or altered over time, and more than 40% of the watershed now contains modified watercourses. The City of Warroad has the only stormwater infrastructure in the LOWW.

Extensive peatlands stain the surface water in the region tannin-brown but the water is generally high-quality with few pollutants. The ditch network has greatly impacted the hydrology of the watershed. The fill that resulted from the ditch digging was usually deposited along the ditch bank, creating a berm, and disconnecting the diffuse water exchange. Minnesota Department of Natural Resources (DNR) studies showed that during low water levels the ditches have more impact on the surrounding hydrology as the hydraulic gradient between the ditch channels and the surrounding peatlands is increased. This increased gradient allows for an increased discharge of water from the peatlands into the ditch channel. The spoil piles, placed alongside the ditch channels, have compacted the peat soil in some places which has in turn created a low-permeable barrier and can also disrupt the natural flow of shallow groundwater and cause upswelling on the back side of those spoil piles. Fixing these legacy ditches has proved difficult

as full restoration is nearly impossible, and the introduction of clay soils as ditch plugs can bring along plants that aren't native to peatlands such as cattails (DNR, 2011).

Stream gages are limited in the watershed, which makes it difficult to track long term flow trends. In addition, backwater from LOW also makes streams difficult to gage accurately for flow. Available data show that flows can vary widely, with very low flows in late summer and high flows during spring snowmelt.

Lake of the Woods operates as a reservoir, meaning water levels are controlled. Water levels on LOW are managed by the Norman Dam in Kenora, Ontario. Flooding events have occurred with regularity in 20% of the last 30 years, exacerbating shoreline erosion.

In 2019, several stream reaches were listed as being impaired for aquatic life use due to problems such as low dissolved oxygen levels, high total suspended solid (TSS) levels, and also impaired for aquatic recreation due to high *E. coli* bacteria levels (Figure 2.5). Parts of Lake of the Woods were listed as impaired for aquatic recreation due to high nutrient levels and algal blooms. Additionally, there were several stream reaches and parts of Lake of the Woods that were listed as impaired for aquatic consumption due to mercury in fish tissue (MPCA, 2026a).

In 2025, the MPCA conducted its second cycle of watershed assessments and determined that there were 4 additional stream reaches that were impaired for aquatic recreation due to high *E. coli* levels and 1 additional stream reach that was impaired for aquatic life due to low macroinvertebrate assessment scores (Table 2.2, page 19). In 2026, the TSS-related impairments and three of the previous index of biological community-related impairments were recommended for delisting / correction (Table 2.2). In 2008, the Minnesota portion of Lake of the Woods and 4-mile Bay were listed as being impaired for aquatic recreation due to harmful algal blooms related to high nutrient levels. A contributor to the impairment is historical pollution attributed to upstream impacts on the Rainy River. These impacts include municipal and industrial waste from the cities and towns along the Rainy River. Addressing this impairment is a priority focus of the watershed plan.

Wetlands are a major part of the watershed, covering about 77% of the land area, and most are in good to excellent condition. Some wetlands were drained in the past for farming, especially south of the lake, but large wetland areas remain intact.

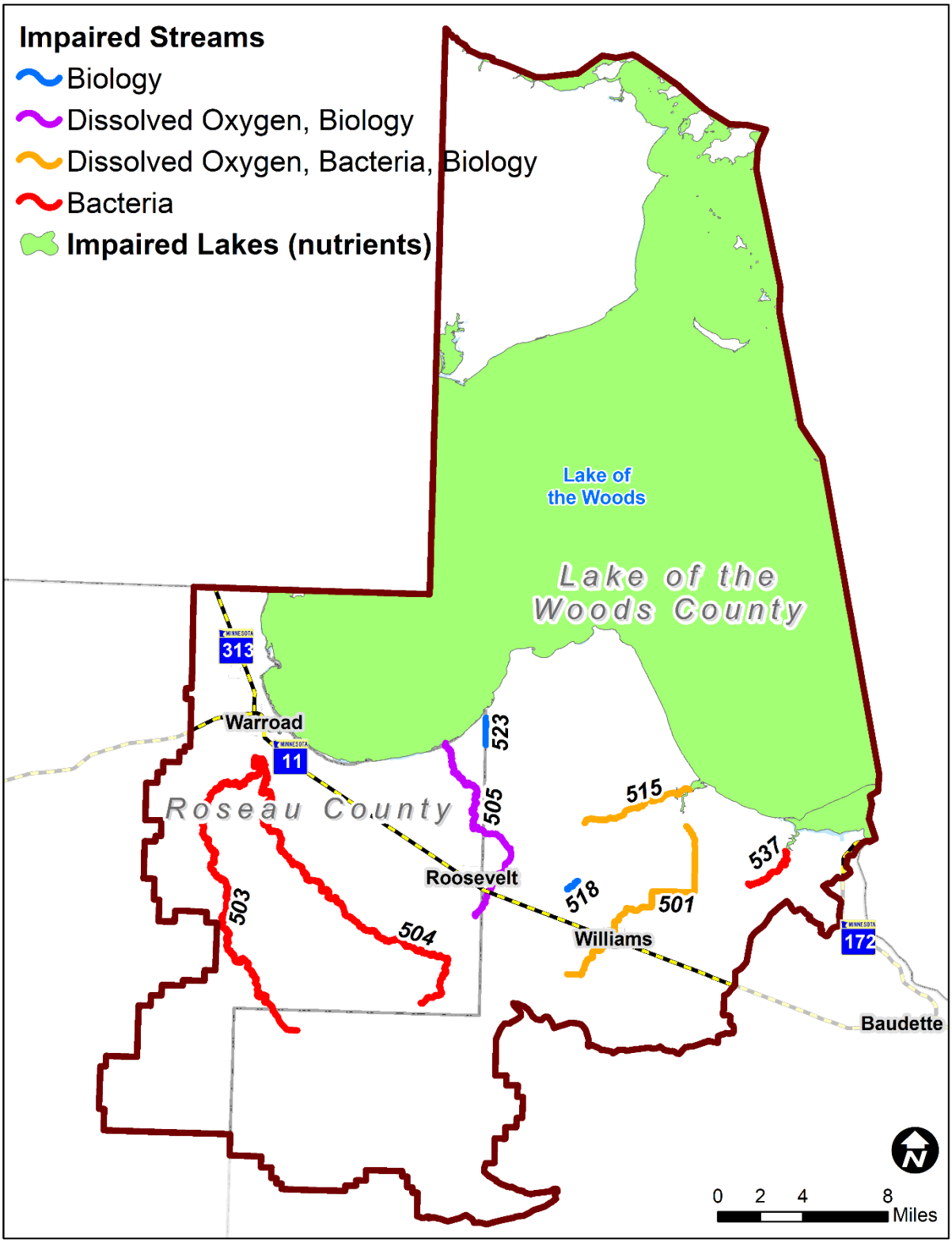


Figure 2.5. Water Quality Impairment in LOWW.

Table 2.2. LOW Cycle 2 TMDL Status (MPCA, 2026a).

WID	Waterbody Name	TSS	DO	Nutrients	*E. coli*	F-IBI	M-IBI	Hg
501	Williams Cr.	**4A**	**5**		**5**	**5**	**4A**	
502	Warroad R.							**4A**
503	Warroad R. W. Br.				**5**			**4A**
504	Warroad R. E. Br.				**5**		**5**	**4A**
505	Willow Cr.		**5**			**5**		
515	Zippel Cr. W. Br. (CD1)	**4A**	**5**		**5**	**5**	**4A**	
518	Tomato Cr.*						**5**	
523	Unnamed Ditch					**4A**	**4A**	
537	Bostic Cr.				**5**			
560	County Ditch 20						**5**	
39-0002-01	LOW (Main)			**4A**				**4A**
39-0002-01	LOW (4-mi bay)			**4A**				**4A**

Category 5 - Impaired and TMDL Study has not been approved by the U.S. Environmental Protection Agency (EPA)

Category 4A - Impaired and has an approved TMDL

Key:

New Impairment
Proposed Correction/Delist
Approved Correction/Delist

Shoreline erosion on LOW

2.6 Ground Water and Drinking Water

The LOWW has three main types of aquifers that supply groundwater: surficial sand and gravel aquifers, buried drift aquifers, and deeper Cretaceous aquifers. The shallow sand and gravel aquifers are usually around 20 feet thick and are formed from old glacial deposits (Figure 2.6). Buried drift aquifers are also made of sand and gravel but lie deeper in old bedrock valleys and usually provide only small amounts of water for homes. Cretaceous aquifers are found much deeper underground and make up a small portion of the region. Groundwater in the watershed varies in how easily it can become polluted. Areas with sandy soils are more vulnerable, while places with glacial till are less at risk. Areas of high pollution sensitivity are concentrated in the southern part of the watershed. About half of watershed residents obtain drinking water from a public supplier, and 53% rely on private wells (MDH, 2026). Many of these wells sit in areas with medium to high pollution susceptibility- about 15% of private wells are highly vulnerable to contamination (MDH, 2026). An additional risk to well water quality is flooding. See GRAPS for more information on groundwater risks in the LOWW.

Septic system on a lake lot

The watershed sits where two groundwater provinces meet: the Western Province, which has thick clayey glacial deposits, and the Arrowhead Province, where bedrock is close to the surface. Groundwater recharge—how water refills aquifers—happens mainly in higher areas with sandy soils (Figure 2.6). Recharge rates in the watershed are slightly higher than the statewide average because of the mix of surface materials. Artesian wells exist in the watershed where wells tap into confined aquifers including the Williams area. Groundwater quality varies by aquifer, with some areas showing higher levels of iron, sulfate, or arsenic. Only one long-term monitoring well exists in the watershed, so trends are not yet clear. More is known about ground water resources as the Lake of the Woods County Ground Water Atlas is nearing completion in 2026. Groundwater withdrawals have increased over the past few decades, mostly for municipal and private water supplies, and the state tracks these withdrawals to help protect long-term water availability. There are seven Drinking Water Supply Management Areas (DWSMAs) in the watershed. All the DWSMAs are located in or around the City of Warroad (Figure 2.6).

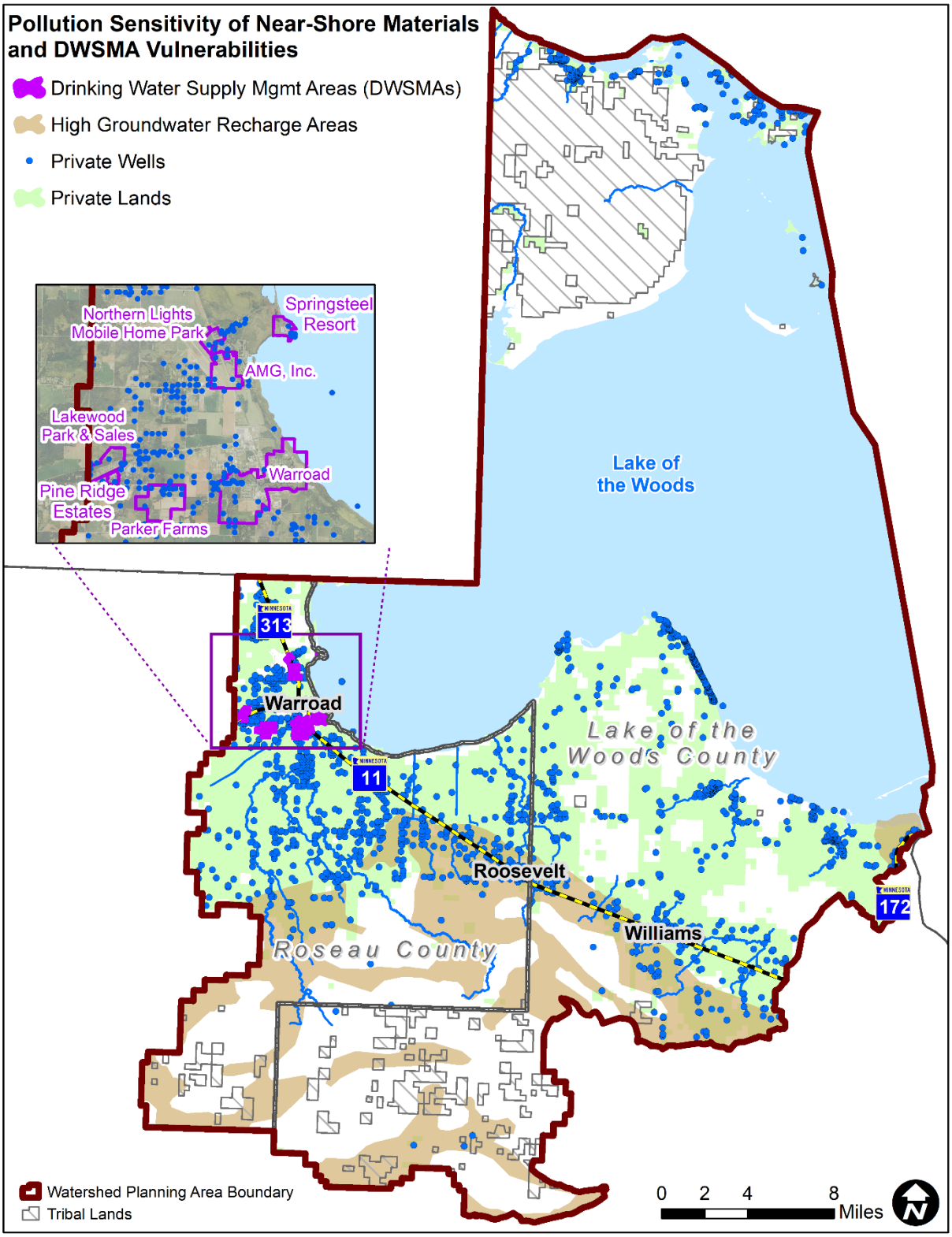


Figure 2.6. Pollution Sensitivity of Near-Shore Materials and DWSMA Vulnerabilities in LOWW.

2.7 Habitat

The LOWW supports a wide variety of fish and wildlife because of its large forests, wetlands, diverse aquatic habitat, and public lands (Figure 2.7). State forests, peatlands, wildlife management areas, and Zippel Bay State Park provide important habitat for birds, deer, waterfowl, and many other species. These areas also offer opportunities for hunting, hiking, birdwatching, and other outdoor recreation. Several streams in the watershed, including the Warroad River, Bostic Creek, Tomato Creek, and Zippel Creek, support warm- and cool-water fish and provide critical spawning and nursery habitat for multiple species that spend the majority of their lives in Lake of the Woods (Skoog, 2026).

The watershed also contains many rare and sensitive natural features. According to the DNR Rare Species Guide there are forty-four plant and animal species in the area listed as endangered, threatened, or of special concern, including the piping plover, which nests on a few remaining sandy beaches and islands including Pine and Curry Island Scientific and Natural Areas (SNA; DNR Rare Species Guide, 2026). The Minnesota County Biological Survey has identified 47 sites of high biodiversity and more than 2,700 native plant communities within the watershed. Several large peatland SNAs—such as Winter Road Lake, Norris Camp, and Luxemberg Peatland—are internationally recognized for their unique ecosystems and provide habitat for species like sandhill cranes, short-eared owls, and specialized peatland plants (Figure 2.7).

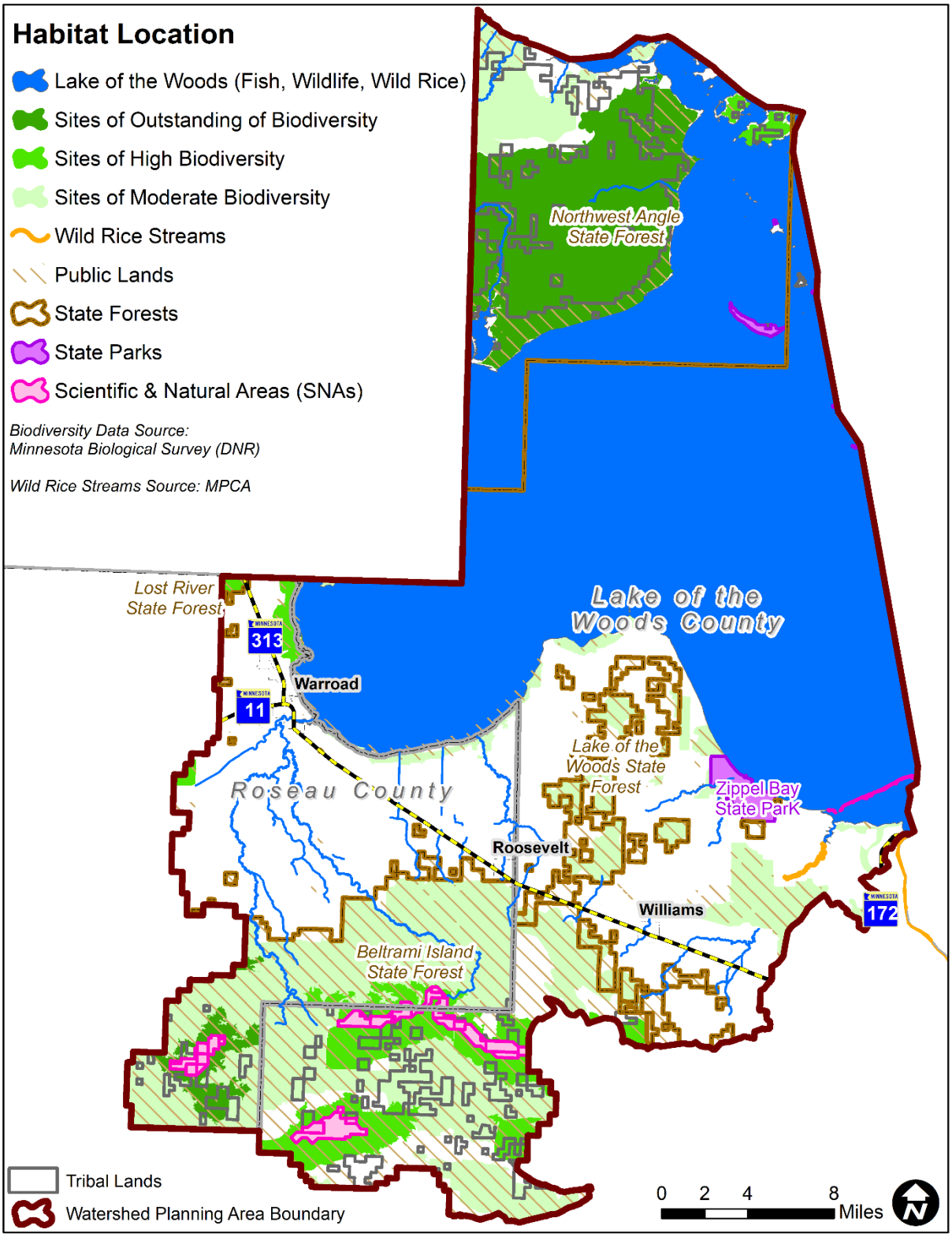


Figure 2.7. Habitat locations in LOWW.

2.8 Socio-Economic Conditions

43% *of land in the watershed is publicly owned.*

Forty-two percent of the land in the watershed is held by private landowners (185,102 acres) (USGS NLCD, 2024). The second largest ownership type is State with 163,822 acres (37%), followed by Tribal with approximately 68,532 acres (15%), and Federal with 24,111 acres (5%). County, city, township and other public lands account for the smallest ownership percentage, covering 3,549 acres (1%) (Table 2.3). There are 289,714 acres of land within Lake of the Woods County and 155,129 acres in Roseau County.

Table 2.3. Land Ownership Percentages for the LOWW (Figure 2.8).

Land Ownership	Total Acres	%
Private	185,102	41.6%
State	163,822	36.8%
Tribal	68,532	15.4%
Federal	24,111	5.4%
Other public lands (city, township, school, etc.)	3,549	0.8%
Total	**445,116**	**100.0%**

Note: Acreage totals vary between this data set and the NLCD as the NLCD is slightly off because they are 30x30 meter grid cells that are not perfectly clipped to the boundary. In addition, this land ownership acreage varies because the parcel data doesn't 100% cover all the non-lake area.

4,893 *total watershed population in 2024.*

There has been very little change in population in the LOWW, and the population in 2024 was 4,893. Populations are generally not expected to increase significantly watershed-wide because the population trends have been slightly decreasing due to deaths outpacing births and people moving out of the area (USAFacts, 2026). Approximately 88% of the population is white (non-hispanic), 1.5% are Native American, and the remaining are multiracial, Asian, and African American (DATAUSA, 2024).

$47,000 *median household income.*

The economy in the region has several industries, with manufacturing, recreation, tourism, agriculture, healthcare, education, and forestry being large industries in the area. The median household income in LOW and Roseau counties is around $47,000, which is less than the Minnesota median of $87,000 (DATAUSA, 2024). Land use is not expected to change substantially in the future due to economic pressures.

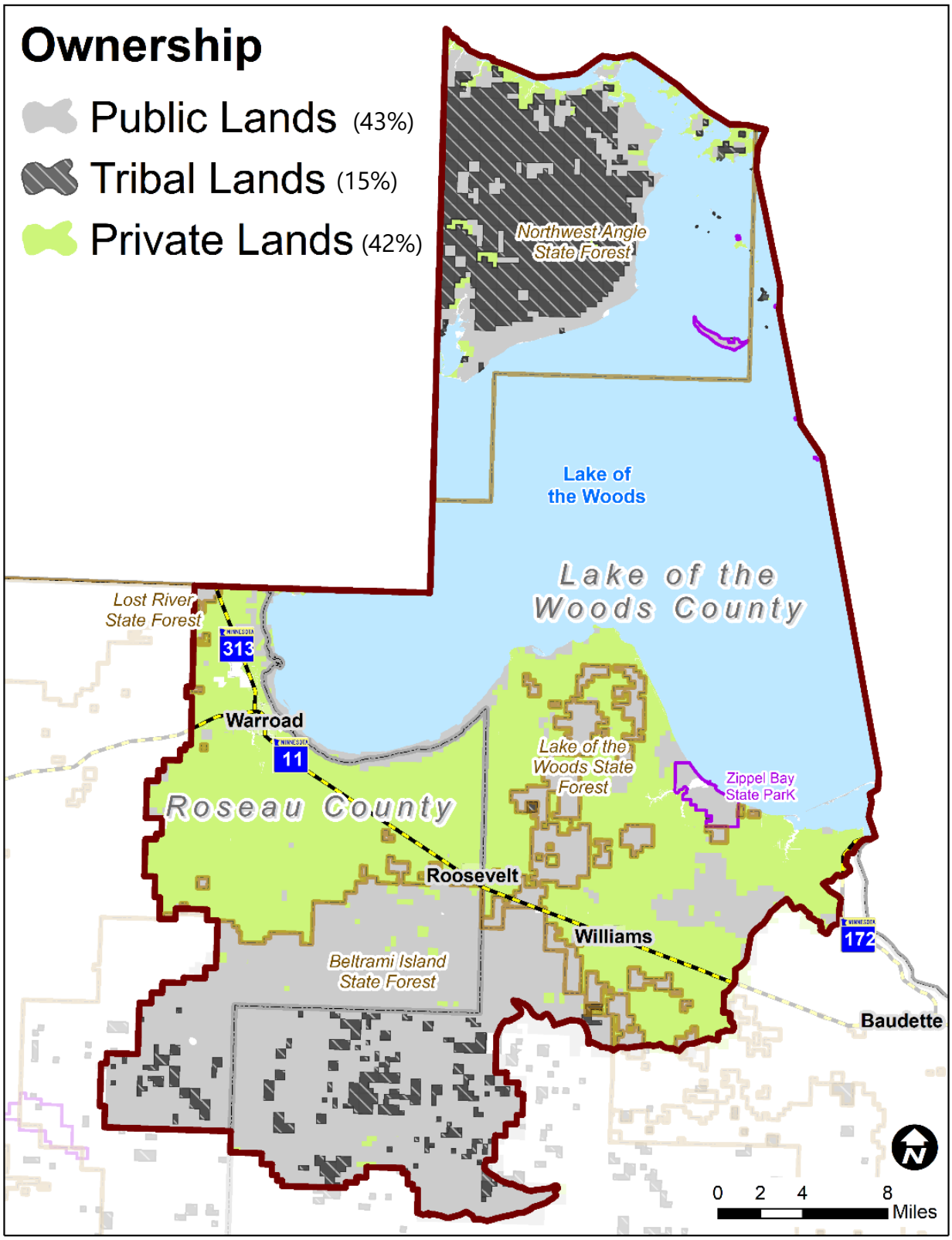


Figure 2.8. Land Ownership Map.

2.9 Conclusion

The LOWW is a unique and complex landscape shaped by its wetlands, forests, cold climate, international border, and human history. Its natural resources such as surface water, groundwater, wildlife habitat, and extensive peatlands play a major role in the region's ecology and economy. While the watershed remains largely undeveloped, it faces ongoing challenges such as water quality impairments, altered hydrology, flooding, erosion, and habitat loss. These issues affect not only the environment but also recreation, local livelihoods, and long-term community resilience. Understanding the watershed's soils, geology, climate, land use, and water systems provides a strong foundation for planning future protection and restoration efforts.

The people who live and work in the watershed also shape its future. With an aging population, modest incomes, and a strong middle-class base, communities have both strengths and limitations when it comes to supporting environmental initiatives. By combining local knowledge with scientific data from state agencies, this CWMP helps identify shared priorities and practical strategies. Continued collaboration among residents, landowners, agencies, and local governments will be essential to protect water resources, support healthy ecosystems, and maintain the watershed's natural and cultural heritage for future generations.

3. Priority Issues

3.0 Priority Issues

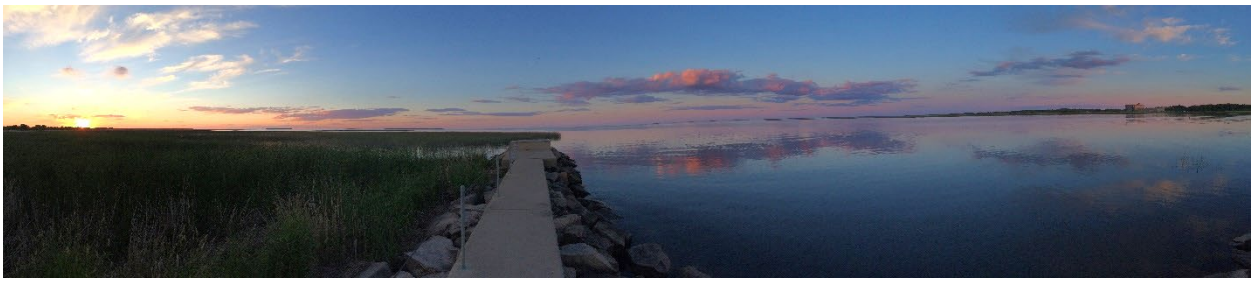
The purpose of this section is to summarize the process that the LOWW Planning Group used to reach agreement on the watershed resource issues that will be addressed within the plan's 10-year lifespan. In the original plan (approved in 2019), there were 48 prioritized issues. The original 48 prioritized issues were condensed into just four issues during the 2026 Plan Renewal Amendment process.

3.1 Identification and Prioritization of Resource Categories, Concerns, and Issues: 2019

The process for identifying and describing the resource categories, concerns, and issues for the original 2019 plan included gathering and reviewing the following:

- Existing local water management plans, studies, reports, data, and information, including the existing county water plans, the WD plan, the LOWW WRAPS and the LOWW and LOW TMDL Studies;
- Comment letters provided by state and federal agencies;
- Geographical priority locations; and
- The knowledge of local water and resource managers, including SWCD, county, and WD staff.

Using this information, the Advisory Committee connected issues, concerns, and resource categories. The original prioritization process resulted in 14 resource concerns with 48 issues.



Priority levels were used in the original 2019 plan to guide the creation of measurable goals and the timeline and aggressiveness of implementation within the targeted implementation schedule.

During the original plan development, concerns and issues were prioritized by soliciting stakeholders' preferences on what potential concerns and issues were most important to them. The process used priority concern letters provided by state and federal agencies, in-person committee meetings, a public meeting, and an online survey to solicit preferences.

The *LOWW 1W1P Prioritization of Potential Concerns and Issues Survey* targeted multiple stakeholder groups within the LOWW, including members of the Policy Committee, Advisory Committee, and Planning Work Group, local government unit (LGU) staff, elected officials, and the public. The survey was distributed through email and local advertising, including radio, newspaper, and hosting and promoting the survey link on the LOWW 1W1P project webpage.

LOW 1W1P public meeting.

Additional issue prioritization input from the public was collected during the LOWW 1W1P Public Kickoff Meeting held on June 20, 2017. The public was asked to identify which issues were most important to them and submit issue comments that were not initially identified by the PWG. The tallied public input was compiled by the PWG.

Based on these responses, issues were grouped into three priority levels. Following the establishment of priority levels, the PWG adjusted rankings based on additional Advisory and Policy Committee input, agency priority letters, and public kickoff and survey findings.

To determine the final prioritization, the PWG placed the issues, along with their initial survey-based rankings and priority levels, into a table which identifies additional information about each issue.

The Advisory Committee reviewed each initial survey-based priority issue to ensure that it fit within its designated priority level. Overall, the survey results were very consistent across all the groups that participated in the survey.

3.2.1 Priority Issues: 2026

During the first five years of plan implementation, the Implementation Committee found that even with issue prioritization, the number of issues was too high, and condensed issues would improve direct implementation efforts. In 2026, a Plan Renewal Amendment process was completed to adjust the plan based on new data and information and to streamline the issues and goals.

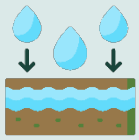
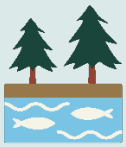
New agency comment letters were solicited (Appendix A), new data and information (WRAPS per Minnesota Pollution Control Agency [MPCA] cycle 2 monitoring) was incorporated, and a new public survey was released in the fall of 2025 to include issues important to watershed residents. A full overview of the 2025 public survey is presented in Appendix B. Key survey outcomes that informed the amended condensed issues were:

- The most important issues/project types were drinking water protection, lakeshore protection, and streambank erosion control, and
- The top issues that the public expected to see that were not addressed were lakeshore stabilization, Pine Island/Curry Island restoration, tributary erosion, and agricultural runoff.

To condense the issues, first the Implementation Committee worked on a table with the original and recommended issues to combine into new issues or move to actions. Then the revised issues table was reviewed by the Advisory Committee and further condensed. No original priority issues were completely rejected; all issues were enveloped into the amended overarching four revised issues. Resource categories are replaced with Issue Themes.

Revised priority issues are listed in Table 3.1. Measurable goals are developed for these issues and actions related to these issues are included in the targeted implementation schedule in Section 4.

Table 3.1. Priority Issues for the LOWW CWMP.

Issue Theme	Issue Description	Sources
Groundwater & Drinking Water 	Groundwater and drinking water need protection from contamination due to activities on the land and underlying geology. Of particular concern in LOWW are nitrates, arsenic, bacteria, and unused wells.	2025 Minnesota Department of Health (MDH) letter, Groundwater Restoration and Protection Strategies (GRAPS)
Water Quality 	Water quality in the LOWW can be impacted by stormwater and agricultural runoff, septic systems, and erosion from streambanks, lakeshores, and ditches. These sources can increase sediment, nutrient, bacteria, and contaminant loading and degrade habitat. Impaired waters in the LOWW include LOW (nutrients) and other waterbodies noted on Figure 4.4 (page 58).	WRAPS, TMDLs, Stress Identification, 2025 MPCA letter, 2025 Board of Soil and Water Resources (BWSR) letter
Habitat Health 	Fish and wildlife thrive when habitats are protected, connected, and supported by clean water. Aquatic habitat, peatlands, and forest health in the LOWW are challenged by climate variability, fragmentation, degradation, and invasive species.	2025 DNR letter, 2025 BWSR letter
Hydrology 	Past ditching and stream straightening have altered natural hydrology in streams, floodplains, wetlands, and peatlands. With today's shifting precipitation patterns, these disrupted systems now have less natural water storage capacity, experience increased flashiness, erosion, and greater lake level fluctuations.	WRAPS, 2025 MPCA letter, 2025 DNR letter, WWD Study, 2025 BWSR letter

3.3 Emerging and Local Issues

This section presents an assessment of potential emerging and local issues. An "emerging issue" is one that lacks detailed information within the watershed, is sometimes prominent in the media, and has the potential to affect the resources within the LOWW at some time in the future. A "local issue" is specific to LOWW such as rail maintenance and public access to Lake of the Woods. The assessment of emerging and local issues has been compiled through input from:

- The review of previous studies, reports, and scientific papers;
- The collective experience of staff and technical advisors;
- Specific requests from the members of the LOWW Planning Group; and
- A general understanding of resource management trends.

A summary of the technical resources reviewed during plan development to identify concerns and issues, including emerging issues, is shown in Appendix C.

Flooding in LOW County

The identification of emerging and local issues affects the content of this plan. Action items are included within the targeted implementation schedule in Section 4 to provide better clarity about the technical data needed to address emerging issues.

This section lays out a framework for addressing emerging issues during the lifespan of the plan.

3.3.1 Climate Variability

Climate variability is not an emerging issue, but the response to it is emerging. According to the National Climatic Data Center, Minnesota's average temperature has increased about one tenth of a degree every decade, from 1895-1970. Since 1970, the rise has been more dramatic; about half a degree every decade. Data indicates that this warming has been occurring faster in the northern part of the state. Precipitation has been increasing across the state as well, with the LOWW region seeing an increase in annual precipitation of about 0.17 inches per decade since the late 1800s (DNR, 2026). Additionally, one of the most important climate shifts in Minnesota has been the severity and frequency of storm events. The Department of Natural Resources (DNR) defines "mega-rain" events as "events in which six inches of rain covers more than 1,000 square miles and the core of the event tops eight inches." Minnesota has seen a sharp increase

in these events since 2000, with 2016 being the first year on record with two mega-rains in the state (DNR, 2017).

As climate changes, Minnesota lakes are seeing loss of ice cover occurring earlier in the spring and, in general over the past century, the average ice-out occurs earlier as well. Lake Osakis, near Alexandria, MN (for which the state has the longest ice-out record of 150 years), indicates that ice-out has been occurring about a week earlier. In turn, earlier snowmelt runoff would cause stream flows to peak sooner in the spring, leading to baseflow conditions earlier in the year.

It is important to understand these changes in regional climatic trends because they impact water resources and their management. More intense storms result in increased soil erosion and increased runoff. Also, the MPCA warns that these more frequent and intense precipitation events may increase flooding. There is increased likelihood of drought which could be a stressor to agriculture and impact stream hydrology.

River Blockage

This plan recognizes the potential implications of climate change by encouraging the use of updated design standards for water resource infrastructure, based on the National Oceanic and Atmospheric Administration Atlas 14.

3.3.2 Rail Maintenance & Potential Environmental Impacts

A significant portion of oil-related exports travel through the LOWW, adjacent to MN Highway 11, passing through each of the municipalities, and crossing all the major watershed tributaries that flow into LOW. The transport of hazardous freight, combined with the aging rail infrastructure and sensitivity of the watershed's natural resources, is a cause for concern.

Efforts have been made within the watershed and the surrounding region to learn more about the potential impacts and resulting risks associated with bitumen transport across the watershed. This has included efforts to develop and understand plausible spill scenarios, describe human and environmental toxicity associated with the scenarios, and model potential impacts to the watershed including drinking water, recreational and subsistence fishing, swimming, boating, and irrigation for food crops. Additionally, various data gaps remain, including knowledge about potential spill impacts to local resources and response times relative to these impacts.

Plan participants recognize rail traffic and maintenance and their overall potential impact to the environment as an emerging issue, which will become more understood in the future. The plan participants will continue to promote continued efforts within the broader community and with its partner organizations to expand understanding of the issue, fill data gaps, and take actions appropriate for mitigating risk.

3.3.3 Contaminants of Emerging Concern

Many contaminants of emerging concern are found in the aquatic environment

A contaminant can generally be defined as a substance in a place where it doesn't belong. According to the MDH, contaminants of emerging concern are substances that have been released to, found in, or have the potential to enter Minnesota waters (groundwater or surface water). They do not have Minnesota human health-based standard (how much of a substance is safe to drink), pose a real or perceived health threat, or have new or changing health or exposure information. MDH's Drinking Water Ambient Monitoring Program seeks to conduct ongoing monitoring for some CECs and to make recommendations based on findings.

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

A class of contaminants of particular concern is PFAS (per- and polyfluoroalkyl substances). PFAS are manufactured substances used in industrial and consumer products such as firefighting foam, nonstick cookware, packaging, cleaning products, and more. They are nicknamed 'forever chemicals' because of resistance to degradation in the environment. PFAS are found all over the world in water, soil, and food. Emerging research has highlighted the many unknowns of the impact of PFAS on human health and suggested links to cancer, developmental impacts, and reduced immune function.

Plan participants recognize the need to provide public water supplies free from contaminants of emerging concern. The plan may indirectly address some of these emerging issues by reducing

the potential for transporting these contaminants by limiting runoff volumes to surface waters and limiting infiltration in sensitive groundwater recharge areas.

3.3.4 Harmful Algal Blooms

LOW frequently experiences algal blooms, some of which produce toxins. Algae are always present in the water column, but when conditions are ideal (sunlight, minimal wind, excess phosphorus) algae blooms grow to nuisance levels and in some cases produce toxins that are dangerous to aquatic life and people. Even if a bloom is not toxic, the decomposition of algae uses oxygen dissolved in the water, reducing oxygen available for fish.

There are international efforts to monitor algae blooms, communicate to the public on their risk, and reduce the nutrient loading that contributes to them. A TMDL for excess nutrients was approved in 2021 and recommends a 17% annual phosphorus load reduction to LOW.

3.3.5 Resource Access

Maintaining safe, legal, and well-managed public access to lakes, rivers, and streams is essential to the ecological, recreational, and economic health of the LOWW. Public access allows residents and visitors to responsibly enjoy the watershed's water resources, fostering environmental stewardship, outdoor recreation, and a strong local tourism-based economy. Well-maintained access points also support monitoring, education, and rapid response to emerging issues such as aquatic invasive species.

Currently, eight legal and controlled public water accesses (PWAs) are maintained within the watershed. These accesses, along with their administering entities, include:

- Lake of the Woods – Springsteel Resort and Marina PWA
- Lake of the Woods – Warroad Point PWA (City of Warroad)
- Warroad River – Ka Ka Geesik PWA (MnDNR, Division of Parks and Trails)
- Lake of the Woods – Swift Ditch PWA (MnDNR, Division of Parks and Trails)
- Zippel Creek – West Branch PWA (Lake of the Woods County)
- Zippel Bay PWA (MnDNR, Division of Parks and Trails)
- Rainy River – Wheeler's Point PWA (MnDNR, Division of Parks and Trails)
- Pine Creek – Pine Creek Access (Lake of the Woods County)

These public accesses will continue to be maintained throughout the life of this plan, with targeted improvements implemented as needed. Enhancements may include infrastructure upgrades and additional amenities designed to reduce the risk of aquatic invasive species spread and to improve user safety and functionality. Based on input from planning partners, it is anticipated that up to two additional public access sites may be developed to better serve the watershed as needs evolve.

4. Goals and Implementation

4.0 Goals and Implementation

4.1 Summary

At the core of this CWMP are goals to address issues, and actions to achieve goals. This plan section sets goals, actions, and geographic targets within each of the four priority issue themes.

4.2 Measurable Goals

4.2.1 Goal Development

The original 2019 planning process identified 21 measurable goals. The 2026 amendment process simplified plan goals through condensing goals into one or two measurable goals per issue theme (Table 4.1, page 37)). Goals are presented to align with WRAPS efforts, set milestones for resource improvement, and allow for resource management flexibility during implementation efforts. Goals were developed through:

- Review of goals from existing management plans, studies, reports, data, and information, including WRAPS, TMDLs, local water plans, state strategies, and similar documents;
- Input from the 2019 and 2025 Public Surveys;
- Input from Advisory Committee members;
- Input from Policy Committee members; and
- The knowledge of local water and resource managers provided by the Implementation Committee.

4.2.2 Measurable Goal Format

A short- and long-term goal is established for each measurable goal. Accomplishing the short-term goal is intended through plan implementation. Measurable goals are laid out in factsheets with the following information.

- Issue theme the goal most directly impacts
- Issue description
- Short- and long-term goals, with metrics for measuring
- Description of why the goal is important
- Targeting map

Goals are summarized in Table 4.1.

GOALS

Short-Term:
A short-term goal is **measurable** (e.g. number of acres or projects) and planned to be achieved during **10-year** plan implementation

Long-Term:
A long-term narrative goal is the condition that the Implementation Committee would like to see **at some point in the future**. It is not measurable.

Cover crops, Credit: LOW SWCD

LOW County Ditch One Stabilization Project, Credit: LOW SWCD

Table 4.1. LOWW measurable goals.

PROTECT DRINKING WATER	**Measures**	**Example actions**
Implement groundwater protection practices.	**50** drinking water BMPs	• Seal unused wells • Source water protection • Testing clinics
REDUCE CONTAMINANTS	**Measures**	**Example actions**
Protect waterbodies from contaminants such as nutrients, sediment, and bacteria.	**3,000 pounds per year** phosphorus reduction to LOW	• Agricultural BMPs • Stormwater management • Septic system upgrades • Chloride management
STABILIZE BANKS	**Measures**	**Example actions**
Stabilize streambanks, ditch banks, and lakeshore to reduce erosion.	**Six miles** of drainage system stabilization **1,000 feet** of lakeshore and stream bank stabilization	• In-channel stabilization • Lakeshore stabilization • Tile outlet stabilization • Vegetative buffers
ENHANCE HABITAT	**Measures**	**Example actions**
Maintain and enhance terrestrial and aquatic habitat and recreational opportunities.	**1,000 acres** of forest protection **2,000 acres** of Woodland Stewardship Plans (including renewals)	• Woodland stewardship plans • Forest management • Sustainable Forest Incentive Act (SFIA) & easements • Fish passage • Public Access • County AIS Program • Keep it Clean
RESTORE HYDROLOGY	**Measures**	• **Example actions**
Maintain storage, and restore connectivity and natural flow timing.	**Maintain** storage, and restore connectivity and natural flow timing.	• Peatland restoration • Wetland restoration • Floodplain restoration • Drainage water management • Stormwater management (volume)

4.3 Implementation

This plan contains implementation schedules with actions organized by goals. Implementation schedules identify actions to meet the goals and address the priority issues in Section 2. There is an implementation schedule for each goal, as well as a separate Capital Improvements implementation schedule. Implementation schedules contain a large amount of information, as summarized in Table 4.2.

Table 4.2. Guide to implementation schedule information.

Implementation Table Column	Description
Action	Action description
Program	Actions are implemented through one of four implementation programs, described in more detail in Section 5
Outcome	The measurable component of the action (i.e. how many / how much)
Priority Areas	Describes where the action will be targeted to
Lead / Supporting Entities	List of which agencies and entities are responsible for action implementation. The lead entity is bolded.
Timeline	Estimated time of implementation, biennially
Output for Goal Tracking	Icon is 'on' if the action contributes directly to a measurable goal
Funding Level	Which funding source will be utilized
10-Year Cost	Estimated cost to implement action

The number of practices, costs, and locations in the implementation schedule represent a best-case scenario for planning. Due to factors such as voluntary participation, field verification, and funding, implementation schedules may not be fully implemented. In addition, projects may emerge that are of interest to implementation partners that are not identified in the implementation schedule. These projects will still be pursued if environmental and economic benefits are comparable to those identified in the implementation schedule.

4.3.1 Planning Regions

To target load reductions and implement implementation schedules within relevant areas, the LOWW Planning Partnership decided to separate the plan area into five distinct planning regions: the Bostic Creek, Muskeg Bay, Northwest Angle, Warroad River, and Zippel Creek. These planning regions were defined hydrologically by using the PTMApp delineation data and generally represent the five major drainage systems within the plan area. The five planning regions are shown in Figure 4.1.

Each planning region is a subwatershed draining a portion of the overall watershed to LOW. Goals apply watershed-wide, but the 'Reduce Contaminants' goal additionally sets planning region load reductions.

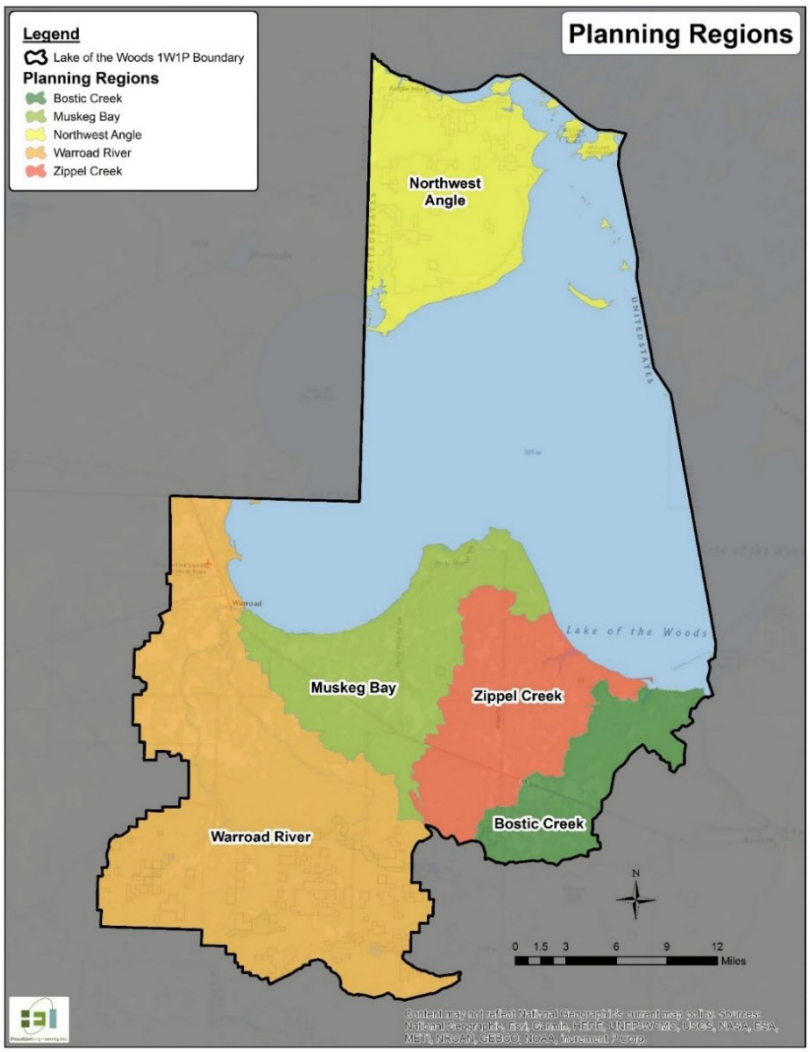


Figure 4.1. LOWW CWMP Planning Regions.

Northwest Angle: set aside from the rest of the watershed, the Northwest Angle is the northernmost point of the United States. It is largely peatlands.

Warroad Bay: As the largest planning region, Warroad Bay borders part of the western shore of LOW and extends to include the most southern part of the watershed. It includes the city of Warroad. The region is wetlands with scattered forest in the south, and largely cultivated lands in the north.

Muskeg Bay: Muskeg Bay includes a large stretch of LOW shore. It is largely cultivated land in the north and wetlands in the south.

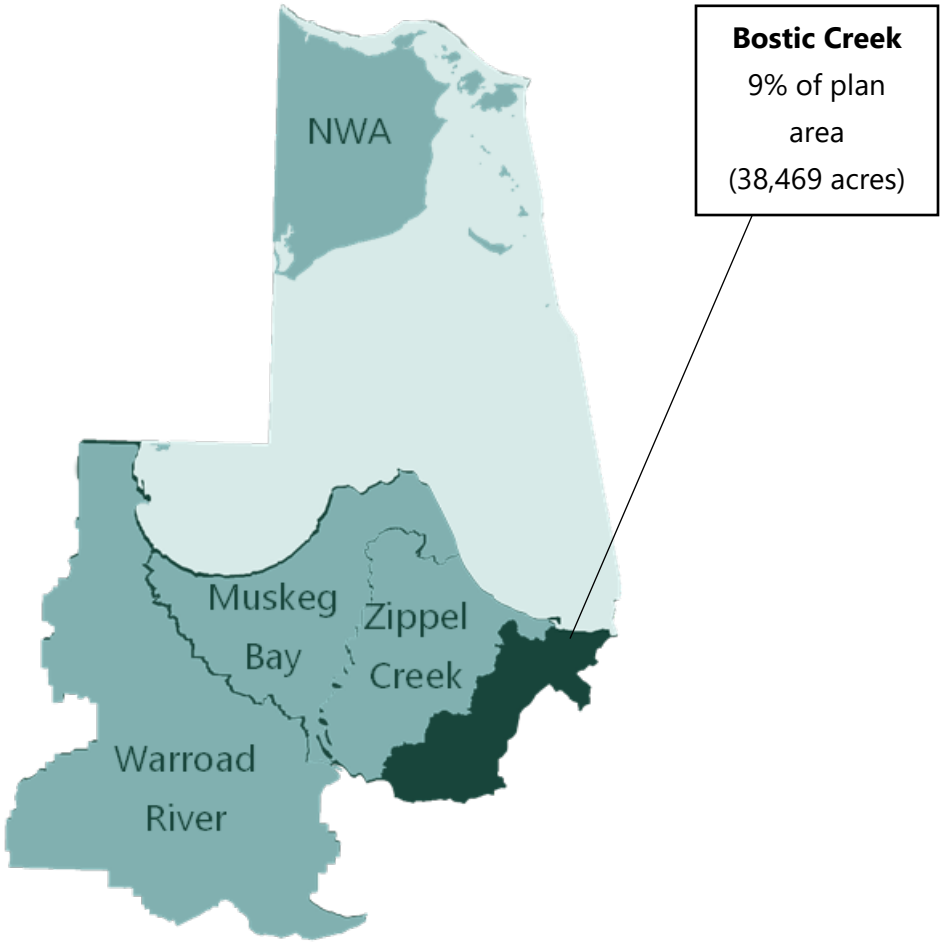
Zippel Creek: Zippel Creek contains the only state park in the watershed. It also is covered in wetlands, with cultivated land in the central area.

Bostic Creek: Bostic Creek is the smallest region and contains the smallest distance of LOW shoreline. It is covered in wetlands with scattered agricultural land.

4.3.2.1 Planning Region Profiles

The original 2019 plan had descriptions and priorities for each Planning Region included in the Implementation Section. In the 2026 Amendment, this information updated and incorporated into this section.

Bostic Creek Planning Region



Planning Region Priorities

The land cover in the Bostic Creek planning region is primarily wetland (68%) followed by moderately drained agricultural (20%). Canfield Creek flows into the Graceton Bog with no defined channel through the bog. County Road 4 and the associated ditch bisect the bog, connecting Canfield Creek to Bostic Creek. The channelized ditch has stabilization issues with an active head cut. Flows through this ditch often exceed capacity. Bostic Bay has a sedimentation

issue that impacts at least five businesses that currently undertake maintenance dredging on a regular basis. Additionally, changes in lakeshore sediment movement and flows from the Rainy River through Four Mile Bay affect navigation. Soils in the planning region are susceptible to erosion and the Lake of the Woods shoreline is vulnerable to erosion and flooding, including continued erosion of Pine Island. The planning region has many forest resources with potential for ditch abandonment. Bostic Creek is a northern pike spawning habitat and the planning region has protection and restoration opportunities for ecological connections.

Baseline funding will prioritize:

- implementation of overland structural and management practices to reduce sediment loading;
- implementation of water retention projects to promote peak flow reductions throughout the system; and
- collection of additional data related to stream flow, surface water/groundwater interaction, and erosion; and support implementation of channel stabilization within JD 28 and JD 16 and hydrology restoration feasibility study for Graceton Bog.

Additional funding opportunities will prioritize:

- implementation of additional overland structural and management practices to reduce sediment loading;
- implementation of recommendations from the Bostic & Zippel Creeks Watershed Assessment that prioritized projects and data gaps for the planning region;
- completion of a hydrologic and hydraulic study of the planning region to guide in-channel project implementation and critical project areas;
- implementation of recommendations from the Southern Shore Barrier Island Erosion Investigations addressing the loss of Pine and Curry Island;
- completion of a needs assessment and feasibility study for restoration/dredging of Bostic Bay; and
- completion of a feasibility study for the installation of community sewer systems for developed shoreland areas.

Current Conditions

While there is currently only an impairment for *E. coli* in the planning region, analysis of the water quality data indicates that all the currently assessed waterbodies within the watershed have the potential to or are likely to fail to meet state water quality standards for dissolved oxygen in the future. Additionally, Bostic Creek, near the outlet to Lake of the Woods, has the potential to fail to meet state water quality standard for total phosphorus in the future. Therefore, protection efforts related to dissolved oxygen and total phosphorus should be the focus in this planning region.

In-Channel Projects

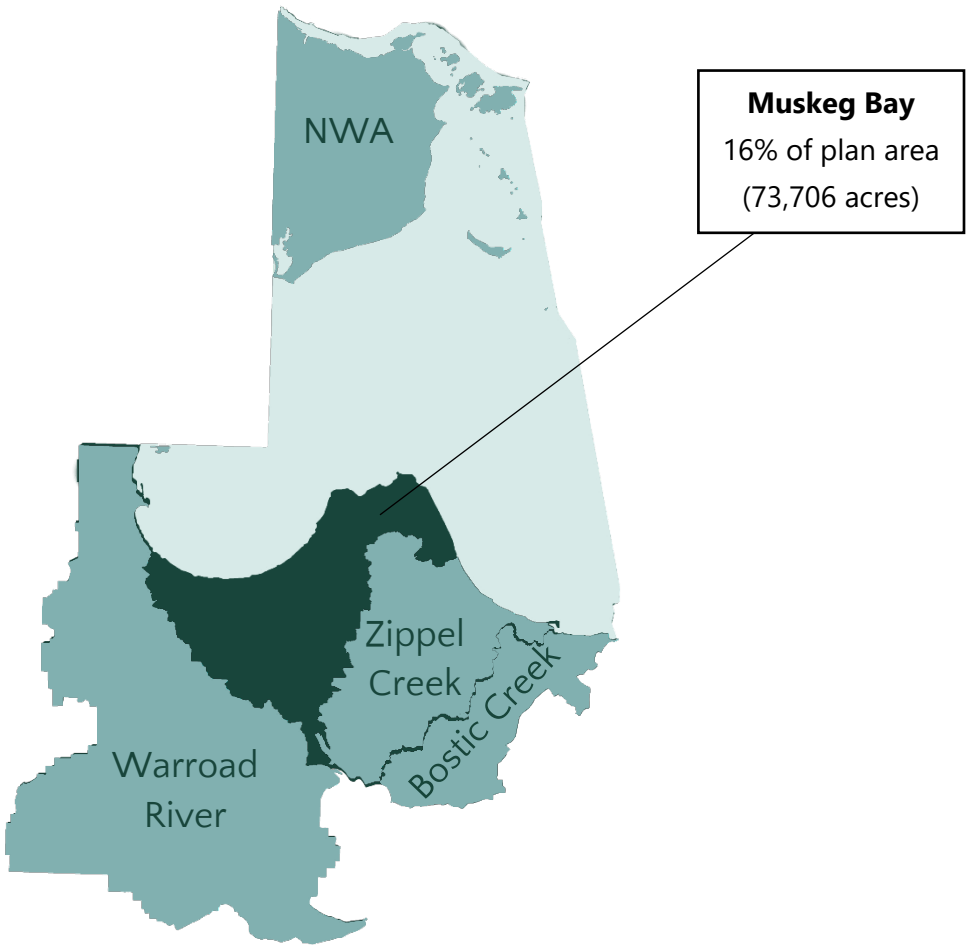
Assessments of the Bostic Creek and Zippel Creek Planning Regions were performed by the USDA NRCS and a resulting project report was published in 2013. The purpose of the project was to evaluate the sources and transport of sediment through the hydrologic system from the watershed headwaters downstream to Zippel and Bostic Bays. This report guides implementation of in-channel projects within the planning regions.

The planning partners anticipate that during the lifespan of this plan, in-channel projects within the Bostic Creek Planning Region will primarily support current ongoing efforts to control the grade and stabilize portions of the reaches using rock riffles or similar projects and to restore pre-channelized hydrology/hydraulics to the reaches.

Pine Island and Curry Island

A Southern Shore Barrier Island Erosion Investigation Study was completed in 2024. A second phase is underway in 2026. The purpose for these studies is to examine the sediment circulation of the lake, watershed changes, shoreline armoring, jetties and water level regulation. The second phase focuses on completing additional data collection and modeling, strengthening coordination with local and indigenous partners and evaluating both the "do-nothing" scenario and a range of realistic mitigation and restoration options. These options include addressing disruptions to sediment supply, beach nourishment, constructing barrier-island cores, and exploring regulatory approaches related to shoreline development and water-level management. Implementation of recommendations from this study will be a priority for this watershed.

Muskeg Bay Planning Region



Planning Region Priorities

The Muskeg Bay planning region has more than fifteen direct drainages to Lake of the Woods and has extensive altered hydrology (ditches and drain tile) throughout. Because the altered hydrology is dispersed amongst multiple outlets to Lake of the Woods, impacts to any single watercourse are lessened. Many of the outlets to the lake are channelized ditches. This planning region has the most private developed lake shoreline in the plan area, primarily east of Rocky Point. Shoreline erosion is largely due to wave action from winds across the long fetch of the bay. Pike and walleye use the shoreline areas for habitat. Northern Pike runs have been observed in County Ditch 20. The planning region has shallow bedrock outcrops with active rock

quarries and artesian wells. With limited space for septic upgrades, shoreland development areas need targeted wastewater treatment facilities.

Baseline funding will prioritize:

- implementation of overland structural and management practices, ditch stabilization, or in-channel structural practices to reduce sediment and nutrient loading; and
- implementation of lakeshore protection projects.

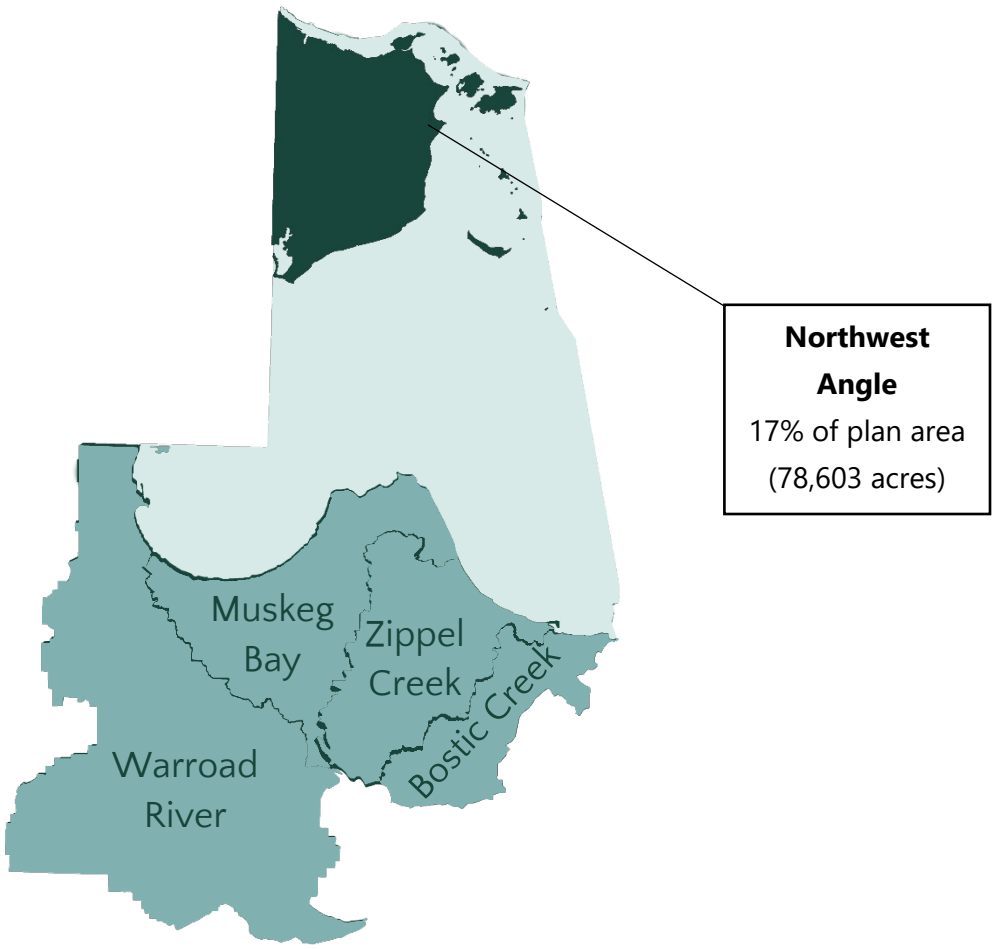
Additional funding opportunities will prioritize:

- implementation of additional overland structural and management practices and ditch / in-channel structural practices to reduce sediment and nutrient loading; and
- completion of a feasibility study for the installation of community sewer systems for developed shoreland areas.

Current Conditions

Impaired waters within the planning region include Judicial Ditch 22 and Willow Creek. Judicial Ditch 22 is impaired for both aquatic macroinvertebrate bioassessments and fish bioassessments. Willow Creek is impaired for both dissolved oxygen and fish bioassessments. Stressor identification at these locations indicates base flow, habitat, and low dissolved oxygen are likely contributors to the biological impairments.

Northwest Angle Planning Region



Planning Region Priorities

The majority (99%) of the Northwest Angle planning region is natural habitat (forests and wetlands) with only 1% developed. Due to its remote nature, this planning region experiences development pressures with diminished oversight from the local zoning office. Therefore, implementation for the planning region focuses on preventing development-related problems. Many private and public entities in the planning region get their drinking water from the lake. There are current applicable shoreland rules in place; however, shoreline erosion is still an issue. In-lake navigation can be challenging. The planning region has multiple drainages that outlet to Lake of the Woods. Pine Creek has experienced high amounts of sedimentation. The source of the sediment is unclear, but a likely factor is the three-foot rise in the lake level after a dam

installation in the late 1800s. The planning region is mostly public or tribal land; the shoreline is primarily state and private.

Baseline funding will prioritize:

- implementation of Lake of the Woods lakeshore protection projects.

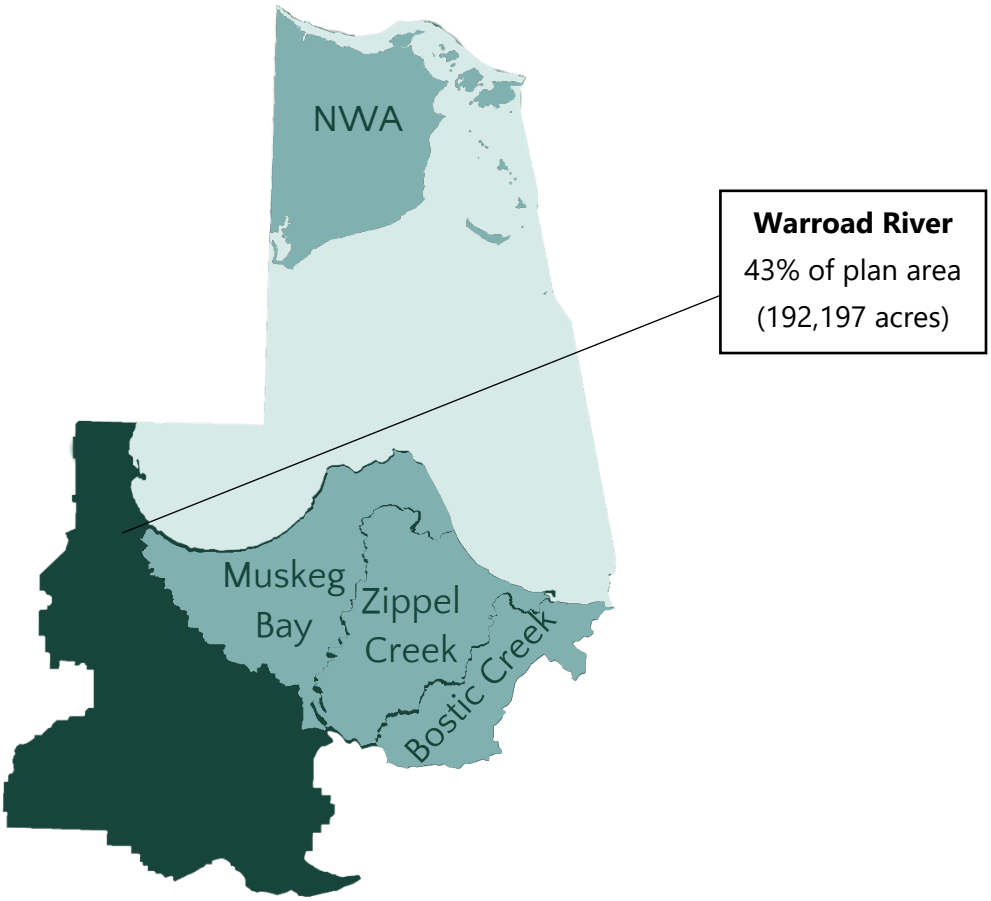
Additional funding opportunities will prioritize:

- implementation of additional Lake of the Woods lakeshore protection projects; and
- completion of a feasibility study for the installation of community sewer systems for developed shoreland

Current Conditions

There are currently no listed impaired waters in the planning region and insufficient data has been collected on the planning region waterbodies to accurately assess their protection or restoration status. Management of the planning region is largely focused on protection, particularly related to shoreline. The planning region is largely public or tribal land and the shoreline is primarily state and privately-owned. The planning region has multiple outlets to Lake of the Woods. Like other planning regions, private access on these outlets is often hampered by sedimentation. Multiple factors may be causing the sedimentation issues including: the 3.5-foot rise in lake elevation after the installation of the Norman Dam at the Lake of the Woods outlet in 1898; isostatic rebound; and wave action from the lake. The planning region also includes multiple islands within Lake of the Woods.

Warroad River Planning Region



Planning Region Priorities

The headwaters of the Warroad River planning region is located in the peatlands of Beltrami Island State Forest and are connected to the state forest's substantial drainage network. The southwest area of the planning region also contains high value forest sites of biodiversity significance. Moving downstream, the land use transitions to agricultural where the east and west branches of the Warroad River join. The Warroad River passes through the City of Warroad and outlets to Lake of the Woods. Shoreline within the planning region is vulnerable to erosion and flooding because the overall stability of the streams and ditches were greatly affected by the 500-year storm event in 2002. Altered hydrology within this planning region creates water quantity issues. Additionally, the Warroad River has issues with log jams that exacerbate bank stability and promote channel instability. The river provides habitat for a northern pike run in the spring. There is a continual need for maintenance dredging at the outlet and into the lake. The

new Warroad safe harbor marina, located northwest of The Point, provides a haven for watercraft during storms or high wind events. The marina project also reduces localized flood damage and improves water depth and quality in the marina.

Baseline funding will prioritize:

- implementation of overland structural and management practices and ditch / in-channel structural practices to reduce sediment and nutrient loading.

Additional funding opportunities will prioritize:

- implementation of additional overland structural, management, and ditch / in-channel structural practices to reduce sediment and nutrient loading;
- implementation of multipurpose drainage management projects;
- implementation of storage and sediment / flow reduction projects in the upper watersheds of East and West Branches Warroad River and County Ditch 10
- a culvert inventory;
- implementation of actions to address log jam issues within the Warroad River;
- restoration of altered hydrology (drainage) within the peatlands via the abandonment of drainage ditches in the headwaters;
- implementation of in-channel restoration projects on the Warroad River; and
- performance of a needs assessment and feasibility study for restoration/dredging of the Warroad Harbor and the continual need for maintenance dredging at the outlet of the Warroad Harbor into Lake of the Woods where shoreland drift sediments can reduce water depths at the outlet.

Current Conditions

Impaired waters within the planning region include both branches of the Warroad River and mainstem Warroad River. The East and West Branches are impaired for both *E. coli* and mercury in fish tissue. Analysis of *E. coli* data indicates that focused implementation efforts could result in restoration. Aquatic macroinvertebrate bioassessments of the East Branch from cycle two analysis were observed to be of the highest quality in the state, according to MPCA. Stressor identification indicates base flow, habitat, sediment, and low dissolved oxygen as likely stressors to aquatic habitat from time to time.

The Warroad River is only impaired for mercury in fish tissue. Due to its proximity to Lake of the Woods and the lake's backwater effects, impairments in the lower reach of the Warroad River

can be difficult to determine. Sediment entering the harbor is an important local issue and implementation in this planning region seeks to reduce sediment transport to the Warroad Harbor. Reducing sediment in the river systems will also help reduce phosphorus bound to the sediment from entering the lake, as the lake itself is impaired for nutrients. Analysis of dissolved oxygen and total phosphorus data indicates that the Warroad River may fail to meet state water quality standards for these parameters in the future. Therefore, protection efforts in this planning region should relate to these parameters.

In-Channel Projects

An in-channel sediment analysis was performed for the planning region as part of a 2016 BWSR Accelerated Implementation Grant (AIG). The study identified a range of erosion areas in the Warroad River system from very low to very high magnitudes. Willing landowners and the least harmful access to the river channel have been found to be key to completing in-channel projects. Medium to high and high to very high areas will be targeted for implementation.

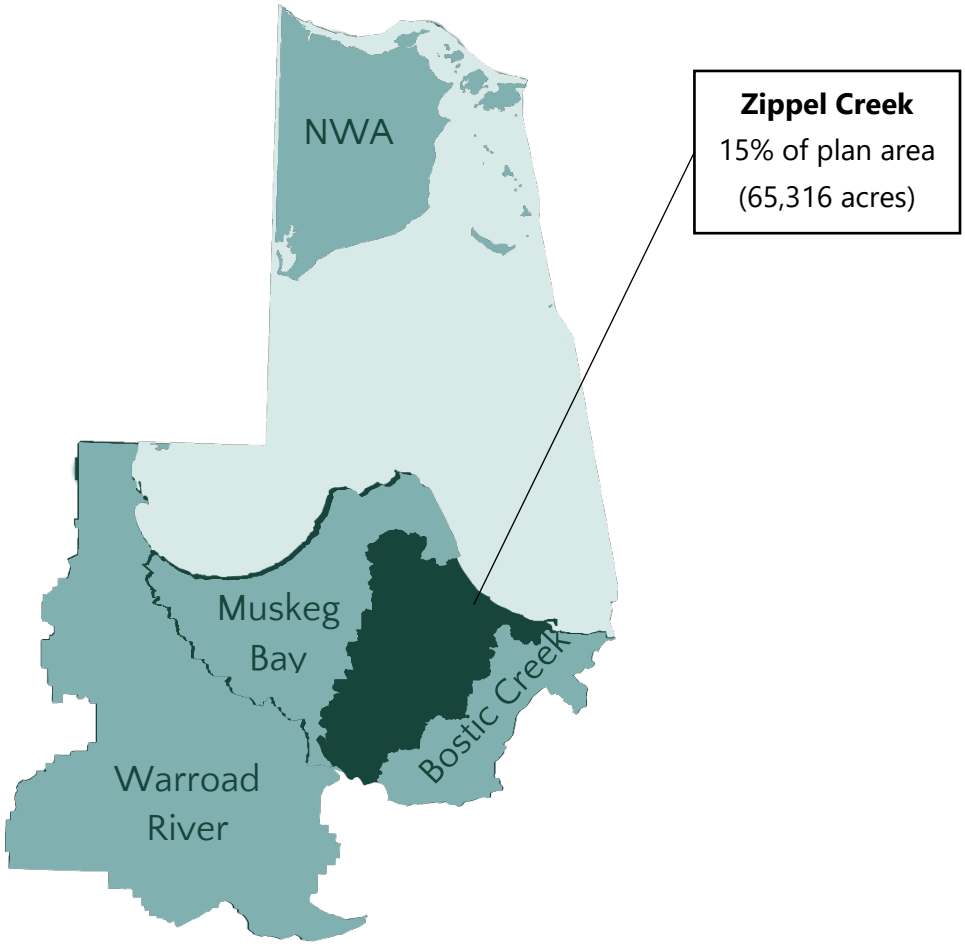
Implementation actions related to in-channel projects and other management and structural practices identified in PTMApp will work together to achieve measurable goals. The Planning Partnership anticipates that during the lifespan of this plan, in-channel projects within the Warroad River planning region will include restoration of historical channel sections that have been straightened and general bank stabilization.

Storage Projects

A Storage Identification and Evaluation was conducted in the subwatersheds of the East and West Branches of the Warroad River and County Ditch 10 as part of this plan. In 2021, project alternatives involving regional storage, ditch plugs, and Bednar Dam improvements were analyzed for storage amounts and sediment transport. Utilizing hydraulic and hydrologic modeling and a sediment transport equation, a total of eight project alternatives were generated. Generally, the West Branch and County Ditch 10 areas have the greatest impact for regional water storage to reduce downstream peak flows. Ditch plugs were found to work best to reduce sediment transport. Recommendations based on the study include 1) regional storage in County Ditch 10, 2) peatland storage via ditch plugs in West Branch Warroad River, and 3) regional storage within Bulldog Run.

Currently, DNR is working in conjunction with local governmental jurisdictions on the Winter Road Peatland Restoration Project to utilize ditch plugs in the Judicial Ditch 62 system and in the Winter Road Peatland Scientific and Natural Area. The project is located in the upper reaches of the West Branch Warroad River.

Zippel Creek Planning Region



Planning Region Priorities

The headwaters of the Zippel Creek planning region have large sections of public lands (primarily woody wetlands). Moving downstream, the land use transitions to agricultural where the east and west branches of Zippel Creek join at Zippel Bay and outlet into Lake of the Woods. Altered hydrology and overland and in-channel sediments are a problem within this planning region. A significant amount of tile drainage was installed from 2004 to 2014. There is some potential for ditch abandonment projects. Shoreline within the planning region is vulnerable to erosion and flooding because the overall stability of the streams and ditches was greatly affected by the 500-year storm event in 2002. Shoreline erosion is extensive at Graceton Beach due to wave action from the winds across the long fetch of Big Traverse Bay. The planning region has shallow bedrock outcrops with active rock quarries and artesian wells. Zippel Bay is a

northern pike spawning habitat. Zippel Bay is a safe harbor and there is a continual need for maintenance dredging at the outlet.

Baseline funding will prioritize:

- implementation of overland structural and management practices, particularly on the west branch of Zippel Creek with regards to ephemeral erosion of fields and grade control at field drain junctions with main ditches;
- implementation of water retention, ditch / channel stabilization, ditch abandonment, and wetland restoration projects; and
- implementation of Lake of the Woods lakeshore protection projects and flood resiliency.

Additional funding opportunities will prioritize:

- implementation of additional overland structural and management practices to reduce sediment and nutrient loading;
- implementation of recommendations from the Bostic and Zippel Watershed Assessment that prioritized projects and data gaps for the planning region;
- implementation of ditch / in-channel stabilization / restoration projects;
- completion of a hydrologic and hydraulic study of the planning region;
- completion of a needs assessment and feasibility study for restoration/dredging of Zippel Bay; and
- completion of a feasibility study for the installation of community sewer systems for developed areas of Zippel Bay and Graceton Beach.

Current Conditions

Impaired waters within the planning region include the west branch of Zippel Creek and Williams Creek. Both the west branch of Zippel Creek and Williams Creek are impaired for aquatic macroinvertebrate bioassessments, dissolved oxygen, *E. coli*, and fish bioassessments. The TSS Impairments are proposed to be delisted from these waterbodies in 2026. In addition, the west branch of Zippel Creek also has a fish bioassessment impairment proposed to be delisted in 2026. Analysis of the water quality data indicates that focused implementation efforts in the west branch of Zippel Creek watershed could result in restoration and the potential to meet state water quality standards for dissolved oxygen. Additionally, analysis of total phosphorus data in the west branch of Zippel Creek indicates that the waterbody may fail to meet state water quality standards for phosphorus in the future. Therefore, protection

implementation efforts should be focused in this planning region as they relate to total phosphorus. Stressor identification identifies base flow, sediment, and low dissolved oxygen as likely stressors to the biological impairments.

In-Channel Projects

Assessments of the Bostic Creek and Zippel Creek Planning Regions were performed by the USDA NRCS and a resulting project report was published in 2013. The purpose of the project was to evaluate the sources and transport of sediments through the hydrologic system from the watershed headwaters downstream to Zippel and Bostic bays. This USDA NRCS report has been utilized in the planning process to set measurable goals for the planning regions and to guide implementation of in-channel projects within the planning regions. Implementation actions related to in-channel projects are included in the planning region Structural Incentive Program Actions along with PTMApp-identified practices. Additional actions are included in the Data Collection & Monitoring actions table related to the filling of in-channel project data gaps.

The planning partners anticipate that during the lifespan of this plan, in-channel projects within the Zippel Creek Planning Region will include grade control at inlets to the reaches and within reaches themselves.

4.3.2 Implementation Programs

There are four implementation programs through which plan actions are carried out: Planned Landscape Management, Data Collection and Outreach, Constructed Environmental Enhancements, and Protected Lands Maintenance (Figure 4.2). See Section 5 for more details on implementation programs.

"Manage It" Planned Landscape Management
County and city ordinances, soil health practices, forest management

"Know It" Data Collection and Outreach
Actions that support direct implementation, gathering knowledge, education to LOWW residents

"Fix It" Constructed Environmental Enhancements
Engineered projects, i.e. Subsurface Sewage Treatment System (SSTS) upgrades, well sealing, stormwater projects

"Keep It" Protected Lands Maintenance
Land protection and restoration actions

Figure 4.2. Plan Implementation Programs

4.3.3 Plan Funding

The ability to achieve measurable goals and the speed at which they are realized depend largely on the amount of funding available for plan implementation. Plan funding assumes continued allocation of local government funds for natural resource management as well as dedicated watershed funding from BWSR (Table 4.3). See Section 6 for more discussion on plan funding.

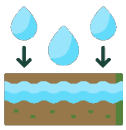
Table 4.3. Plan funding categories. The local funding amount is the baseline + the Watershed Based Implementation Funding (WBIF).

Name	Description
Baseline	Existing local government budget.
WBIF	Funds provided to LOWW from BWSR for CWMP implementation
Other	Actions with 'Other' as the funding source acknowledge outside funding is likely required for implementation. External funding can be competitive or non-competitive funds from federal or state agencies, non-profits, or the private sector.

MEASURABLE GOAL: Protect Drinking Water

Issue Theme:

Groundwater & Drinking Water



Issue Description:

- Groundwater and drinking water need protection from contamination due to activities on the land and underlying geology. Of particular concern are nitrates, arsenic, lead, bacteria, and unused wells.

GOALS

Short-Term:

50 Drinking Water **BMPs**

(inclusive of wells sealings or recharge conservation practices).

Long-Term:

Drinking water quality and quantity is protected.

METRICS

Short-Term:

Number of practices implemented that protect groundwater such as well sealing and WHPP are developed and implemented.

Long-Term:

Future drinking water testing data and MDH input.

Why These Goals Are Important

This goal focuses on the protection of drinking water sources from contamination. Drinking water that is free from contamination is of the utmost importance to watershed residents and the many visitors that vacation at resorts. All community drinking water in the LOWW is sourced from groundwater. However, there is speculation that some residents may be utilizing surface water due to the difficultly of drilling wells in this area. Outreach and education regarding risks and treatment options will be done. There are about 1,130 known private wells and seven community Drinking Water Surface Management Areas (DWSMAs). Community systems are monitored and must meet drinking water standards, but private well owners are responsible for testing their water. Common contaminants of concern include bacteria, arsenic, lead, and nitrate.

There are 111 non-community non-transient public water supply wells in the watershed, such as resorts. There are five vulnerable non-community systems. Outreach is an important step which may then lead to implementation of drinking water BMPs. Goal targeting (Figure 4.3) will focus on DWSMAs, vulnerable non-community systems, and private land with high groundwater recharge rates.

Older household water systems may contain lead pipes or leaded components that can leach lead into water. Lead exposure can harm major organs and is associated with developmental and behavioral issues in infants and children.

Bacterial contamination in drinking water wells can lead to waterborne diseases and is a threat to human health. Arsenic is naturally occurring and while the drinking water standard is 10 µg/L there is no safe amount for consumption. It has been linked to cancer and diabetes. Of private wells sampled in the watershed, 8% exceeded the standard and 23% exceeded 5 µg/L. Nitrate concentrations in groundwater are low in the watershed and no wells sampled exceeded the standard. Ongoing monitoring of contaminants is important to be aware of changing conditions. Drinking water quality in the LOWW is generally good and implementation of actions will protect it.

Targeting Map

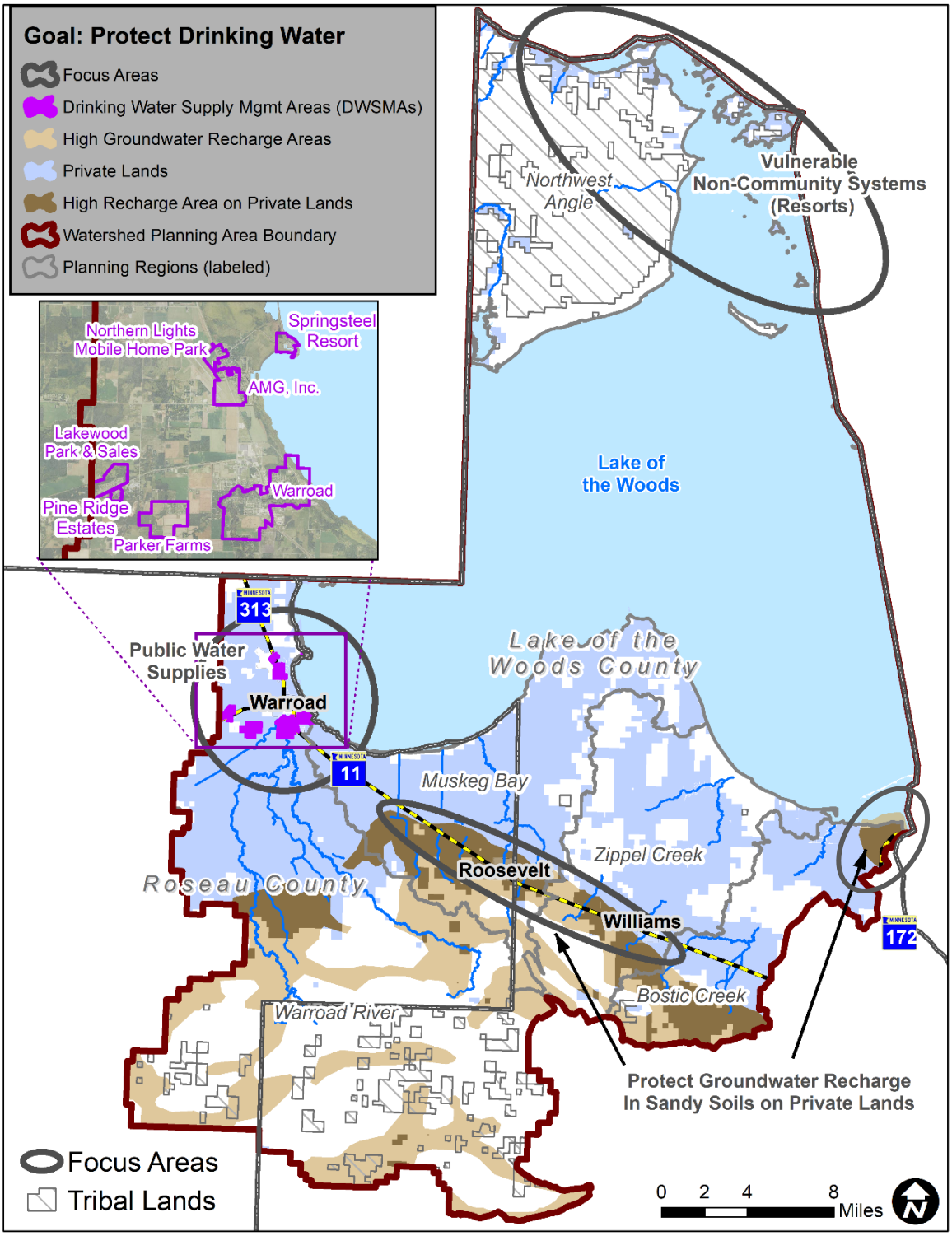


Figure 4.3. Targeting for drinking water protection.

GOAL: PROTECT DRINKING WATER

50 drinking water BMPs

Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2027-2028	2029-2030	2031-2032	2033-2034	2035-2036	Output for goal tracking	Funding Level	Total 10-year Cost
Seal unused wells by continuing the SWCD's existing cost share program and finding ways to increase participation.		50 wells	Watershed-Wide	**SWCDs**, MDH, NRCS, Public Water Suppliers	●	●	●	●	●	✓	Base + WBIF	$50,000
Screen private wells for contaminants - continue current annual bacteria/nitrate clinic and add contaminants of concern such as arsenic.		Sponsor two well testing clinics per year, provide testing kits at SWCDs	Watershed-Wide	**SWCDs,** MDH	●	●	●	●	●		Base + WBIF	$20,000
Implement and maintain BMPs that reduce groundwater contamination within high groundwater recharge areas and DWSMAs.		Two BMPs	DWSMAs, Figure 4.3	**Counties, City of Warroad, SWCDs,** NRCS, Public Water Suppliers			●	●	●	✓	Base + WBIF	$20,000
Fill data gaps in groundwater in the watershed by completing the GRAPS and Roseau County Geologic Atlas.		GRAPS: *complete LOW* Geologic Atlas: *start Roseau*	Watershed-Wide	**MDH**, University of Minnesota (UMN)	●	●					Other	$20,000
Outreach - wellhead protection, arsenic education, surface water risks, and outreach to non-community systems such as resorts.		Mailings and promotions for events	Watershed-Wide, Figure 4.3	**SWCDs, MDH,** Public Water Suppliers	●	●	●	●	●		Base + WBIF	$50,000

Base + WBIF Funding Sources: County, SWCDs, City, BWSR

Other Funding Sources: NRCS, DNR, MPCA, Minnesota Department of Agriculture (MDA), MDH, Minnesota Department of Transportation (MNDOT)

Total	**$140,000**
Total	**$20,000**

MEASURABLE GOAL
Reduce Contaminants

Issue Theme:
Water Quality

Issue Description:

- Water quality in the LOWW can be impacted by stormwater and agricultural runoff, septic systems, and erosion from streambanks, lakeshores, and ditches. These sources can increase sediment, nutrient, bacteria, and contaminant loading and degrade habitat. Impaired waters in the LOWW include LOW (nutrients) and other waterbodies noted in Figure 4.4.

GOALS

Short-Term:

Reduce 3,000 pounds per year of phosphorus to LOW

Percent progress towards the TMDL Reduction:

- *Bostic Creek – 60%*
- *Muskeg Bay – 11%*
- *Northwest Angle – Protect (no increase)*
- *Warroad River – 44%*
- *Zippel Creek – 11%*

Long-Term:

Meet the LOW TMDL; contribute to NRS.

METRICS

Short-Term:

Practices implemented that reduce phosphorus such as agricultural BMPs, stormwater management, septic systems, and erosion.

Long-Term:

Continued monitoring of LOW, periodic sediment phosphorus inventories, and calculate and track BMP nutrient reductions.

A note about measuring loading numbers:

The percent reductions are included in the table because the models used for the TMDL and the progress tracking are different. During implementation and work planning, **the Implementation Committee will discuss annually how to consistently track progress towards this goal.**

Why Goals Issues Are Important

Excess phosphorus leading to algae blooms in LOW is a priority for watershed management. Some phosphorus loading in LOW is from historical loads bound to sediment releasing into the water column (internal loading). **This goal focuses on mitigating total phosphorus loading to both streams and rivers within the watershed, and to LOW** (Figure 4.4).

The values estimated for the planning regions are largely based on modeled values. Because of the LOW lake level effect on inflows from the tributaries, it is difficult to get actual loading data in this watershed. The LOW nutrients/eutrophication impairment is primarily attributed to phosphorus loading. While other portions of the LOW drainage basin throughout the United States and Canada contribute most of phosphorus loading to LOW, this watershed can still work towards achieving its TMDL load reduction goal to work towards helping LOW meet state water quality standards.

Planning Region	TMDL Reduction	Achieved 2019-2025	New 10-Yr Goal
Bostic Creek	1,102 (28%)	331 (30%)	660 (60%)
Muskeg Bay	8,211 (58%)	437 (5%)	880 (11%)
Warroad River	2,186 (16%)	489 (22%)	980 (44%)
Zippel Creek	4,384 (53%)	239 (5%)	480 (11%)
NW Angle	-	-	-
TOTAL	**15,883**	**1,496 (9%)**	**3,000 (19%)**

The Minnesota Nutrient Reduction Strategy (NRS; MPCA, 2025) identifies nitrogen and phosphorus pollutant load reduction goals for the Lake Winnipeg Basin. While local plans are not expected to achieve these goals alone, this measurable goal makes progress towards basin-wide nutrient reduction goals.

Targeting Map

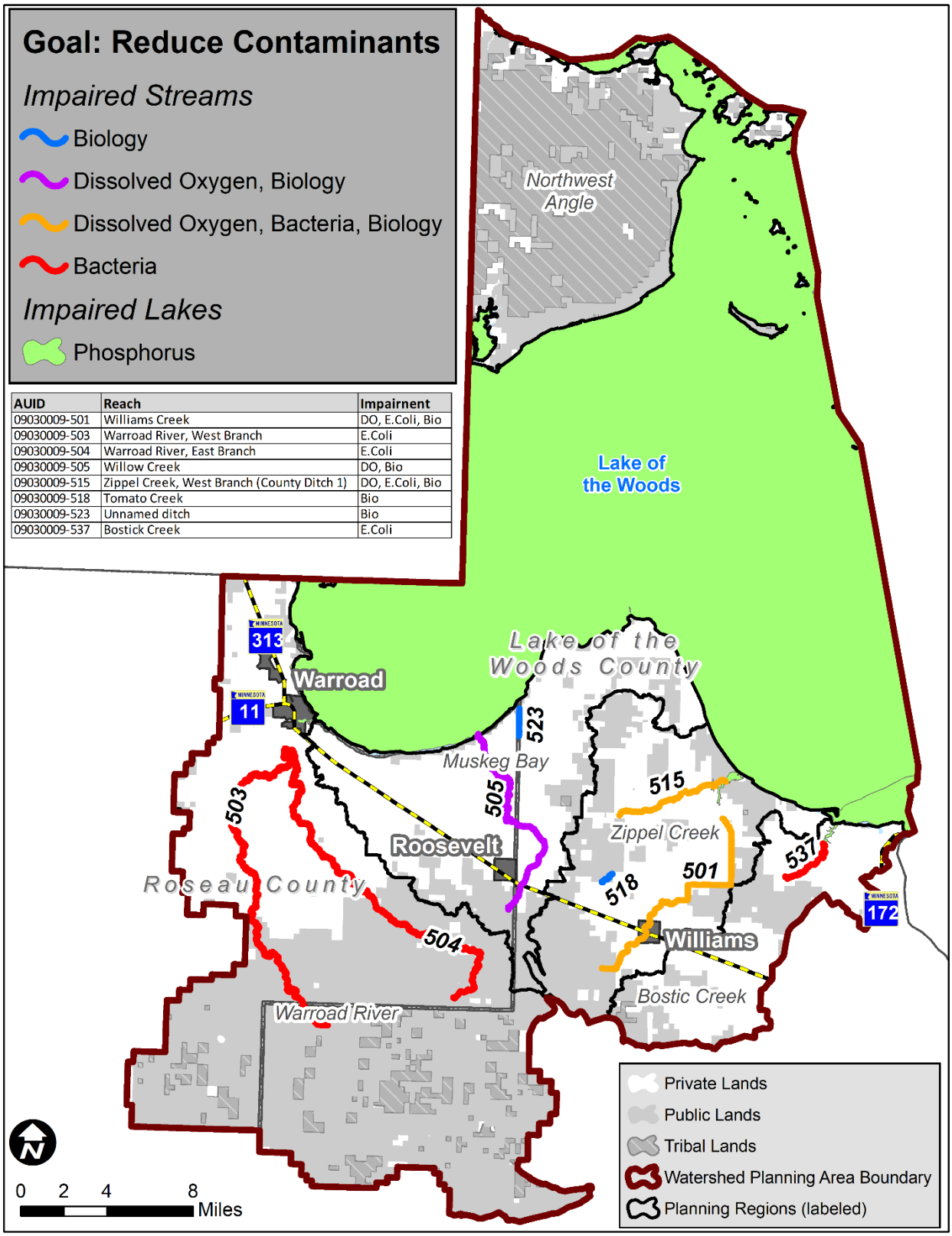


Figure 4.4. Targeting map for reducing contaminants. See Table 2.2 (page 19) for more details.

GOAL: REDUCE CONTAMINANTS

Reduce 3,000 pounds per year of phosphorus to LOW.

Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2027-2028	2029-2030	2031-2032	2033-2034	2035-2036	Output for goal tracking	Funding Level	Total 10-year Cost
Implement **livestock BMPs** such as rotational grazing, water way exclusion fencing, feedlot runoff control and manure management.		600 Acres (10% of all pasture acres)	Pasture lands	**NRCS, SWCDs,** MPCA	●	●	●	●	●	✓	Base + WBIF	$90,000
Implement **soil health BMPs**, such as conservation tillage, crop rotation, nutrient management, and cover crops.		1,000 Acres (1% of all crop acres)	Croplands	**SWCDs**, **NRCS**, Counties	●	●	●	●	●	✓	Base + WBIF	$250,000
Implement **structural agricultural BMPs** such as grade stabilizations.		Ten projects	Croplands	**SWCDs**, **NRCS**, Counties	●	●	●	●	●	✓	Base + WBIF	$100,000
Encourage the use of **precision agriculture** through education, technical, and financial assistance.		Two workshops	Croplands	**SWCDs**, NRCS, Co-Ops, Dealers	●	●	●	●	●	✗	Base + WBIF	$25,000
Increase enrollment in **Ag Water Quality Certification program** within the watershed.		Add two producers	Croplands	**MDA,** SWCDs	●	●	●	●	●	✗	Other	$2,000
Implement **stormwater infrastructure upgrades** within the city of Warroad to reduce potential for flooding and improve water quality.		Two projects	Warroad	**City of Warroad, WWD,** MPCA, Roseau SWCD	●	●	●	●	●	✓	Base + WBIF, Other	$400,000
Implement **chloride management BMPs** through trainings, equipment or environmentally friendly alternatives		Salt training, purchase equipment	Warroad	**Roseau County, LOW County, City of Warroad,** SWCDs			●	●	●	✗	Base + WBIF, Other	$100,000

Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2027-2028	2029-2030	2031-2032	2033-2034	2035-2036	Output for goal tracking	Funding Level	Total 10-year Cost
Implement a targeted **street sweeping program** to reduce contaminated stormwater runoff reaching bays and rivers.		Initiate program	Williams	**LOW County, City of Williams**			●	●	●		Base + WBIF, Other	$50,000
Assist landowners in **upgrading noncompliant SSTS**.		60 SSTS	Watershed -wide	**LOW County**, MPCA, BWSR	●	●	●	●	●		Base + WBIF, Other	$1,500,000
Feasibility study for **cluster systems or community septic systems.**		One feasibility study	Bostic, Zippel, Muskeg, NWA	**LOW County, MPCA**				●	●		Base + WBIF	$100,000
Data Collection: water quality monitoring of LOW and tributaries.		Annual and Scheduled Monitoring	Watershed -wide	**MPCA, RLN,** SWCDs, WWD	●	●	●	●	●		Other	$50,000
Outreach: to shoreland owners, realtors, farmers, etc. on BMPs and practices to reduce contaminants (including but not limited to pesticides).		Outreach program	Watershed -wide	**SWCDs, Counties, WWD, MDH**	●	●	●	●	●		Base + WBIF	$25,000

Base + WBIF Funding Sources: County, SWCDs, City, BWSR

Other Funding Sources: NRCS, DNR, MPCA, MDA, MNDOT

Total	**$590,000**
Total	**$2,102,000**

MEASURABLE GOAL
Stabilize Banks

Issue Theme:
Water Quality

Issue Description:

- Water quality in the LOWW can be impacted by stormwater and agricultural runoff, septic systems, and erosion from streambanks, lakeshores, and ditches. These sources can increase sediment, nutrient, bacteria, and contaminant loading and degrade habitat. Impaired waters in the LOWW include LOW (nutrients) and other waterbodies noted in Figure 4.5.

GOALS

Short-Term:
Stabilize **six miles** of drainage systems
Stabilize **1,000 feet** of stream bank and lakeshore

Long-Term:
Meet the LOW TMDL.

METRICS

Short-Term:
Linear feet or miles of practices that stabilize banks, lakeshore, and drainage systems by using materials.

Long-Term:
Continued monitoring of water quality, fish, and macroinvertebrates to delist impaired streams.

Why These Goals Are Important

This goal focuses on the protection and stabilization of stream banks and shoreland banks to enhance water quality and aquatic habitat for fish, macroinvertebrates, and aquatic life. The impacts of altered hydrology on aquatic ecosystems can be significant. Increased flows from straightening stream reaches and extreme runoff events can lead to increased erosion and sediment movement. Channelized systems are not effective at redepositing suspended and transported sediment, a process that healthy, naturally meandering streams perform well. When streams no longer have access to their floodplains, which allow water to spread out and slow down, flow velocity is increased and channels become unstable. While overland runoff mitigation certainly plays a large role in protecting riparian systems, additional efforts can be focused within and adjacent to the systems themselves to help mitigate impacts. These efforts often take the form of in-channel projects, including but not limited to: in-stream bank protection, re-establishment of floodplain vegetation buffers, grade control (riffles), re-meandering of straightened reaches, and adjusting or replacing improperly placed culverts.

The long fetch of LOW contributes to the power of the waves hitting the shore. Stabilization of LOW banks will target areas shown in Figure 4.5. During implementation and work planning, **the Implementation Committee will discuss annually how to consistently track progress towards this goal.**

Targeting Map

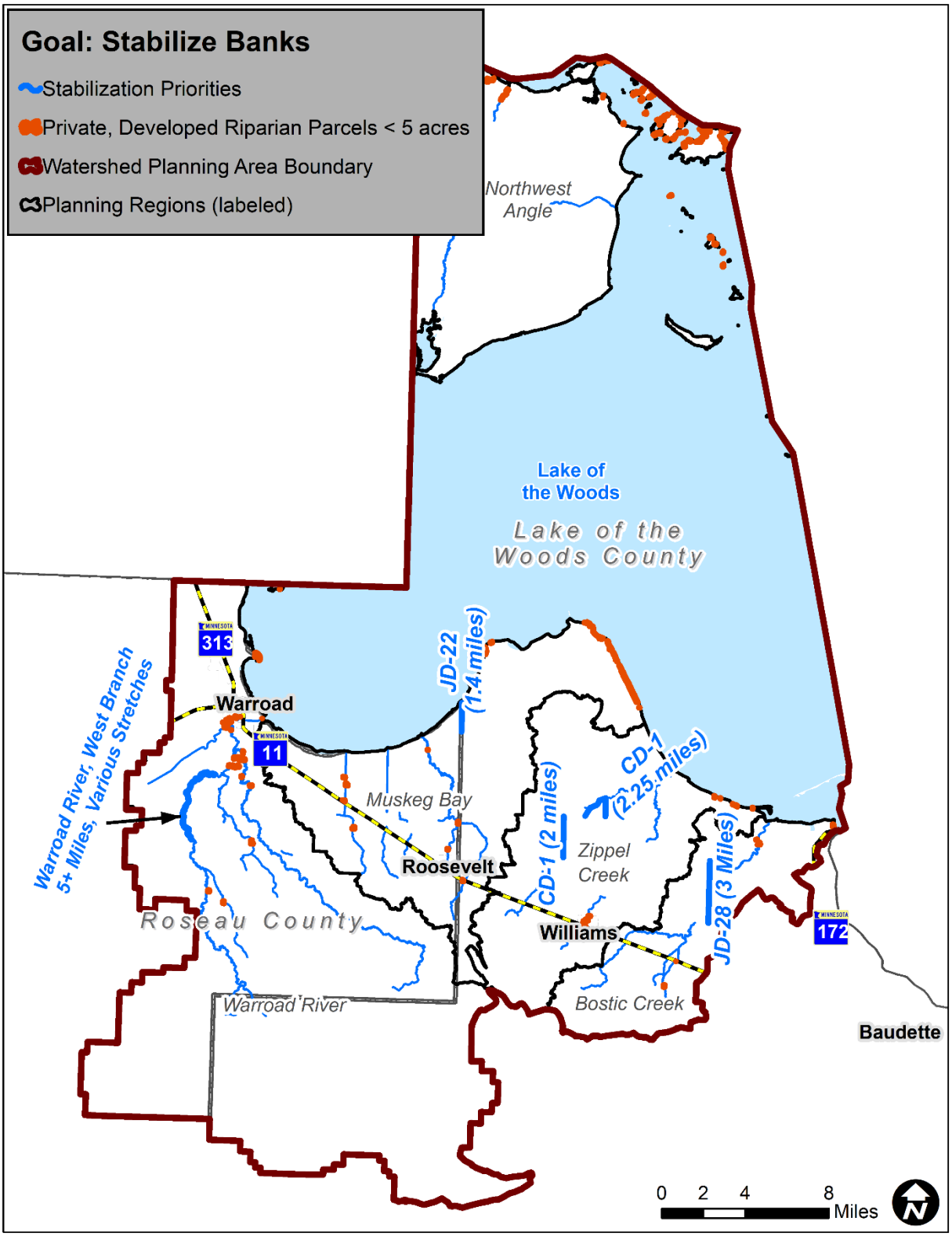


Figure 4.5. Targeting map for bank stabilization.

GOAL: STABILIZE BANKS

Six miles drainage system stabilization; 1,000 feet of lakeshore or stream bank stabilization;

Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2027-2028	2029-2030	2031-2032	2033-2034	2035-2036	Output for goal tracking	Funding Level	Total 10-year Cost
Data Collection: Investigation and ground-truthing of areas that need lakeshore, stream, and ditch stabilization.		Two studies	Watershed-wide	**SWCDs, Counties**		●	●	●	●		Base + WBIF	$50,000
Conduct erosion control and in-channel projects to **stabilize drainage systems**.		Six miles	Warroad, Muskeg, Zippel, WWD, County Ditch (CD) 1, CD 26, Bostic Planning Region, JD 28	**Counties, WWD,** DNR		●	●	●		✓	Base + WBIF	$1,800,000
Protest and restore degraded shoreline and riparian areas.		1,000 feet	Watershed- wide	**SWCDs, WWD,** Counties, DNR	●	●	●	●	●	✓	Base + WBIF	$500,000
Stabilize surface water outlets (e.g., side water inlets, rock chutes) to reduce erosion and improve water quality.		Two outlets	Watershed-wide excluding NWA	**SWCDs**, **WWD**, Counties, NRCS		●	●	●	●		Base + WBIF	$40,000
Coordinate with County and MNDOT on projects to implement water quality BMPS on road, ditch and culvert replacement projects.		Meet annually to discuss upcoming projects.	Watershed-wide	**Counties, City of Warroad, MNDOT,** SWCDs, DNR	●	●	●	●	●		Base + WBIF	*Included in staff time*
Restoration efforts for Pine Island.		Complete project (if possible)	Pine Island SNAs	**DNR, LOW Counties,** SWCDs	●	●	●				Base + WBIF, Other	$1,200,000

Base + WBIF Funding Sources: County, SWCDs, City, BWSR

Other Funding Sources: NRCS, DNR, MPCA, MDA, MNDOT, Lessard-Sams Outdoor Heritage Fund, Legislative-Citizen Commission on Minnesota Resources

Total	**$2,390,000**
Total	**$1,200,000**

MEASURABLE GOAL
Enhance Habitat

Issue Theme:
Habitat Health

Issue Description:

- Fish and wildlife thrive when habitats are protected, connected, and supported by clean water. Aquatic habitat, peatlands, and forest health in the LOWW are challenged by climate variability, fragmentation, degradation, and invasive species.

GOALS

Short-Term:

1,000 acres of forest protection

2,000 acres of Woodland Stewardship Plans (WSPs)

Long-Term:

Keep forested areas forested.

METRICS

Short-Term:

Protection: acres of SFIA, 2c, and conservation easements.

WSPs: acres of new plans and plan renewals.

Long-Term:

Keep SFIA and WSPs re-enrolled.

Why These Goals Are Important

This goal focuses on the protection of forests and other unique habitats within the LOWW. There are a significant amount of existing unique habitat features in the LOWW including, but not limited to: unique shoreline dunes, forested areas, fish spawning and nursery areas, SNAs, and Wildlife Management Areas. These areas have been identified as locations to concentrate adjacent protection or restoration efforts. These areas often abut habitats that were historically similar and have the potential to be restored or reconnected to these unique habitats through actions such as easements and SFIA.

The short and long-term goals are based on an anticipated increase (acres) of land protection or forest management focused on lands bordering these areas. Private parcels were prioritized using the Risk, Adjacency, Quality (RAQ) scoring and are shown as high, medium, or low priority in Figure 4.6. Parcels that are adjacent to lakes, streams, and other protected lands are high priorities. The higher RAQ scoring parcels are a higher priority for targeting outreach and implementation in. However, the Partnership will work to assist all eligible landowners who walk in.

While not a measurable short-term goal, additional work to enhance habitat beyond forest protection will occur under the Enhance Habitat goal. Aquatic habitat will be protected and restored via addressing stream barriers to fish passage, AIS outreach, and implementation of the Keep It Clean program. AIS management is especially important in the LOWW given its international waters. Maintenance of the high-quality multispecies fisheries and native fish communities in the LOWW relies on healthy, connected stream systems.

Targeting Map

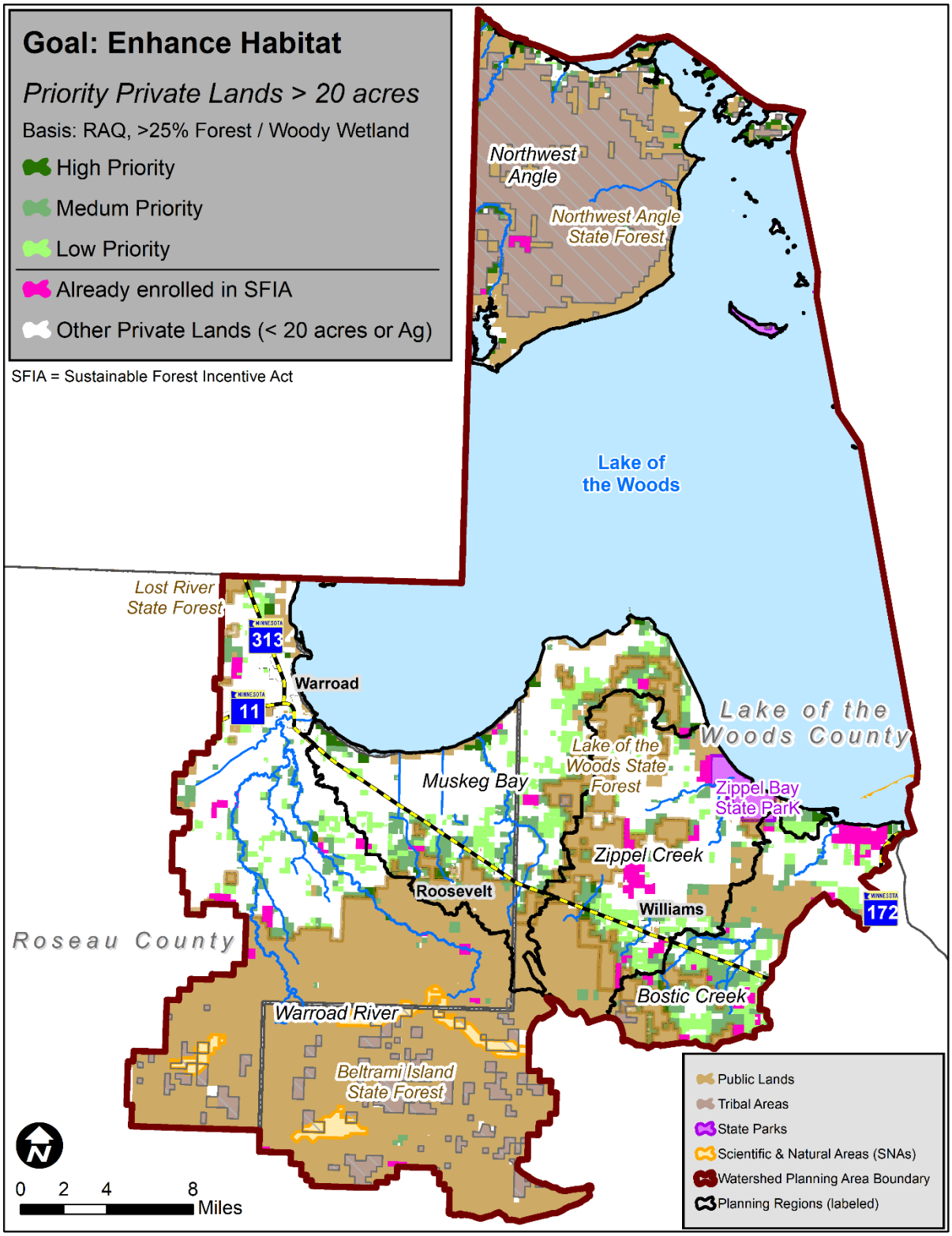


Figure 4.6. Targeting map for enhancing habitat.

GOAL: ENHANCE HABITAT

1,000 acres of forest protection, 2,000 acres of WSPs

Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2027-2028	2029-2030	2031-2032	2033-2034	2035-2036	Output for goal tracking	Funding Level	Total 10-year Cost
Develop and renew **Woodland Stewardship Plans (WSPs)** for private forest lands.		2,000 acres	Figure 4.6	**SWCDs**	●	●	●	●	●		Base + WBIF	$50,000
Manage private forest lands through forest stand improvement and brush management.		1,000 acres	Figure 4.6	**NRCS,** SWCDs, DNR	●	●	●	●	●		Base + WBIF	$600,000
Protect forests with SFIA, 2C, or conservation easements.		1,000 acres	Figure 4.6	**SWCDs**, NRCS, United States Fish and Wildlife Service (USFWS), DNR, Department of Revenue	●	●	●	●	●		Other	$1,050,000
Establish **Cooperative Weed Management** Areas to address known issues.		Establish	Watershed -wide	**SWCDs**, Counties, BWSR			●	●	●		Base + WBIF	$10,000
Modify barriers for fish passage, also restoring hydrology and sediment dynamics.		Five barriers	Watershed -wide	**DNR**, Counties, SWCDs,	●	●	●	●	●		WBIF + Other	$350,000
Develop and establish a **demonstration beach nourishment** project on public lands and for habitat quality.		Complete project	Bostic, Zippel, Pine Island	**DNR**, SWCDs Counties					●		Other	$1,000,000

Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2027-2028	2029-2030	2031-2032	2033-2034	2035-2036	Output for goal tracking	Funding Level	Total 10-year Cost
Implement the county **AIS prevention and management** program.		Implement program	Watershed -wide	**Counties**, DNR, SWCDs	●	●	●	●	●		Other	$554,000
Implement **Keep It Clean** program and implement existing rules to address littering and improper disposal of human waste on LOW during winter ice fishing.		Implement Program	LOW	**SWCDs**, Counties, City, DNR Enforcement	●	●	●	●	●		Base + WBIF, Other	$100,000

Base + WBIF Funding Sources: County, SWCDs, City, BWSR

Other Funding Sources: NRCS, DNR, MPCA, MDA, MNDOT

Total	**$660,000**
Total	**$3,054,000**

MEASURABLE GOAL
Restore Hydrology

Issue Theme:
Hydrology

Issue Description:

- Past ditching and stream straightening have altered natural hydrology in streams, floodplains, wetlands, and peatlands. With today's shifting precipitation patterns, these disrupted systems now have less natural water storage capacity, and experience increased flashiness, erosion, and greater lake level fluctuations.

GOALS

Short-Term:
Maintain storage, and restore connectivity and natural flow timing.

Long-Term:
Same as short-term.

METRICS

Short-Term:
Implement projects such as peatland restoration, floodplain restoration, drainage water management, and stormwater management.

Long-Term:
Same as short-term.

Why These Goals Are Important

This goal emphasizes improving watershed hydrology by implementing practices that offset the effects of past land-use changes, wetland loss, increased precipitation, and disrupted flow patterns. As land use evolves and development expands over time, the watershed's hydrology is altered, typically resulting in higher runoff volumes, increased peak flows, and changes in the timing of water movement. These shifts often lead to degraded water quality and are collectively referred to as *altered hydrology*, a common stressor associated with many waterbody impairments.

Altered hydrology goals aim to reduce flooding, limit high peak stream discharges, decrease downstream sediment and nutrient transport, and prevent erosion of riparian corridors. Peatland restoration plays a key role in these efforts by reestablishing natural water flow patterns while also preserving important carbon storage functions.

Altered hydrology east of Norris Rd, by Blaine Broten RRWD

Targeting Map

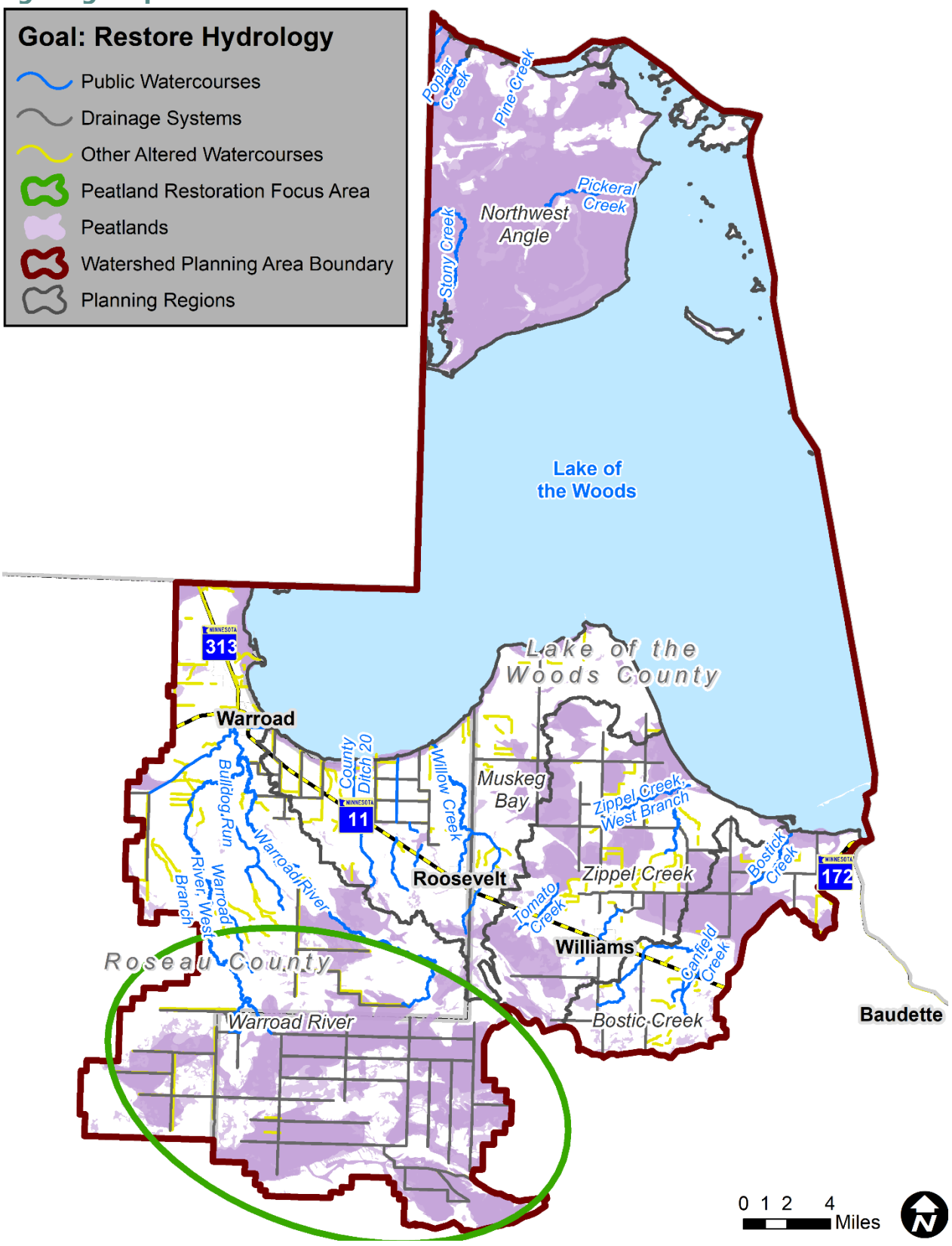


Figure 4.7. Priority areas for hydrologic restoration.

GOAL: RESTORE HYDROLOGY

Maintain storage, and restore connectivity and natural flow timing.

Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2027-2028	2029-2030	2031-2032	2033-2034	2035-2036	Output for goal tracking	Funding Level	Total 10-year Cost
Restore peatlands, floodplains, and/or hydrology based on feasibility studies.		Two projects	Beltrami Island State Forest and SNA, Figure 4.7	**DNR**, WWD, Counties	●	●				✓	Other	$3,000,000
Explore and implement disabling ditch projects to address altered hydrology and peatland health.		One project	Warroad, Bostic, Zippel Bay Planning Regions	**SWCDs**, **Counties** WWD, DNR		●	●	●	●		Other	$1,000,000
Manage beaver activity within waterways and drainage systems through the use of Clemson levelers, bounties, or control.		40 projects	Watershed-wide	**Counties**, SWCDs, WWD	●	●	●	●	●		Base & Other	$40,000
Evaluate the feasibility of maintaining storage, restoring connectivity and natural flow timing		1 feasibility study	Figure 4.7	**DNR,** SWCDs, Counties	●	●					Other	$80,000
Target flow monitoring in priority areas for hydrology restoration		Data collected	Figure 4.7	**MPCA,** DNR, SWCDs, Counties	●	●	●	●	●		Other	$20,000

Level 2 Funding Sources: County, SWCDs, City, BWSR

Level 3 Funding Sources: NRCS, DNR, MPCA, MDA, MNDOT

Total	**$40,000**
Total	**$4,100,000**

Regulatory Program

Actions in the Regulatory program (Table 4.4) include those that pertain to common and consistent administration and enforcement of statutory responsibilities, local regulations, and local ordinances. These actions already occur as part of the LOWW Planning Partnership's individual roles. These actions are funded by the existing baseline budget (Table 4.3, page 53) and are described in Section 6.

Table 4.4. Regulatory Actions

Program	Lead Jurisdiction	Lead Entity	Partner(s)
Ensure compliance with the **state buffer law** requirements.	Local	Counties	SWCD, BWSR
Administer adopted **land use and zoning ordinances** to manage possible sources of nitrate and pathogenic bacterial contamination, and consider potential adverse effects within DWSMAs.	Local	Counties, MPCA	SWCD, NRCS, Cities, WWD
Meet all statutory requirements of the state of Minnesota **shoreland rules**.	Local	LOW County, Roseau SWCD, Municipalities	SWCDs, DNR
Use the **floodplain management ordinance** and land use and zoning approvals to minimize the likelihood of future flood damages.	Local	Counties	Cities, SWCD, DNR
Implement the **state feedlot program** rules.	Local, State	MPCA, LOW SWCD	NRCS, County
Require **Storm Water Pollution Prevention Plans** on all projects that reach the one-acre threshold.	Local, State	MPCA, Counties	SWCD, County, City
Implement and enforce applicable county ordinances and the **Wetland Conservation Act (WCA)** to retain wetland quantity, function, and value.	Local	Counties and/or SWCD	BWSR
Work collectively with all partners through the **Keep It Clean program** to implement enforcement of existing rules to address littering and improper disposal of human waste on LOW during winter ice fishing.	DNR	DNR	Counties, SWCDs, Tourism
Implement Minn. R. Ch. 7080 and local ordinances related to **septic systems.**	Local	Counties	N/A

Capital Improvement Projects (CIPs)

A capital improvement is defined as a major non-recurring expenditure for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features. Capital improvements are beyond the normal financial means of the LOWW Planning Partnership and therefore require external or atypical funding (e.g. grants, bonds, levies, or assessments).

Table 4.5. Capital Improvement Projects

Project Description	**Lead,** partners	**Timeframe**	**Estimated Cost**
Designation of the Warroad Harbor as a Regional Park to get additional partners to the table for the overall harbor project.	**City of Warroad**	No estimate	No estimate
Create new or upgrade existing LOW public accesses (Three accesses: Gull Rock, Zippel, Wheelers).	**DNR**, Counties, SWCDs	2026-2028	$6,000,000 (~$2,000,000 each)
Develop Warroad Marina project that will create access to LOW, make use of an existing marina, act as a safe harbor, and provide flood control to keep high lake levels from back flooding Warroad.	**City of Warroad**, WWD, Counties	No estimate	No estimate
City of Warroad Seawall	**USACE**	No estimate	No estimate
Communicate, advocate, and plan for the completion of Harbor Maintenance Dredging through USACE. Harbors: Warroad, Zippel, Pine Creek.	**Counties**, **USACE,** WWD, Cities, SWCDs	No estimate	$600,000

4.5 Tracking Implementation

Overall plan progress towards goals will be tracked by watershed partners.

Table 4.6 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.

Table 4.6. Evaluation throughout implementation.

Level	Description	Timeframe	LOWW Application
Tracking 	Gathering and compiling numbers about the practices, acres, and feet of stabilization achieved in plan implementation.	Ongoing	Outputs in the implementation schedule. Projects will be tracked and reported in *eLINK* during implementation.
Reflecting 	Comparing the work activities completed to the work activities in the plan to evaluate progress.	Annual or Biennial	WBIF Grant Reports, Work Plans
Evaluating 	Comparing the resource results associated projects, practices, or programs to the stated resource goals and outcomes in the plan.	Mid-point evaluation	Analysis of loading at watershed pollutant load monitoring sites, water quality trends, sediment core testing in LOW, WRAPS Cycle 2.
Sharing 	Maintain support for local work through communications about local watershed implementation geared toward the public and specific stakeholders.	Ongoing	Stakeholder and public engagement and support.

5. Implementation Programs

5.0 Implementation Programs

5.1 Introduction

Implementation programs are the funding mechanism to implement actions and make progress toward achieving plan measurable goals. There are four implementation programs through which plan actions are carried out: Planned Landscape Management ("**Manage It**"), Protected Lands Maintenance ("**Keep It**"), Constructed Environmental Enhancements ("**Fix It**") and Data Collection and Outreach ("**Know It**") (Figure 5.1).

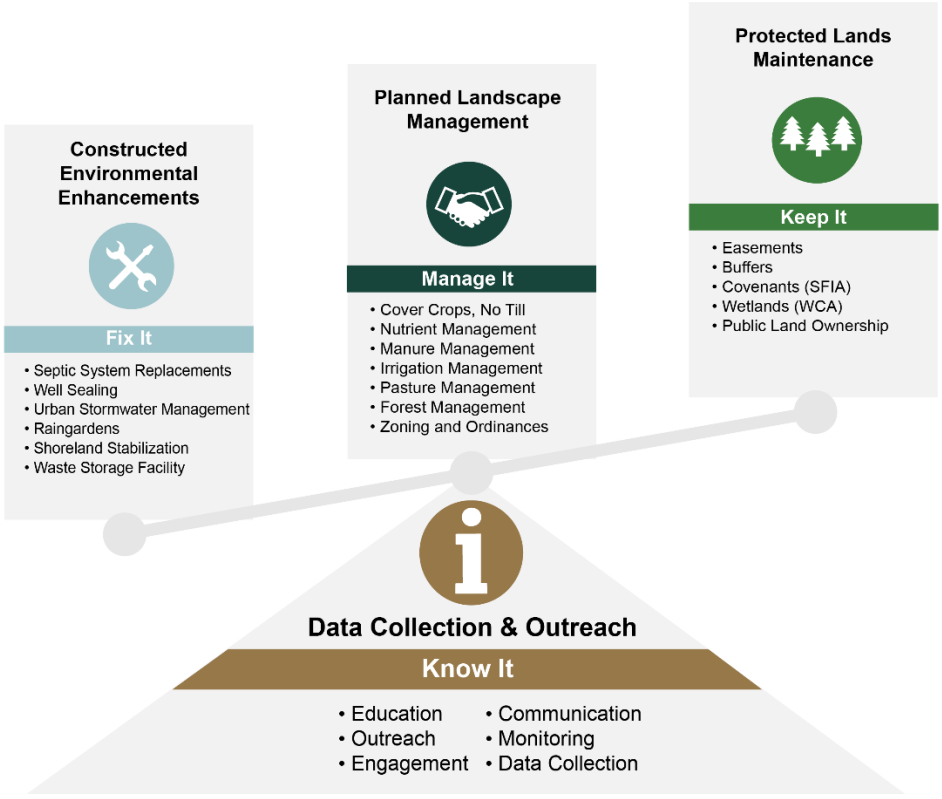


Figure 5.1. LOWW Implementation Programs.

5.2 Planned Landscape Management ("Manage It")

"Manage It" programs involve continual management of the landscape including soil health practices such as cover crops and reduced tillage, pasture management, woodland stewardship plans, zoning, and ordinances. Implementation of this plan will involve programs that will be actively targeted to prioritized areas for management (Section 4). Non-priority areas will be considered on an opportunity basis.

5.2.1 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, or forest enhancement are applicable examples that meet plan goals.

5.2.2 Private Forest Management

5.2.2.1 Woodland 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. Plans must be prepared by a DNR-approved plan writer, which may include SWCD staff and private foresters.

5.2.2.2 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.

5.2.3 Regulatory Program

Table 5.2 (page 90) shows the relationship and differences between statutory obligations and ordinances administered by the counties and WD within the LOWW.

5.2.3.1 Feedlots

Feedlot rules, regulations, and programs were established under MN Rules 7020 and are administered through the MPCA. While LOW County is a delegated feedlot county, Roseau County is not, which means the MPCA implements the feedlot rules in Roseau County. Counties administering the feedlot program provide regulatory oversight, technical assistance programs, and maintain a feedlot inventory. LOW SWCD has been delegated this authority by LOW County. Feedlots are also addressed in the City of Warroad ordinances (Chapter 153).

Cattle in the Warroad River Planning Region

5.2.3.2 Floodplain Management

Floodplain zoning regulations are intended to guide development in the floodplain consistent with the magnitude of the flood threat to minimize loss of life and property, disruption of commerce and governmental services, extraordinary public expenditure for public protection and relief, and interruption of transportation and communication, all of which adversely affect public health, safety, and general welfare. MN Rules Chapter 6120 establishes the authority for counties and cities to regulate activities within defined floodplain boundaries. LOW County, Roseau County, and the City of Warroad have established floodplain management ordinances.

5.2.3.3 Hazard Management

Section 104 of the Disaster Mitigation Act of 2000, Public Law 106-390, codified at 42 USC Sections 5121 et seq. Hazard Mitigation Planning, 44 CFR Part 201, established criteria for state and local hazard mitigation planning. Counties participating in the CWMP have developed hazard mitigation plans because of DMA 2000. Furthermore, the City of Warroad has an ordinance (Chapter 33) that addresses Hazard Management.

5.2.3.4 Shoreland Management

Erosion in LOW County

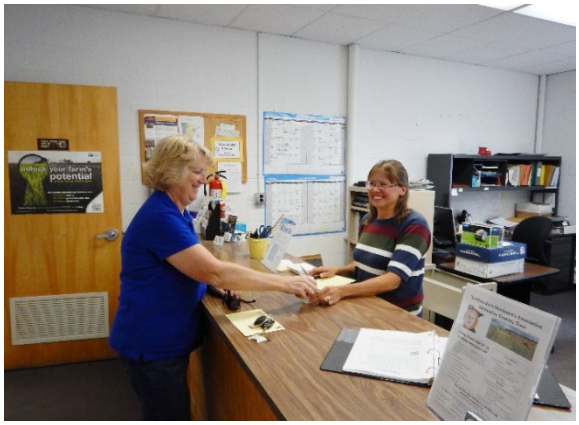
The Minnesota Legislature has delegated responsibility to LGUs to regulate the subdivision, use, and development of shorelands along public waters to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources. Established under MN Rules Chapter 6120, LOW County, Roseau County, City of Warroad, and the WWD all have developed shoreland management ordinances/rules.

5.2.3.5 Solid Waste Management

The counties participating in the LOWW CWMP operate solid waste management systems as directed by Minnesota Statues Chapters 115A and 400. These programs may include waste reduction and waste education programs, curbside pickup for household garbage and publicly owned and operated recycling center, mixed municipal solid waste transfer stations, demolition landfill, household hazardous waste special collection events, yard waste composting sites, and regional hazardous waste management facility.

5.2.3.6 Subsurface Sewage Treatment Systems (SSTS)

The counties participating in the CWMP administer Minnesota Rules Chapter 7080 through 7083 for SSTS. The programs provide technical assistance, education, plan review, and inspections to protect water quality, prevent and control water borne diseases, and prevent or eliminate nuisance conditions. The LOW County Land and Water Planning Office and Roseau County Environmental Office are responsible for fulfilling this obligation. The City of Warroad has provisions in Ordinance Chapter 51 for temporary individual disposal systems.



Well Testing Clinic

5.2.3.7 Wellhead Protection

The MDH administers the state wellhead protection rule, Minnesota Rules, Chapter 4720.5100 – 4720.5590, that sets standards for wellhead protection planning. Municipalities within the LOWW have completed wellhead protection plans. The most recent listing of completed wellhead protection plans can be found in the GRAPS report.

5.2.3.8 Aggregate Management

Individual counties manage the development and extraction of aggregate resources through local zoning and ordinances. The county government will remain responsible for this process.

5.2.3.9 Construction Erosion Control

The state of Minnesota, through the MPCA, requires permits through the National Pollutant Discharge Elimination System for all construction on development sites of one acre or more in size. The MPCA administers MN Rules Chapter 7090 for development sites that meet this threshold. Additionally, Sections 4.0 and 6.0 of the WWD Rules address construction site erosion control as does the City of Warroad Ordinance Chapter 153.

Erosion in LOW County

5.2.3.10 Countywide Land Use

Within the plan area, LOW County has countywide zoning and Roseau County does not. In LOW County, land use ordinances are administered by the Land and Water Planning Office. In Roseau County, Lake, Cedarbend, Moranville, and Laona Townships all administer zoning ordinances that pertain to land use. In the City of Warroad, Ordinance Chapters 150-157 establish the authority to regulate land use.

5.2.3.11 Preservation of Natural Drainage Ways

The purpose of a WD, under Minnesota Statute 103D.201, is to conserve the natural resources of the state by land use planning, flood control, and other conservation projects, by using sound scientific principles for the protection of the public health and welfare and the provident use of the natural resources. The WWD Rule Section 6.0 encourages the adaption of land use practices and other methods to reduce erosion and sedimentation and consequently preserve natural drainages.

Section 904 of the LOW County Zoning Ordinance addresses natural drainage ways as part of the stormwater management standards.

5.2.3.12 Public Drainage Systems

Public drainage repairs and improvements are managed by the LOW County Drainage Authority and Roseau County Drainage Authority. The WWD does not have any public drainage systems. Section 5 of the WWD Rules addresses disposal of surface water runoff, coordination of surface water runoff with entities having ordinances and drainage plans, and design criteria for drainage plans and storm water systems.

5.2.3.13 Drainage Authority

Both LOW and Roseau County Boards serve as the drainage authorities for all public drainage systems within their respective jurisdiction of the plan area. The WWD has no jurisdiction for public drainage systems. Shared systems do exist at the boundary between the counties (Judicial Ditch [JD] 22 and JD 62) and, in accordance with Ditch Law, the counties have established a joint ditch authority with representatives from each County Board. All roadside drainage is managed under the policies of the Road Authority (state, county, city, township) for roads under its jurisdiction outside of the drainage systems.

The LOW County public drainage systems in the plan area include all or part of the following systems: CD 1, JD 6, JD 16, JD 22, JD 24, JD 28, and JD 62.

The Roseau County public drainage systems within the plan area include all or part of the following drainage systems: CD 6, CD 10, CD 20, CD 25, CD 26, JD 22, JD 61, and JD 62.

5.2.4 Watershed District Rules

The WWD is the only watershed district in the LOWW. The district has a system of rules and regulations for the management of water within its WD boundary area. The implementation of existing rules and regulations within the district, as well as the development of new ones, will continue through the district. Existing rules and regulations within the district, as they relate to statutory responsibilities and local county ordinances, are shown in Table 5.2 (page 90).

5.2.4.1 Stormwater Runoff

Stormwater runoff is regulated by the MPCA through Minn. Rule Chapter 7090. In Roseau County, both the City of Warroad and the WWD have additional rules that address stormwater runoff within their jurisdictional boundaries.

5.2.4.2 Tile Drainage

There are no local ordinances regulating tile draining within the plan area. The WWD has recently begun a tile inventory and has asked landowners to submit information on tiled fields within the jurisdictional boundaries of the district. LOW County has a process for permission of the installation of tile outlets in the county right-of-way (ROW). The application requires approval from the Land and Water Planning Office and Public Works Department (PWD).

5.3 Protected Lands Maintenance ("Keep It")

"Keep It" programs are those that involve permanent landscape protection, such as Sustainable Forest Incentive Act covenant lands, conservation easements, and public land acquisition. Projects will be actively targeted to prioritized areas for protection (Section 4). Non-priority areas will be considered on an opportunity basis.

Orchid in LOW County

5.3.1 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, Minnesota Land Trust, or The Nature Conservancy.

5.3.2 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 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."

5.3.3 Wetland Conservation Act (WCA)

The Minnesota Legislature passed the WCA of 1991, which is intended to result in no net loss of wetlands through filling, draining, excavating, or converting wetlands to other uses. LGUs are responsible for administering, regulating, and educating landowners on WCA. MN Rules Chapter 8420 establishes this authority. In LOW County, the WCA LGU is the Land and Water Planning Office; in Roseau County the WCA LGU is the Roseau SWCD.

Flooding in LOW County

5.3.4 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.

5.3.5 Land Acquisition

For areas with unique and important resources that meet state goals, the DNR, United States Fish and Wildlife Service (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 that are used for small game hunting and waterfowl migration.

5.3.6 Conservation Reserve Program (CRP)

CRP is administered by the Farm Service Agency (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.

5.4 Constructed Environmental Enhancements ("Fix It")

Two-Stage Ditch

"Fix It" programs include installation of on the ground, usually permanent or long-term constructed enhancements, including septic system upgrades, stormwater projects, and sealing unused wells. The program can also be used to fund in-channel projects or any other physical implementation that works towards achieving measurable goals (e.g. public water accesses). Any type of assistance (e.g. financial incentive, technical assistance, tax exemption, conservation easement, land acquisition) associated with these types of projects/practices are funded through the program. Projects will be actively targeted to prioritized areas for protection (Section 4). Non-priority areas will be considered on an opportunity basis.

The Partnership established under the formal agreement of this plan (Section 6) is responsible for managing the process, paperwork, and funds (including payment requests) of the "Manage It" program. The program will be coordinated through LGUs.

5.4.1 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.

5.4.2 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 restorations, 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.

5.4.3 Capital Improvement Projects

A capital improvement is defined as a major non-recurring expenditure for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or

environmental features. Capital improvements are beyond the normal financial means of the LOWW Planning Partnership and therefore require external or atypical funding (e.g. grants, bonds, levies, or assessments).

Large drainage system improvements fall within the "Fix It" program. County Boards are the local drainage authorities, and ensure drainage projects are multi-purpose, involve early coordination with state and local partners, and do not have adverse impacts on water storage or downstream waters.

Bank Stabilization Project on the West Branch of the Warroad River

The CIP actions in Section 4 (page 72) identify proposed capital improvements within the LOWW. Identified CIPs include public access sites, the Warroad Marina project, and feasibility studies for sediment removal. Due to the specificity and increased funding required for CIP, additional discussions are needed among plan participants to develop the specific process for implementing capital improvements. Specifically, members of the Joint Powers Board or the Implementation Committee's individual and representative Boards are expected to discuss the means and methods for funding new capital improvements with potential funding partners before an implementation timeline can be established.

Ongoing inspection, maintenance, and operation of CIPs is expected. CIPs completed through this plan will be operated and maintained by the owner of the project for the lifespan of the project as specified under the associated actions.

5.4.4 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.

5.5 Data Collection and Outreach Program ("Know It")

5.5.1 Outreach

Actions assigned as "Know It" are both outreach actions as well as data collection actions. Outreach actions use information sharing, stakeholder meetings, programs, and events to make progress towards measurable goals. These actions are primarily targeted at two audiences:

- General Public and
- Landowner, Producer, and Lakeshore Owner.

Cover Crop

Education on watershed issues and outreach on plan actions is essential for implementation success. Public buy-in is critical for long-term support of conservation work and immediate implementation of actions that require landowner collaboration.

Outreach actions are operated through a combination of independent work and shared services.

5.5.5.1 General Public

Activities pertaining to the general public audience will focus on water-related issues and management efforts across the watershed. Plan partners include LOW County and SWCD, Roseau County and SWCD, and the WWD. These entities already collaborate with others to increase education and outreach and community engagement within the plan area. Programs that the plan partners have used for education and outreach purposes include, but are not limited to, those included in Table 5.1.

City of Warroad Arbor Day at The Point

Table 5.1. Programs utilized by the LOWW Planning Partnership for general public education and outreach opportunities.

General Public Education & Outreach Opportunities	LOW County	LOW SWCD	Roseau County	Roseau SWCD	WWD
Agassiz Low Lands Environmental Learning Area School Forest[1]		X			
AIS Program	X	X	X	X	
County Ag Inspector	X			X	
County Fairs[1]		X	X	X	X
Envirothon[1]		X		X	
Household Hazardous Waste Program[1]	X		X		
Keep It Clean LOW Program	X	X	X	X	
Long Lake Conservation Center: Outdoor Explorers Camp[1]				X	

[1] Active, but not specifically within the Plan Boundary

Not all education opportunities will be in-person. Social media is an emerging medium that many LGU staff have used to educate and inform the general public about resource concerns and what actions are being conducted to address them. Although some citizens often use these platforms as their news and information source, many do not. Therefore, e-mail, website updates, newsletters, news articles, and other releases will remain a priority for communicating water quality, quantity, and conservation issues and concerns with local community members.

Outreach resources currently used by the LOW SWCD include their website, newsletters, newspapers, radio, local Channel 3 announcements, targeted letter mailings, their county fair booth, workshops, public meetings and open house forums, field days, presentations at local governments and civic meetings (e.g., Master Gardeners, Chamber of Commerce, schools etc.). Similarly, outreach resources currently used by the Roseau SWCD include their website, newsletters, newsgrams, newspaper articles, targeted letter mailing, radio, and their county fair booth.

Lastly, many counties, WDs, and SWCDs have programs specifically devoted to educating the public about resource concerns and issues. These include programs related to aquatic and terrestrial invasive species, noxious weeds, land management activities, and drinking water resources. Actions resulting from these programs may include development of educational materials, newsletters, coordination of volunteer activities, school presentations, and public meetings to raise awareness and gain a better understanding of the consequences of individual decisions on water management. General media campaigns, community and LGU surveys, and municipal training are also included.

2014 Cover Crop Workshop in Laona Township, Muskeg Bay Planning Region

Consistent across many of these education programs is collaboration between organizations. Plan partners collaborate with others to increase outreach opportunities, share and leverage resources, and better engage diverse audiences. Collaboration with other entities is discussed more in Section 6—Plan Administration and Coordination.

5.5.5.2 Landowner, Producer, and Lakeshore Owner

The purpose engaging landowners, producers, and lakeshore owners is to understand, engage, and communicate with this audience. Plan actions will help these groups increase their understanding of resource issues and the benefits of conservation action.

There are many education and outreach activities already occurring in the area tailored to landowners, producers, and lakeshore property owners. Existing examples include, but are not limited to:

- Providing technical and/or application assistance related to:
    - Structural/management practice implementation (e.g. filter strips, side-water inlets, tree plans, etc.)
    - Conservation of wetlands (e.g. WCA)
    - Nutrient management plans
    - Feedlot runoff control
    - SSTS failure

- Holding educational workshops related to:
    - Management practices (e.g. cover crops, grazing, weeds, tree pruning, drain tile, etc.)
    - Structural practices (e.g. shoreland protection/plantings, etc.)
    - Conservation programs (e.g. Conservation Reserve Program [CRP] and continuous CRP)
    - Wildlife habitat preservation/protection and private forestry establishment/improvement through the CRP and SFIA

Conservation Practice: Leaving Standing Grain

- Educating about and offering free or reduced cost well water clinics for nitrate and coliform bacteria testing; and
- Offering agricultural inspection and chemical licensing/examination (e.g. Agricultural Inspector Program).

Plan actions include production of educational materials, demonstration projects, and workshops tailored to landowners, agricultural producers, and lakeshore owners about compensation and incentive programs to promote structural and management practices. Other actions may include the development of citizen-led initiatives that promote conservation through peer-based outreach and performance-based incentives. These could include Farmer-Led Councils, citizen-led groups, farmer mentor lists, and local advisory committees.

5.5.2 Data Collection

Actions funded under the "Know It" program use research and monitoring to close information and data gaps. Closing data gaps allows for the conceptualization of tailored, science-based implementation strategies aimed at developing information to better address priority issues. Plan participants will continue to invest in the development and assembly of data and information.

Oaks Monitoring Station

Implementation actions generally fall into two categories:

- water quality/quantity monitoring; and
- filling of data gaps (e.g. needs assessments, feasibility studies, and data analysis).

This program is in part dedicated to enhancing and maintaining the monitoring network in the LOWW to capture and document measurable water quality changes resulting from watershed implementation activities. Plan partners have a robust surface water monitoring network in place that continues to be refined.

Both LOW and Roseau SWCDs have conducted water quality monitoring in the LOWW since the early 2000's. Local entities continue to pursue funding to assess and monitor water quality in the LOWW to fill identified data gaps and measure progress toward implementation goals, as well as provide the basis for future planning and adaptive management.

There are several surface monitoring sites in the LOWW that serve as assessment locations by the MPCA as part of the watershed monitoring approach. The MPCA began an Intensive Watershed Monitoring (IWM) Program with the LOWW in 2012 and the MPCA awarded Surface Water Assessment Grants (SWAG) to Roseau and LOW SWCDs to aid in the IWM process. Additional goals of the SWAG grant program have been to expand the local entities' training programs and outreach efforts enabling organizations to recruit and retain additional community volunteers for both lake and stream monitoring in the LOWW. Data collected throughout the IWM process includes streamflow, water chemistry, biological monitoring, and biological stressor identification. The Cycle 2 IWM process was most recently completed through LOW and Roseau SWCD efforts.

Water Level Monitor, Bostic Creek Planning Region

Currently, the DNR maintains one monitoring well (Unique ID 243966, DNR #39000) as part of their statewide groundwater observation well program. The MDA does not currently monitor

groundwater quality in this region. There is one MPCA Ambient Groundwater Monitoring well that will allow for future groundwater quality trend analysis within the LOWW.

Several of the actions in Section 4 that are associated with the "Know It" Program focus on filling data gaps needed to make sound watershed management decisions. Examples include ground-truthing and surveys, feasibility studies, and additional monitoring efforts. The LOWW Planning Partnership will work to identify and fund these types of activities needed to fill these data gaps as part of this program.

During implementation, the "Know It" Program will build on the data and information processes already established by plan participants. This initiative will also be used to fund the implementation of actions aimed at building and maintaining technical capacity to fully use new technology and tools for water resource management. It will also be used to determine water quality trends and assess plan success. The program will be operated through the sharing of services. However, actions will be locally administered and implemented with individual local entities operating as the fiscal agent.

Table 5.2. Local controls administered by the counties and watersheds district participating in the LOWW CWMP. This list is not intended to be all-inclusive.

	LOW County	Roseau County	WWD
Buffers	LOW Buffer Ordinance and MN Statute §103F.48 LOW County Land & Water Planning Office	Roseau County – Ordinance No. 40, State Statutes	--
Feedlots	MN Rules Chapter 7020 LOW SWCD – Delegated Authority from LOW County	MN Rules Chapter 7020 MPCA, City of Warroad Chapter 153	--
Floodplain Management	LOW County Zoning Ordinance and MN Rules Chapter 6120.5000-6120.6200 LOW County Land & Water Planning Office	SWCD – Ordinance No. 29 City of Warroad Ordinance Chap 151	--
Hazard Management	Emergency Management – All Hazard Mitigation Plans	Emergency Management – All Hazards Mitigation Plan City of Warroad Ordinance Chap 33	--
Individual Sewage Treatment Systems	LOW County SSTS Ordinance and MN Rules Chapter 7080-7081 LOW County Land & Water Planning Office	Environmental Office – Ordinance No. 24; City of Warroad Chapter 51 (temporary), 152 (manufactured home park), 153	--
Municipal Wastewater Treatment Systems	City of Williams Wastewater Facilities Ordinance No. 56	City of Warroad Ordinance Chapter 51, 151,152, 153	WWD Rules 7.0
Shoreland Management	LOW County Zoning Ordinance and MN Rules Chapter 6120.2500-6120.3900 LOW County Land & Water Planning Office	SWCD – Ordinance No. 4 City of Warroad Ordinance Chap 153	Section 5.0 B. e.
Solid Waste Management	LOW County Solid Waste Ordinance City of Williams Sewer Use Ordinance No. 55	Environmental Office – Ordinance(s) No. 2 & 31 City of Warroad Ordinance Chap 50	--
Wetland Conservation Act	MN Rules Chapter 8420 LOW County Land & Water Planning Office	MN Rules Chapter 8420 Roseau County	WWD Rules 4.0, 5.0 (Not WCA specific but permit required for dredging or filling a wetland)
Aggregate Management	LOW County Zoning Ordinance LOW County Land & Water Planning Office	SWCD – Ordinance No.4	--
Agricultural Soil Erosion	--	--	WWD Rules 6.0 (Sloping lands abutting drainage-ways, lakes, ponds or reservoirs shall be used in such a manner so as to provide reasonable control of sediment)

	LOW County	Roseau County	WWD
Bluffland Protection	LOW County Zoning Ordinance	Roseau County – Ordinance No.4, City of Warroad Chapter 153	--
City Ordinances	City of Williams	City of Warroad, City of Roosevelt	--
Construction Erosion Control	MN Rules Chapter 7090 MPCA	MN Rules Chapter 7090 MPCA, City of Warroad Chapter 153	Section 4.0; Section 6.0 A., c-e
Forestland Management	LOW County Zoning Ordinance	DNR; Division of Forestry City of Warroad Ordinance Chap 157 – 157.135, 157.136B	--
Land Use	LOW County Zoning Ordinance LOW County Land & Water Planning Office	Township Zoning – Lake, Cedarbend, Moranville, & Laona City of Warroad Ordinance Chapter 157	--
Preservation of Natural Drainage Ways	LOW County Zoning Ordinance	--	WWD Rules Section 5.0
Public Drainage Systems: Establishment, Improvement, Rerouting, Repairs, Impoundments, Buffer Compliance	LOW County Drainage Authority	Roseau County, Culvert Policy, Buffer Ordinance No. 40	-
Stormwater Runoff	MN Rules Chapter 7090 MPCA	MN Rules Chapter 7090 MPCA City of Warroad Ordinance – Sections 51.48, 152.06	WWD Section 4.0; Section 5. C. a-h.
Stream Hydraulic Capacity	--	--	WWD Rules 5.0, 6.0
Surface Drainage	--	--	WWD Rules 5.0
Tile Drainage	Public Works and State Statutes	State Statutes	-

6. Plan Administration

6.0 Plan Administration

6.1 Funding

This section describes how the plan will be funded and administered. Plan participants expect to pursue grant opportunities collaboratively to fund the implementation schedules. Actions are organized by implementation programs within the implementation schedules. The sources of funding that will be used to fund the implementation programs are shown in Table 6.1.

This plan is ambitious. Baseline funding sources will not be sufficient to implement everything in the implementation schedules. As such, the success of implementing the plan will depend on collaboratively sought competitive state, federal, and private grant dollars.

The most used programs and grants for executing the implementation programs described by this plan and used within the implementation schedules are shown in Table 6.2. These funding grants and programs are cross-referenced to plan implementation programs, thereby showing potential sources of revenue for implementation.

Table 6.1. Summarized budget for the LOWW CWMP baseline funding levels including local, state, federal, and non-governmental organizations (NGOs) as funding sources.

Funding Level	Annual	10 Year Total
Baseline	$712,000	$7,120,000
WBIF	$274,500 *(2025-2026 allocation)*	$2,745,970
Other	$1.047,600	$10,476,000

Table 6.2 Implementation programs and related funding sources for the LOWW CWMP. Note: This table lists examples of funding sources and is not intended to be all-inclusive.

Source	Organization	Program/Grant Name	Primary Assistance Type	Manage It	Fix It	Keep It	Know It
Federal	NRCS	Conservation Innovation Grant (CIG)	Financial	x			
Federal	NRCS	Conservation Stewardship Program (CSP)	Financial/Technical	x			x
Federal	NRCS	Environmental Quality Incentives Program (EQIP)	Financial/Technical	x	x		
Federal	NRCS	Agricultural Conservation Easement Program	Easement	x		x	
Federal	FSA	CRP	Easement	x		x	
Federal	FSA	Conservation Reserve Enhancement Program	Easement	x		x	
Federal	FSA	Farmable Wetlands Program	Easement	x			
Federal	FSA	Grasslands Reserve Program	Easement	x	x	x	
Federal	FSA/USDA/National Rural Water Association	Source Water Protection Program	Technical	x			x
Federal	USFWS	Partners for Fish and Wildlife Program	Financial/Technical	x		x	
Federal	Pollution Control Agency	Federal Clean Water Act Section 319 Grants	Financial	x			
Federal	Federal Emergency Management Agency (FEMA)	Hazard Mitigation Grant Program	Financial	x	x		x
Federal	FEMA	Pre-Disaster Mitigation	Financial	x			x
Federal	FEMA	Flood Mitigation Assistance	Financial	x	x		
Federal	FEMA	Risk Mapping, Assessment, and Planning	Technical	x			x
Federal	EPA	Water Pollution Control Program Grants (Section 106)	Financial	x			x
Federal	EPA	State Revolving Fund	Loan	x			
Federal	EPA	Drinking Water State Revolving Fund	Loan	x			
State	DNR	AIS Control Grant Program	Financial/Technical	x	x		
State	DNR	Conservation Partners Legacy Grant Program	Financial	x		x	
State	DNR	Pheasant Habitat Improvement Program	Financial	x		x	
State	DNR	Flood Hazard Mitigation Grant Assistance	Financial	x	x		x
State	DNR	Forest Stewardship Program	Technical		x	x	
State	DNR	Aquatic Management Area Program	Easement			x	
State	BWSR	CWF Grants	Financial	x	x	x	x
State	BWSR	Erosion Control and Management Program	Financial	x	x		x
State	BWSR	Natural Resources Block Grant	Financial	x	x		
State	BWSR	Reinvest in Minnesota	Financial	x		x	

Source	Organization	Program/Grant Name	Primary Assistance Type	Manage It	Fix It	Keep It	Know It
State	MPCA	SWAG	Financial				x
State	MPCA	Clean Water Partnership	Financial	x			
State	MDH	Source Water Protection Grant Program	Financial	x	x	x	x
State	MDH	Well Sealing Program	Financial		x		
State	MDA	Agriculture BMP Loan Program	Financial	x	x		
Other	Ruffed Grouse Society	Wildlife Habitat Grant	Financial	x		x	
Other	Ducks Unlimited (DU)	DU	Financial/Easement	x		x	x
Other	Sustainable Forestry Initiative	Conservation Grant Program	Financial	x		x	x

*Disclaimer: This is not an all-inclusive list of funding opportunities but instead provides examples of funding opportunities and their primary relation to the LOWW CWMP Implementation Programs.

6.1.1 Local Funding

Swamp Milkweed in LOW County

The amount of funding needed to implement the baseline funding level from local sources is an estimated $227,694 annually and $2,276,943 for the ten-year plan life cycle (Table 6.1). Local revenue is defined as money derived from either the local property tax base or in-kind services of any personnel funded from the local tax base. Local funding excludes fees for service and grants or partnership agreements with the federal government or other conservation organizations. Locally derived fees and non-state grants are eligible for grant matching.

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 grant matching.

6.1.2 State Funding

Sunset on Bostic Bay

The amount of funding needed to implement the baseline funding level from state sources is $395,516 annually and $3,955,164 for the ten-year plan life cycle. State funding includes all funds derived from the state tax base. State funding excludes general operating funds obtained from counties, fees for service and grants, or partnership agreements with the federal government or other conservation organizations.

6.1.3 Federal Funding Sources

The amount of funding needed to implement the baseline funding level from federal sources is $89,192 annually and $891,916 for the ten-year plan life cycle. Federal funding includes all funds derived from the federal tax base. For example, this includes programs such as CSP, EQIP, CRP, and CIG. This also includes NRCS funding for structural practice implementation. The EPA also has Section 319 funds, which traditionally have been used for implementation to improve water quality. Federal funding excludes general operating funds obtained from counties, fees for service and grants or partnership agreements with state government or other conservation organizations.

Federal dollars will be used to help fund the implementation programs described by this plan where the purpose of an implementation program aligns with the objectives of various federal agencies.

6.1.4 Other Funding Sources Including NGOs and Private Entities

This category of funding excludes general operating funds obtained from:

- BWSR;
- Counties;
- Fees for service;
- Local funding sources; and
- Grants or partnership agreements with the state or federal government or other conservation organizations.

Purple Loosestrife, Muskeg Bay Planning Region

Several non-governmental funding sources may provide technical assistance and fiscal resources to implement the LOWW CWMP implementation schedule. For example, locally active DU and Whitetails Unlimited chapters are potential funding sources that differ from the other categories. This plan should be provided to all NGOs as a means of exploring opportunities to fund specific aspects of the targeted implementation schedule.

Private sector companies, including those specifically engaged in local lake-based tourism (resorts), agribusiness, and forestry, are often overlooked as a potential source of funding for implementation. The success of lake-based tourism is highly dependent on the results of watershed management and many agribusiness companies are working to improve water quality. Some of the agribusiness companies are providing technical or financial support for the implementation of structural and management practices because they are interested in agricultural sustainability. Additionally, the forestry industry often looks for opportunities to participate in local conservations efforts. This plan could be used to explore with private sector companies whether the estimated water quality benefits have monetary value and therefore, may provide access to funding from the private sector.

6.2 Plan Administration & Coordination

6.2.1 Decision-Making & Staffing

It is expected that the roles and functions (Table 6.3) of each committee will shift and change focus during implementation. The LOWW CWMP fiscal and administrative duties are assigned through a Joint Powers Board decision as outlined in the formal Joint Powers Agreement. Responsibilities for biennial work planning and serving as the central fiscal agent will be revisited by the Implementation Committee on an annual basis and approved by the Joint Powers Board.

Table 6.3. Anticipated roles for LOWW CWMP implementation.

Committee Name	Roles and Responsibilities
Joint Powers Board	• Review the implementation funds from plan participants • Approve the biennial work plan • Approve annual fiscal reports • Approve annual reports submitted to BWSR • Annually review and confirm priority issues • Direct the Implementation Committee on addressing emerging issues • Approve plan amendments • Implement county ordinances and state statutory responsibilities separately from plan implementation • Approve grant applications • Approve annual assessment
Advisory Committee	• Review and provide input for the biennial work plan • Identify and advise on collaborative funding opportunities • Recommend program adjustment to the Implementation Committee • Assist with execution of the targeted implementation schedule
Implementation Committee	• Review the status of available implementation funds from plan participants • Review fiscal reports • Review annual reports submitted to BWSR • Evaluate and recommend response to emerging issues • Prepare grant work plans and related amendments • Implement the targeted implementation schedule • Develop Watershed Based Implementation Funding Work Plans
Local Fiscal/Administrative Agent	• Convene committee meetings • Prepare the biennial work plan • Prepare and submit grant applications/funding requests • Compile annual results for annual assessment

It is also possible that implementation of this plan will require additional staffing needs, such as a Watershed Coordinator. The roles and responsibilities of this position would be established as part of the plan administration and coordination of the plan implementation entity and approved by the Joint Powers Board.

6.2.2 Collaboration

6.2.2.1 Collaboration with Other Units of Government

Zippel Bay State Park

The LOWW Planning Partnership will continue coordination and cooperation with other governmental units at all levels. This cooperation and coordination are both horizontal and vertical. Vertical coordination between the LOWW Planning Partnership and agencies such as BWSR, USACE, DNR, MDA (e.g. MN Agriculture Water Quality Certification Program), MDH, and the MPCA are mandated through legislative and permit requirements. Horizontal cooperation between the LOWW Planning Partnership and comparable units of government such as municipalities, township boards, county boards, SWCD boards, the WWD board, joint powers boards, and other water management authorities are a practical necessity to facilitate watershed wide activities. Additional federal agencies that the LOWW Planning Partnership currently collaborates with include the USDA – FSA, USDA – NRCS, and the USFWS. Lastly, because LOW is a boundary water with Canada, this plan will continue collaboration established via the International Joint Commission's International Rainy-Lake of the Woods Watershed Board and the International Multi-Agency Arrangement .

The LOWW Planning Partnership will exercise intergovernmental coordination and cooperation as an absolute necessity for it to perform its required functions. The LOWW Planning Partnership will continue to foster an environment that enhances coordination and cooperation to the maximum extent possible throughout the implementation of this plan.

The LOWW Planning Partnership has identified that agency goals, objectives, directions, and strategies are generally compatible with the content of this plan. The implementation actions and goals were predominantly defined through a collaborative effort. However, 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.

The LOWW Planning Partnership will act as the lead for the implementation of this plan's identified priority issues. Due to local funding, technology, and other capacities, issues that were not prioritized are encouraged to be implemented with agency-led efforts. The LOWW Planning Partnership will continue to cooperate and collaborate with other governmental units on

implementation actions related to issues that were not prioritized by the LOWW Planning Partnership . However, the cooperating governmental unit will be responsible for primary funding of these actions.

6.2.2.2 Collaboration with Others

Plan partners expect to continue and build on existing collaborations with others, including non-governmental organizations, while implementing this plan. These organizations have various functions, many of which address issues and work towards achieving goals outlined in this plan. Examples of functions these groups may provide include education and facilitation services, volunteering and promotion of stewardship related to LOW and its surrounding resources, and assisting with land stewardship within the watershed itself.

Winter Road Lake Peatland SNA

Potential non-governmental collaboration partners range from educational groups like the UMN Extension, to smaller private organizations such as 4-H, Friends of Zippel Bay State Park, Master Gardeners, Minnesota State Cattleman's Association, and the Scouts, to specialized local groups such as the Keep It Clean Committee. Other partners include international groups such as the International Rainy-Lake of the Woods Watershed Board, the LOW Water Sustainability Foundation, and the LOW Control Board.

6.2.3 Work Planning

This plan envisions collaborative implementation. Therefore, work planning is envisioned to align the priority issues addressed, the availability of funds, and the roles and responsibilities for implementation.

6.2.3.1 Local

An biennial work plan will be developed by the Implementation Committee based on the implementation schedule and any adjustments made by means of the plan assessment (Section 6.2.4). The Implementation Committee may solicit input from the Advisory Committee during this process. The work plan will then be presented to the Joint Powers Board, who will ultimately be responsible for approval. The intent of these work plans will be to maintain collaborative progress toward completing actions within the implementation schedule and achieving measurable goals.

6.2.3.2 Funding Request

The Implementation Committee will collaboratively develop, review, and submit a biennial work plan which includes a funding request from this plan to BWSR. The work plan and funding request will be submitted to and ultimately approved by the Joint Powers Board prior to submittal to BWSR. The work plan will be developed based on the implementation schedule and any adjustments made through plan assessment (Section 6.2.4).

6.2.4 Assessment, Evaluation, and Reporting

6.2.4.1 Accomplishment Assessment

Each year the Implementation Committee will provide the Joint Powers Board with an annual update on the progress of the plan's implementation. For example, any additional acres forest management will be tracked so that each year the Implementation Committee will report how many additional acres were managed in the watershed. A tracking system will be used to measure progress based on measurable goals 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.

6.2.4.2 Partnership Assessment

Biennially, the Implementation Committee, with the help of the Advisory Committee, will review the LOWW 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, Joint Powers Board, and partners such as state agencies and non-governmental organizations. This feedback will be presented to the Joint Powers Board 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 midpoint evaluation. The LOWW Planning Partnership intends to pursue watershed-based funding to meet goals and plan implementation schedules.

6.2.4.3 Midpoint Evaluation

This plan has a ten-year life cycle beginning in 2027. Over the course of the plan life cycle, progress towards reaching goals and completing the implementation schedule may vary. In addition, new issues may emerge, and/or new monitoring data, models, or research may become available. As such, in 2031-2032, a midpoint 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.

Sunset on LOW

6.2.4.4 Reporting

The LGUs have several annual reporting requirements. A number of these reporting requirements will remain a responsibility of the LGUs. However, reporting related to grants and programs developed collaboratively and administered under this plan will be reported by the Implementation Committee. As part of the workplan development and in addition to annual reports, the Implementation Committee may also decide to develop an annual State of the Watershed Report. This report would document progress toward reaching goals and completing the implementation schedules and will describe any new emerging issues or priorities. The information needed to annually update the State of the Watershed Report would be developed through the annual evaluation process.

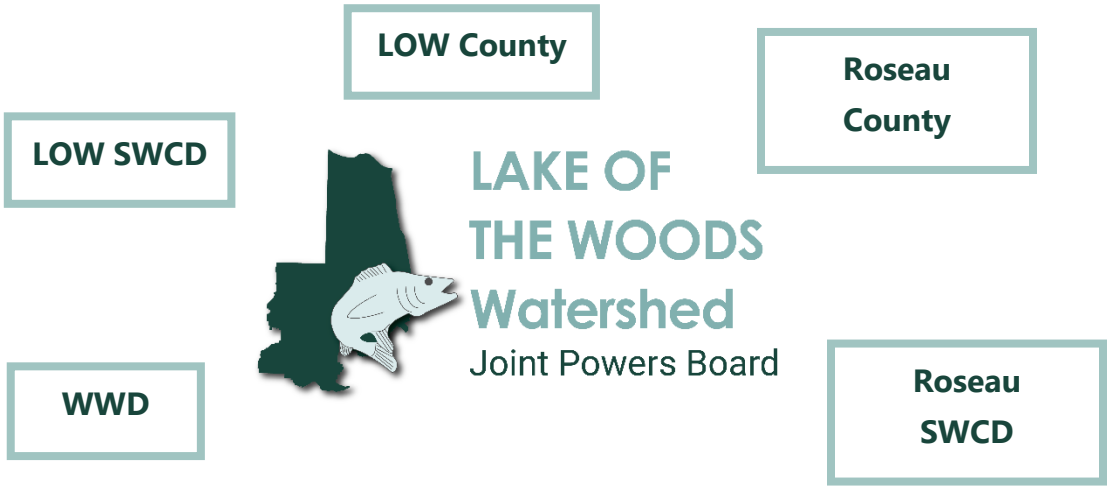
6.2.5 Plan Amendment Process

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

During the time this plan is in effect, it is likely that new data giving a better understanding of watershed opportunities and solutions will be generated. Administrative authorities, state policies, and resource concerns may also change. New information, significant changes to the projects, programs, or funding in the plan, or the potential impact of emerging concerns and issues may require activities to be added to the plan. Amendments may be proposed by member local government units. Plan amendment initiation process will be started by the Joint Powers Board when approved according to their bylaws.

6.2.6 Formal Agreements

Upon the completion of the original plan in 2019, the LOW Planning Partnership formed the LOW Watershed Joint Powers Board (LOWWJPB), made up of LOW County, LOW SWCD, Roseau County, Roseau SWCD, and the WWD (https://www.lowwjpb.org). The formation of the LOWWJPB signifies an important step in local efforts to manage, restore, and protect water and natural resources within the Minnesota portion of the LOWW.



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