

Otter Tail River

ONE WATERSHED
ONE PLAN

Acknowledgements

Project Partners

East Otter Tail SWCD
West Otter Tail SWCD
Otter Tail County
Becker SWCD
Becker County
Pelican River Watershed District
Cormorant Lakes Watershed District



Steering Committee

Darren Newville, East Otter Tail SWCD
Don Bajumpaa, East Otter Tail SWCD
Bryan Malone, Becker SWCD
Tera Guetter, Pelican River Watershed District
Pete Waller, Board of Water and Soil Resources
Henry Van Offelen, Board of Water and Soil Resources
Moriya Rufer, Houston Engineering



Contributors

Mary Steinlicht, Red River Valley Conservation Service
Mitch Brinks, Technical Service Area 8
Mark Kaelke, West Central Initiative

Prepared by

Moriya Rufer
Houston Engineering
7550 Meridian Circle North, Suite 120
Maple Grove, MN 55369

Funding by



Funding provided from the Clean Water Fund as part of the Clean Water, Land, and Legacy Amendment.

Policy Committee

Wayne Johnson, Otter Tail County (Chair)
Wayne Enger, East Otter Tail SWCD
Rick Drevlow, West Otter Tail SWCD
John Okeson, Becker County
Michelle Andresen, Becker SWCD
Dennis Kral, Pelican River Watershed District
Jeff Moritz, Cormorant Lakes Watershed District

Advisory Committee

Darren Newville, East Otter Tail SWCD
Don Bajumpaa, East Otter Tail SWCD
Chris LeClair, Otter Tail County
Kyle Westergard, Otter Tail County
Brad Mergens, West Otter Tail SWCD
Aaron Larsen, West Otter Tail SWCD
Bryan Malone, Becker SWCD
Kyle Vareberg, Becker County
Tera Guetter, Pelican River Watershed District
Gina Kemper, Pelican River Watershed District
Liz Larson, Cormorant Lakes Watershed District
Julie Aadland, DNR
Scott Schroeder, MPCA
Dan Disrud, MDH
Luke Stuewe, MDA
Pete Waller, BWSR
Henry Van Offelen, BWSR
Bob Guetter, NRCS
Wayne Bringer, Tamarac National Wildlife Refuge



Acronyms and Abbreviations

1W1P	One Watershed, One Plan
AIS	Aquatic Invasive Species
BMP	Best Management Practice
BWSR	Board of Water and Soil Resources
CEC	Contaminants of Emerging Concern
COLA	Coalition of Lake Associations
CRP	Conservation Reserve Program
DNR	Minnesota Department of Natural Resources
DO	Dissolved Oxygen
DWSMA	Drinking Water Supply Management Area
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency
GRAPS	Groundwater Restoration and Protection Strategy
HEI	Houston Engineering, Inc.
HUC	Hydrologic Unit Code
LGU	Local Government Unit
LSP	Landscape Stewardship Plan
MAWQCP	Minnesota Agriculture Water Quality Certification Program
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MGLP	Midwest Glacial Lakes Partnership
MnDOT	Minnesota Department of Transportation
MOA	Memorandum of Agreement
MPARS	Minnesota DNR Permitting and Regulatory System
MPCA	Minnesota Pollution Control Agency
MRWA	Minnesota Rural Water Association
MS4	Municipal Separate Storm Sewer System
NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
OTW	Otter Tail Watershed
OTCWMP	Otter Tail Comprehensive Watershed Management Plan
PC	Policy Committee
PFAS	Perfluoroalkyl Substances
PFC	Perfluorochemicals
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanoic Sulfonic Acid
RAQ	Risk Adjacency Quality



RRVCSA	Red River Valley Conservation Service Area
SCORE	Select Committee on Recycling and the Environment
SFIA	Sustainable Forest Incentive Act
SSTS	Subsurface Sewage Treatment Systems
SWCD	Soil and Water Conservation District
TNWR	Tamarac National Wildlife Refuge
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
W:L	Watershed to Lake Ratio
WBIF	Watershed-Based Implementation Funding
WCA	Wetland Conservation Act
WHAF	Watershed Health Assessment Framework
WMA	Wildlife Management Areas
WPLMN	Watershed Pollutant Load Monitoring Network
WRAPS	Watershed Restoration and Protection Strategy
WRP	Wetland Reserve Program



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1. Executive Summary



Section 1. Executive Summary

In 2021-2022, the Otter Tail Watershed (OTW) planning partners embarked on the development of an Otter Tail Comprehensive Watershed Management Plan (OTCWMP) through the One Watershed One Plan (1W1P) program administered by the Board of Water and Soil Resources (BWSR), Minnesota Statutes §103B.801. This effort marks a **watershed moment** for management of the natural resources in this area. Previously, each local government had its own water management plan; now, all the local governments in the planning area collaborated on a joint plan to guide the management of the diverse and valuable natural resources in the watershed.

The OTW, located in northwest Minnesota, has a wide diversity of natural resources from lakes and streams to forests, prairies, and wetlands. It is at the headwaters of the Red River Basin (RRB) but looks much different than the rest of the RRB because of its many lakes, intact wetlands, and forested uplands. Most of these natural resources are in good condition, so this plan focuses on prevention of future degradation and protection of outstanding resources, as evidenced in the watershed vision statement below.

The natural beauty and diversity of water and land in the Otter Tail Watershed is attractive to residents and tourists because of its recreational opportunities, farming, forests, and wildlife. We strive to sustain this diversity of riches for future generations to enjoy.

Plan Area

The plan area spans parts of five counties, but most of the plan area is in Becker and Otter Tail (Figure 1.1). There are also two watershed districts that are completely within the plan area: Pelican River Watershed District and Cormorant Lakes Watershed District. The White Earth National Wildlife Refuge and Tamarac National Wildlife Refuge cover the headwaters portion of the watershed. Major towns include Detroit Lakes, Fergus Falls, Perham, and Pelican Rapids.

The plan area border varies slightly from the major watershed border because it lines up with other neighboring plan borders to not leave any orphan areas without a plan. In addition, the plan area ends at Orwell Dam because the

watershed

wá·ter·shed

noun

1. An area or region drained by a river or river system.
// The Otter Tail Watershed.
2. An event or period marking a turning point in a course of action or state of affairs.
// This plan marks a watershed moment in the management of the Otter Tail Watershed.

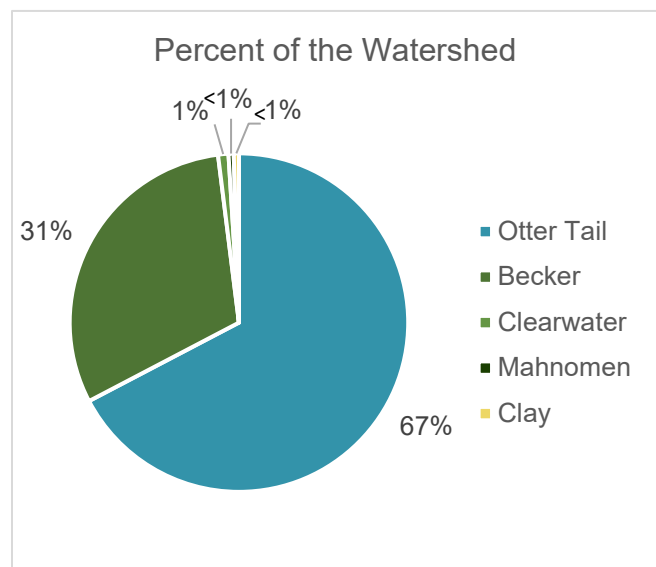


Figure 1.1. Plan area per county.

Lower Otter Tail River is in the Buffalo Red River Watershed District and is therefore a part of the Buffalo Red Comprehensive Watershed Management Plan (Figure 1.2).

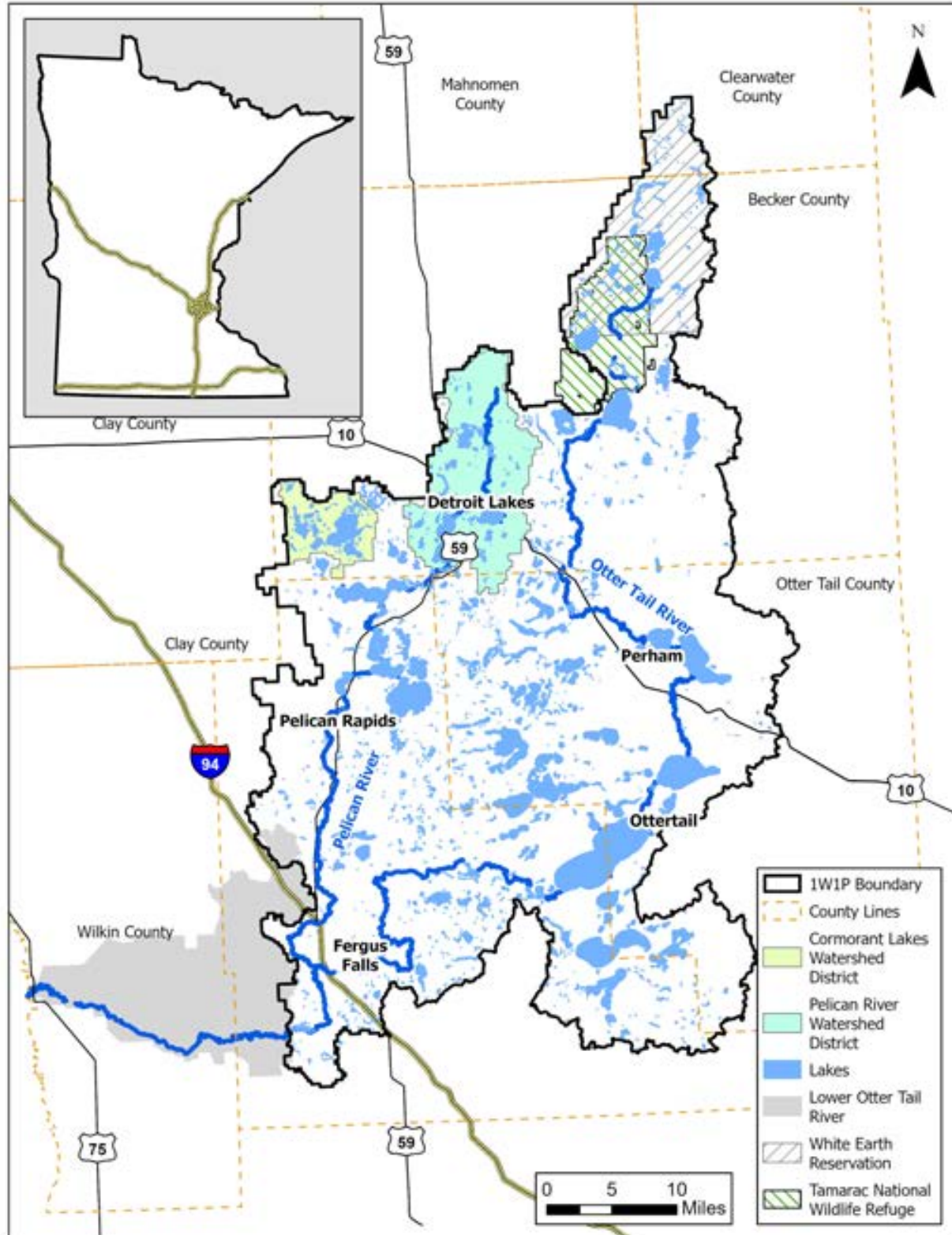


Figure 1.2. The Otter Tail Watershed Planning Area.

Roles and Responsibilities

The OTCWMP planning effort began with a Memorandum of Agreement (MOA) between Otter Tail County, East Otter Tail Soil and Water Conservation District (SWCD), West Otter Tail SWCD, Becker County, Becker SWCD, Pelican River Watershed District, and Cormorant Lakes Watershed District. All entities with a portion of the planning area within their jurisdiction were invited to participate but Clearwater (<1%), Clay (<1%), Mahnomen (<1%) counties and the White Earth Nation declined.

The 1W1P process uses existing authorities, and therefore a representative from each MOA governmental unit was appointed by each local board to serve on the Policy Committee, which is the decision-making body for this plan (Figure 1.3). The East Otter Tail SWCD was the fiscal agent and plan coordinator for this project.

The plan content was developed by the Technical Advisory Committee, which consisted of the staff from the MOA governmental units, state agencies, the United States Fish and Wildlife Service (USFWS), and the Natural Resource Conservation Service (NRCS). The Citizen Advisory Committee, made up of local stakeholders including lake groups, agricultural producers, and local business owners, provided input on the plan priorities and content. The Steering Committee guided the planning process and timeline and produced the final plan.



Figure 1.3. Committees and roles in the OTCWMP planning effort.

Public Participation

Public input was gathered in numerous ways throughout the planning process. At the start of the plan in the summer of 2021, an online survey and two public open house events were held in Detroit Lakes and Fergus Falls. The survey received 260 responses, and over 60 people attended the open houses, which garnered great feedback for plan development (Figure 1.4).

- Top three watershed concerns in the public survey:
1. Lake and stream water quality
 2. Increased development on lakes
 3. Groundwater quality



Figure 1.4. A) Top three watershed concerns in the public survey; B) Response to the public survey question: what do you want the Otter Tail Watershed to look like in 50 years?

The Citizen Advisory Committee met in January 2022 to discuss watershed issues, develop a watershed vision, and provide input on what they felt should be included in the plan. The citizens' responses were consistent with issues identified in existing studies and plans and by the Technical Advisory Committee (Figure 1.5). This public response validated that the plan was on the right track. Most citizen concerns can be addressed with actions that would be implemented by planning partners.

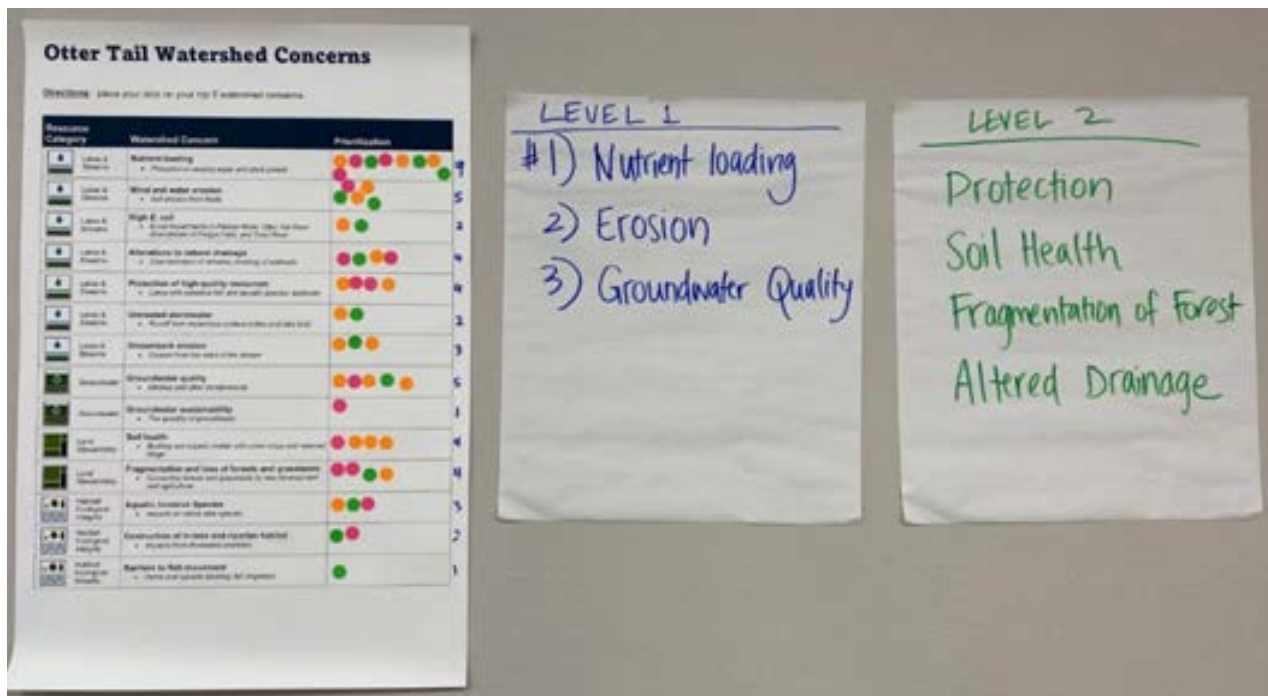


Figure 1.5. Issue prioritization at the Citizen Advisory Committee meeting in January 2022.

Focus Issues

Using input from the public, the Citizen Advisory Committee, and existing plans and studies in the watershed, the Technical Advisory Committee developed issue statements. They then determined which issues to focus on during plan implementation using existing data. These focus issues were reviewed and approved by the Policy Committee in January 2022. The issues and process are described in detail in Section 3.

Primary issues are the most important issues that will be the focus of implementation efforts in the 10-year plan (Table 1.1). They had a “high” ranking in the watershed. The main theme of the issue statement is shown in **bold** text.

Table 1.1. Primary Issues.

Resources Affected	Issue Statement
Lakes, Streams, Drinking Water	Nutrient loading causes algal blooms and eutrophication.
Lakes, Streams	Wind and water erosion impact water clarity, dissolved oxygen levels, and aquatic habitat.
Lakes, Streams, Wetlands, Forests, Prairies	Sufficient protection is needed for outstanding resources and sensitive species to maintain water and habitat quality.
Lakes, Streams, Wetlands	Untreated stormwater , including chloride, impacts water quality.
Aquifer, Drinking Water	Groundwater quality is vulnerable to contamination.
Soil, Lakes, Streams, Wetlands	Soil health is important for agricultural productivity and climate change resilience.
Forests, Prairies	Fragmentation and loss of forests and grasslands by land use change impacts land resilience, habitat, and surface and groundwater quality.
Lakes, Streams	Aquatic Invasive Species impact the aquatic ecosystem, water quality, recreation, and economic development.

Secondary issues will be addressed during the 10-year plan, likely with additional funding and/or with partners (Table 1.2). The main theme of the issue statement is shown in **bold** text.

Table 1.2. Secondary Issues.

Resources Affected	Issue Statement
Streams, Lakes	Barriers to fish movement impact fish communities and stream geomorphology.
Lakes, Streams, Wetlands, Ditches	Altered hydrology increases the flow of water, increases streambank erosion, and impacts aquatic life.
Streams, Lakes, Ditches	Unstable stream channels contribute to sediment loading and reduced habitat quality.
Streams	High <i>Escherichia coli</i> (<i>E. coli</i>) makes waterbodies unsafe for recreation.
Lakes, Streams	Destruction of in-lake and riparian habitat impacts water quality, lake and stream health, and fish and macroinvertebrate communities.
Aquifer	Groundwater sustainability is vulnerable to overuse and loss of recharge.

Focus Resources

In order to make measurable change in 10 years, it is important to narrow the focus to specific lakes, streams, and groundwater areas (resources). Three different management focus categories were identified for the OTW: Protect, Enhance, and Restore (Table 1.3). These are common management strategies used in protection-focused watersheds in the northern half of Minnesota. There are relatively few impairments in the OTW, so the focus of this plan is preventing future impairments and protecting the good quality resources in the watershed.

The Technical Advisory Committee used the Watershed Restoration and Protection Strategy (WRAPS) Report and associated watershed studies (MPCA 2021), data, and local information to determine which resources to focus outreach and funding on in the next 10 years. These resources are mapped and explained in detail in Section 4. Resources that are not a focus of this plan can still be a local priority. The Technical Advisory and Policy Committees outlined some of the actions that could still be implemented for non-focus resources including continuing monitoring, offering technical assistance, and reassessment in the future (Section 4).

Table 1.3. Management focus categories used in this plan.

Management Focus	Definition	Focus Resources
Protect	The resource is in good condition. Maintain good condition and protect against future risks. Reduce inputs of phosphorous, sediment, and bacteria, and protect the natural landscape and hydrological features around the resource.	<p><u>Lakes</u>: Big Cormorant, Floyd Lakes, Big Pine, Cotton, Dead, Little McDonald, Little Pine, Long (Vergas), North & South Lida, North & South Lizzie, Otter Tail, Pelican, Rose, Seven, Six, Star, Sybil, West Battle, Hoot, Wright</p> <p><u>Streams</u>: Otter Tail River (east of Fergus Falls), Brandborg Creek, Solid Bottom Creek, Egg River, Reed Creek</p> <p><u>Groundwater</u>: nonvulnerable Drinking Water Supply Management Areas</p>
Enhance	The resource is at risk, but not impaired. Factors for lakes and streams include degrading trends, nearly impaired for phosphorus, total suspended solids, dissolved oxygen, or <i>E.coli</i> , or a eutrophication stressor in Lake IBI report (DNR and MPCA 2019). Factors for groundwater include nitrogen infiltration risk and vulnerable Drinking Water Supply Management Areas. Focus on high quality resources that are nearly impaired or vulnerable. Reduce pollutant loading through stormwater and agricultural best management practices.	<p><u>Lakes</u>: Big & Little Detroit, Leif, Little Cormorant, Paul, Pickerel (Maine), Sallie, Upper Cormorant, Walker</p> <p><u>Streams</u>: Otter Tail River (west of Fergus Falls), County Ditch 14, Pelican River (north of Detroit Lakes and south of Pelican Rapids), Dead Horse Creek</p> <p><u>Groundwater</u>: vulnerable Drinking Water Supply Management Areas and areas at risk for nitrogen infiltration to groundwater.</p>
Restore	The resource is impaired (phosphorus, dissolved oxygen, total suspended solids, or <i>E.coli</i>). Focus on resources that are barely impaired. Reduce pollutant loading through stormwater and agricultural best management practices.	<p><u>Lakes</u>: St. Clair</p> <p><u>Streams</u>: Toad River, Unnamed Creek (Silver Leaf Township), Otter Tail River (west of Fergus Falls), Campbell Creek, Pelican River (within Detroit Lakes and north of Fergus Falls)</p>

Measurable Goals

Measurable goals identify the desired change in the resource and indicate how progress will be measured. Goals are developed to address the priority issues, and models and data are used to quantify milestones for progress. The measurable goals were developed over the course of three Technical Advisory Committee meetings and approved by the Policy Committee. They are described in detail in Section 5.

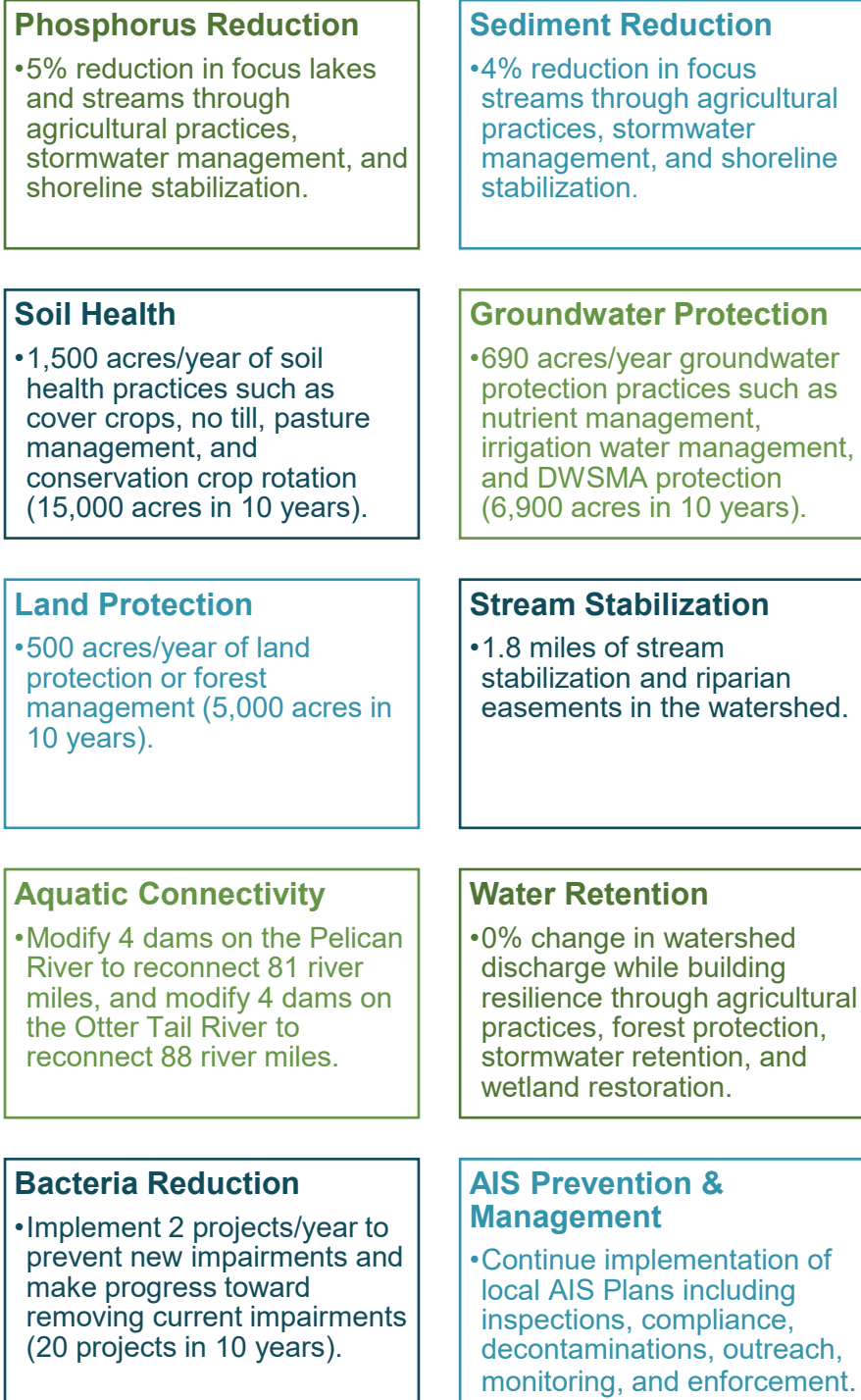


Figure 1.6. Measurable goals for the Otter Tail Watershed.

Implementation

Implementation activities and costs are presented in Section 6 of this plan. The implementation focus of the OTCWMP is to encourage additional best management practices in priority areas to reach the goals (Figure 1.6). Plan practices are voluntary on private lands and will be implemented through a variety of cost-share programs, grants, and state and federal funding programs.

To implement the full extent of this plan, additional state or federal funding and capacity over current levels will be necessary. The implementation tables label implementation actions as funding Level 1, 2, or 3 (Table 1.4). Level 1 is the current amount of baseline funding (noncompetitive) being spent on protection, enhancement, and restoration practices and programs in the watershed. After the plan is complete, watershed partners will be eligible for Watershed-Based Implementation Funding (WBIF) administered through BWSR. This funding is noncompetitive and can be requested biennially by watershed partners to implement this plan. Level 2 includes Level 1 funding plus the WBIF and is the new operating level of the watershed after this plan is completed. Level 3 describes partner-sponsored projects that will help achieve plan goals.

Table 1.4. Funding levels in the OTCWMP.

Funding Level	Description	Estimated Plan Total (10 years)	Estimated Annual Average
1	Current Baseline Funding	\$20,000,000	\$2,000,000
2	Baseline + WBIF (WBIF = \$632,500/yr)	\$26,330,000	\$2,633,000
3	Partner and Other funding (CRP, SFIA, NRCS, MPCA, etc.)	\$44,000,000	\$4,400,000

Existing programs will be utilized for implementing plan actions and are organized into four categories: Planned Landscape Management (“Manage It”), Protected Lands Maintenance (“Protect It”), Constructed Environmental Enhancements (“Fix It”), and Data Collection and Outreach (“Know It”).



Landscape in the OTW north of Fergus Falls.

Plan Administration and Coordination

This plan will be implemented by the Otter Tail Watershed Partnership, of which members include Otter Tail County, East Otter Tail SWCD, West Otter Tail SWCD, Becker County, Becker SWCD, Pelican River Watershed District, and Cormorant Lakes Watershed District (Figure 1.7). These entities previously entered into an MOA to develop this plan and will enter a similar agreement to implement this plan. The Policy Committee is advisory to the individual county, SWCD, and watershed district boards, and to the fiscal agent, under the umbrella of the MOA.

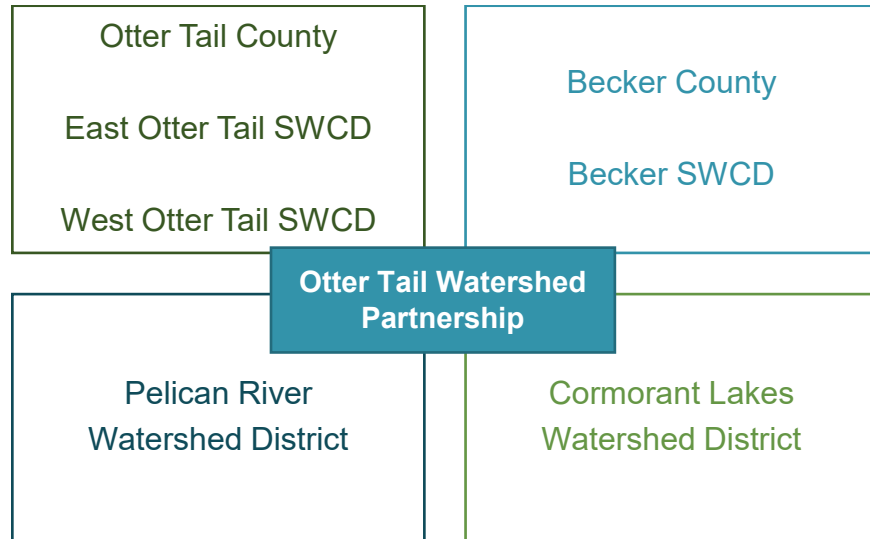


Figure 1.7. Members of the Otter Tail Watershed Partnership.

Plan progress and accomplishments will be recorded by watershed partners in a tracking system and summarized biennially. In addition, committees that convened for planning will continue into implementation in the same roles (Figure 1.3).



Maple Beach Resort on Lake Lida.

Partnership Successes

Watershed partners have a strong track record of successful projects and partnerships in the OTW. At the beginning of the planning process, the Technical Advisory Committee was led through an exercise to build common ground and learn about each other. First, the participants were asked to discuss and write **success stories of natural resource improvement in the watershed**. The answers were put on a white board and discussed.

Next, the group was asked to write answers to the question – **“Why was this project successful?”** Answers were again put on the white board.

Then in the last step, the participants grouped the “Why” responses into themes. Common themes included people, funding mechanisms, scale, timeline of project, values behind the work/approach, goals and priority vs opportunity, and partnerships. These themes can be carried forward in the future to guide successful implementation.

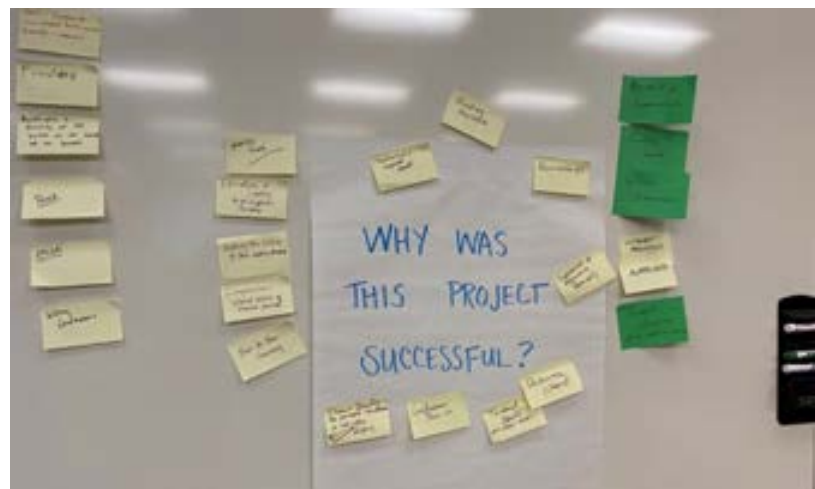
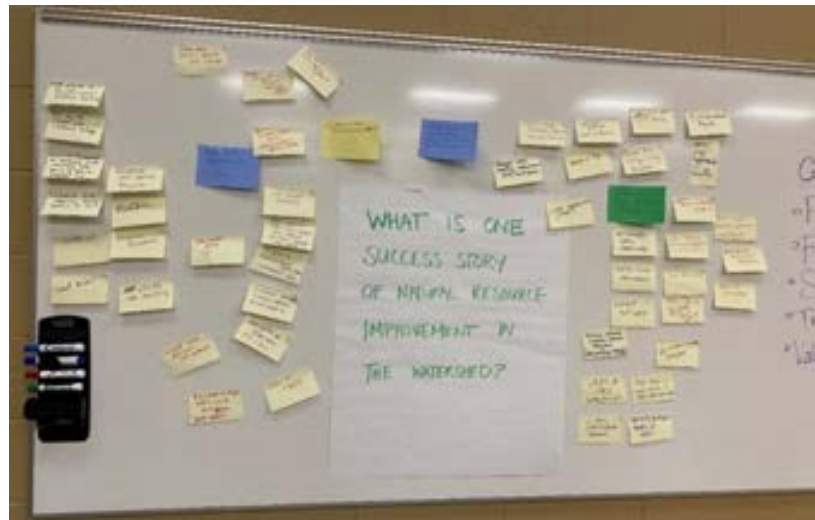


Figure 1.8. Brainstorming activity with the Technical Advisory Committee (8/30/2021).

Reasons behind the success in the watershed:

- **People:** *capable staff, willing landowners, trust, persistence*
- **Partnerships:** *cooperation, supportive and proactive boards, shared values*
- **Funding Mechanisms:** *funding sources are increasing*
- **Values behind the work/approach:** *respect, communication, selling the projects to the decision-makers, landowner buy-in, quality of life values on the results of the successes, shown benefits to landowners and to the public*
- **Priority vs Opportunity:** *resource need, willing landowners*



2. Land and Water Resources Narrative





Section 2. Land and Water Resources Narrative

The Otter Tail Watershed (OTW), like the whole of Minnesota, boasts a diverse landscape. Three ecoregions create this diversity: forests populate the north, lakes both large and small populate the heart of the watershed, and the fertile prairie farmlands of the Red River Valley stretch into the southwest corner of the watershed (Figure 2.1 and Figure 2.2). Three main rivers—the Otter Tail River, Toad River, and Pelican River—originate in the watershed, with the Otter Tail River later joining together with the Bois de Sioux River to become the Red River of the North. People also shape the diverse landscape and include populations within the White Earth Nation; the larger cities of Detroit Lakes, Fergus Falls, Pelican Rapids, Perham, Battle Lake, and Ottertail; and residents who live or vacation on the shorelines of the watershed’s many lakes and rivers.



Figure 2.1. Ecoregions in the Otter Tail Watershed.

The OTW is brimming with water above and below the surface. The Otter Tail Comprehensive Watershed Management Plan (OTCWMP) planning area contains 996 lakes (40 of which are over 1,000 acres in surface area), 975 miles of streams, and both deep and shallow aquifers. In fact, 30% of the watershed is covered by surface water, resulting in 4,210 miles of lake and stream shoreline.

The OTCWMP planning area covers 1,104,323 acres (1,725 square miles), the majority of which are in Becker (31%) and Otter Tail (67%) counties. Small portions of the watershed are also located in Clearwater (1%), Mahnomon (<1%) and Clay (<1%) counties.

Watershed partners have joined together to create a Comprehensive Watershed Management Plan (CWMP) to be consistent with statute and ultimately with the resolutions to adopt and implement as a substitute for 103B, 103C or 103D plans. Partners include Becker Soil and Water Conservation District (SWCD), Becker County, Pelican River Watershed District, Cormorant Lakes Watershed District, East Otter Tail SWCD, West Otter Tail SWCD, and Otter Tail County.



Figure 2.2. Tamarac National Wildlife Refuge near the headwaters (left), Little Pine Lake near Perham (center), and prairie potholes north of Fergus Falls and at the end of the OTW planning area.

The plan area border varies slightly from the major watershed border because it lines up with other neighboring plan borders to not leave any orphan areas without a plan. In addition, the plan area ends at Orwell Dam because the Lower Otter Tail River is in the Buffalo-Red River Watershed District and is therefore a part of the Buffalo-Red Comprehensive Watershed Management Plan (Figure 2.3). Some maps in this plan showing data analyses use the major watershed borders.

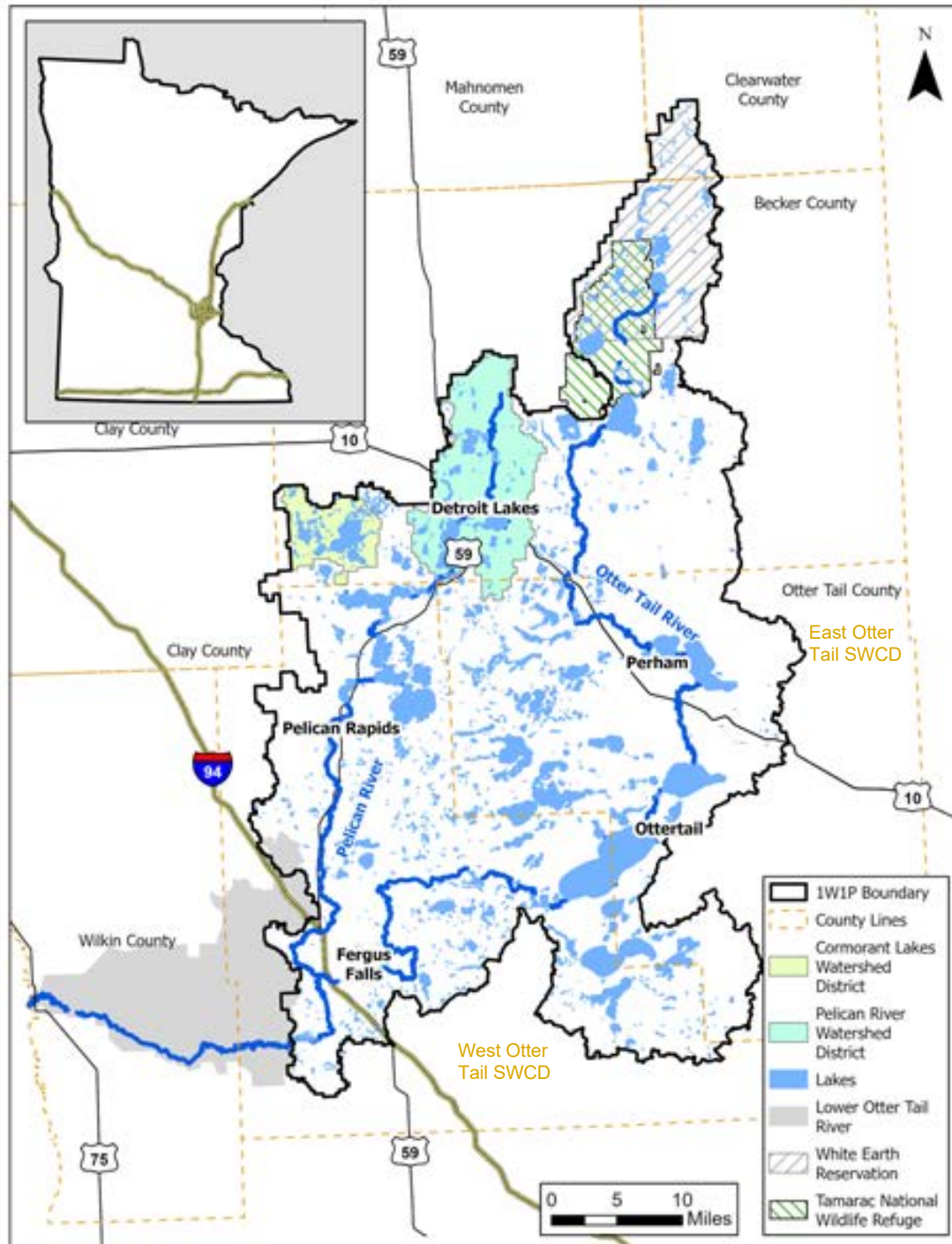


Figure 2.3. The OTCWMP Planning Area.

Past Glaciation and Soils

The OTW was shaped by the glaciers that scoured the area up to 10,000 years ago. The glaciers pushed sand and gravel in front of them as they traveled south and then left clay till in the Alexandria Moraine when they melted and retreated. The lakes of the OTW were formed as ice blocks melted into these sand and gravel ridges, called moraines (Figure 2.4). On the western edge of the moraines was Glacial Lake Agassiz, which left behind fertile soil for cultivation as it drained north into the Red River.

Humans have been in the OTW for thousands of years. Skeletal remains found near the Pelican River are estimated to be over 7,500 years old (DNR 2021). Native Americans, including both Ojibwe and Dakota, settled into the area because of the desirability of the lakes, wooded areas, and native wild rice.

It's unknown when the first European explorer saw the OTW. Some suggest Vikings may have explored the area before 1400 A.D., while the quest for furs brought European trappers to the region in the 1600s. But it was still some time before European settlement of the area began in earnest. Driven by the need for lumber to build a growing nation and facilitated by railroads and steamboats, the final wave of settlement began in the 1870s (DNR 2021). By 1919, the once seemingly endless supply of large red and white pines had been exhausted (USFWS – TNWR). Pre-settlement vegetation data shows rich mixed pine forests in the north, mixed oak and deciduous forests through the middle, and prairie in the south (Marschner 1974).



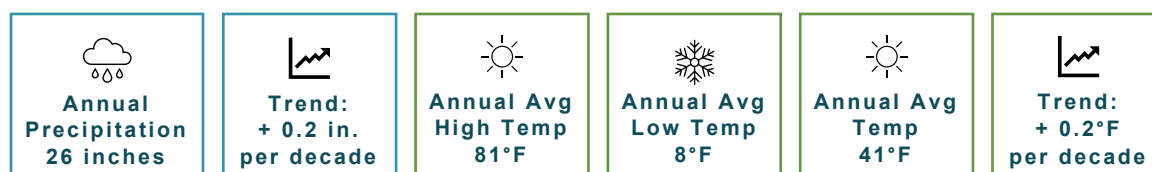
Figure 2.4. Glacial moraines in the Red River Valley (University of Minnesota).

Present

Today, the watershed remains a desirable place to live. The comfortable temperate climate; abundance of clean lakes, streams, and drinking water; and richness of the land for recreation and cultivation draw residents and visitors alike.

Climate

The climate in the watershed has four seasons, with a warm summer and a cold winter that freezes over most lakes and rivers. The growing season typically stretches from May through September. DNR climate trend data show that precipitation is increasing in the OTW on average by 0.2 inches per decade. In addition, the frequency of large storm events is also increasing. Long-term observation sites in Minnesota have seen dramatic increases in one-inch and three-inch rain events. The average temperature in the OTW is also increasing at a rate of 0.2° F per decade (DNR 2020). At this rate, the climate of the OTW is predicted to be more like today's southern Iowa by the year 2070 (NG 2021).



Surface Water

Hydrology

The Otter Tail River originates in Elbow Lake in northern Becker County and the White Earth Reservation and flows south through pine forest, wild rice lakes, and tamarack bogs. It then enters a mosaic of large and small lakes, deciduous forests, and farmland. Major lakes along the river include Height of Land, Big Pine, Rush, and Otter Tail (Figure 2.3 and Figure 2.5). As the river flows south, lakeshore development and agricultural practices increase. Along the way, the river is periodically interrupted by 29 dams, primarily at lake or wetland outlets. There are five dams along the river in and around Fergus Falls that are operated for hydropower.

The Pelican River begins north of Detroit Lakes and flows through the Pelican River Chain of Lakes, including Detroit, Sallie, Melissa, Pelican, Lizzie, and Prairie (Figure 2.3 and Figure 2.6). The Pelican River then joins the Otter Tail River near Fergus Falls, which then flows west to meet the Bois de Sioux River near Breckenridge, MN. The Pelican River has dams as well, which are described on page 18. The Toad River is located in the northern section of the watershed, where it originates in Little Toad Lake, flows south for 21 miles, and drains into Big Pine Lake. The Cormorant Lakes are a group of regionally significant lakes in the western portion of the watershed.

Agricultural land drainage began as early as the mid-1800s to make more land within the Red River Basin available for agricultural production (Krenz and Leitch 1993). Ditching and other hydrologic alterations were most common in the southwestern portion of the watershed, although some exist throughout the northwestern and eastern portions of the watershed as well.

The large volume of surface water in the OTW, including 70% of remaining historical wetlands, acts as a sponge and contributes to the lack of flashy hydrology in the watershed. The natural storage provided by the lakes and wetlands within the OTW (30% of the watershed's surface area) also provides significant flood damage reduction benefit to downstream lands and communities in the Red River Basin (DNR 2010). The Orwell Dam at the end of the planning area is operated primarily for downstream flood control outside of the planning area.

Water Quality

The excellent water quality in this watershed is vital, as the local economy and quality of life depend on it. In 2016, the Minnesota Pollution Control Agency (MPCA) embarked on intensive watershed monitoring and assessment. The recently completed Watershed Restoration and Protection Strategy (WRAPS) report concluded that 91% of the assessed lakes within the planning area support aquatic recreation, and 85% support aquatic life (MPCA 2019a). Long-term trend analyses shows that only 7% of the lakes monitored show degrading trends. Of the few lakes within the watershed that are impaired for aquatic recreation, they are mostly shallow lakes with elevated nutrient (total phosphorus (TP)) concentrations. For streams within the

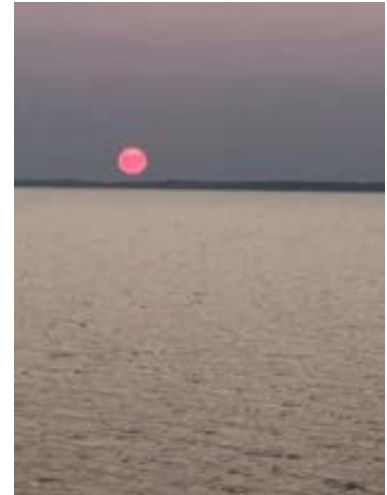


Figure 2.5. Otter Tail Lake, the 10th largest lake in Minnesota (photo by Chris LeClair).



Figure 2.6. Pelican River in Detroit Lakes.

planning area, there are six reaches with bacteria impairments, three dissolved oxygen (DO) impairments, four fish and macroinvertebrate biology impairments, and one total suspended solids impairment (MPCA 2021) (Figure 2.7). Of the stream reaches that were assessed within the planning area, 76% met aquatic life use standards and 62% met aquatic recreation use standards (MPCA 2021).

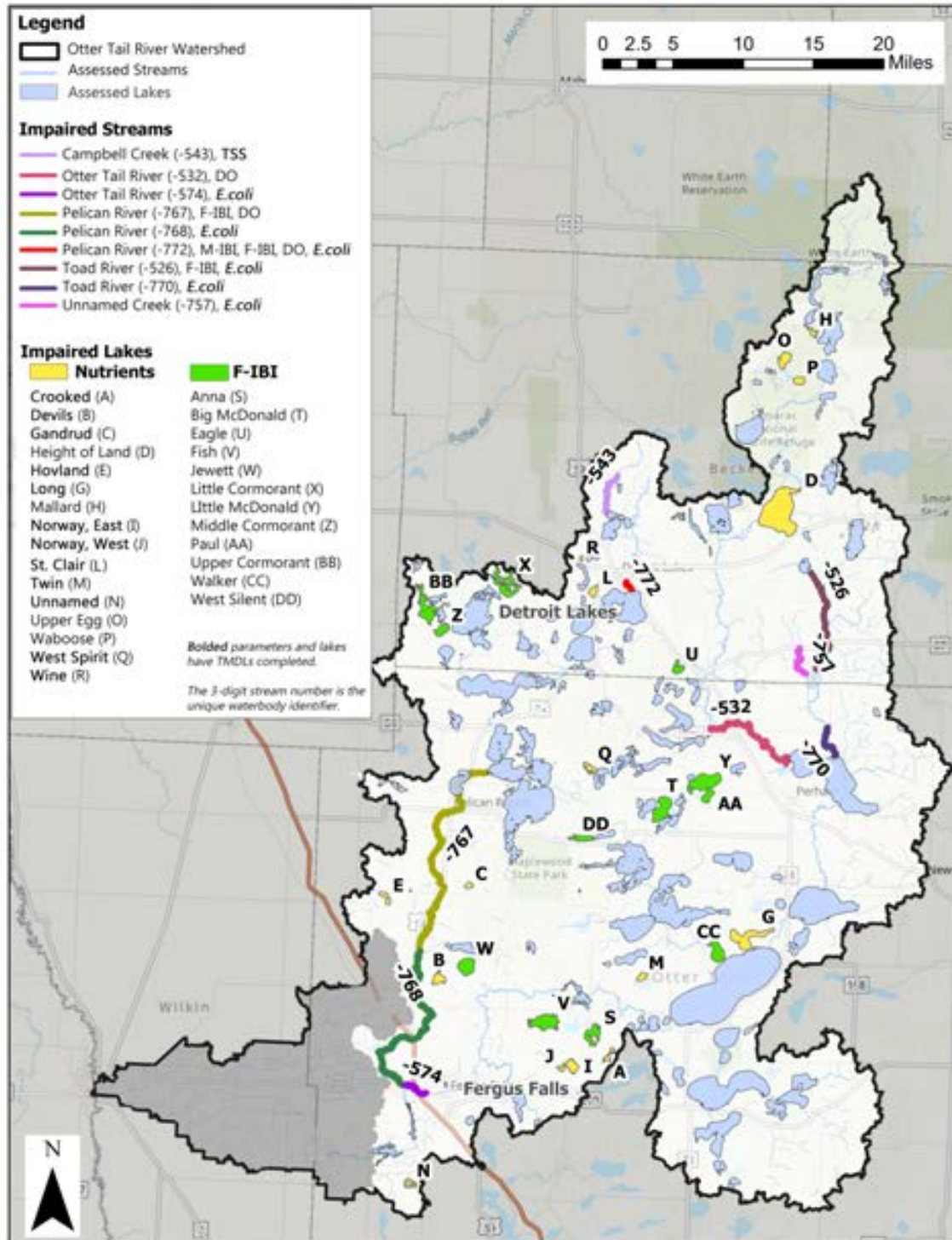


Figure 2.7. Impairments in the Otter Tail Watershed (MPCA 2021).

A majority of the 996 lakes in the planning area have retained their biological diversity and outstanding water quality. The DNR has developed lake classifications to help describe and prioritize lakes with unique qualities, including:

- **Wild rice lakes.** Lakes identified by the DNR Division of Fish & Wildlife as supporting wild rice.
- **Cisco refuge lakes.** Lakes with cold-water fisheries and the presence of Cisco (tullibee). These lakes are classified as deep and clear enough that they will still provide suitable cold-water fish habitat even as the climate changes.
- **Lakes of biological significance.** The presence of species of aquatic plants, fish, birds, or amphibians that are unique to the region.



Many lakes are also connected by small tributary streams. This connectivity increases the risk of resource degradation due to the downstream movement of nutrient loads, bacteria, sediment, and aquatic invasive species (AIS) throughout the system (MPCA 2019a). This connectivity is evident through several AIS invasions in the watershed. Eurasian flowering rush was first found in Deadshot Bay of Detroit Lake in the 1970s and spread downstream into lakes Sallie and Melissa. Zebra mussels were first found in Pelican Lake in 2009 and spread to downstream lakes and neighboring lakes by the movement of boats, docks, and boatlifts. Through research and treatment, the flowering rush has greatly decreased in the watershed, but zebra mussels remain a nuisance.

Habitat and Recreation

Forests, wetlands, streams, and lake-rich areas are beneficial to fish and wildlife and enjoyable terrain for recreation. Exceptional habitat in the watershed has been permanently protected to preserve the biodiversity. Many unique and rare species, including the red-shouldered hawk, cerulean warbler, greater prairie-chicken, mudpuppies, pugnose shiner, and least darter, have been documented as native to the OTW (Harper 2006). Protected areas include 24 Wildlife Management Areas, Tamarac National Wildlife Refuge, Sucker Creek Preserve, Maplewood State Park, Glendalough State Park, and the Greenwood Lake Scientific and Natural Area. These areas, along with the North Country Trail, are open to hiking, and the state parks are also open to camping.

The Otter Tail River is also designated as a State Water Trail, with 157 river miles of scenery, from pine forests to native prairies.

The western half of the watershed is in the Prairie Pothole region, which is crucial for waterfowl production and migration. The US Fish & Wildlife Service (USFWS) has preserved 487 shallow lakes as Waterfowl Production Areas (WPAs) (Figure 2.8 and Figure 2.9).



Figure 2.8. Prairie pothole near Fergus Falls.

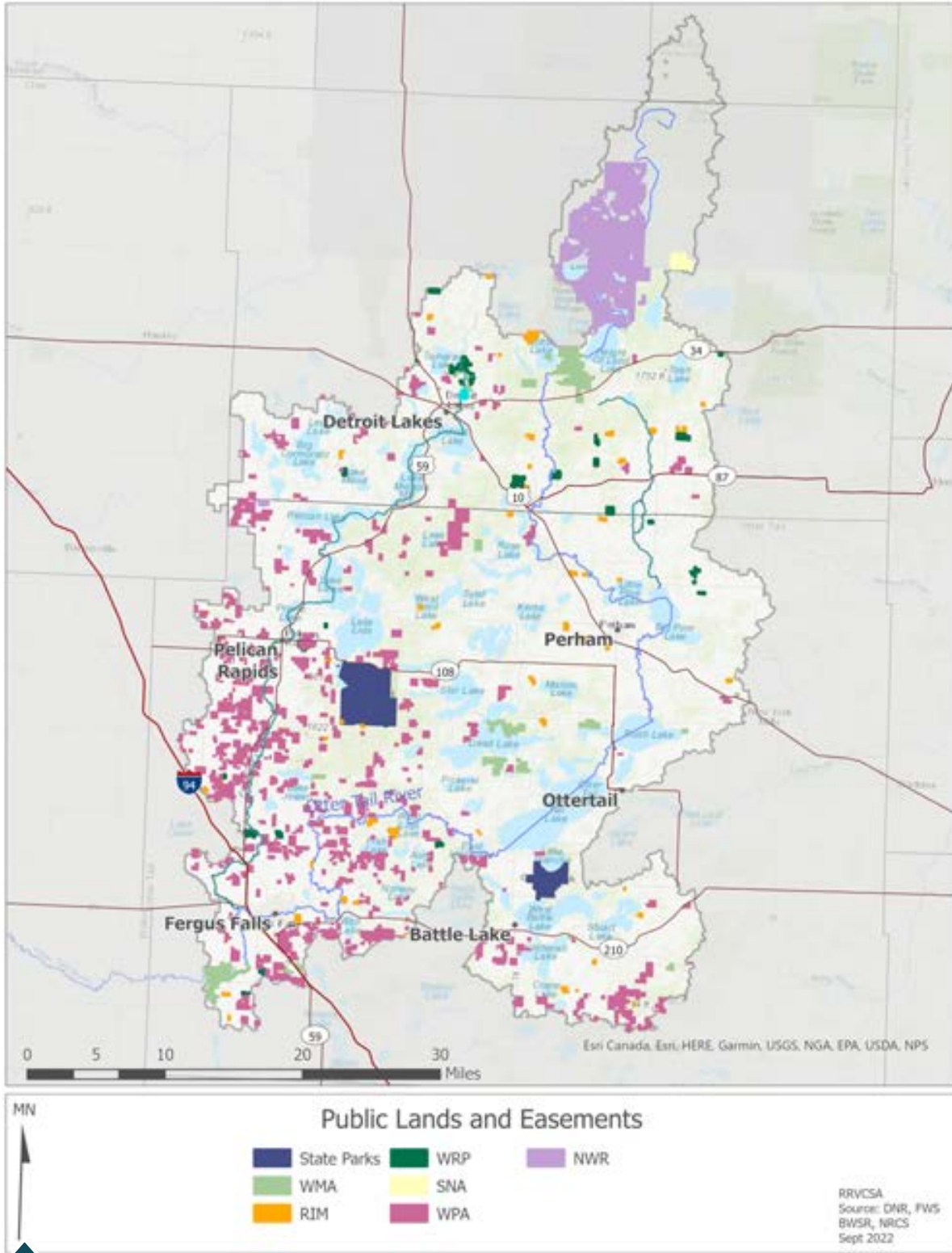


Figure 2.9. Public lands and easements in the OTW (DNR, USFWS, BWSR).

More species of fish are found in the OTW than in any other watershed within the Red River Basin (75 species, MPCA 2021). The OTW lake and stream habitat is home to several species of fish designated by Minnesota as Threatened or Species of Concern. The 29 dams in the watershed block fish passage and are a main cause of biological impairments (MPCA 2021).

In the past 10 years, MN DNR and local partners have worked to replace these dams with rock rapids to allow the fish to migrate up and downstream. As of 2021, six dams on the Pelican River and two dams on the Otter Tail River have been modified for fish passage (Figure 2.10).



Figure 2.10. Fish Lake dam modification to rock rapids to facilitate fish passage in the Pelican River.

Lake sturgeon once inhabited the Red River and its tributaries and lakes, but their populations were decimated as a result of habitat alterations, dam construction, and sediment. In the 2000s, sturgeon were introduced to Detroit Lake and other surrounding lakes by the DNR and are now thriving again due to the dam modification projects. In fact, the DNR documented within the OTW in May 2022 the first natural sturgeon spawning event in the Red River Basin in over 100 years.

Land Use

The land use in the OTW is a reflection of the diverse landscape and natural resources present.

Forests and Water

Forests, wetlands, and open water cover just over half of the watershed's area (Figure 2.11 and Figure 2.12). The presence of forests and retention of 70% of the historical wetland area likely contribute to the excellent water quality in the watershed. Forests provide perennial cover on the landscape, minimizing soil loss, infiltrating precipitation, and sequestering carbon. Wetlands store precipitation and filter the water that flows through them.

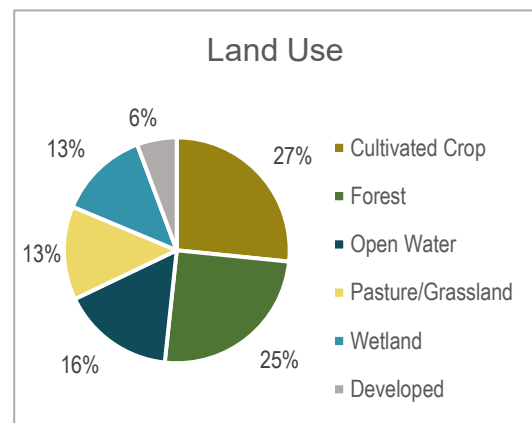


Figure 2.11. Land use in the OTW (NLCD 2019).

Urban

Urban areas cover 6% of the watershed (Figure 2.11) and tend to have a large portion of impervious surface, which causes stormwater to run off the surface instead of infiltrate. This runoff can impact water quality and quantity when it flows untreated into a lake or stream. The cities of Fergus Falls, Detroit Lakes, Perham, Pelican Rapids, Battle Lake, and Ottertail are a regional draw for industry, recreation, and tourism. Two of these communities are large enough to be subject to municipal separate storm sewer system (MS4) permitting: Detroit Lakes and Fergus Falls. These communities are required by their permits to identify potential pollutant sources and to implement best management practices (BMPs) or other efforts to address those pollutant sources. Some industrial and municipal facilities or activities are regulated by National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permits, which allow regulated discharges to surface waters, or SDS permits, which generally do not allow



discharges to surface waters. There are 22 active NPDES/SDS permits and 13 active SDS permits in the OTW. Of those, 15 of the permits are municipal or domestic wastewater treatment facilities, seven of which are permitted to discharge to surface waters, and 20 are industrial wastewater and/or stormwater permits, nine of which are permitted to discharge to surface waters. These facilities are considered to be potential but insignificant sources of pollutants such as bacteria, nutrients, sediment, and others to surface waters within the watershed (MPCA, 2021).

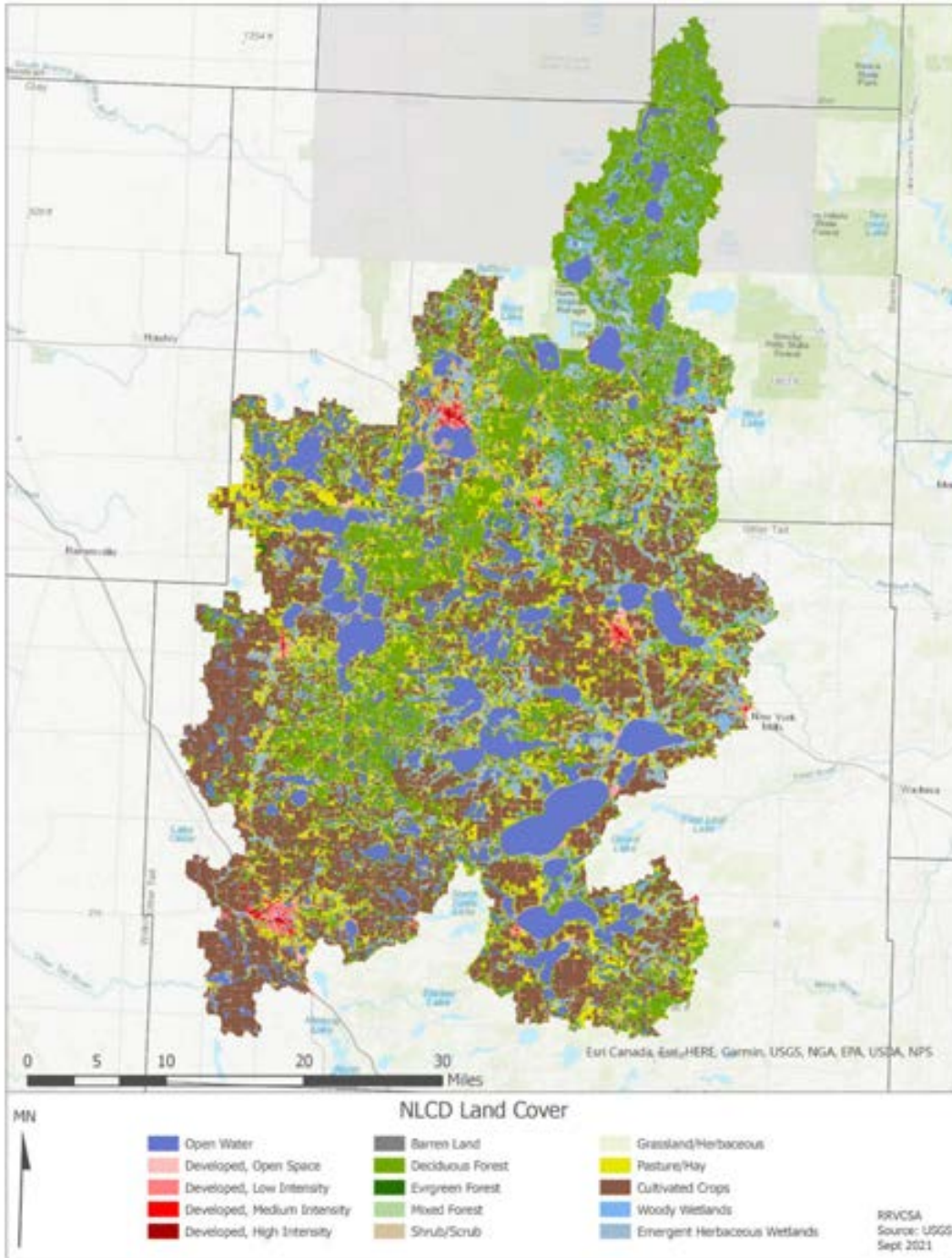
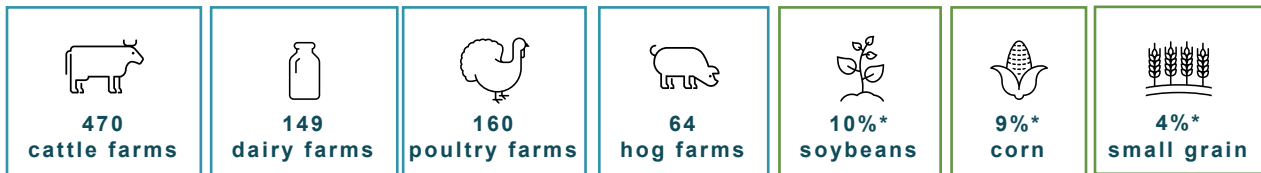


Figure 2.12. Land use in the OTW (NLCD 2019).

Agriculture

Agricultural practices such as cultivated crops, hay and pasture, and animal agriculture are important to the local economy of the watershed and run like a patchwork quilt between the lakes, forests, and wetlands (Figure 2.13). Animal agriculture includes dairy, beef, poultry, and pork (USDA 2017). The most common crops grown are corn, soybeans, alfalfa, and small grains.



*Indicates the % of the entire watershed acreage, not just agricultural acreage.

In the sandy soils around Perham and throughout the central part of the watershed, center pivot irrigation is necessary for cultivation. Local SWCDs administer a program to help local producers with groundwater conservation. Irrigation can be done more precisely by improving when irrigation is applied (irrigation scheduling) and how it is applied (variable rate irrigation).



Figure 2.13. Patchwork quilt of agricultural lands, forests, wetlands, and lakes in the OTW.

Groundwater

The glaciers left their fingerprint on the groundwater resources as well as the land. The large sand and gravel outwash plain in the middle of the watershed has sandier soils and a shallow aquifer near the surface that is vulnerable to contamination from land use on the surface above (Figure 2.14). Testing has shown that there are high nitrate levels in wells in this area as well as the Drinking Water Supply Management Area (DWSMA) of the City of Perham. High nitrates in groundwater can be a result of runoff or leakage from fertilized soil, wastewater, landfills, animal feedlots, septic systems, or urban drainage (MDH, 2022).

Most of the public and private drinking water in the watershed is sourced from groundwater. There are approximately 12,000 known private wells in the watershed, but there are also likely numerous unknown well locations (MDH, 2022). The City of Fergus Falls is the only known location in the watershed that sources its drinking water from both surface water (Otter Tail River is diverted to Hoot and Wright Lake) and groundwater. The cities of Fargo and Moorhead, downstream of the OTW, also source drinking water from both surface water (Red River of the North) and groundwater.

The abundance of water near the land's surface also lends itself well to being used for multiple purposes. The DNR regulates the use of groundwater. Of the 842 groundwater appropriation permits in the watershed, there are 81% for agricultural irrigation, 1% for power generation, 7%



for water supply, 3% for industrial processing, and the remaining 8% are for other uses. By permitted volume, power generation is 53%, and agricultural irrigation is 23% (MPARS 2018).

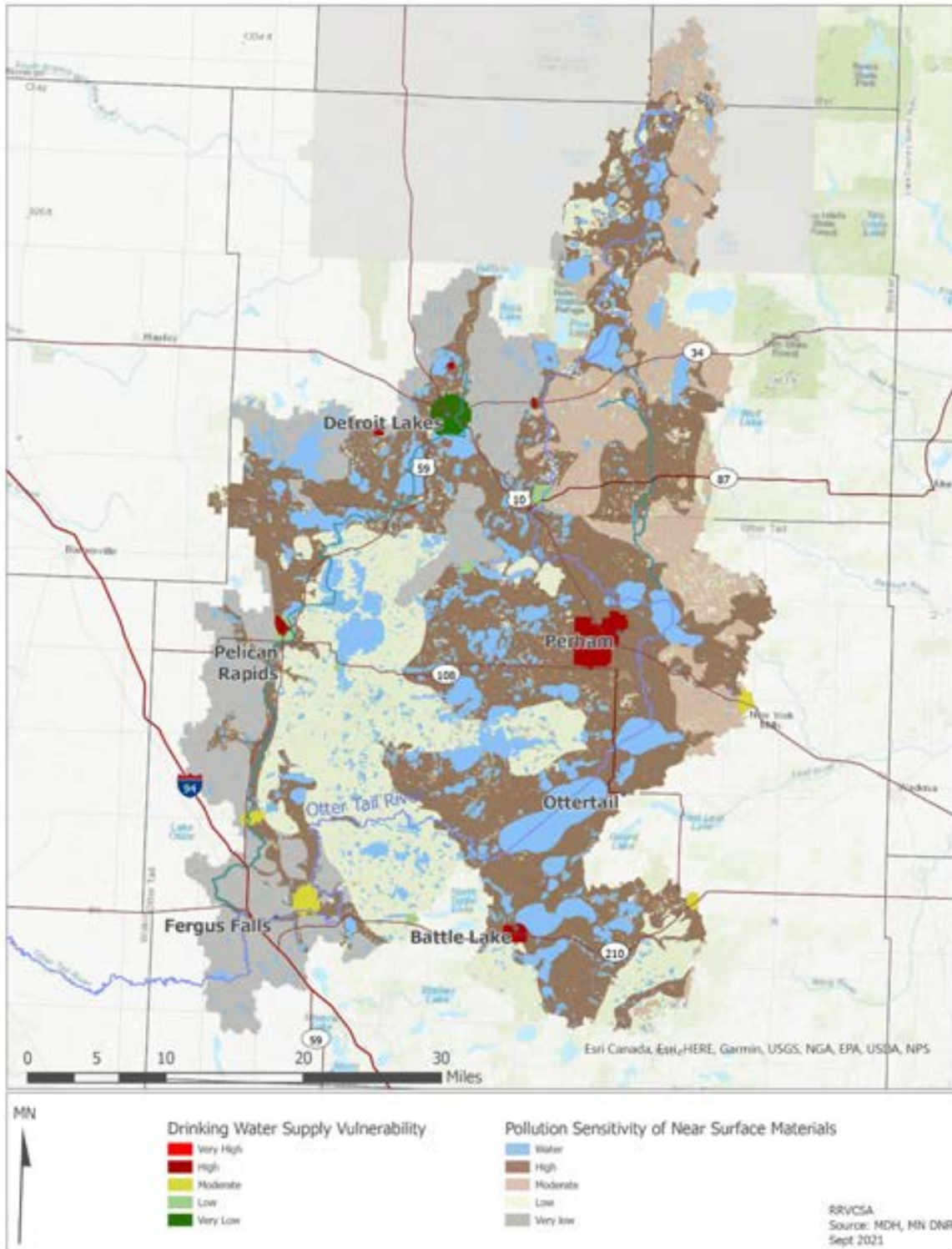
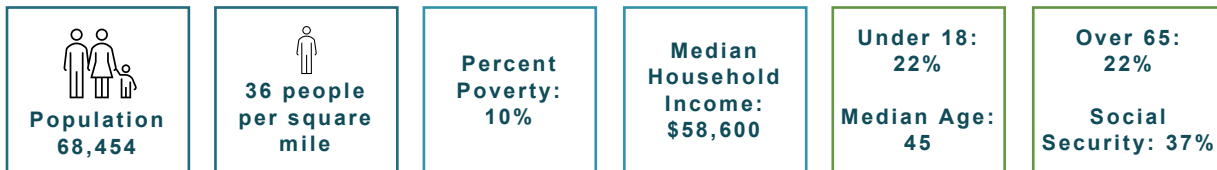


Figure 2.14. DWSMA Area vulnerability and groundwater pollution sensitivity (MDH).

Demographics

The people of the watershed reflect the geographic location of the watershed in west-central Minnesota and the ample lakes that people choose to retire to. The watershed population is 90% White, 4% Native American, 3% Hispanic, 1% Black or African American, and 1% Asian. The White Earth Nation sits at the headwaters of the watershed, where the waters, fish and wildlife, and wild rice have valuable cultural significance. The overall population of the watershed is stable. The cities with increasing population are Detroit Lakes, Ottertail, and Fergus Falls (DNR, 2020).



The tax data of Becker and Otter Tail Counties illustrates the prominence of seasonal lake homes. The market values in the area for comparison are as follows:

- Pelican Lake: \$1.1 Billion
(*Dunn and Scambler Townships*)
- Cormorant Lakes: \$1.1 Billion
(*Cormorant and Eunice Townships*)
- Detroit Lakes Area: \$964 Million
(*Detroit and Lakeview Townships*)
- City of Perham: \$307 Million

The Cormorant Lakes are less than an hour drive from Fargo, ND, and the population in the area, as well as the other lakes in the watershed, more than doubles in the summer months.

In Otter Tail County, 30% of the tax base is comprised of seasonal properties, with over 5,500 homesteaded properties located in shoreland areas (Otter Tail County).

In Becker County, 24% of the tax base is seasonal (Becker County). While this is very significant income, a large population swing does stress staffing levels in such areas as Law Enforcement, Shoreland Management, and other community services.

Many of the large lakes have lake associations who conduct lake monitoring, educational outreach, and community events. In addition, nine lakes in Otter Tail County have established Lake Improvement Districts (LIDs), which are a local taxing authority. These LIDs have volunteer boards and are involved in water quality improvement projects, AIS management and prevention, and other projects that benefit lake residents.



Long Lake in Becker County.

Future

Although the Otter Tail Watershed has rich and abundant natural resources of good to high quality, human impacts are evident now and will likely grow in the future without active stewardship. The local watershed partners have stewarded over 3,500 BMP projects and \$93 million dollars of state and federal investment in water quality improvements between 2004-2019, including agricultural and cropland practices, stream bank and shoreline restorations, septic system improvements, urban stormwater control practices, and more (MPCA 2021).

As the Benjamin Franklin saying goes, “*an ounce of prevention is worth a pound of cure.*” It is essential to continue to protect the good resources in the watershed and for we humans to recognize that what we do on the land impacts the water. Therefore, it is necessary for all of us to assume their care. Future areas to continue work in the watershed include:

- **Lakes.** Lakes can be “loved to death” if people don’t mitigate the impacts of the development of property, such as maintaining the natural vegetation on shorelines and within the lake and preventing stormwater runoff from entering the lake.
- **Agriculture.** Protecting the soils in agricultural lands is imperative to preserving productivity and protecting the water quality of streams and lakes in the area. There are many in-field BMPs that can reduce soil erosion, build soil health, and manage water to enhance soil performance and profitability.
- **Groundwater quality and quantity.** In this watershed the surface and groundwater are very closely connected. Land uses on the surface can impact both the quality and the quantity of groundwater.
- **Habitat continuity.** Large tracts of unfragmented forest and long stretches of unimpeded river are the best habitat for fish and wildlife species. Managing the watershed to maintain and restore this continuity will benefit both the species that are important to the local ecosystem and those that we love to observe, hunt, and fish.



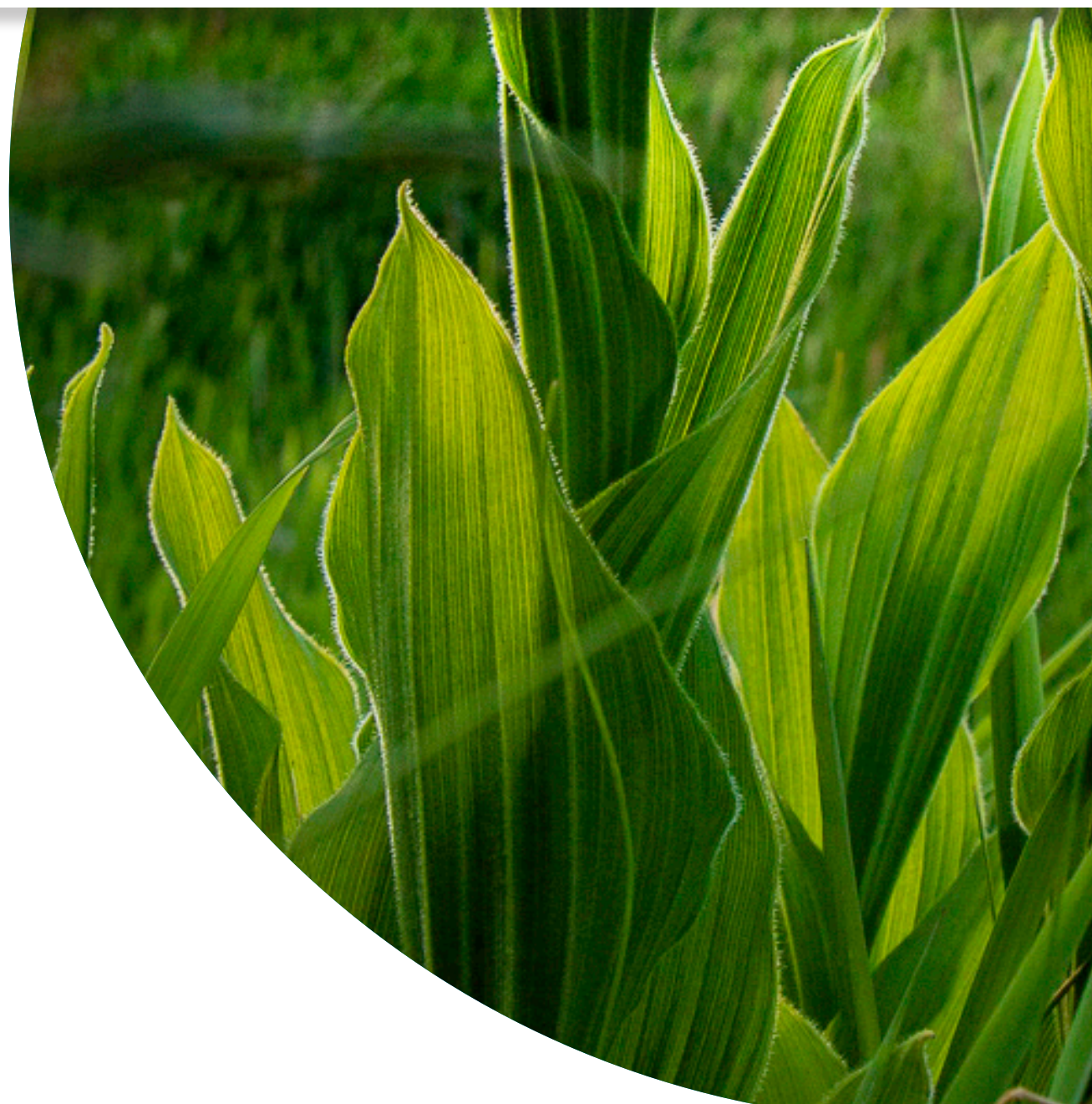
Prairie Lake in Otter Tail County.

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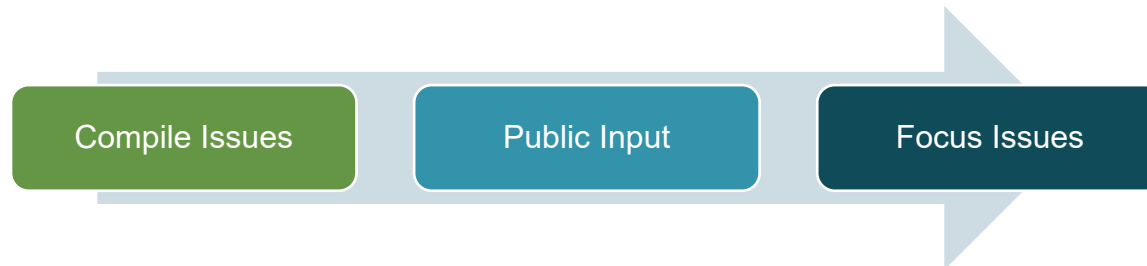


3. Focus Issues



Section 3. Focus Issues

“Issues” are concerns or opportunities that can be addressed to protect or restore natural resources in the watershed. The Technical Advisory and Policy Committees thoughtfully compiled and considered all issues in the watershed, gathered public input, and determined the focus issues that will be addressed by this plan.



Issue Compilation

The issues were brainstormed, gathered, and synthesized into a comprehensive watershed-wide issues list in August – November of 2021. Written sources used to gather issues included:

- *The Otter Tail River Watershed Restoration and Protection Strategy Report (WRAPS)* and supporting MPCA documents (such as the *Stressor Identification, Monitoring and Assessment*, and *Total Maximum Daily Load* reports)
- Local County Water Plans,
- Pelican River and Cormorant Lakes Watershed District plans,
- Otter Tail Watershed Plan 2003,
- County Comprehensive Land Use Plans, and
- Agency responses to 60-day plan notification (MPCA, BWSR, MDA, MDH, and DNR).





Issues were also brainstormed on post it notes at Technical Advisory Committee meetings in October and November 2021 and grouped into similar themes, which formed the basis of the issue statements in this plan (Figure 3.1).



Figure 3.1. Issue brainstorming and grouping into themes at the Technical Advisory Committee meetings.

The issues were organized into four resource categories which helps frame and communicate the issues throughout the process (Table 3.1).

Table 3.1. Resource categories in the Otter Tail Watershed.

Category	Description
	Surface Water Includes all water on the surface such as lakes, streams, wetlands, and drainage systems.
	Groundwater Includes all groundwater resources including aquifers, with a focus on drinking water.
	Land Stewardship Includes multiple benefits of managing the land for healthy soils, groundwater, surface water, and habitat quality.
	Habitat Includes habitat for wildlife, game, birds, and aquatic life (fish and macroinvertebrates), and sensitive species such as wild rice, cisco, and trout.

Public Input

Input from the public was gathered from an online public survey with 260 responses and Public Open House events in Detroit Lakes and Fergus Falls in the summer of 2021. Open House participants and survey respondents were asked to provide input on the issues and opportunities they feel should be included in the plan. The full Public Input Summary Report can be found in Appendix B.

The Citizen Advisory Committee met in January of 2022 and indicated their priority issues using sticky dots. Their responses were consistent with many of the issues identified from existing plans and studies in the watershed. Most citizen concerns were issues that can be addressed with actions that would be implemented by planning partners (Figure 3.2).

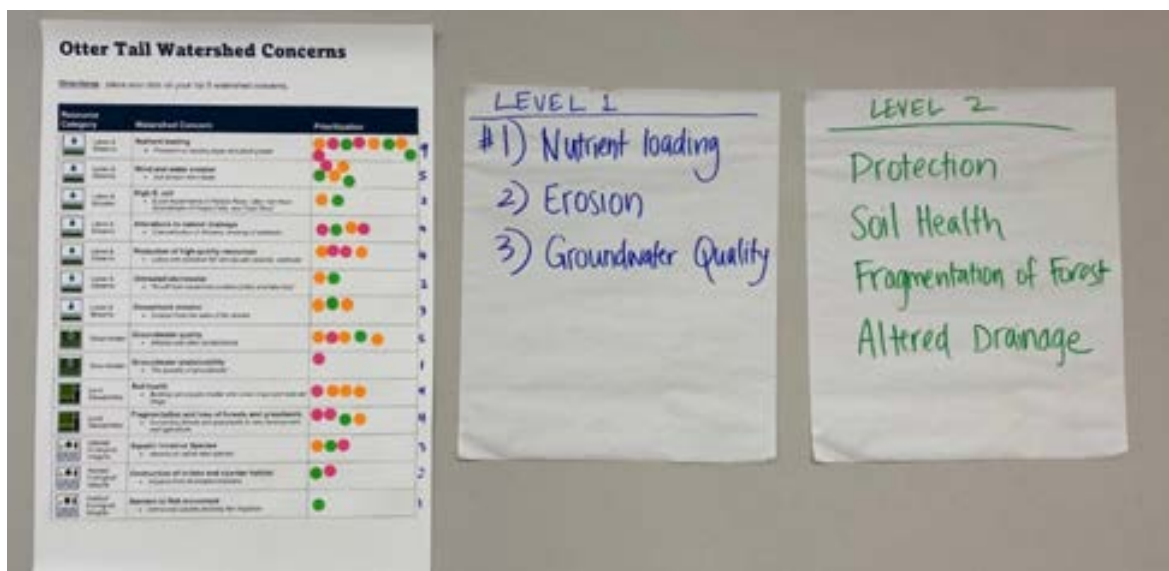


Figure 3.2. Issue prioritization at the Citizen Advisory Committee in January 2022.

Determining Focus Issues

In a perfect world, there would be enough funding and capacity to accomplish everything. In the real world, funding and staff time are limited, so the issues for the plan must be narrowed down as to what will be the primary focus over the next 10 years.

In addition to determining “what” will be the focus of the plan, it is necessary to determine “where” in the landscape to focus as well. This “what” and “where” were accomplished simultaneously by the Technical Advisory Committee. The “where” part of the prioritization process was conducted at the planning region scale.

Planning Regions

The Otter Tail Watershed (OTW) is very diverse in land use and resources. Because of this, 11 smaller planning regions were created for the plan to focus on specific concerns in specific regions of the watershed (Figure 3.3). The Technical Advisory Committee determined the planning region boundaries based on similar land use, drainage areas, hydrologic boundaries, and in the case of the Watershed Districts, political boundaries.

Primary and Secondary Issues

At their December 2021 and January 2022 meetings, the Technical Advisory Committee assigned applicable issues to each planning region. Many factors were considered in the prioritization, including citizen input, water quality impairments, groundwater resources, and land use. Aquatic consumption impairments (mercury in fish tissue) were not addressed in this plan as they are covered by the state-wide mercury TMDL.

Any issue that was ranked as high priority in more than one of the planning regions was considered a Primary issue. Primary issues are those that will be the focus of effort and funding during implementation over the next 10 years. Issues that ranked as a medium priority in any planning region were considered Secondary Issues. Secondary Issues are those that will be addressed with additional funding sources and partnerships. The Technical Advisory Committee decided that primary and secondary issues will have goals developed for addressing them. Issues ranked as a low priority in any planning region are not a priority for the next 10 years but could be addressed as opportunities arise. These issues and their focus level were presented to the Policy Committee in January 2022 and approved. All these efforts have resulted in the final issue statements listed in this section.

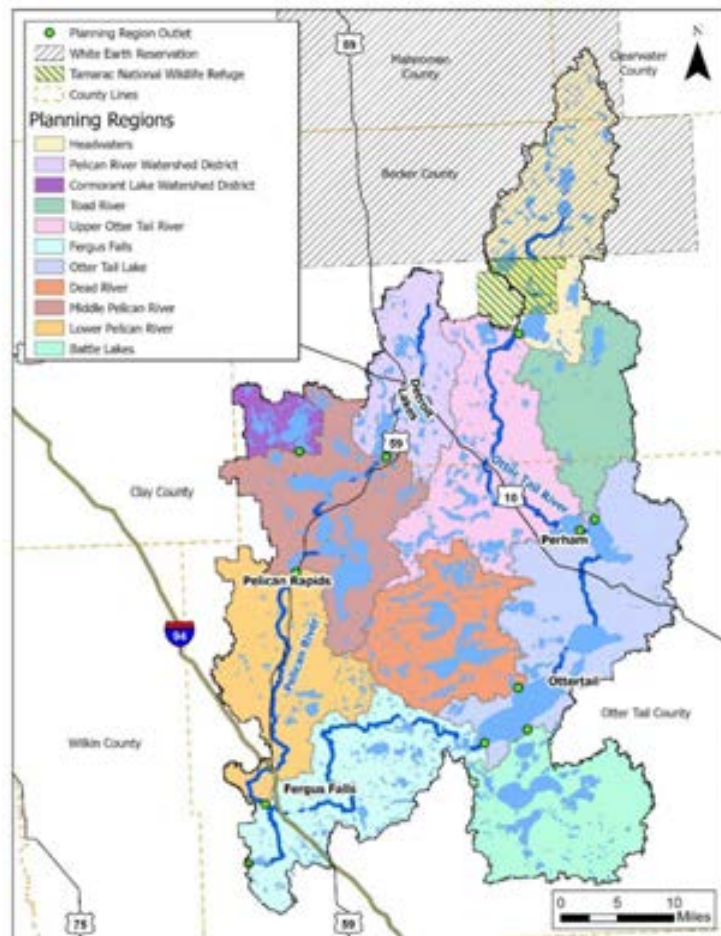


















Figure 3.3. Planning Regions for the OTW.

Primary Issues

Primary issues are the most important issues that will be the focus of implementation efforts in the 10-year plan. They had a “high” ranking in more than one planning region. The main theme of the issue statement is shown in **bold** text. NRCS Resource Concerns that align with issues are included for ease of implementation.



Planning Region Focus - Primary Focus: Secondary Focus: As Opportunities Arise:









Resource Category	Resources Affected	Issue Statement	Planning Region Focus	Description
	Lakes, Streams, Drinking Water	Nutrient loading causes algal blooms and eutrophication.		Nutrient loading considers the amount of phosphorus and nitrogen entering a lake or stream. Fergus Falls drinking water, as well as downstream Moorhead and Fargo, is partially supplied by surface water and is included as a focus for this issue. Internal loading from legacy phosphorus in lake sediments is also included here. NRCS Resource Concern: <i>Water Quality Degradation – Excess nutrients in surface water</i>
	Lakes, Streams	Wind and water erosion impact water clarity, dissolved oxygen levels, and aquatic habitat.		This issue focuses on how much sediment is moving and being deposited across the landscape due to wind and water erosion. Excess sediment in waterbodies can impact water quality and also aquatic life through decreased dissolved oxygen levels and degraded aquatic habitat. NRCS Resource Concerns: <i>Soil Erosion – Wind, sheet, and rill erosion</i> <i>Water Quality Degradation – Excessive sediment in surface waters</i>
	Lakes, Streams, Wetlands, Forests, Prairies	Sufficient protection is needed for outstanding resources and sensitive species to maintain water and habitat quality.		Sufficient protection is needed for waterbodies that are designated supporting cisco or trout, as shallow lakes, as sensitive wetlands, or as containing wild rice. Protection is also a priority for forests and prairies as described in the Land Stewardship Plan. NRCS Resource Concern: <i>Inadequate Habitat for Fish & Wildlife – Habitat Degradation & Habitat Continuity</i>
	Lakes, Streams, Wetlands	Untreated stormwater , including chloride, impacts water quality.		Untreated stormwater impacts are most prevalent near main roads and highways, in urban areas, on lakeshore, and within the municipal separate storm sewer system (MS4) permit boundaries in Detroit Lakes and Fergus Falls.. NRCS Resource Concerns: <i>Water Quality Degradation – Excessive salts in surface waters</i> <i>Excess Water – Ponding, flooding</i>





Resource Category	Resources Affected	Issue Statement	Planning Region Focus	Description
	Aquifer, Drinking Water	Groundwater quality is vulnerable to contamination.		Groundwater contamination will focus on dealing with nitrates, arsenic, well sealing, well head protection, and protection of Drinking Water Supply Management Areas. NRCS Resource Concern: <i>Water Quality Degradation – Excess nutrients in groundwater</i>
	Soil, Lakes, Streams, Wetlands	Soil health is important for agricultural productivity and climate change resilience.		Cover crops, no till, and other best management practices are being used to improve or sustain soil health, soil organic matter, and soil aggregation. These practices also reduce nutrient and sediment loading to lakes and streams. NRCS Resource Concern: <i>Soil Quality Degradation – Organic matter depletion</i>
	Forests, Prairies	Fragmentation and loss of forests and grasslands by land use change impacts land resilience, habitat, and surface and groundwater quality.		The transition of prairie and forests to agriculture and development impacts ecological integrity including loss of pollinator and wildlife habitat and causes conflicting land uses. NRCS Resource Concern: <i>Inadequate Habitat for Fish & Wildlife – Habitat Degradation & Habitat Continuity</i>
	Lakes, Streams	Aquatic Invasive Species impact the aquatic ecosystem, water quality, recreation, and economic development.		Aquatic invasive species are a focus of local programs to prevent the establishment of new invasive species and manage invasive species that already exist in the watershed.

Secondary Issues

Secondary issues will be addressed during the 10-year plan, likely with additional funding and/or with partners. The main theme of the issue statement is shown in **bold** text.

Planning Region Focus - Secondary Focus:  As Opportunities Arise: 

Resource Category	Resources Affected	Issue Statement	Planning Region Focus	Description
	Streams, Lakes	Barriers to fish movement impact fish communities and stream geomorphology.		The OTW has a long history of dams built in the 1930s at lake outlets along the Pelican and Otter Tail Rivers to maintain consistent lake water levels. These dams are barriers to fish movement and affect the transport of sediment. In the past few years there has been good momentum in the watershed to modify these dams into rapids that still hold water in the lake but also allow for fish passage and improved habitat.
	Lakes, Streams, Wetlands, Ditches	Altered hydrology increases the flow of water, increases streambank erosion, and impacts aquatic life.		Historical human alterations to natural drainage such as channelization, ditching, and draining wetlands has changed the quantity, timing, and variability in water flow across the landscape. This change in flow can cause erosion in the banks of streams and ditches, impacting aquatic habitat and water quality.
	Streams, Lakes, Ditches	Unstable stream channels contribute to sediment loading and reduced habitat quality.		In-stream loading and unstable streams contribute to sediment and nutrient transport through watercourses, accelerating water quality issues, and impacting riparian habitat.
	Streams	High <i>E. coli</i> makes waterbodies unsafe for recreation.		<i>E. coli</i> from agriculture and septic systems, urban and industrial areas, and birds and wildlife all may impact the ability to recreate safely in waterbodies.

Resource Category	Resources Affected	Issue Statement	Planning Region Focus	Description
	Lakes, Streams	Destruction of in-lake and riparian habitat impacts water quality, lake health, and fish communities.		Continued development pressure on shorelines and removal of in-lake vegetation have consequences on habitat in and around the lakes and streams. Shoreland ordinances and education can help alleviate these pressures, but restoration projects can also help regain what has been lost.
	Aquifer	Groundwater sustainability is vulnerable to overuse and loss of recharge.		Irrigation and water appropriation both have impacts on groundwater quantity. Conservation measures such as irrigation water management can help maintain aquifers into the future.

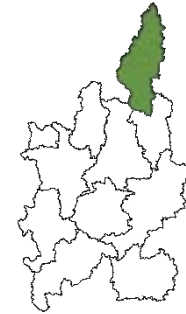
Issues Presented by Planning Region





Because the watershed’s land use and resources are so diverse, and there are two watershed districts within the watershed planning area, the Technical Advisory Committee expressed their preference to present issues in this section specific to each planning region. This way, they can focus on the planning region(s) that falls within their jurisdictional boundary. There is some repetition between planning regions, but the intent is that the pages about each planning region can stand alone outside the full plan to be used for reference and obtaining additional funding during implementation.



Headwaters Planning Region Becker County and White Earth Nation

The Headwaters Planning Region includes the Tamarac National Wildlife Refuge and the White Earth Reservation. There are no impaired stream reaches and four nutrient impaired lakes, although these lakes are naturally shallow and have very little human impact. Additionally, this region contains two cisco lakes, a sign of deep, clear, and cold water that will likely remain suitable to coldwater fish habitat in the future. The Headwaters is an area with good groundwater recharge potential and limited nitrogen infiltration risk (Figure 3.4). Lakes in this region are spring fed with significant groundwater discharge. The major land use is forest.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Sufficient Protection	Wind and Water Erosion Nutrient Loading Altered Hydrology	Untreated Stormwater High <i>E.coli</i> Unstable Stream Channels
 Groundwater		Groundwater Quality	Groundwater Sustainability
 Land Stewardship		Fragmentation of Uplands	Soil Health
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat Barriers to Fish Movement	

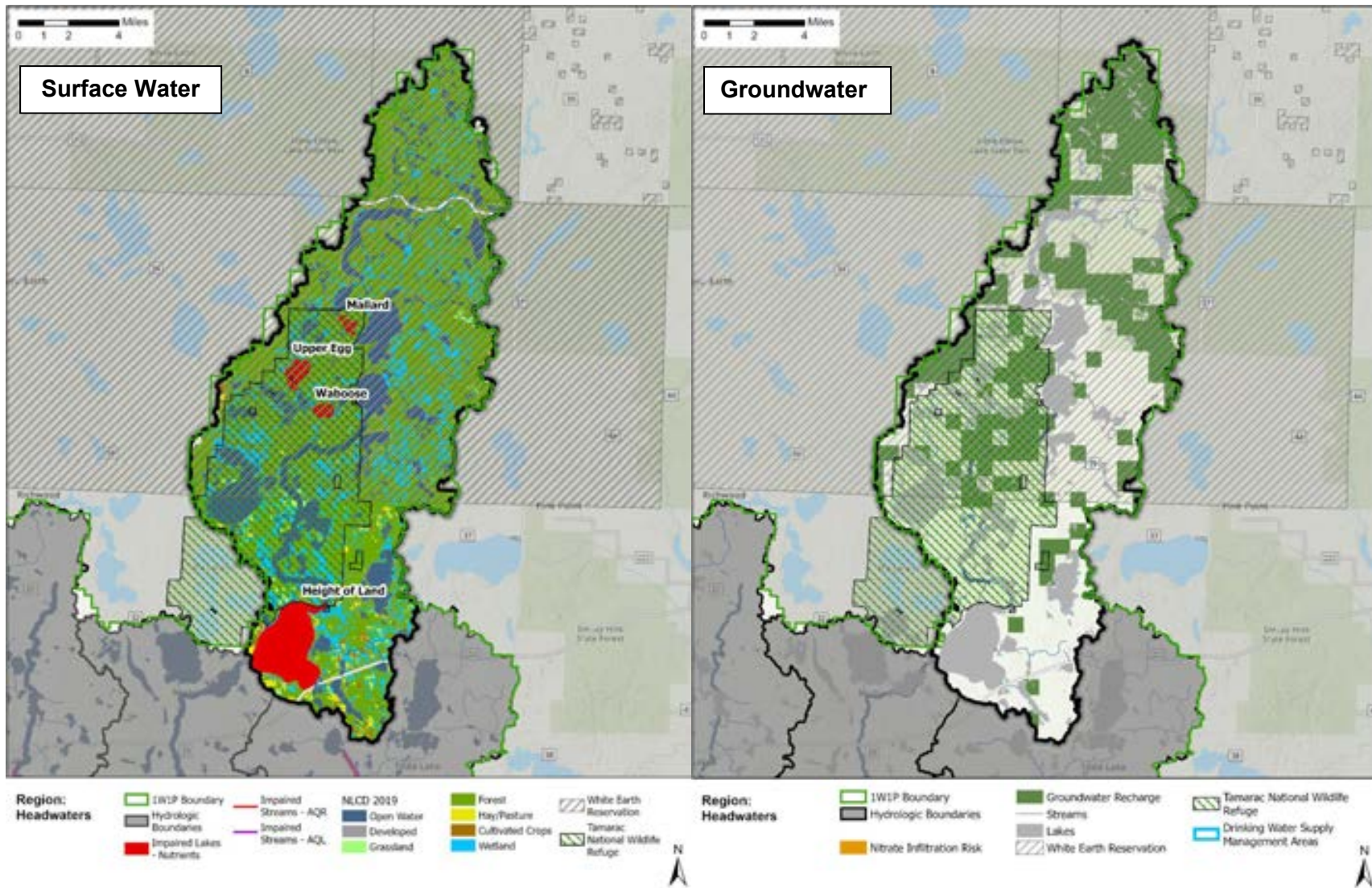
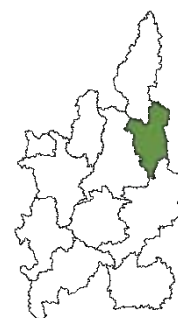






Figure 3.4. Surface water, land use, and groundwater in the Headwaters Planning Region.



Toad River Planning Region Becker County and Otter Tail County

The Toad River Planning Region is in Becker and Otter Tail counties, on the eastern side of the watershed. There are no nutrient impaired lakes but there are three impaired streams. Two separate stream reaches are impaired due to *E. coli*, and a third reach is impaired due to both *E. coli* and fish biotic integrity. The Toad River Planning Region contains areas with high groundwater recharge potential and some areas where nitrogen infiltration into the groundwater is a risk (Figure 3.5). The major land uses within the planning region are cultivated crop and hay/pasture.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion	Sufficient Protection Unstable Stream Channels High <i>E.coli</i>	Altered Hydrology Nutrient Loading Untreated Stormwater
 Groundwater	Groundwater Quality	Groundwater Sustainability	
 Land Stewardship	Soil Health Fragmentation of Uplands		
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat Barriers to Fish Movement	

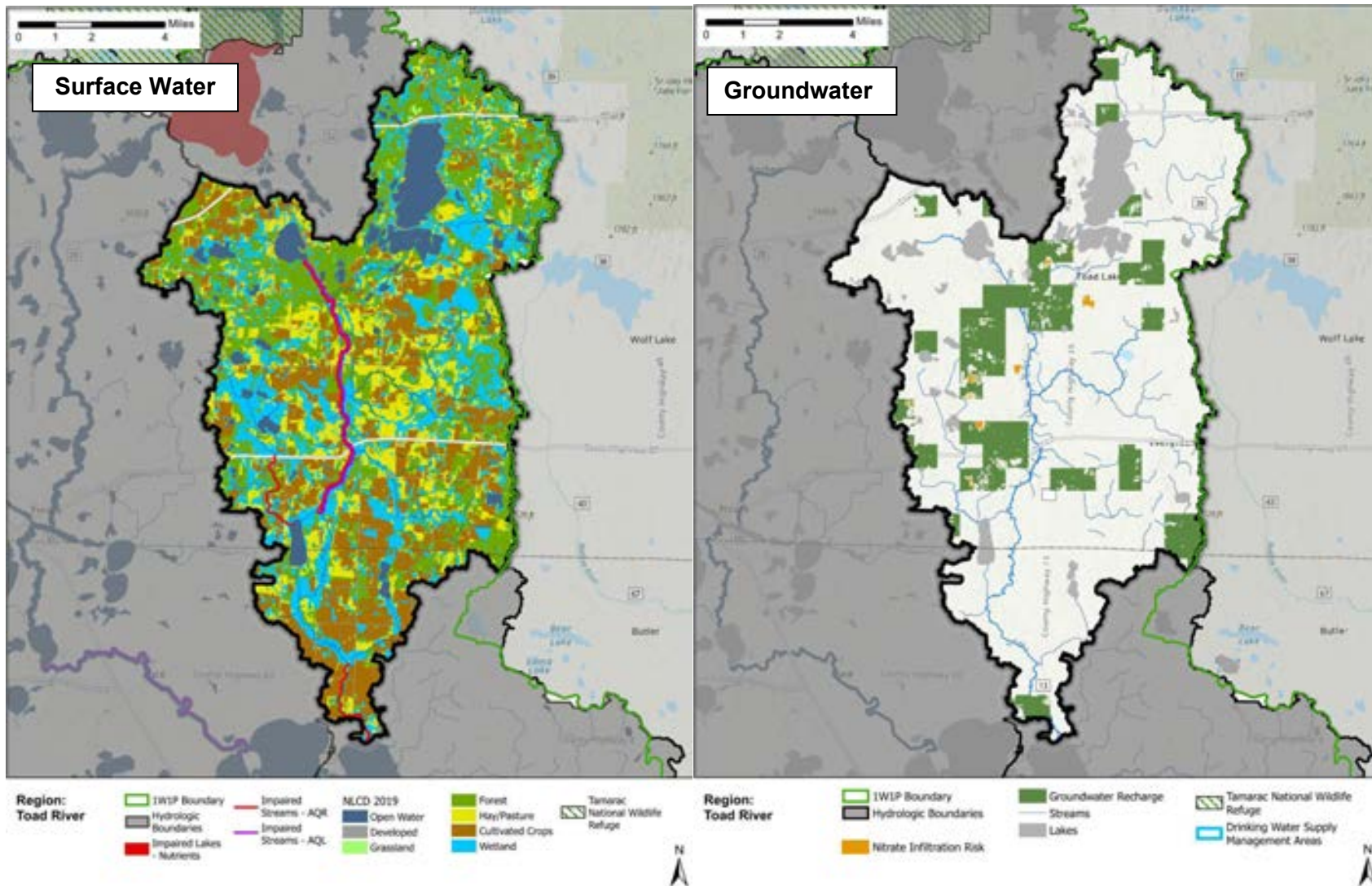
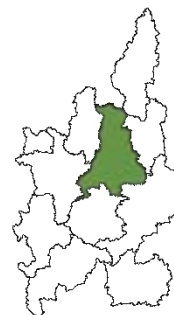


Figure 3.5. Surface water, land use, and groundwater in the Toad River Planning Region.

Upper Otter Tail Planning Region Otter Tail and Becker Counties

The Upper Otter Tail Planning Region spans Becker and Otter Tail counties and is in the north central part of the watershed. There are three fish biotic integrity impaired lakes and one nutrient impaired lake. One stream reach is impaired for aquatic life caused by low dissolved oxygen. This Planning Region contains seven of the twelve cisco lakes within the watershed, which are a sign of deep, clear, and cold water. There is an area with good groundwater recharge potential but does have areas in the southeast that are at a high risk of nitrogen groundwater infiltration (Figure 3.6). The major land uses within the watershed include forest, cultivated crop, and hay/pastureland.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion	Untreated Stormwater Nutrient Loading Sufficient Protection Untreated Stormwater Unstable Stream Channels	High <i>E.coli</i> Altered Hydrology
 Ground-Water	Groundwater Quality	Groundwater Sustainability	
 Land Stewardship	Soil Health Fragmentation of Uplands		
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat Barriers to Fish Movement	

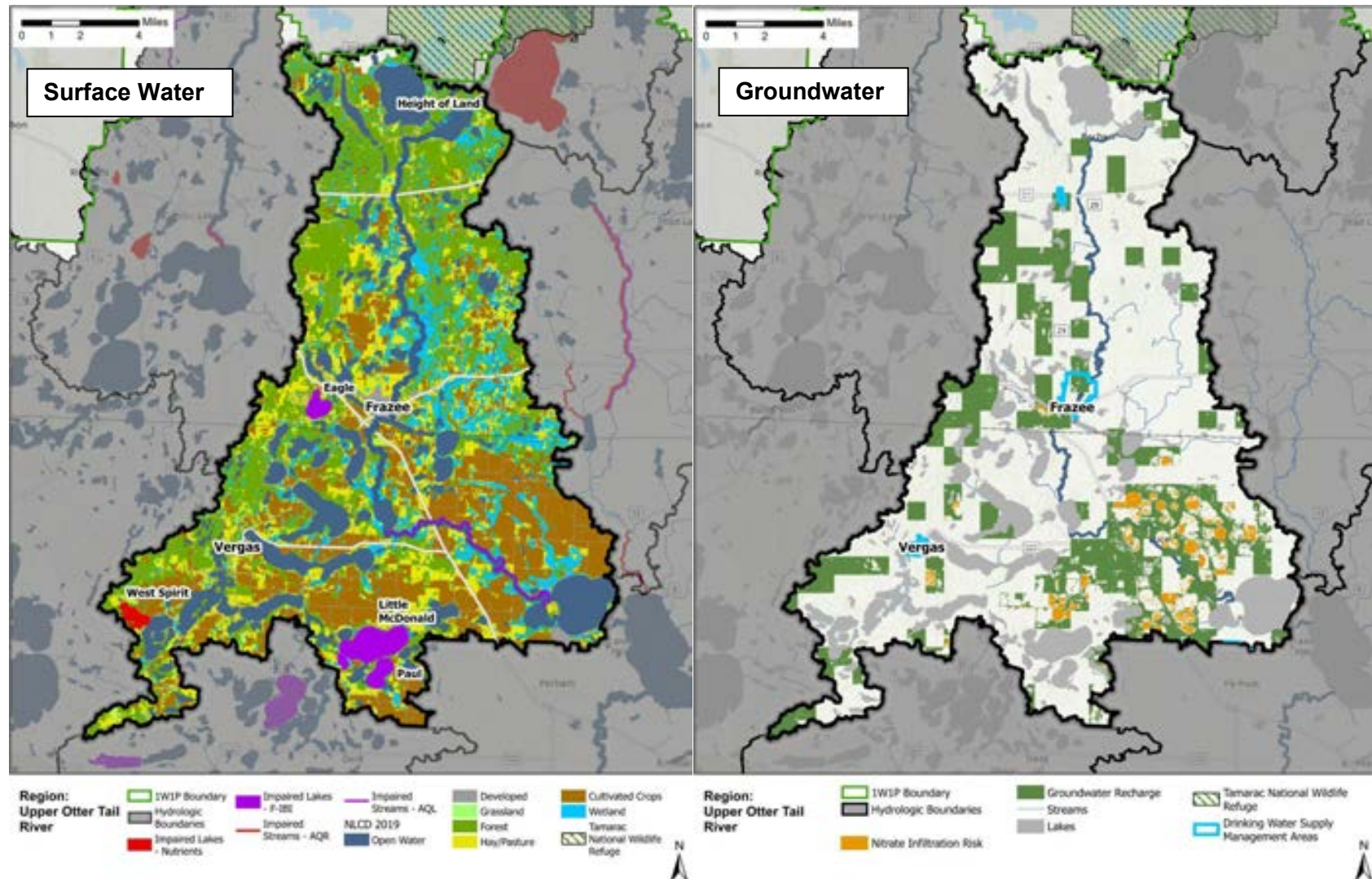
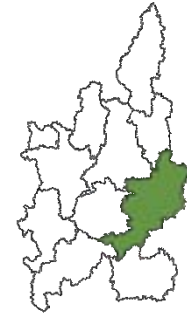


Figure 3.6. Surface water, land use, and groundwater in the Upper Otter Tail Planning Region.



Otter Tail Lake Planning Region Otter Tail County

The Otter Tail Lake Planning Region is in Otter Tail County and contains Otter Tail Lake, the 10th largest lake in Minnesota. It also contains Rush and Big Pine lakes, which are regionally significant recreational lakes. There are two nutrient impaired lakes and no impaired streams. The cities of Perham and Ottertail are located in this planning region. The western side of the planning region contains areas where high groundwater recharge is possible. The same region also contains areas where nitrogen infiltration is of high risk (Figure 3.7). The dominant land use within the region is cultivated crops.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion Sufficient Protection Nutrient Loading	Untreated Stormwater	High <i>E.coli</i> Altered Hydrology Unstable Stream Channels
 Groundwater	Groundwater Quality	Groundwater Sustainability	
 Land Stewardship	Soil Health Fragmentation of Uplands		
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat Barriers to Fish Movement	

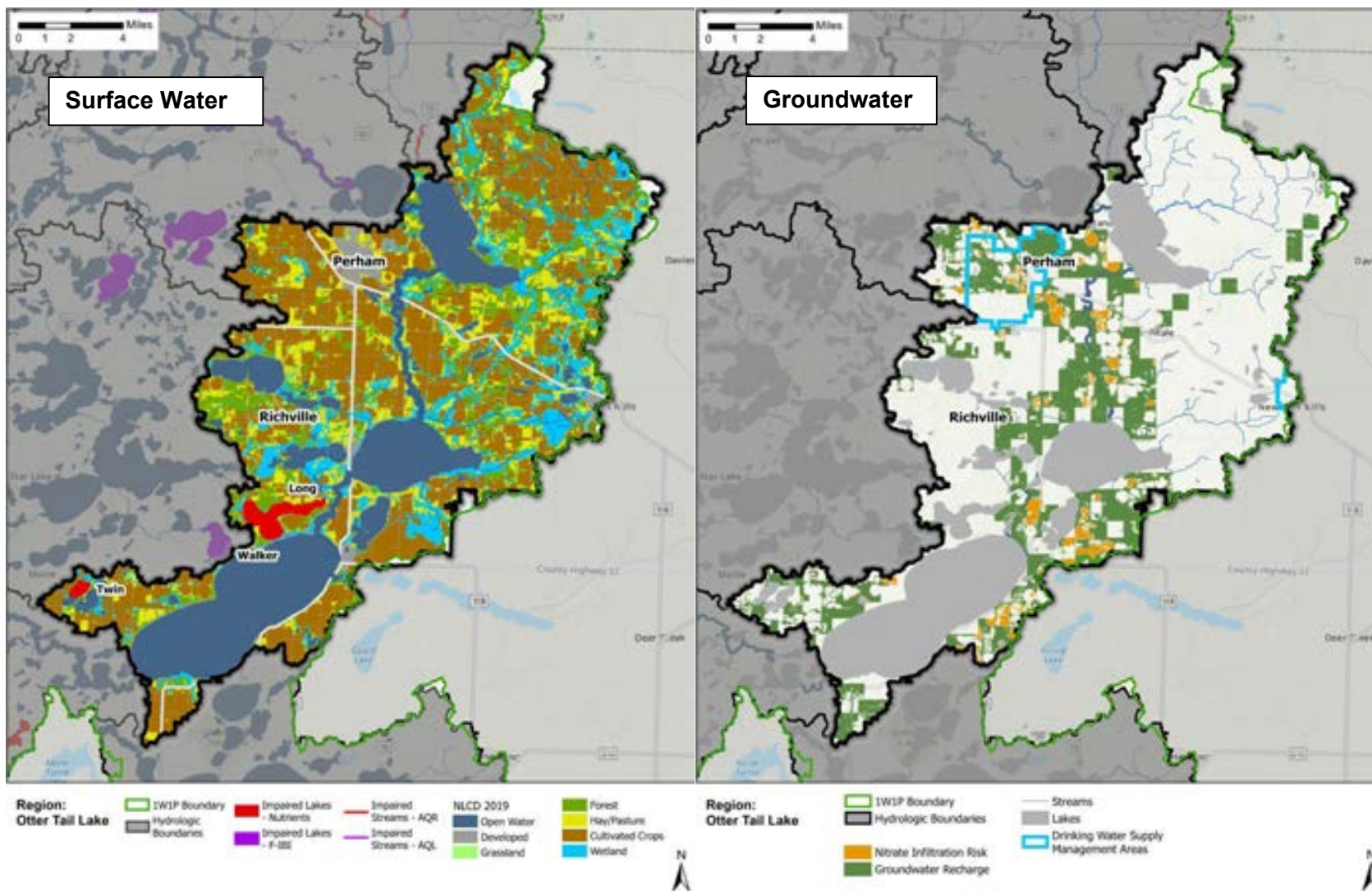
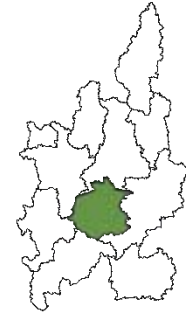


Figure 3.7. Surface water, land use, and groundwater in the Otter Tail Lake Planning Region.



Dead River Planning Region Otter Tail County

The Dead River Planning Region is located in Otter Tail County and contains one cisco refuge lake. Three lakes are impaired due to fish biotic integrity, and there are no nutrient impaired lakes and no impaired streams. This Planning Region has high groundwater recharge potential throughout with risk of nitrogen infiltration at the northern and southern boundaries (Figure 3.8). Cultivated crops and hay/pastureland dominate the edges of all but the western planning region boundary. Forests are the main land use on the western boundary.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion Sufficient Protection	Untreated Stormwater Nutrient Loading	High <i>E.coli</i> Altered Hydrology Unstable Stream Channels
 Ground-Water		Groundwater Sustainability Groundwater Quality	
 Land Stewardship	Fragmentation of Uplands	Soil Health	
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat	Barriers to Fish Movement

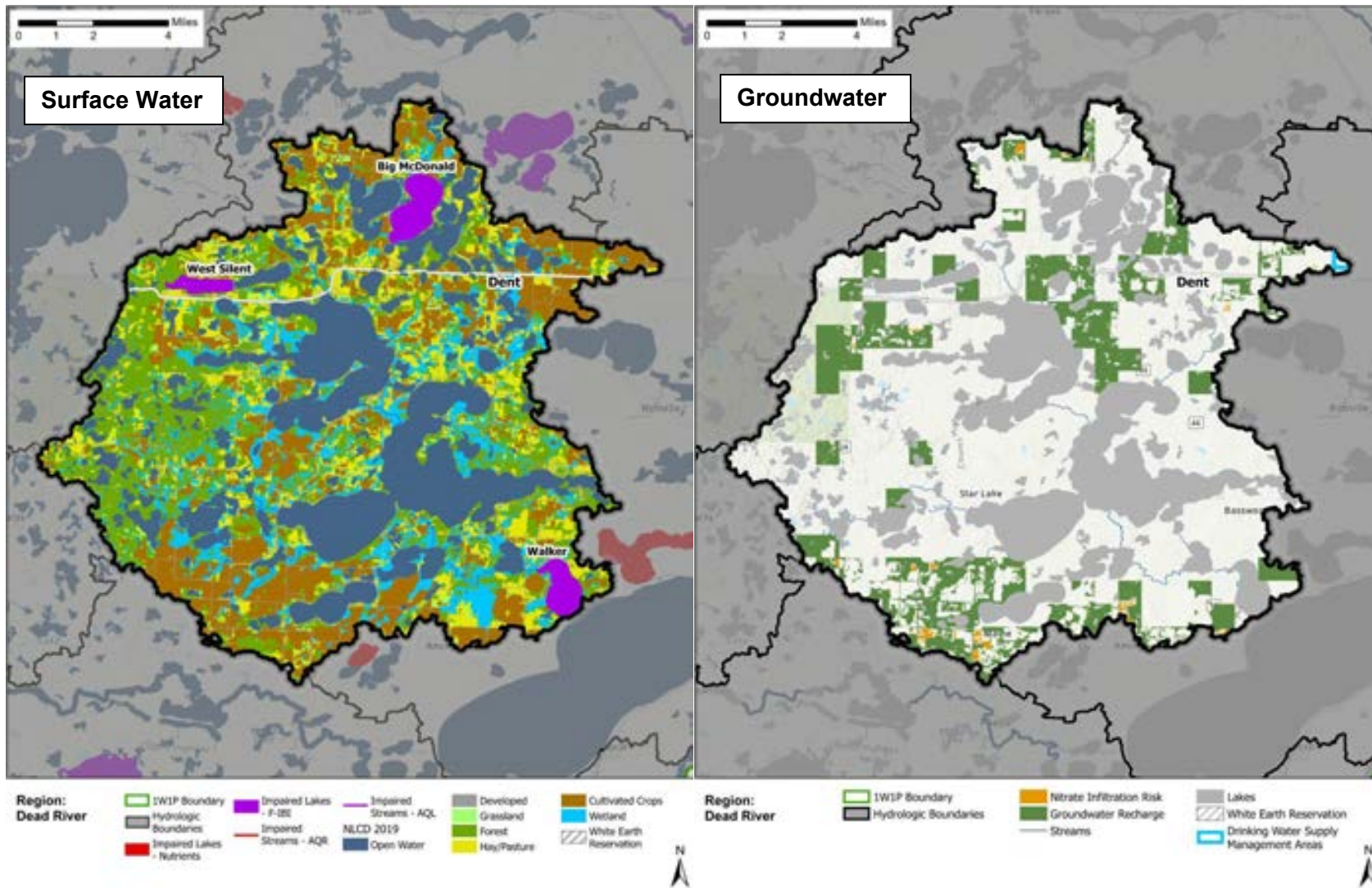
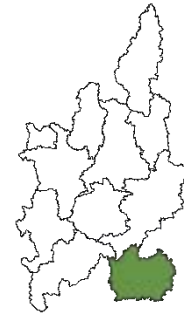


Figure 3.8. Surface water, land use, and groundwater in the Dead River Planning Region.



Battle Lakes Planning Region Otter Tail County

The Battle Lakes Planning Region is located in Otter Tail County and makes up the southeast corner of the watershed. It contains no impairments in lakes or streams. Groundwater recharge potential is possible in certain areas across the planning region, and groundwater nitrogen infiltration risk is most likely to take place on the western side of the region (Figure 3.9). The land use transitions from forested to cultivated crop and hay/pastureland from east to west.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion Sufficient Protection	Untreated Stormwater Nutrient Loading	High <i>E.coli</i> Altered Hydrology Unstable Stream Channels
 Groundwater	Groundwater Quality	Groundwater Sustainability	
 Land Stewardship	Soil Health	Fragmentation of Uplands	
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat	Barriers to Fish Movement

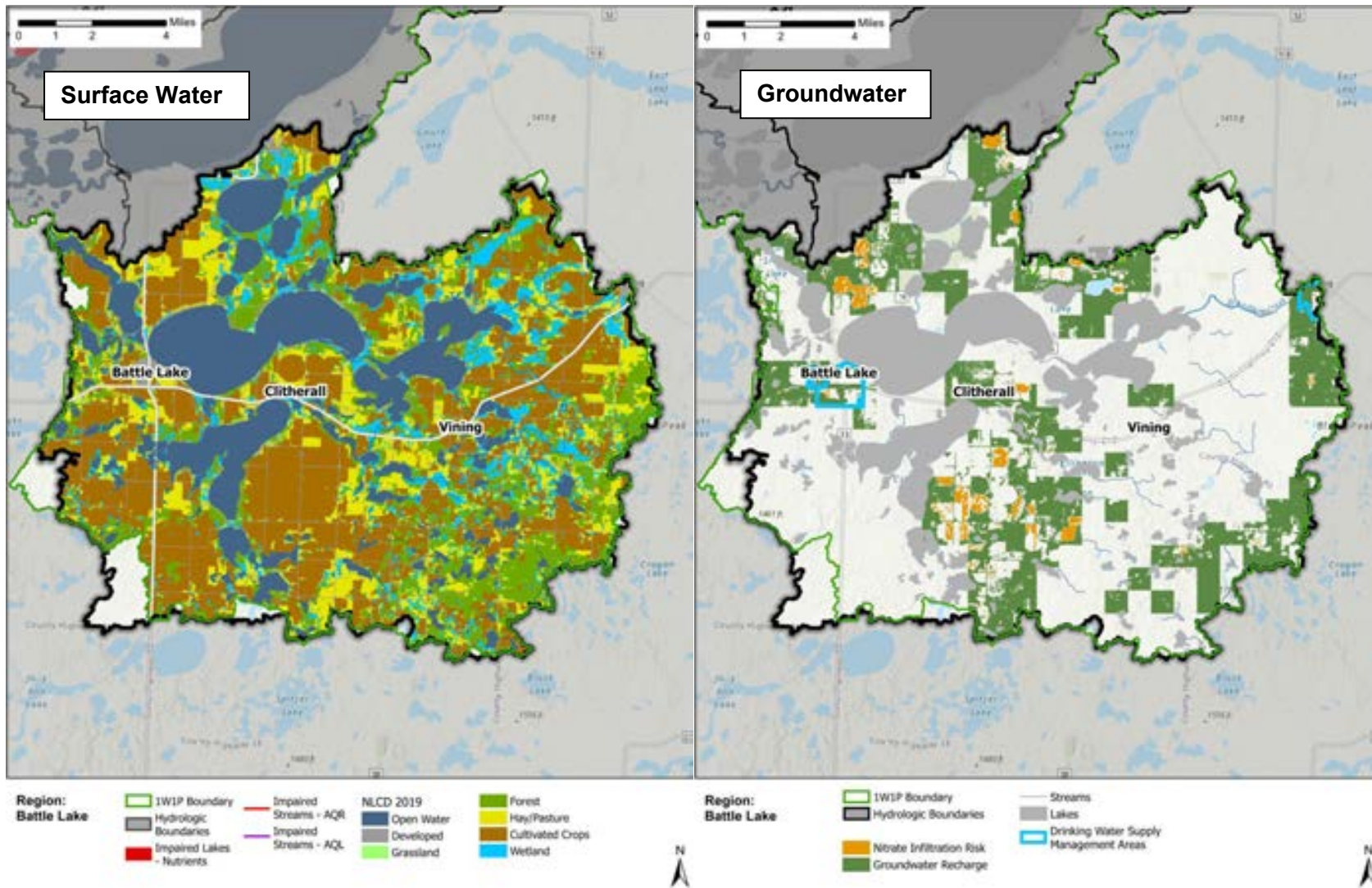
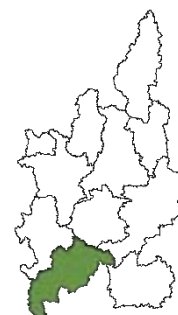


Figure 3.9. Surface water, land use, and groundwater in the Battle Lakes Planning Region.

Fergus Falls Planning Region Otter Tail County

The Fergus Falls Planning Region is the most downstream planning region within the OTW planning boundary. This planning region contains five lakes with nutrient impairments, two lakes with fish biotic integrity impairments, and one stream impairment due to *E. coli*. There are two main areas where groundwater recharge is most likely: the middle and the northeastern portion of the planning region (Figure 3.10). The dominant land use within this planning region is cultivated crops. This Planning Region is unique in that Hoot and Wright lakes supply a portion of Fergus Falls’ drinking water. In addition, Fergus Falls has an MS4 permit regulating stormwater. MS4 permits are a type of National Pollutant Discharge Elimination System (NPDES) permit, and the permit authorizes local government units to discharge stormwater into surface waters. As discussed on page 18, MS4 permits require local government units to implement best management practices for treating stormwater prior to discharging into surface waters.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion Untreated Stormwater Nutrient Loading	Unstable Stream Channels High <i>E. coli</i> Altered Hydrology	Sufficient Protection
 Groundwater		Groundwater Sustainability Groundwater Quality	
 Land Stewardship	Soil Health	Fragmentation of Uplands	
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat Barriers to Fish Movement	

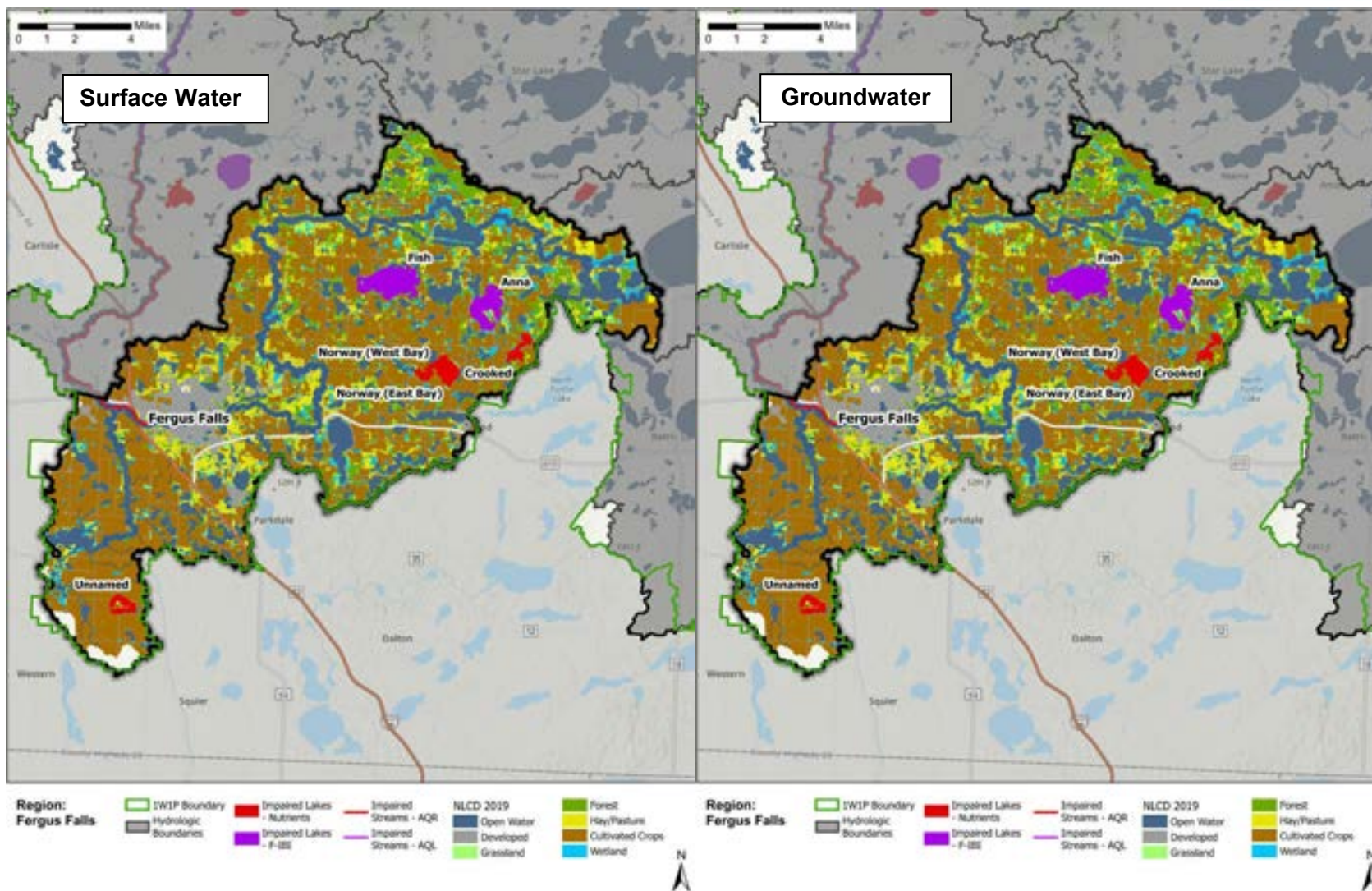
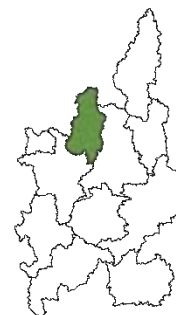


Figure 3.10. Surface water, land use, and groundwater in the Fergus Falls Planning Region.

Pelican River Watershed District Planning Region Pelican River Watershed District and Becker County

The Pelican River Watershed District Planning Region is defined by the Watershed District boundaries and encompasses the city of Detroit Lakes and the regionally significant Floyd, Detroit, Sallie, and Melissa lakes. This planning region contains two nutrient impaired lakes and two impaired stream reaches, one due to total suspended solids and the other due to *E. coli*, dissolved oxygen, fish biotic integrity, and macroinvertebrate biotic integrity. There are pockets across the planning region that have both high groundwater recharge and high nitrogen infiltration risk potential (Figure 3.11). Land use comprises a mix of concentrated development, cultivated crop, hay/pastureland, and forested areas. In addition, Detroit Lakes has an MS4 permit regulating stormwater.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion Untreated Stormwater Nutrient Loading Sufficient Protection Unstable Stream Channels	High <i>E.coli</i> Altered Hydrology	
 Groundwater		Groundwater Quality	Groundwater Sustainability
 Land Stewardship		Soil Health Fragmentation of Uplands	
 Habitat	Aquatic Invasive Species	Destruction of Riparian Habitat Barriers to Fish Movement	

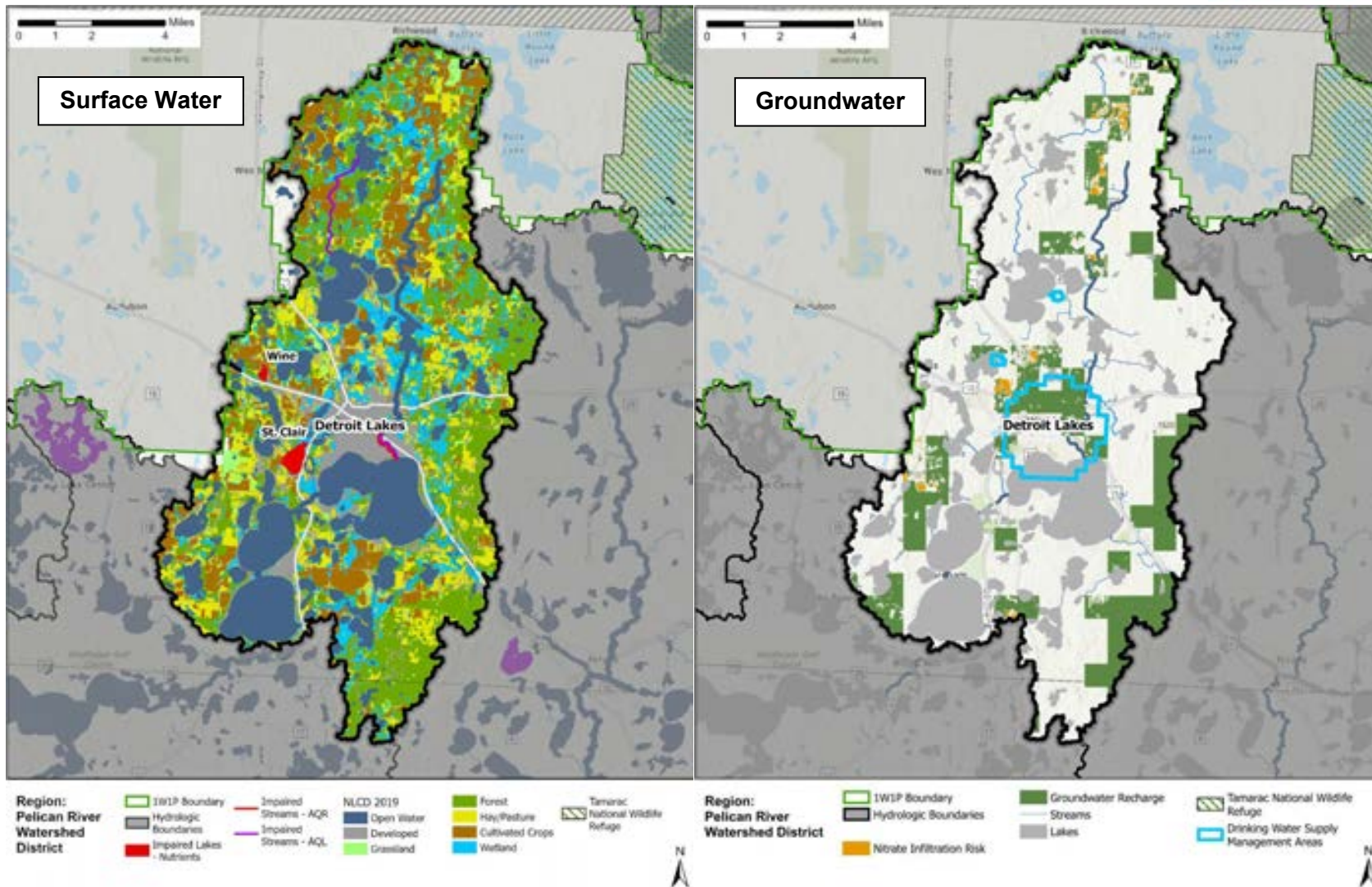
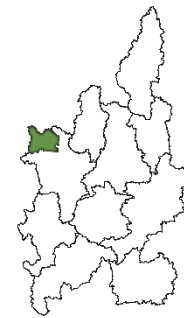


Figure 3.11. Surface water, land use, and groundwater in the Pelican River Watershed District Planning Region.



Cormorant Lakes Watershed District Planning Region Cormorant Lakes Watershed District and Becker County

The Cormorant Lakes Watershed District Planning Region is defined by the Watershed District Boundaries and contains the regionally significant recreational Cormorant chain of lakes. There are two lakes that have fish biotic integrity impairments and no other impairments within the planning region. Groundwater recharge potential is limited to the southern portion of the planning region and there is high risk for nitrogen infiltration in the southwestern corner (Figure 3.12). Land use is spread relatively evenly between forest, developed shorelines, cultivated crop and hay/pastureland.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Nutrient Loading Sufficient Protection	Untreated Stormwater Wind and Water Erosion	High <i>E.coli</i> Altered Hydrology Unstable Stream Channels
 Groundwater		Groundwater Quality	Groundwater Sustainability
 Land Stewardship		Soil Health Fragmentation of Uplands	
 Habitat	Aquatic Invasive Species	Destruction of Riparian Habitat	Barriers to Fish Movement

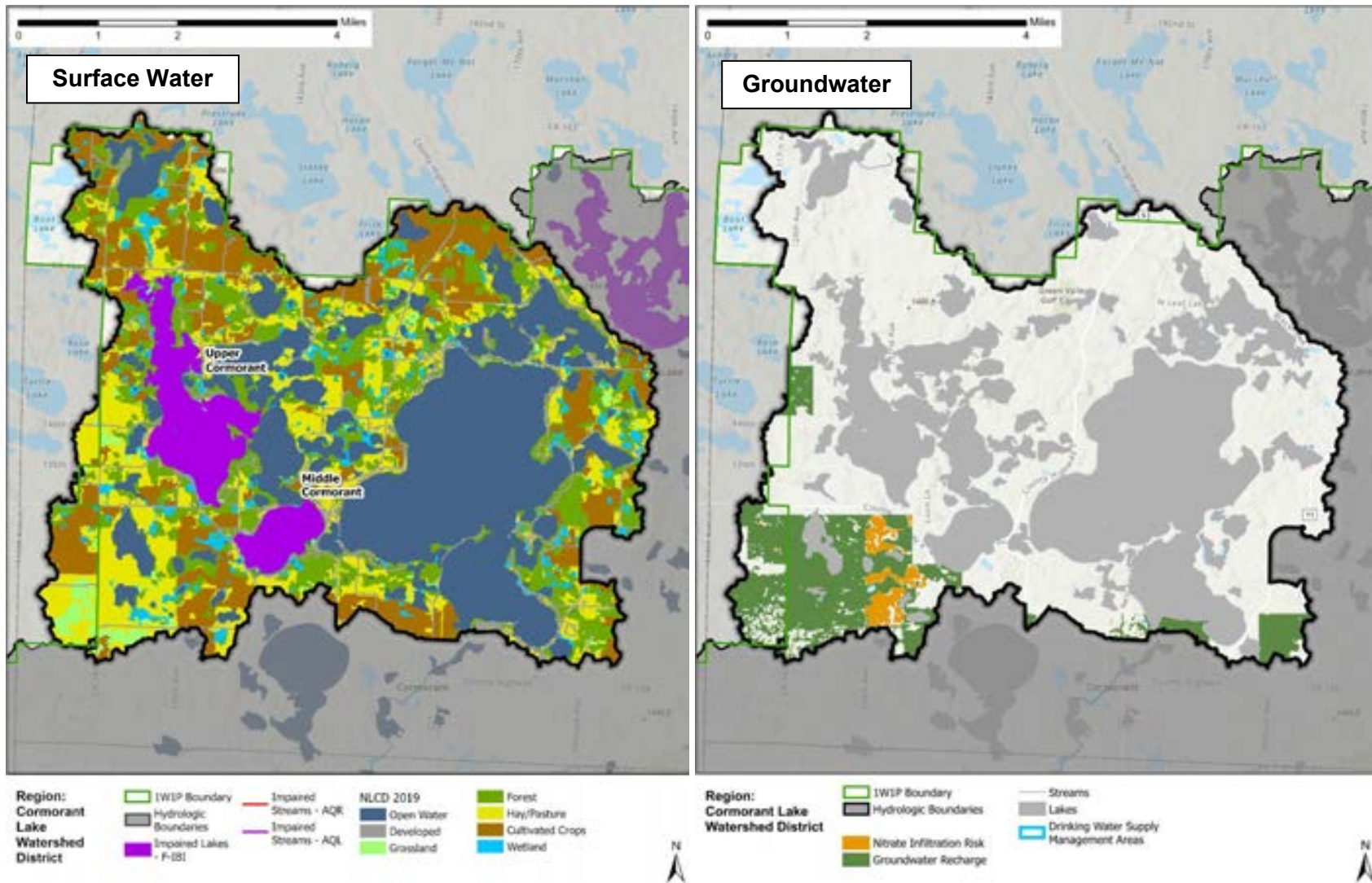


Figure 3.12. Surface water, land use, and groundwater in the Cormorant Lakes Watershed District Planning Region.



Middle Pelican River Planning Region Otter Tail and Becker Counties

The Middle Pelican River Planning Region contains the Pelican chain of lakes, a series of regionally significant recreational lakes. There is one lake with a fish biotic integrity impairment. The planning region contains one cisco refuge lake. High groundwater recharge potential is mostly concentrated to the edges of the planning region. High nitrogen infiltration risk is limited to the western part of the planning region (Figure 3.13). Generally, land use switches from forested in the east to cultivated crop and hay/pastureland in the west.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion Nutrient Loading Sufficient Protection	Untreated Stormwater	High <i>E.coli</i> Altered Hydrology Unstable Stream Channels
 Ground-Water	Groundwater Quality	Groundwater Sustainability	
 Land Stewardship	Fragmentation of Uplands	Soil Health	
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat Barriers to Fish Movement	

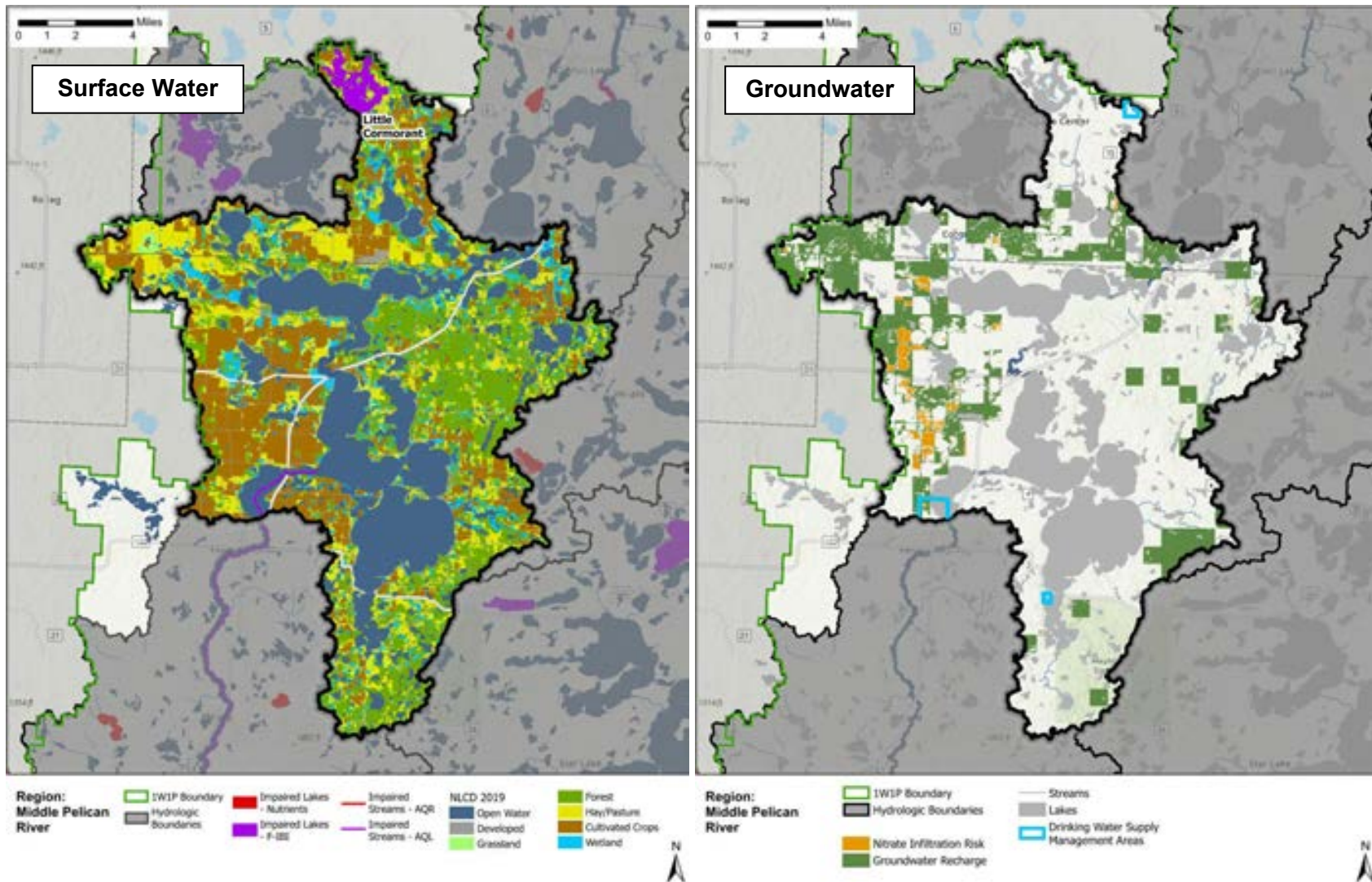
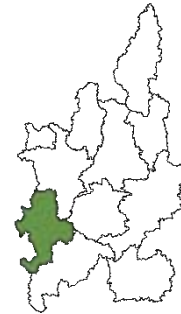


Figure 3.13. Surface water and land use in the Middle Pelican River Planning Region.



Lower Pelican River Planning Region Otter Tail County

The Lower Pelican River Planning Region outlets into the Otter Tail River near Fergus Falls. The city of Pelican Rapids is located in this planning region. There are four lake impairments, three of which are due to nutrients and one is due to fish biotic integrity. Two stream reaches are impaired - one due to *E.coli* and the other due to dissolved oxygen and fish biotic integrity. Spread-out within the planning region, there are areas where high groundwater recharge potential and high nitrogen infiltration risk are possible (Figure 3.14). The planning region is dominated by cultivated crop and hay/pastureland, with some forest towards the northeast.



Category	Primary Issues	Secondary Issues	As Opportunities Arise
 Surface Water	Wind and Water Erosion	Untreated Stormwater Nutrient Loading Sufficient Protection Unstable Stream Channels High <i>E.coli</i> Altered Hydrology	
 Groundwater	Groundwater Quality	Groundwater Sustainability	
 Land Stewardship	Soil Health Fragmentation of Uplands		
 Habitat		Aquatic Invasive Species Destruction of Riparian Habitat Barriers to Fish Movement	

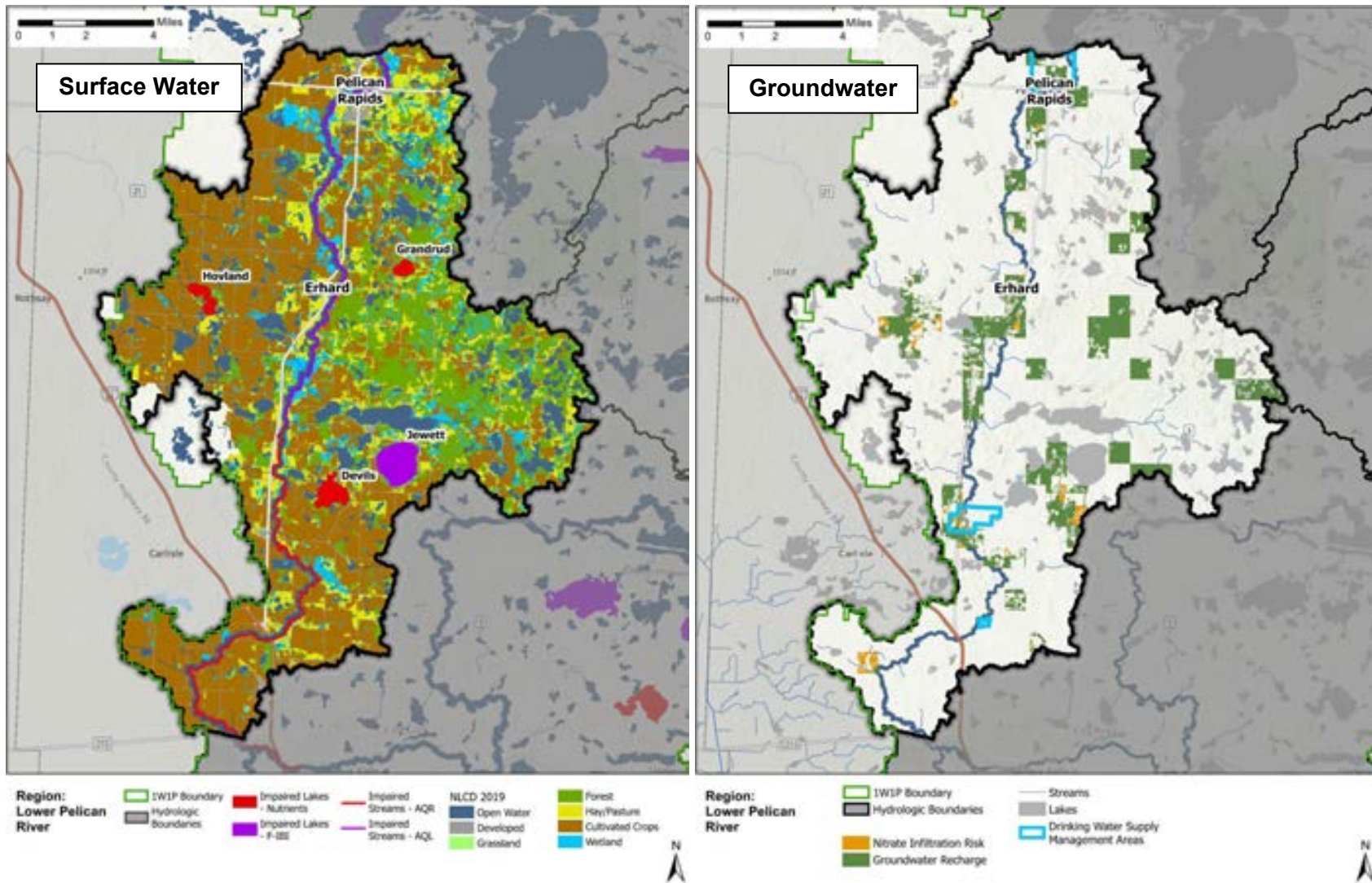


Figure 3.14. Surface water, land use, and groundwater in the Lower Pelican River Planning Region.

Emerging Issues

Emerging issues are concerns in the watershed that lack detailed information but may affect the resources in the OTW in the future. These issues are described in this section along with how the plan will address it.

Chloride

Chloride comes from multiple sources, including winter road salt application, water softener brine discharge, fertilizer application, industrial discharge, and others. The main contributors of chloride in surface waters come from the application of salt on roadways, wastewater treatment plants (residential softener salts and industrial discharge), and fertilizers.

Chloride concentration sources are influenced by population densities. The denser an area is, the more chloride concentration is related to road salt and wastewater treatment plant discharge. The less dense an area is, the more influenced chloride is from fertilizer application and dust-suppressants. This is an important distinction to make because reductions in chloride use will require different best management practices depending on chloride source.

In 2020, the Minnesota Pollution Control Agency published a document describing a first of its kind statewide chloride management plan (CMP). The CMP outlines a strategy that can help guide and inform organizations and individuals on how to better manage chloride and understand the risks and costs associated with chloride pollution. The CMP has noted that chloride concentrations have been increasing in all regions in the state, and the rate of increase is causing alarm. Once chloride has entered the environment, it is very difficult to remove and is generally considered cost prohibitive because the water contaminated with chloride must be treated with reverse osmosis. With increased use of items that contain chloride, it will become increasingly important to mitigate the spread of chloride, so that it does not overwhelm an ecosystem and ruin the environmental resources we rely on and enjoy.



Maplewood State Park. *Credit: Darren Newville*

Climate Variability

Minnesota’s climate is changing rapidly. According to the Minnesota Department of Natural Resources, the likelihood of extreme weather is increasing; the chance of receiving a one-inch or three-inch rain event in Minnesota has increased 20% and 65% respectively. The length of time in which Minnesotans experience frost-free days has increased, and the average temperatures have gone up. The record breaking hottest and wettest years are heavily skewed towards the most recent twenty years in the climate history dataset going back to 1895. These events are experienced differently across the state and from person to person, however, climate change is being experienced everywhere. This may be experienced with having earlier “ice out days” for ice fishing season, fish kills, changes in lake locations of where certain fish can be caught, increased algal blooms, changes in the syrup industry and when trees are ready to be tapped, and an increase in the prevalence of invasive species that are able to withstand our now warmer winters.

The OTW is not immune to climate change, and it should be seen as an emerging concern. Figure 3.15 and Figure 3.16 show the minimum and maximum temperatures from 1895-2021 and the average precipitation for a given year from 1895-2021. On average, the decadal increase in maximum temperature is 0.20 °F and the average increase in decadal minimum temperature is 0.25 °F. The increase in average annual precipitation is 0.18 inches. This means that on average, each decade will have a maximum temperature that is 0.20°F hotter, a minimum temperature that is 0.25°F hotter, and an average precipitation value that is 0.18 inches greater.

The effects of this increase in temperature and precipitation has had and will continue to have serious impacts to the watershed, including damaged infrastructure, flooding, and changes to water resources used for recreation, irrigation, and drinking water. Actions and projects outlined in this plan can be built with future increases in temperature and precipitation in mind so that they are resilient to future changes.

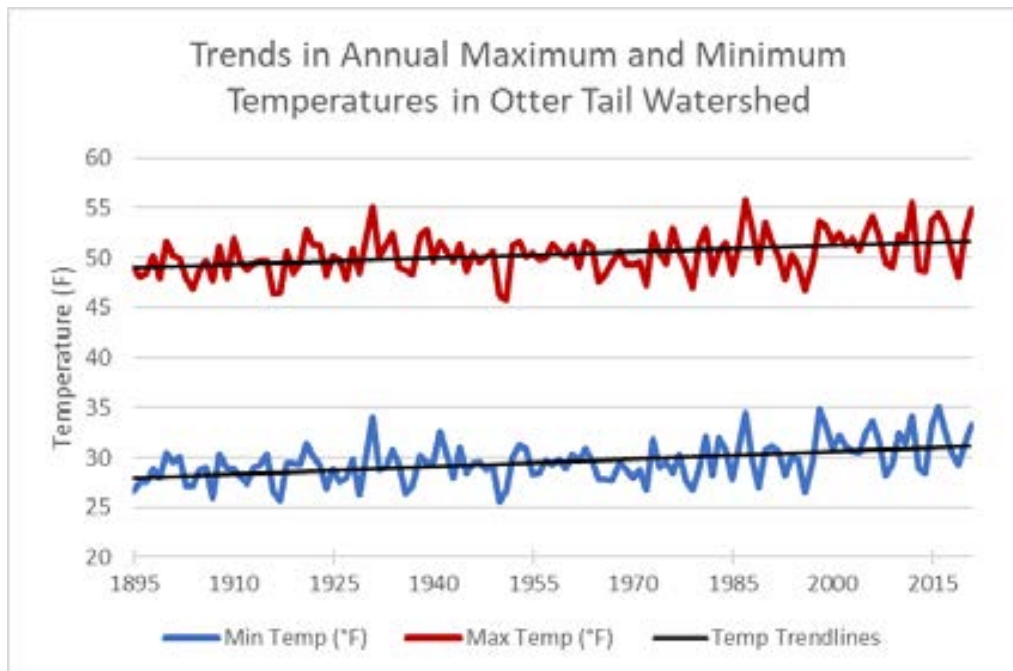


Figure 3.15. Trends in annual minimum and maximum air temperatures in the OTW (DNR 2020).

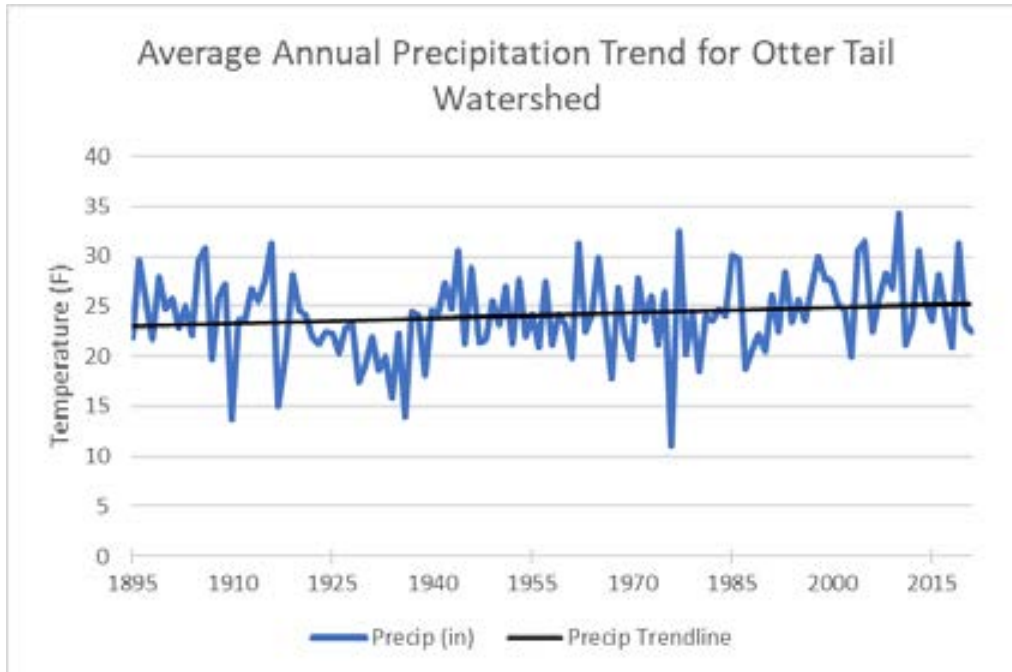


Figure 3.16. Trends in annual precipitation in the OTW Watershed (DNR 2020).

Further details about climate variability and how this plan addresses it can be found in Section 7. Resiliency.

Contaminants of Emerging Concern

Water quality regulation and planning have focused on nutrient and sediment pollution and highly toxic substances. However, monitoring in Minnesota has identified new contaminants that don't fit within the current regulatory and planning system. These contaminants are also not currently treated in wastewater treatment plants. The effects of contaminants of emerging concern (CEC) on human and animal health are unclear. Examples of CECs include pharmaceuticals, estrogenic compounds, pesticides, Teflon, perfluorooctanoic acid (PFOA), microplastics, and many others. Of particular concern are Perfluoroalkyl Substances (PFAS), also known as Perfluorochemicals (PFCs), which are a widely used family of chemicals that do not break down in the environment on relevant timescales. PFASs have been used in fire-fighting foam, packaging, and many other industrial applications. A subset of the PFAS family of chemicals is Perfluorooctane sulfonic acid (PFOS), known to accumulate in aquatic life, including sportfish. Some of these chemicals are known to be able to disrupt the reproductive systems of fish and other aquatic life. In May 2021, the MDH released new [guidance on fish consumption](#) that indicated an emerging harm present in our ecosystem from these CECs. CECs are widespread and more research is needed to determine the health risks, especially in areas of the OTW where there is shallow groundwater used for human consumption. More information can be found at:

<https://www.pca.state.mn.us/water/contaminants-emerging-concern>.



4. Focus Resources



Section 4. Focus Resources

“Resources” are natural features on the landscape that have aesthetic, economic, environmental, or social value. Examples include lakes, rivers, streams, wetlands, soils, and aquatic and terrestrial habitat. The Technical Advisory and Policy Committees used existing data from the WRAPS, GRAPS, the Landscape Stewardship Plan (LSP), and local priorities to determine which resources to focus effort and funding on in the next 10 years. Focus resources will be targeted with outreach and project development effort. Other resources in the watershed will be assisted with projects on an opportunity-basis. Focus resources were developed for lakes, streams, groundwater, and habitat.

It is important to keep the prioritization quantitative so that there is sound reasoning behind why a lake, stream, or groundwater resource area is considered a focus resource. It is also important to keep it simple and transparent so that the priorities can be clearly communicated with stakeholders and the public (Figure 4.1).

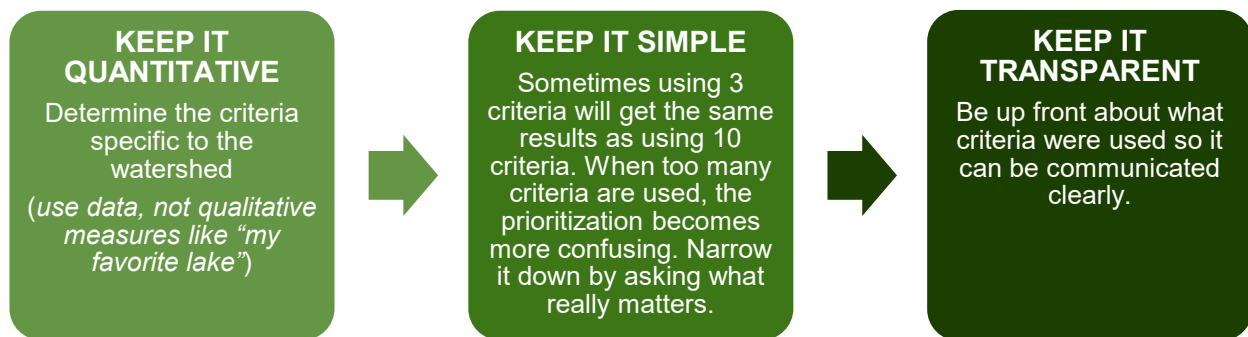


Figure 4.1. Resource prioritization guidelines.

Management Strategies

Three management strategies were identified for the OTW – Protect, Enhance, and Restore – and are defined in Table 4.1. These are common management strategies used in protection-focused watersheds in the northern half of Minnesota. A majority of assessed lakes and streams support aquatic life and aquatic recreation and are not impaired, so the focus of this plan is restoring barely impaired resources, preventing future impairments, and protecting the good quality resources in the watershed.

BWSR’s Nonpoint Priority Funding Plan for Clean Water Funding Implementation and Minnesota’s Clean Water Roadmap set the priorities listed below. These priorities are incorporated into the OTW management strategies (Table 4.1).

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

Table 4.1. Management focus categories used in this plan.

Management Focus	Definition
Protect	The resource is in good condition. Maintain good condition and protect against future risks. Reduce inputs of phosphorous, sediment, and bacteria, and protect the natural landscape and hydrological features around the resource.
Enhance	The resource is at risk, but not impaired. Factors for lakes and streams include degrading trends, nearly impaired for phosphorus, total suspended solids, dissolved oxygen, or <i>E. coli</i> , or a eutrophication stressor in Lake IBI report (DNR and MPCA 2019). Factors for groundwater include nitrogen infiltration risk and vulnerable Drinking Water Supply Management Areas. Focus on high quality resources that are nearly impaired or vulnerable. Reduce pollutant loading through stormwater and agricultural best management practices.
Restore	The resource is impaired (phosphorus, dissolved oxygen, total suspended solids, or <i>E. coli</i>). Focus on resources that are barely impaired. Reduce pollutant loading through stormwater and agricultural best management practices.



Pelican Lake.

Focus Lakes



Focus lakes are organized by their management strategy (Figure 4.2). Additional criteria (second row) were used to narrow down lakes in each category. The Technical Advisory Committee decided to focus on lakes with Recreational Development (RD) or General Development (GD) classifications since they have the most opportunity for new development and land conversion around them (see definitions in Table 4.2). Outstanding biological significance and drinking water sources were prioritized for protection. The Policy Committee approved the final list.

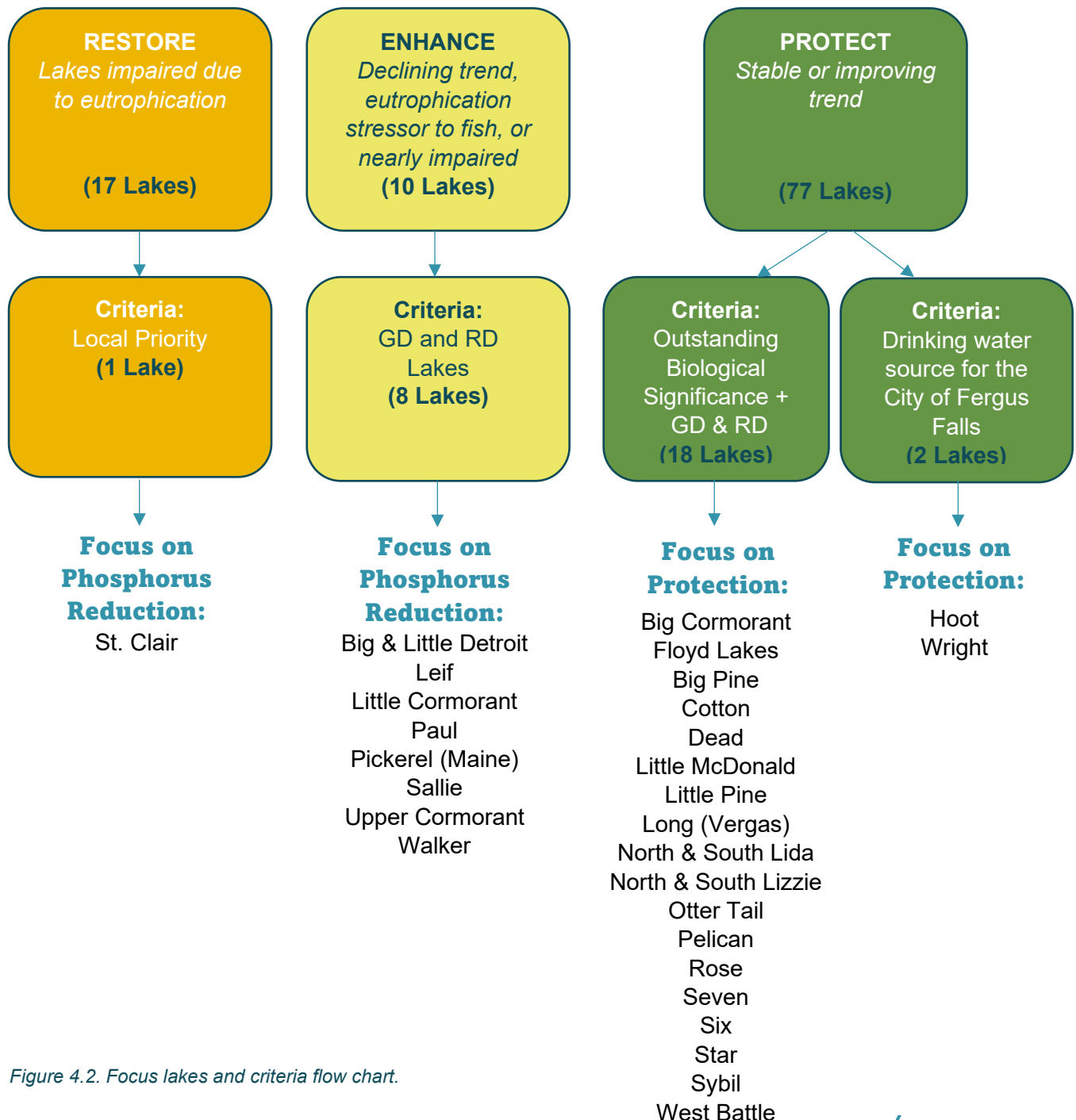


Figure 4.2. Focus lakes and criteria flow chart.



Table 4.2. Definitions.

Term	Description
RD	RD lakes are generally medium-sized lakes. They often are characterized by moderate levels of recreational use and existing development. Development consists mainly of seasonal and year-round residences and recreationally oriented commercial uses.
GD	GD lakes are generally large, deep lakes with high levels and mixes of existing development. These lakes often are extensively used for recreation and, except for the very large lakes, are heavily developed around the shore. Second and third tiers of development are common. These lakes also typically have the highest property values.
Lakes of Biological Significance	A classification given by the DNR to describe lakes with sensitive fish, plant, bird, and amphibian species based on survey work (DNR 2015).

What about the lakes and streams that aren't a focus in this plan?

Lakes and streams that are not a focus of this plan can still be assisted locally. The Technical Advisory and Policy Committees outlined some of the actions that could be implemented on non-focus resources:

- Continue volunteer water quality monitoring to track trends;
- SWCDs, Counties, Watershed Districts continue to provide technical and financial assistance for projects, especially those that deal with or address a priority issue;
- Lake Associations and Lake Improvement Districts could participate in Lake Management Planning; and
- Resources will be re-assessed by MPCA in the next 10-year cycle and could be a focus in the future.



Focus Streams



Focus streams are organized by their Planning Region (Table 4.3, Figure 4.3). The Technical Advisory Committee decided to focus on Total Phosphorus (TP), Total Suspended Solids (TSS), *E. coli*, and Dissolved Oxygen (DO) impairments. Biological impairments are not included in Table 4.3 but can also be a secondary benefit of projects during plan implementation. Stressors to aquatic life such as connectivity for fish passage are addressed in plan goals.

Table 4.3. Focus streams and specific parameters.

Planning Region	Water Body (-AUID)	Location	Current WQ Conditions	Mgmt Strategy	Parameter(s)
Head-waters	Otter Tail River (-610, -611, -612, -614, -618)	Becker, TNWR	Excellent water quality	Protect	All
	Solid Bottom Creek (-565)	Becker, TNWR	Excellent water quality	Protect	All
	Egg River (-744, -756)	Becker, TNWR	Excellent water quality	Protect	All
Upper Otter Tail	Otter Tail River (-529, -530, -532)	Becker, Otter Tail	Excellent water quality	Protect	All
Toad River	Toad River (-526, -770)	Becker County	"Nearly" Impaired TP, TSS, DO Impaired for <i>E. coli</i>	Restore	TP Enhance, TSS Enhance, DO Enhance <i>E. coli</i> Restore
	Unnamed Creek (-757)	Becker County	Impaired for <i>E. coli</i> "Nearly" Impaired TSS	Restore	<i>E. coli</i> Restore TSS Enhance
	Dead Horse Creek (-563)	Becker County	"Nearly" Impaired TP	Enhance	TP Enhance
Otter Tail Lake	Otter Tail River (-521)	Otter Tail	Excellent water quality	Protect	All
Battle Lakes	Brandborg Creek (-561)	Otter Tail	Excellent water quality	Protect	All
Fergus Falls*	Otter Tail River (-773, -774)	Otter Tail	Excellent water quality	Protect	All
	Otter Tail River (-574)	Otter Tail	Impaired for <i>E. coli</i>	Restore	<i>E. coli</i> Restore
	Otter Tail River (-503)	Otter Tail	"Nearly" Impaired TP, TSS, and <i>E. coli</i>	Enhance	TP Enhance TSS Enhance <i>E. coli</i> Enhance
Pelican River Watershed District	Campbell Creek (-543)	Becker, PRWD	"Nearly" Impaired TP and DO, Impaired TSS	Restore	TP and DO Enhance TSS Restore
	Pelican River (-771)	Becker, PRWD	"Nearly" Impaired TP and DO	Enhance	TP and DO Enhance

Planning Region	Water Body (-AUID)	Location	Current WQ Conditions	Mgmt Strategy	Parameter(s)
	Pelican River (-772)	Becker, PRWD	"Nearly" Impaired TP Impaired for <i>E. coli</i> Impaired for DO	Restore	TP Enhance <i>E. coli</i> Restore DO Restore
	County Ditch 14 (-546)	Becker, PRWD	"Nearly" Impaired TP and DO	Enhance	TP and DO Enhance
Lower Pelican River	Pelican River (-767)	Otter Tail	"Nearly" Impaired TP "Nearly" Impaired for <i>E. coli</i> Impaired for DO	Enhance	TP Enhance <i>E. coli</i> Enhance DO Restore
	Reed Creek (-653)	Otter Tail	Excellent water quality	Protect	All
	Pelican River (-768)	Otter Tail	"Nearly" Impaired TP Impaired for <i>E. coli</i>	Restore	TP Enhance <i>E. coli</i> Restore

* The diversion of the Otter Tail River to Hoot and Wright lakes in the Fergus Falls Planning Region is significant to protect as Fergus Falls source water for drinking water.



Pelican River looking south from Otter Tail County Highway 20.

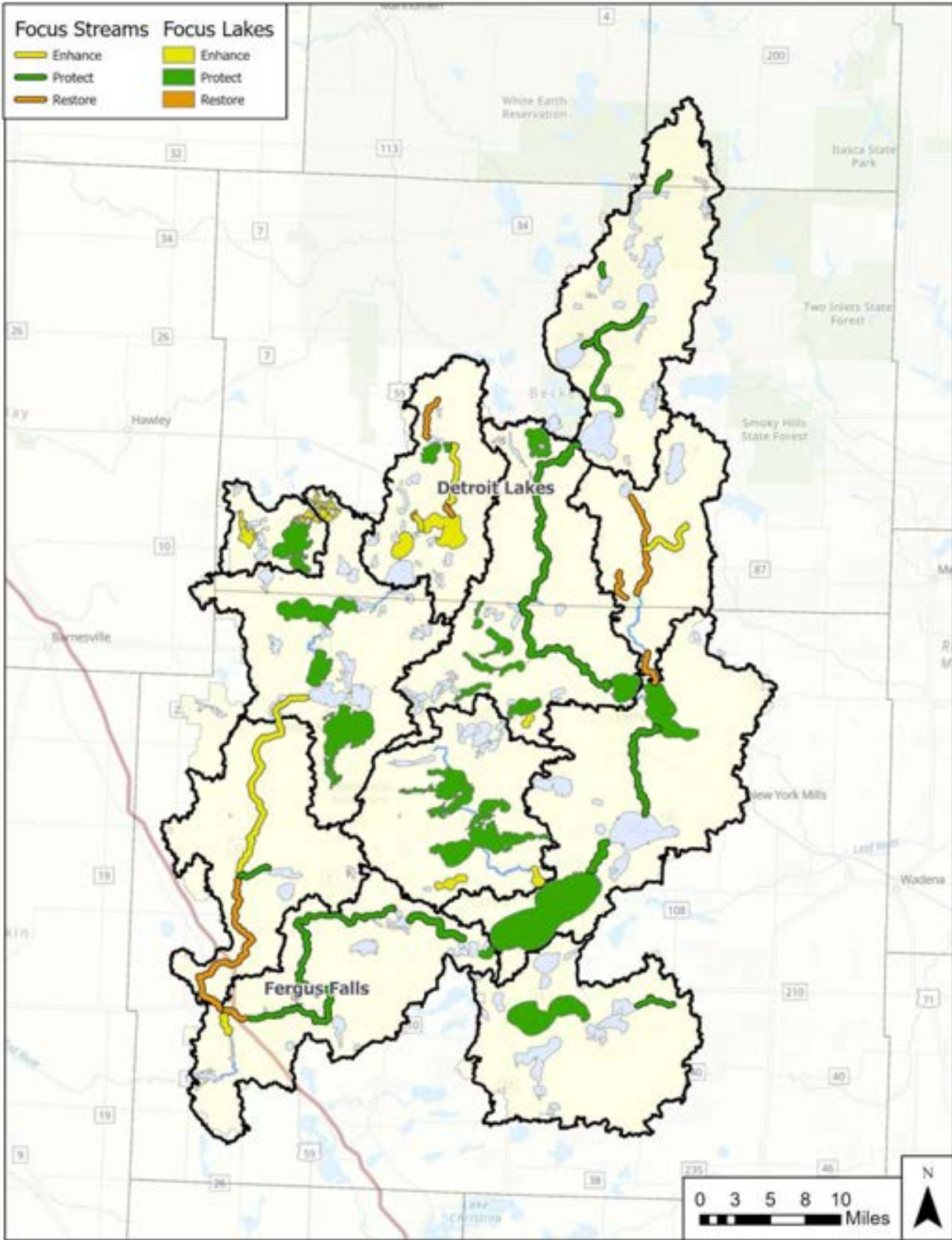


Figure 4.3. Focus lakes and streams in the OTW.

Groundwater



Focus areas for groundwater were determined based on nitrogen risk. Township testing from the Minnesota Department of Agriculture (MDA) showed three townships with 5-10% of wells greater than or equal to the state standard of 10 mg/L nitrate (Figure 4.4A). The GRAPS report found that 1% of drinking water wells tested for nitrate had concentrations above the 10 mg/L standard. A nitrogen infiltration risk analysis completed during the WRAPS showed the same areas as the township testing are at risk for nitrogen infiltration to the groundwater based on the sandy soils, travel time to groundwater, and land use practices (Figure 4.4B). The Technical Advisory Committee decided that these areas should be a focus for nutrient management and irrigation water management practices, and the Policy Committee approved it (Figure 4.5).

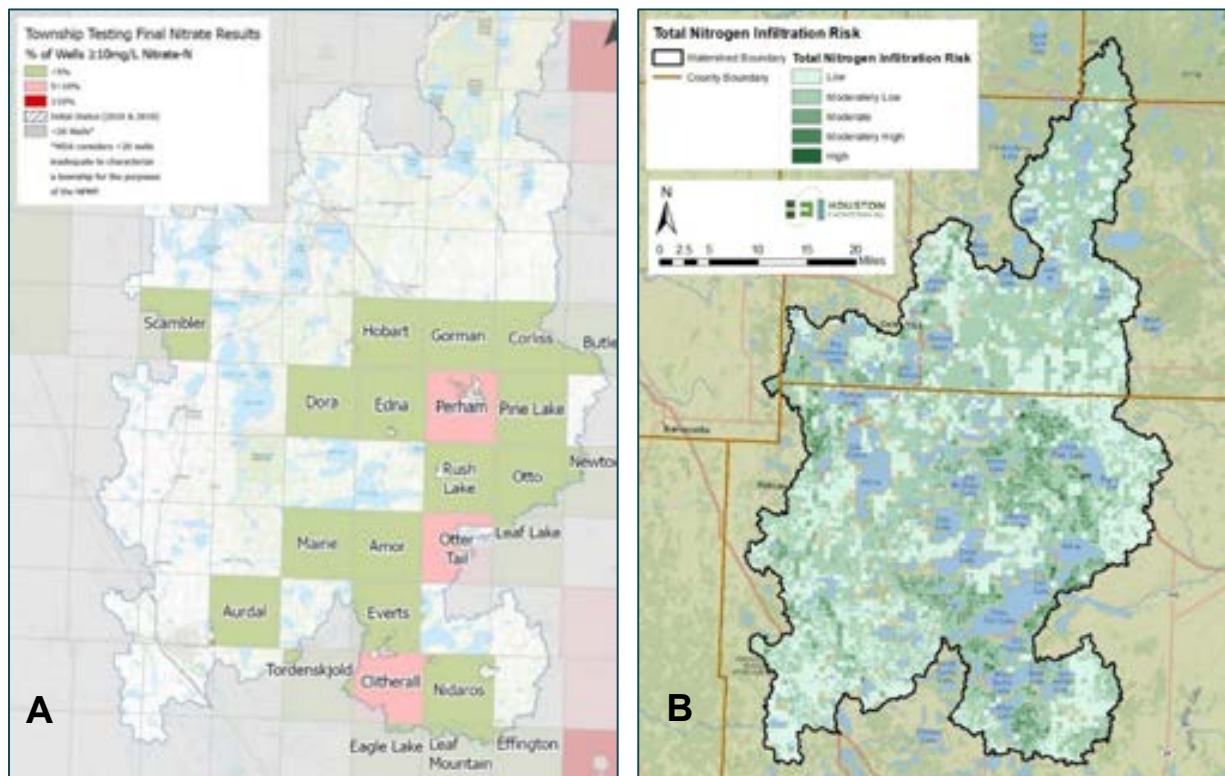


Figure 4.4. A) MDA Township Testing nitrate results. B) Nitrogen Infiltration Risk (HEI analysis).

Drinking Water Supply Management Areas (DWSMAs) are most important to the drinking water source for a community water supplier such as a city or mobile home community. DWSMA boundaries establish a protection area through an extensive evaluation that determines the contribution area of a community water supply well, aquifer vulnerability, and provide an opportunity to prioritize specific geographic areas for drinking water protection purposes.

Much of the land within DWSMAs is owned privately. While MDH and community water suppliers are responsible for providing safe drinking water, they do not have the authority or capacity to protect drinking water sources on their own.

Privately owned lands within DWSMAs classified as vulnerable by the MDH in the OTW can be targeted for voluntary best management practices to protect groundwater and/or groundwater protection easements.

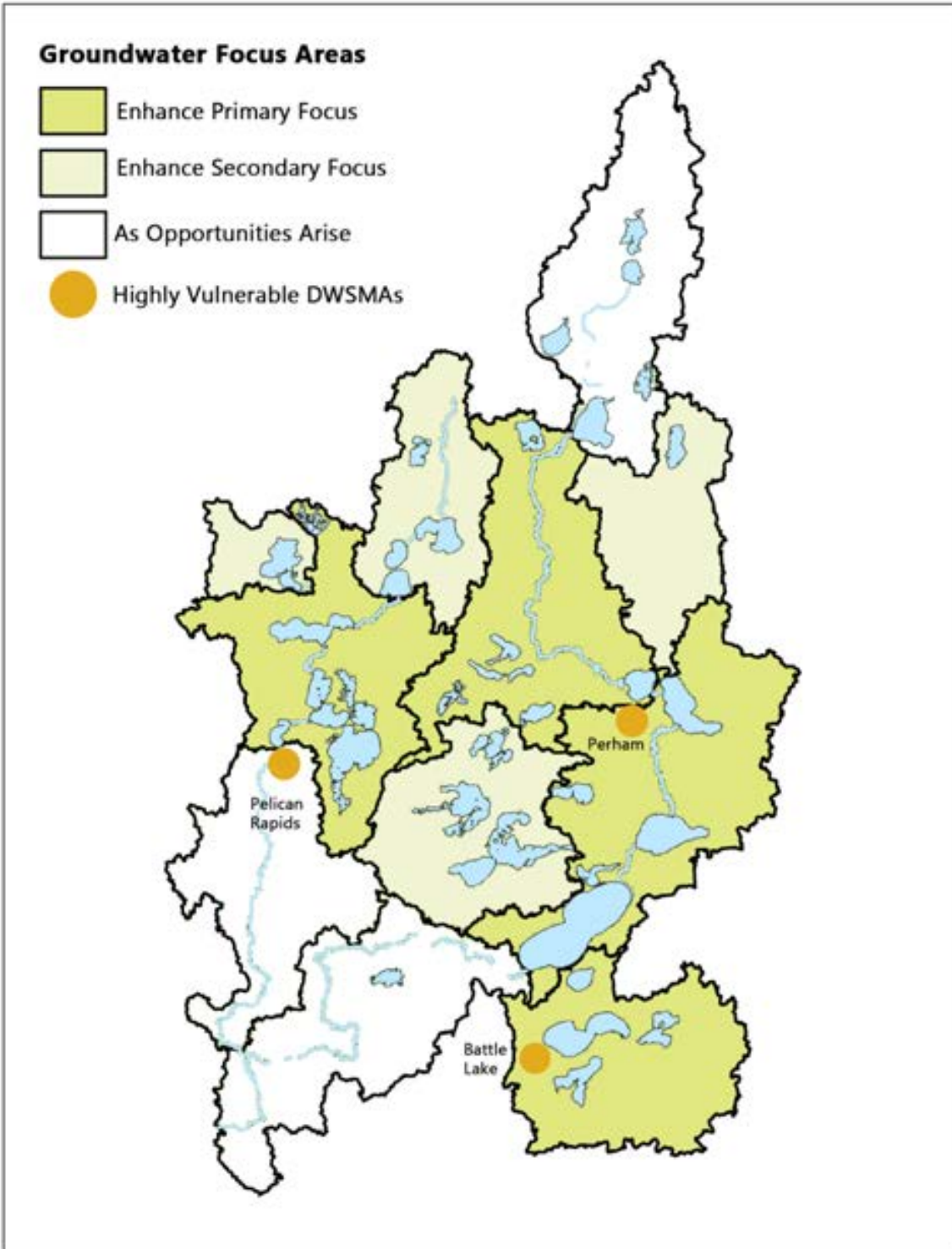


Figure 4.5. Groundwater focus areas and highly vulnerable DWSMAs in the OTW.

Habitat

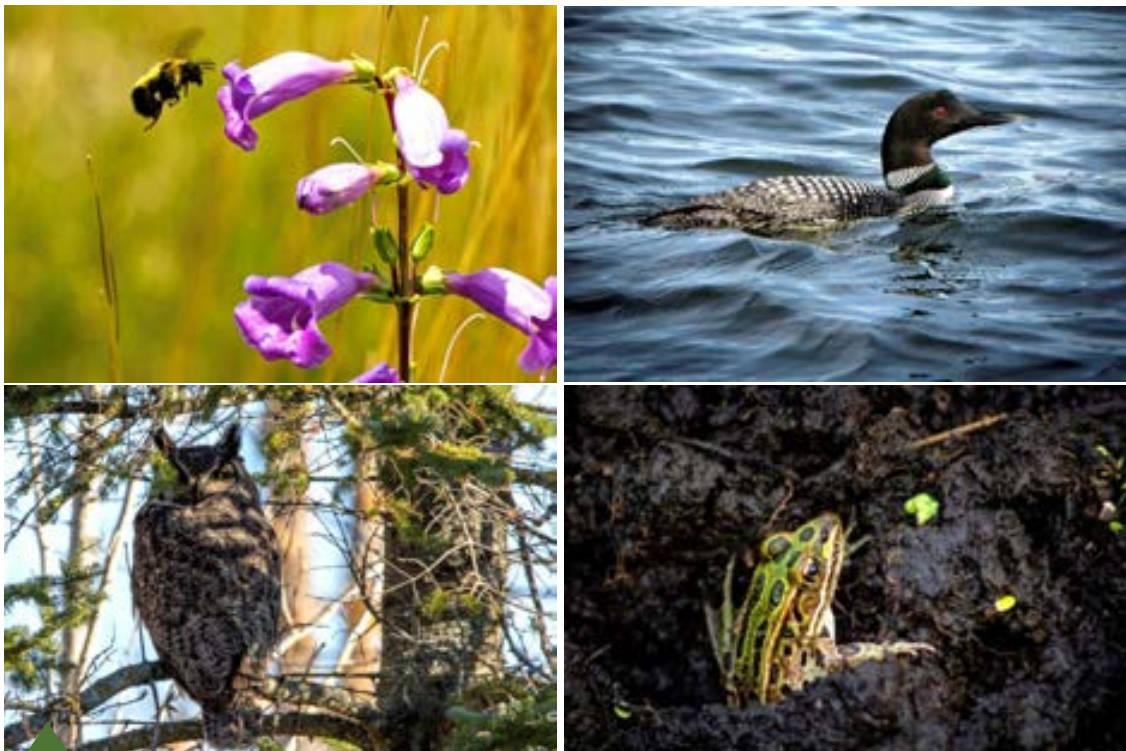


Habitat focus areas in the OTW are closely tied to the surface and groundwater resources already mentioned in this plan section and the priorities in the LSP. The LSP process involved many Technical Advisory Committee members for the OTW, and they determined the drivers of quality for scoring minor watersheds and parcels for protection. This scoring resulted in a map of priority minor watersheds for increasing forest management or protection (Figure 4.6), and a map of priority parcels based on being riparian, adjacent to other protected areas, or having drivers of quality (RAQ). One example of a RAQ map is included as Figure 4.7. RAQ maps for focus lakes are included in Appendix E. The full package of RAQ maps is available at the SWCD offices.

Native prairie is also important habitat in the watershed. Programs used to protect habitat include Forest Stewardship Plans, Sustainable Forest Incentive Act, conservation easements, and acquisitions.

Drivers of Habitat Quality in the OTW LSP

- Cisco Lakes
- Lakes of Biological Significance
- Priority Shallow Lakes
- Priority Wild Rice Lakes
- Terrestrial Biodiversity
- Trout Lakes
- Trout Streams
- Wetlands
- Native prairie



Wildlife in the OTW. Credit: Darren Newville.

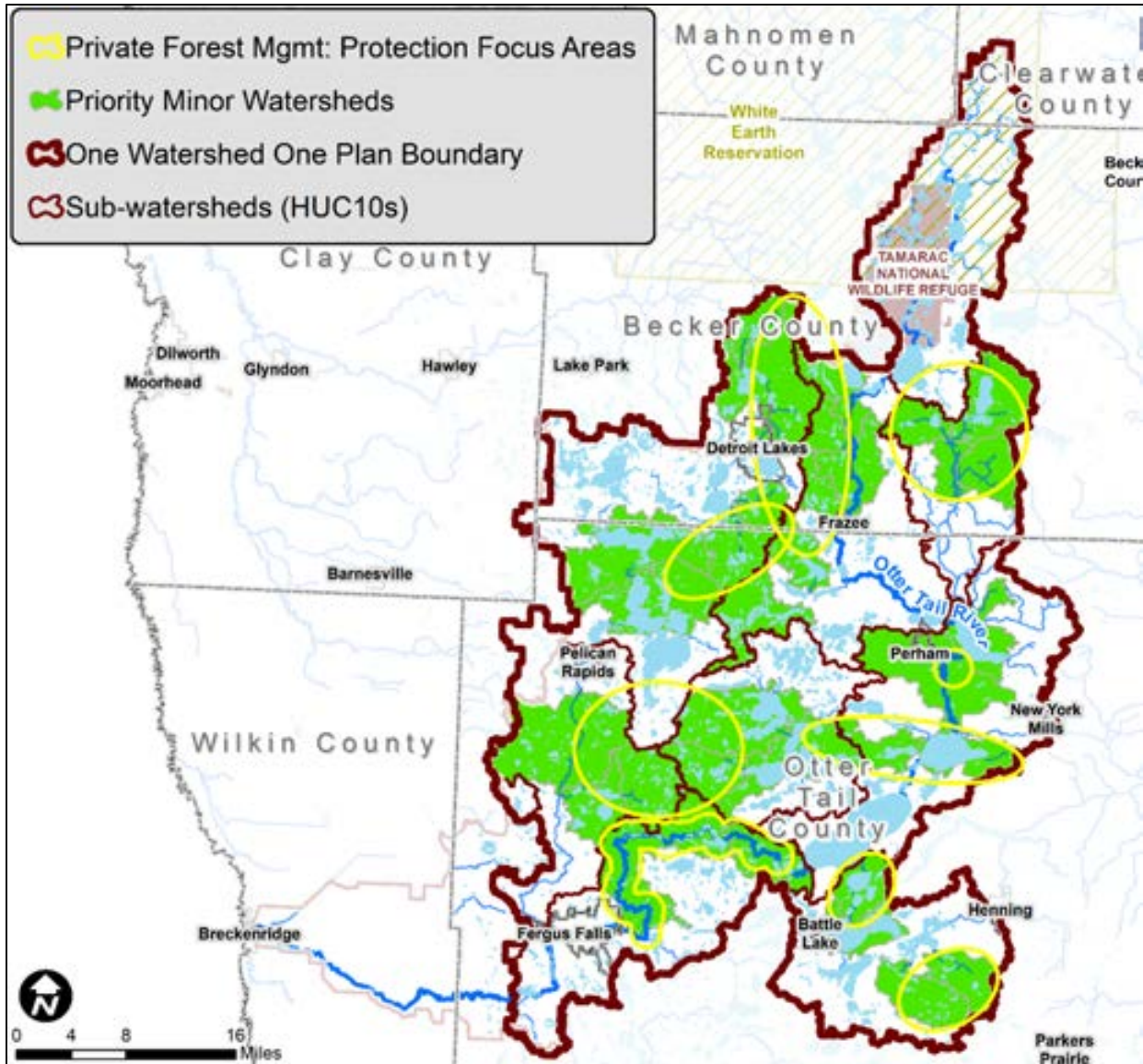
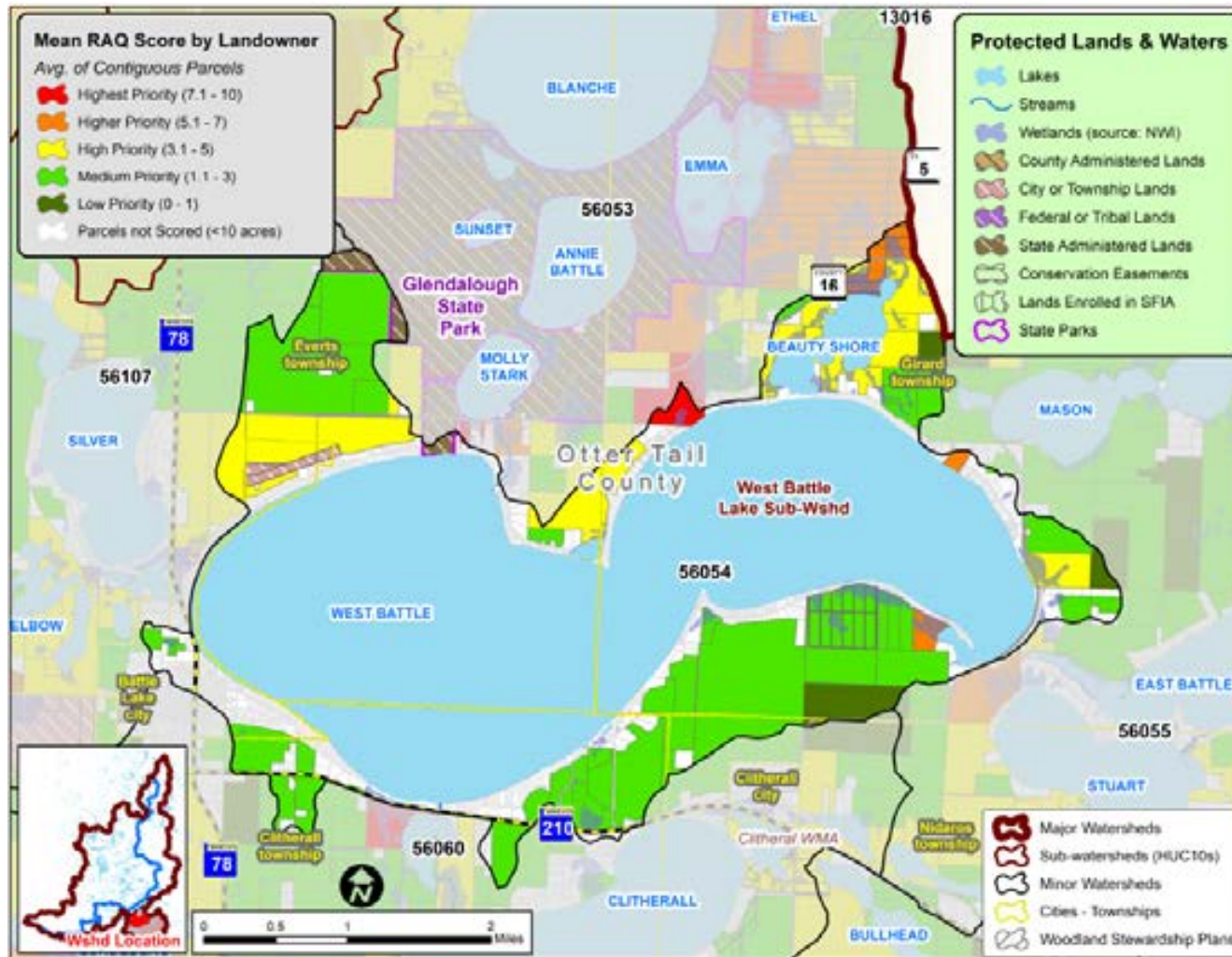


Figure 4.6. Focus habitat areas in the OTW based on the LSP.



Scoring Criteria:		
Riparian	3	Riparian
	2	Non-riparian: Shoreland (1 parcel back)
	1	2 parcels back
Adjacency	3	2 sides touching public land
	2	1 side touching public land
	1	One parcel removed from public land or touching parcel with SFIA or Easement
Quality*	3	1 point for each feature that the parcel touches: such as High or Outstanding Biodiversity (upl. or aqu.), Wild Rice,
	2	
	1	

* Quality is locally determined and for this project included other features, including groundwater resources. For this project, quality also included:

- Outstanding Resource Value Resources (MPCA)
- Old Growth Forests (DNR)
- Lakes with Exceptional IBI Scores (DNR)
- Drinking Water Supply Management Areas (MDH)
- Source Water Assessment Areas (MDH)
- Medium High or High Wildlife Action Network Score (DNR)
- Priority Shallow /Waterfowl Lakes
- Oligotrophic Lakes
- Audubon Important Bird Areas (IBAs)
- Rare Species (DNR)...see disclaimer below

Max Score for Quality = 4

Rare species data included in the RAQ scoring: Copyright 2020, State of Minnesota, Department of Natural Resources. Rare species data included here were provided by the Division of Ecological and Water Resources Division, Minnesota Department of Natural Resources (DNR), and were current as of May 2020. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.

Figure 4.7. Example of a RAQ map showing focus habitat areas in the OTW based on the LSP. The full map package can be obtained from the SWCDs in the watershed.



5. Measurable Goals



Section 5. Measurable Goals

Measurable goals identify the desired change in the watershed resources and indicate how progress will be measured during implementation. The goals are developed to address all the focus issues in this plan (Section 3). Models, existing data, and local information are used to determine how much progress can be achieved in 10 years. In this plan the WRAPS, Prioritize Target Measure Application (PTMApp), Landscape Stewardship Plan (LSP), existing BMP implementation data (eLINK), and local data were used to develop goal numbers.

Many of these goals have stacked benefits that will achieve progress towards other goals as well. For example, implementing soil health practices in targeted areas make progress towards the soil health goal and also the phosphorus and sediment goals. In addition, phosphorus and nitrogen reductions achieved through this CWMP will contribute to downstream nutrient reductions in the Red River of the North and Lake Winnipeg, making progress towards the MN Nutrient Reduction Strategy.

The goals were developed over the course of three Technical Advisory Committee meetings, and then approved by the Policy Committee. This plan section describes each goal and targeted locations for implementing the goal, including:

- General description of the goal.
- Issues addressed.
- Metric: how the goal will be measured.
- Focus Resources.
- Goals:
 - The short-term goal is the 10-year goal for this plan.
 - The long-term goal is the desired future condition without an end date.
- Resource or Planning Region Milestones: progress milestones for individual areas or resources.
- Targeting map: where this goal is targeted on the landscape for the most benefit to watershed resources.



Farmland north of Fergus Falls.

Goal: Phosphorus Reduction



Description

Because of the way the glaciers moved through the area, there are many large lakes in the OTW. This goal focuses on reducing phosphorus loading to focus lakes and streams determined in Section 4. Implementation activities will include stormwater BMPs and agricultural BMPs in the lakeshed.

Issues Addressed

- Nutrient loading
- Untreated stormwater
- Destruction of riparian habitat

Goals

The short-term goals are based on a 5% reduction of the Lakes of Phosphorus Sensitivity Significance (DNR 2020) loads for lakes and the PTMApp loads for streams.

The long-term goals are to prevent degradation from current conditions and make progress towards the MN Nutrient Reduction Strategy benefitting downstream resources such as the Red River and Lake Winnipeg (21% by 2040, MPCA 2021).

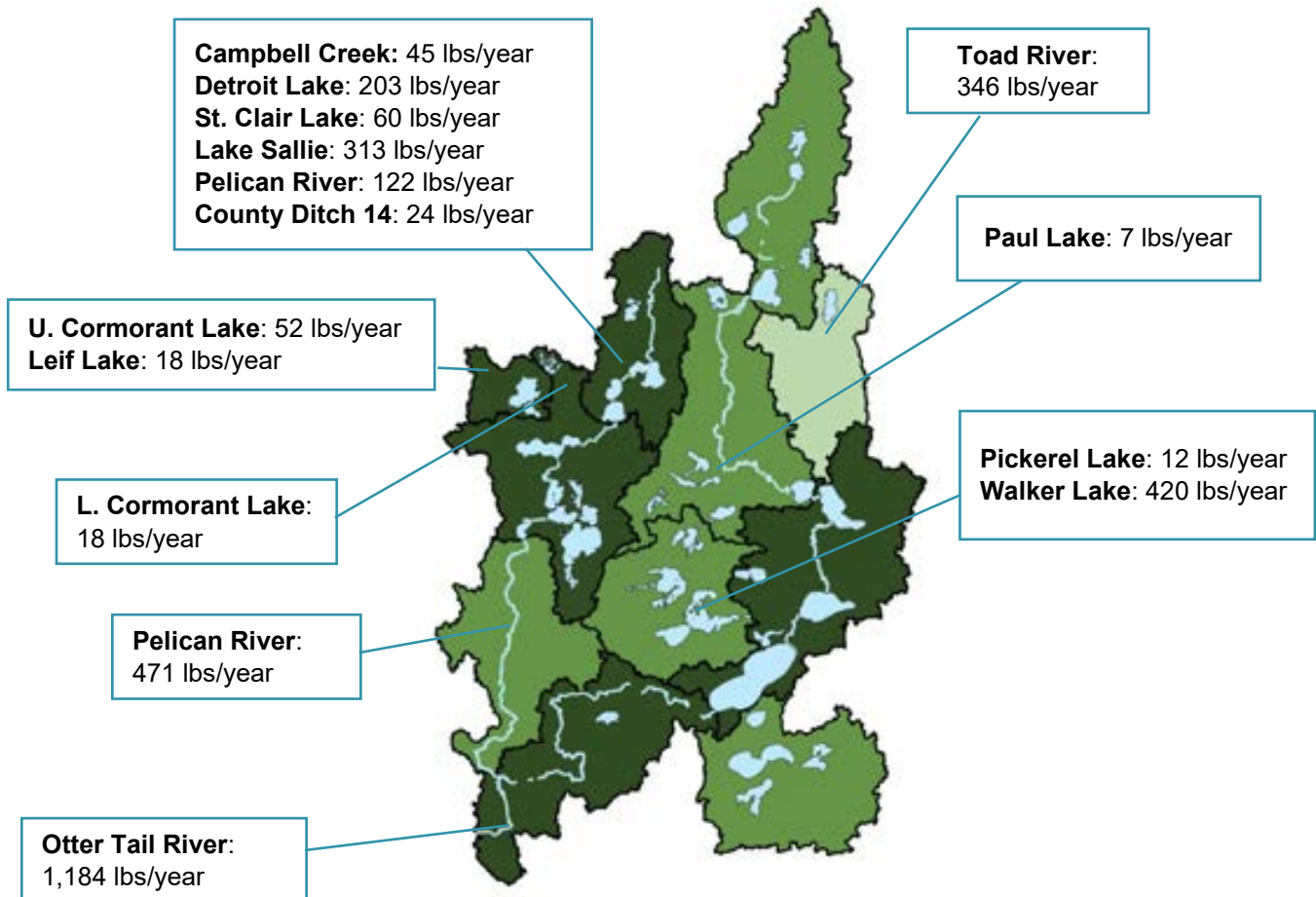
Metric

Pounds of phosphorus/year (edge of field).

Focus Resources

Focus lakes and streams (Tables 5.1, 5.2).

Resource Milestones



Targeting

Lakes

The focus lakes were determined in Section 4. The watershed to lake ratio (W:L) can be used to determine where to focus BMPs around lakes (Table 5.1). Lakes with a small W:L have a small drainage area and therefore a nearshore focus. Lakes with a large W:L have many lakes upstream and a watershed focus. The W:L ratios used in this plan are from the DNR Lakes of Phosphorus Sensitivity Significance dataset (DNR 2015).

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

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

Table 5.1. Lake goals and phosphorus loading focus.

Lake Name	Lake ID	Management Category	Phosphorus Short-Term Goal	Watershed: Lake Ratio	Phosphorus Loading Focus
St. Clair	03-0382-00	Restore	5% reduction	49	Watershed
Big & Little Detroit	03-0381-00	Enhance	5% reduction	15	Mixed
Leif	03-0575-00	Enhance	5% reduction	6	Nearshore
Little Cormorant	03-0506-00	Enhance	5% reduction	3	Nearshore
Paul	56-0335-00	Enhance	5% reduction	7	Nearshore
Pickereel	56-0475-00	Enhance	5% reduction	5	Nearshore
Sallie	03-0359-00	Enhance	5% reduction	46	Watershed
Upper Cormorant	03-0588-00	Enhance	5% reduction	9	Nearshore
Walker	56-0310-00	Enhance	5% reduction	165	Watershed
Big Cormorant	03-0576-00	Protect	No increase	6	Nearshore
Big Pine	56-0130-00	Protect	No increase	76	Watershed
Cotton	03-0286-00	Protect	No increase	5	Nearshore
Dead	56-0383-00	Protect	No increase	11	Nearshore
Big Floyd	03-0387-02	Protect	No increase	15	Mixed
Hoot*	56-0782-00	Protect	No increase	NA	Watershed
Little Floyd	03-0386-00	Protect	No increase	81	Watershed
Little McDonald	56-0328-00	Protect	No increase	5	Nearshore
Little Pine	56-0142-00	Protect	No increase	120	Watershed
North & South Lizzie	56-0760-00	Protect	No increase	111	Watershed
Long (Vergas)	56-0388-00	Protect	No increase	25	Mixed
North & South Lida	56-0747-00	Protect	No increase	5	Nearshore

Lake Name	Lake ID	Management Category	Phosphorus Short-Term Goal	Watershed: Lake Ratio	Phosphorus Loading Focus
Otter Tail	56-0242-00	Protect	No increase	48	Watershed
Pelican	56-0786-00	Protect	No increase	39	Watershed
Rose	56-0360-00	Protect	No increase	8	Nearshore
Seven (Scalp)	56-0358-00	Protect	No increase	16	Mixed
Six	56-03690-0	Protect	No increase	6	Nearshore
Star	56-0385-00	Protect	No increase	9	Nearshore
Sybil	56-0387-00	Protect	No increase	23	Mixed
West Battle	56-0239-00	Protect	No increase	17	Mixed
Wright*	56-0783-00	Protect	No increase	14	Mixed

*Hoot and Wright lakes are a focus for protection as a drinking water source for the City of Fergus Falls.

Streams

The focus streams were determined in Section 4. PTMApp can be used to target agricultural BMPs and urban stormwater BMPs can be targeted to reach phosphorus reduction goals. See Section 6 for detailed information on potential reductions and a benefits calculator per practice. In addition, local data can be used to target other projects and practices to reduce phosphorus.

Table 5.2. Stream goals and phosphorus targeting method.

Stream Name	Stream Reach ID	Management Category	Short-Term Goal	Targeting Method
Toad River	(-526, -770)	Enhance	5% reduction	PTMApp
Campbell Creek	(-543)	Enhance	5% reduction	PTMApp, PRWD Data
Pelican River	(-771)	Enhance	5% reduction	PTMApp
County Ditch 14	(-546)	Enhance	5% reduction	PTMApp, PRWD Data
Pelican River	(-772)	Enhance	5% reduction	PTMApp
Pelican River	(-767)	Enhance	5% reduction	PTMApp
Pelican River	(-768)	Enhance	5% reduction	PTMApp
Otter Tail River	(-503)	Enhance	5% reduction	PTMApp
Otter Tail River*	All other	Protect	No increase	PTMApp
All Other Streams	--	Protect	No increase	PTMApp

*The Otter Tail River diversion is a focus for protection as a drinking water source for the City of Fergus Falls.

Goal: Sediment Reduction



Description

Compared to the rest of the Red River Basin, the OTW has a lot of existing forests and wetlands, therefore sediment loading is not as large an issue watershed wide. This goal focuses on reducing overland sediment loading to focus streams determined in Section 4. Implementation activities will include stormwater BMPs, agricultural BMPs, and shoreline stabilization.

Issues Addressed

- Wind and water erosion
- Destruction of riparian habitat

Metric

Tons of sediment.

Focus Resources

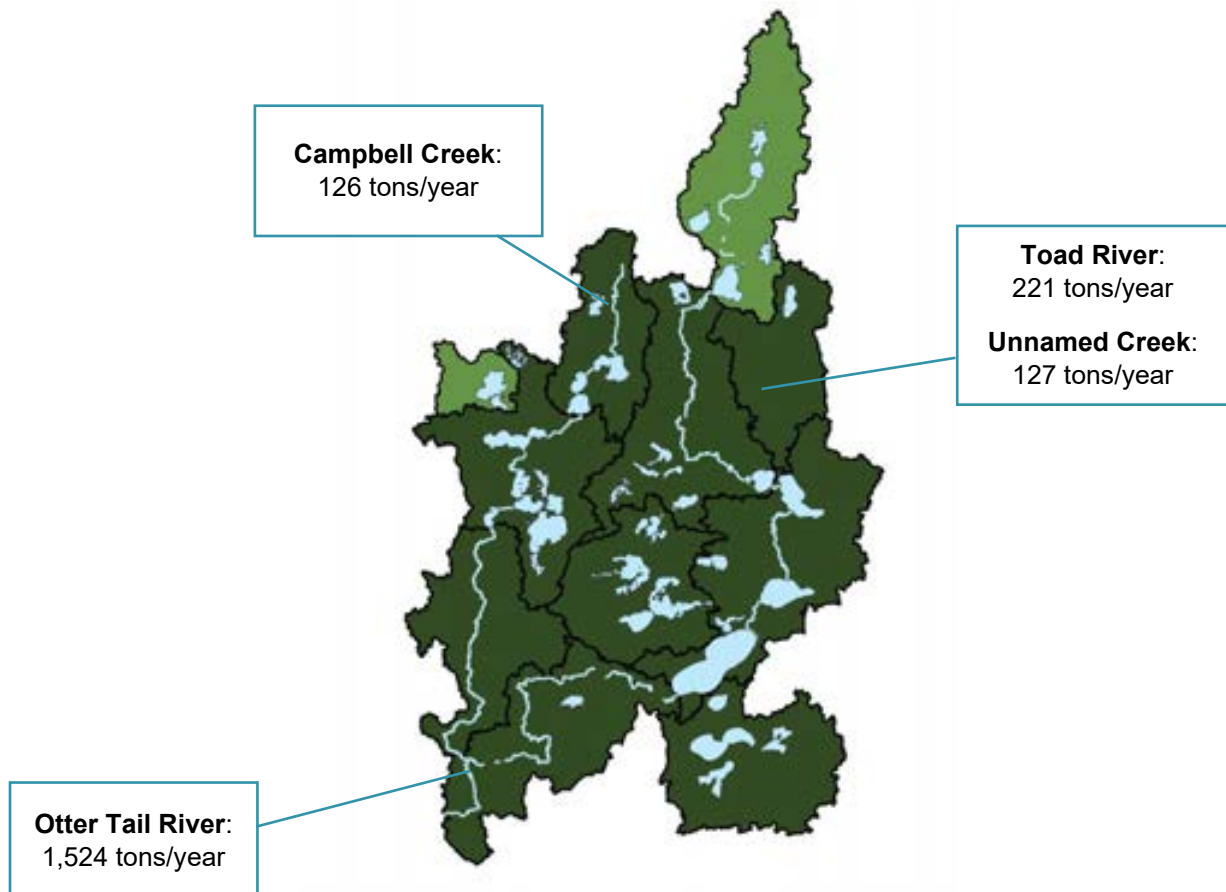
Enhance and restore sediment streams.

Resource Milestones

Goals

The short-term goals are based on a 4% reduction from PTMApp loads as recommended by the WRAPS.

The long-term goals are to reach the TMDL reductions for Campbell Creek and to prevent impairment for enhance streams.



Targeting

The focus streams were determined in Section 4. PTMApp can be used to target agricultural BMPs to reach the overland sediment reduction goals. See Section 6 for detailed information on potential reductions and a benefits calculator per practice. In-channel sediment reduction is the focus of the Stream and Ditch Stabilization Goal (page 85).

Table 5.3. Stream goals and targeting methods.

Stream Name	Stream Reach ID	Management Category	Short-Term Goal	Targeting Method
Campbell Creek	(-543)	Restore	4% reduction	PTMApp, PRWD Data
Toad River	(-526, -770)	Enhance	4% reduction	PTMApp
Unnamed Creek	(-757)	Enhance	4% reduction	PTMApp
Otter Tail River	(-503)	Enhance	4% reduction	PTMApp
All Other Streams	--	Protect	No increase	PTMApp

Goal: Land Protection & Management



Description

The OTW has a diverse landscape including large areas of forests, lakes, streams, and wetlands, as well as biologically significant species such as cisco, trout, and wild rice. This goal addresses permanently protecting high value areas to preserve surface water, groundwater, and habitat quality.

Issues Addressed

- Protection of outstanding resources
- Fragmentation of forests and grasslands
- Destruction of riparian habitat

Goals

The short-term goal is to make 5% progress towards the LSP goals. Average annual pace of progress watershed-wide is 500 acres.

The long-term goal is to reach LSP goals (99,229 acres).

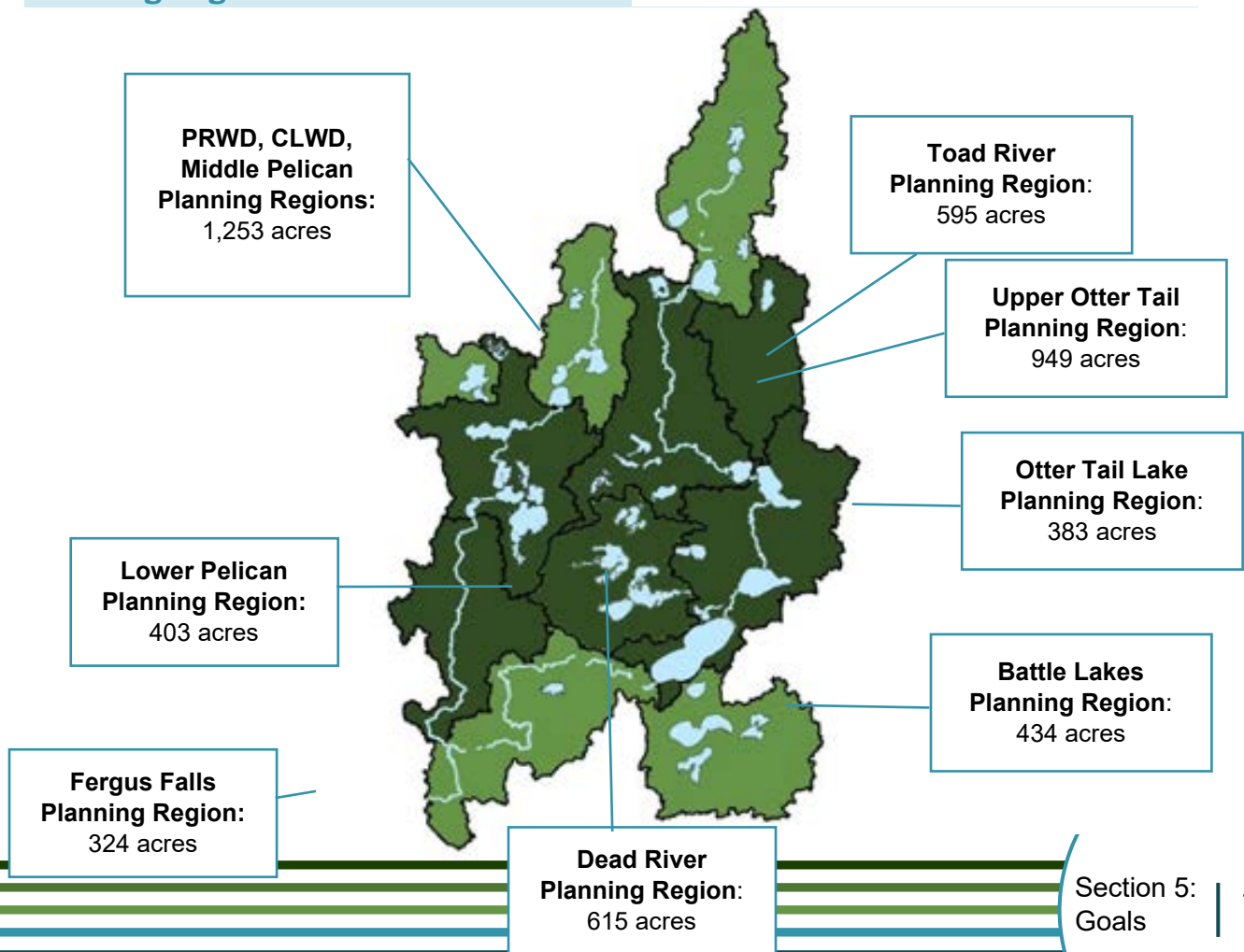
Metric

Acres of protective practices (Forest Management Plans, SFIA, 2c, Easements, Acquisitions).

Focus Resources

Focus lakes and streams, DWSMAs, and Landscape Stewardship Plan (LSP) areas.

Planning Region Milestones



Targeting

Watershed partners completed an LSP in 2022. The goals and targeted areas in the LSP were directly translated into this watershed plan.

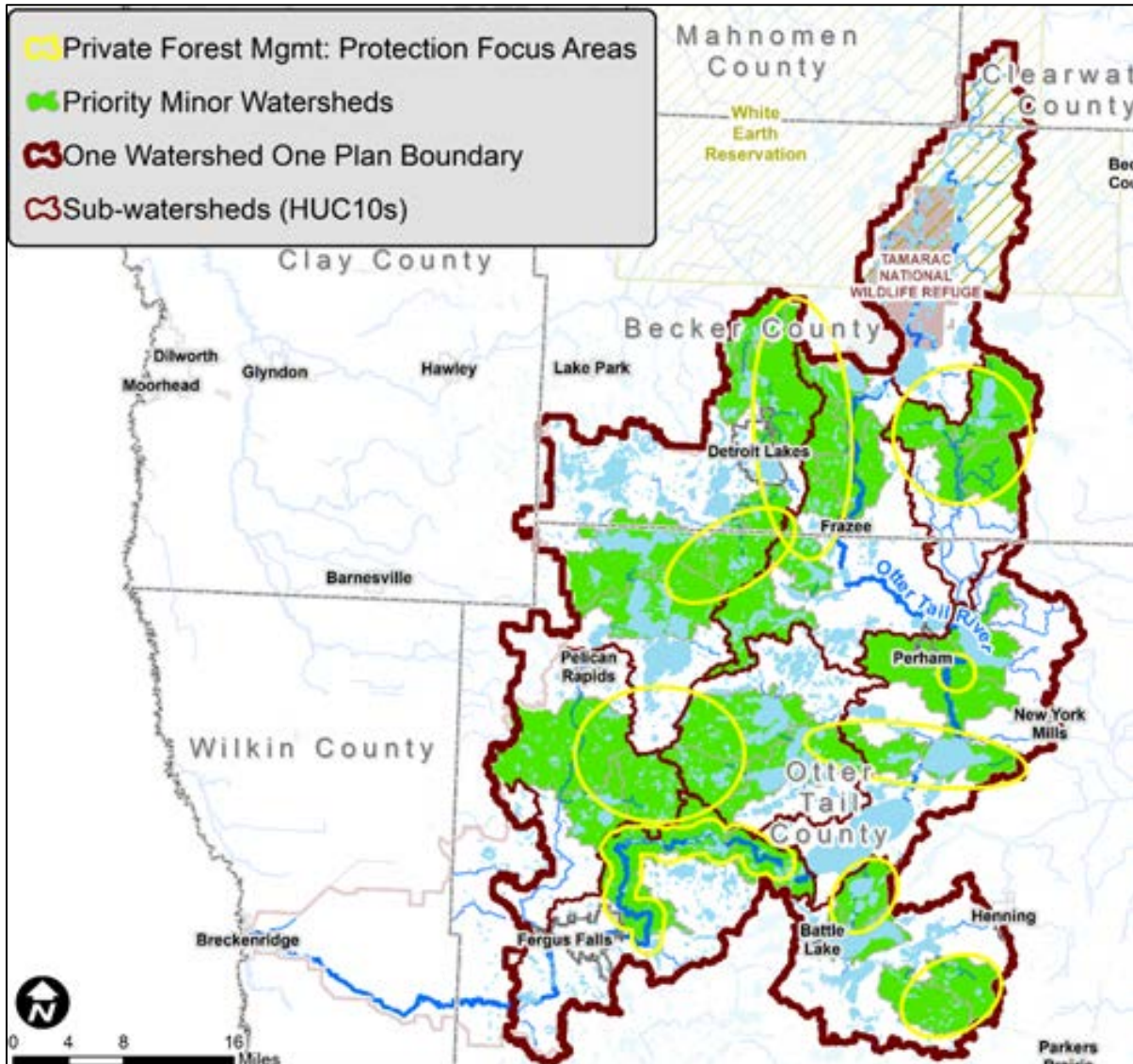


Figure 5.1. Focus areas for land protection and forest management in the OTW.

Goal: Groundwater Protection



Description

Well testing has shown that nitrates are over the state standard (10 mg/L) in some areas of the watershed where there is a combination of shallow sandy aquifer and land uses that apply nitrogen to the landscape. The MDH has identified vulnerable DWSMAs within the OTW (Figure 5.2). Implementing nutrient management and irrigation water management practices in these DWSMAs and areas with a high risk of infiltration can make progress toward reducing nitrate concentrations in wells and conserving groundwater quantity.

Issues Addressed

- Groundwater quality
- Groundwater quantity
- Nutrient loading

Goals

The short-term goals are based on the top 10% of parcels with the highest risk of nitrogen infiltration to the groundwater. Average annual pace of progress is 690 acres/year watershed wide.

Metric

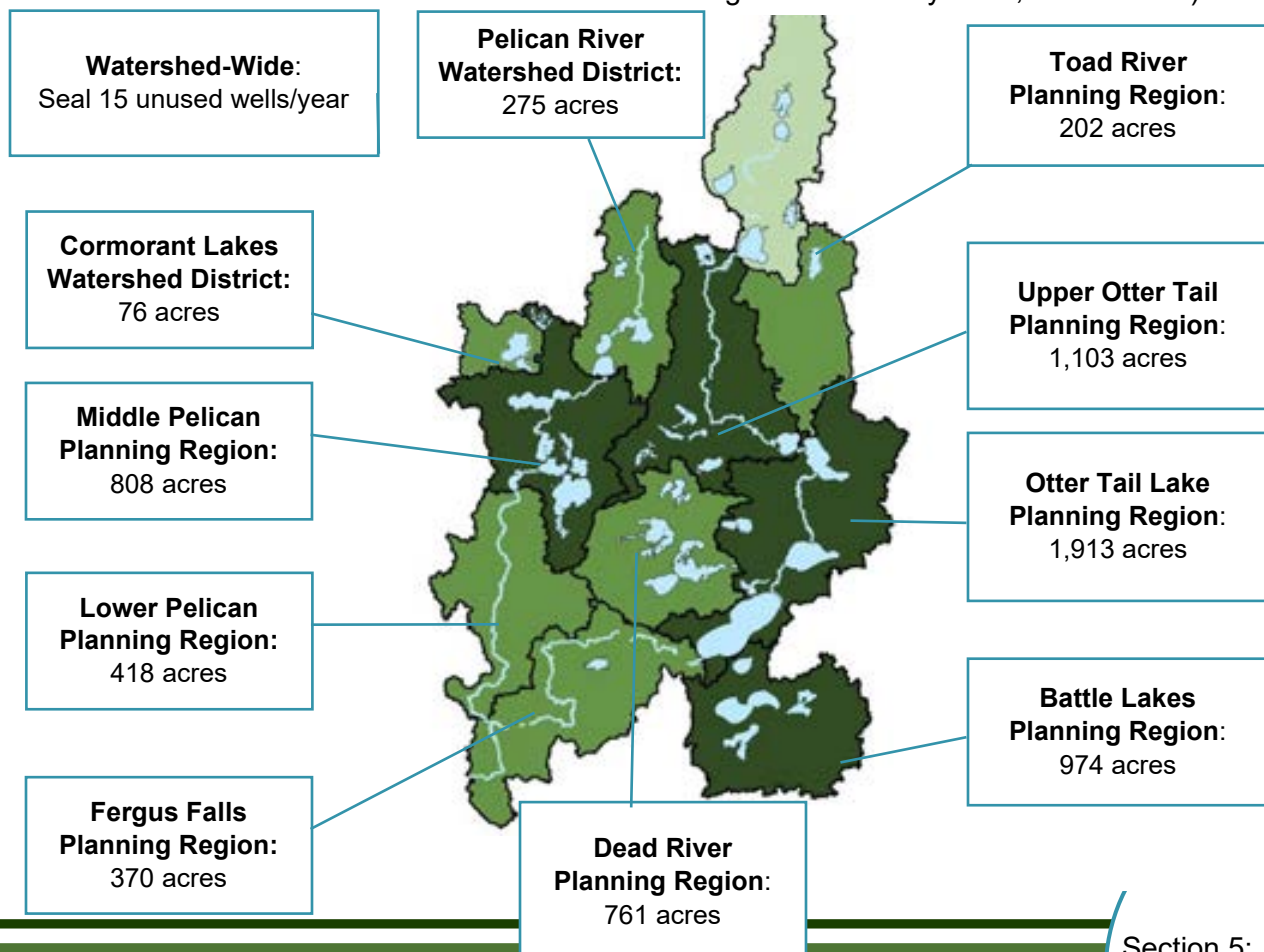
Acres of agricultural BMPs, pounds of nitrogen.

The long-term goal is to implement groundwater protection on all acres at risk (69,135 acres) and make progress towards the MN Nutrient Reduction Strategy benefitting downstream resources (30% nitrogen reduction by 2040, MPCA 2021).

Focus Resources

Nitrogen infiltration risk areas and vulnerable DWSMAs.

Planning Region Milestones



Targeting

Implementation will be targeted to the areas with the highest risk of nitrogen infiltration to the groundwater and DWSMAS with high and very high vulnerability (Figure 5.2).

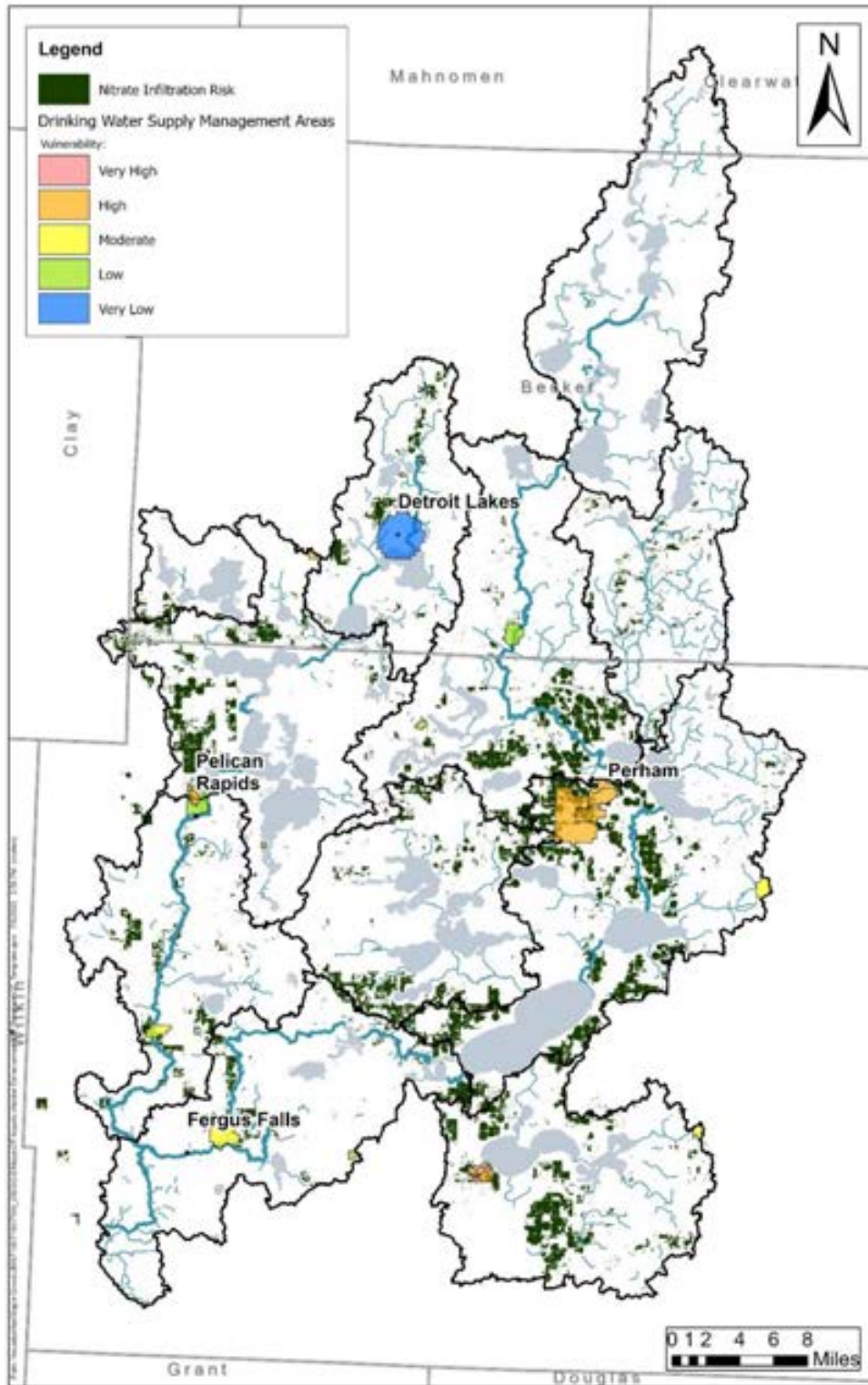


Figure 5.2. Focus areas for groundwater protection in the OTW.

Goal: Soil Health Enhancement



Description

There are very few phosphorus and sediment impairments in the OTW, so this goal addresses increasing non-structural agricultural practices on the landscape to provide multiple benefits such as increased soil health, continuous vegetative cover, and carbon storage, while reducing phosphorus, sediment, and nitrogen to lakes, streams, and groundwater.

Issues Addressed

- Soil Health
- Nutrient Loading
- Wind and Water Erosion

Metric

Acres of soil health practices (cover crops, no till, pasture management).

Focus Resources

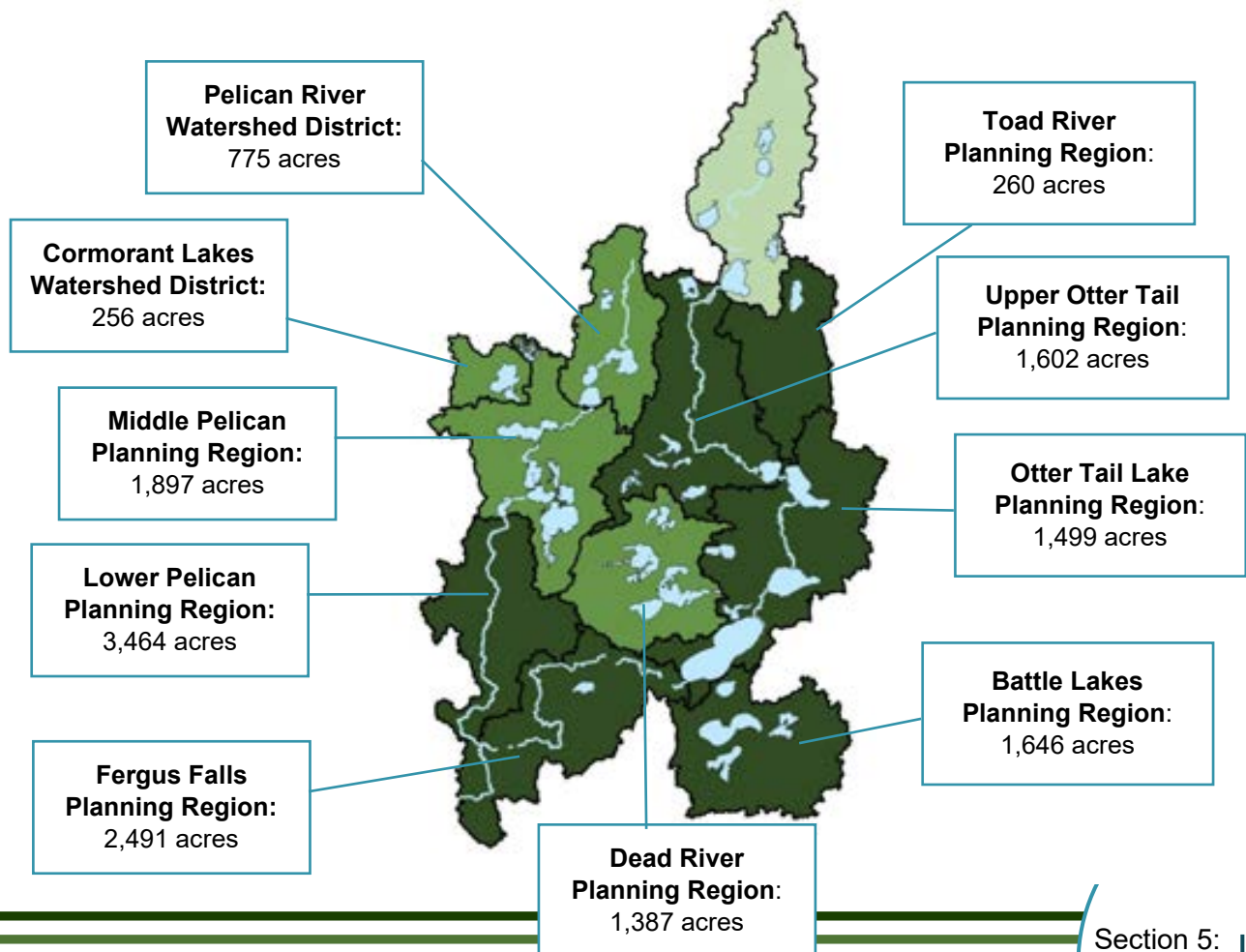
Parcels with the highest risk of wind and water erosion.

Goals

The short-term goals are based on the top 20% of parcels with the highest risk of erosion. Average annual pace of progress is 1,500 acres watershed-wide.

The long-term goal is to have soil health practices on all acres with risk of erosion (76,387 acres).

Planning Region Milestones



Targeting

Soil health practices will be targeted to parcels with the highest risk for wind and water erosion (Figure 5.3). These practices can also make progress towards the phosphorus and sediment reduction goals.

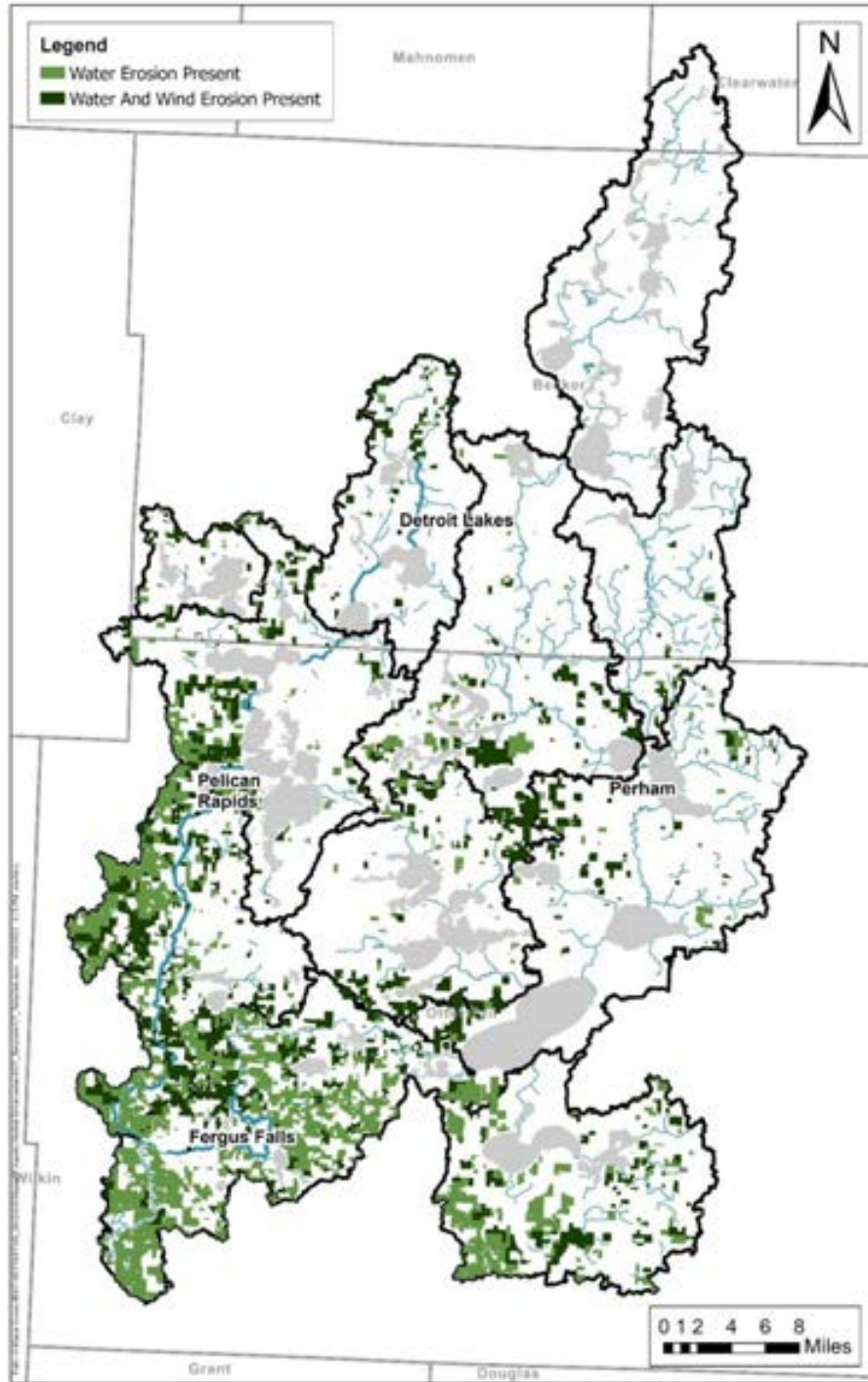


Figure 5.3. Focus areas for soil health practices in the OTW - parcels with the most wind and water erosion (critical soil loss analysis, HEI).

Goal: Aquatic Connectivity Enhancement



Description

Many aquatic species rely on movement up and down streams for their life cycle. For example, many fish species move for spawning, feeding, and hiding. Connectivity barriers—such as dams and culverts that are perched, clogged, and undersized—prevent this movement, while also disrupting the temperature regime and sediment transport process. The Pelican and Otter Tail Rivers have a history of dams at the lake outlets that were originally meant to regulate water levels. Today, these dams can be modified into rapids that hold back water similar to the dam, but also provide fish spawning habitat and provide fish passage.

Issues Addressed

- Barriers to fish movement

Metric

Number of dam modifications, culvert replacements, and miles of stream reconnected.

Focus Resources

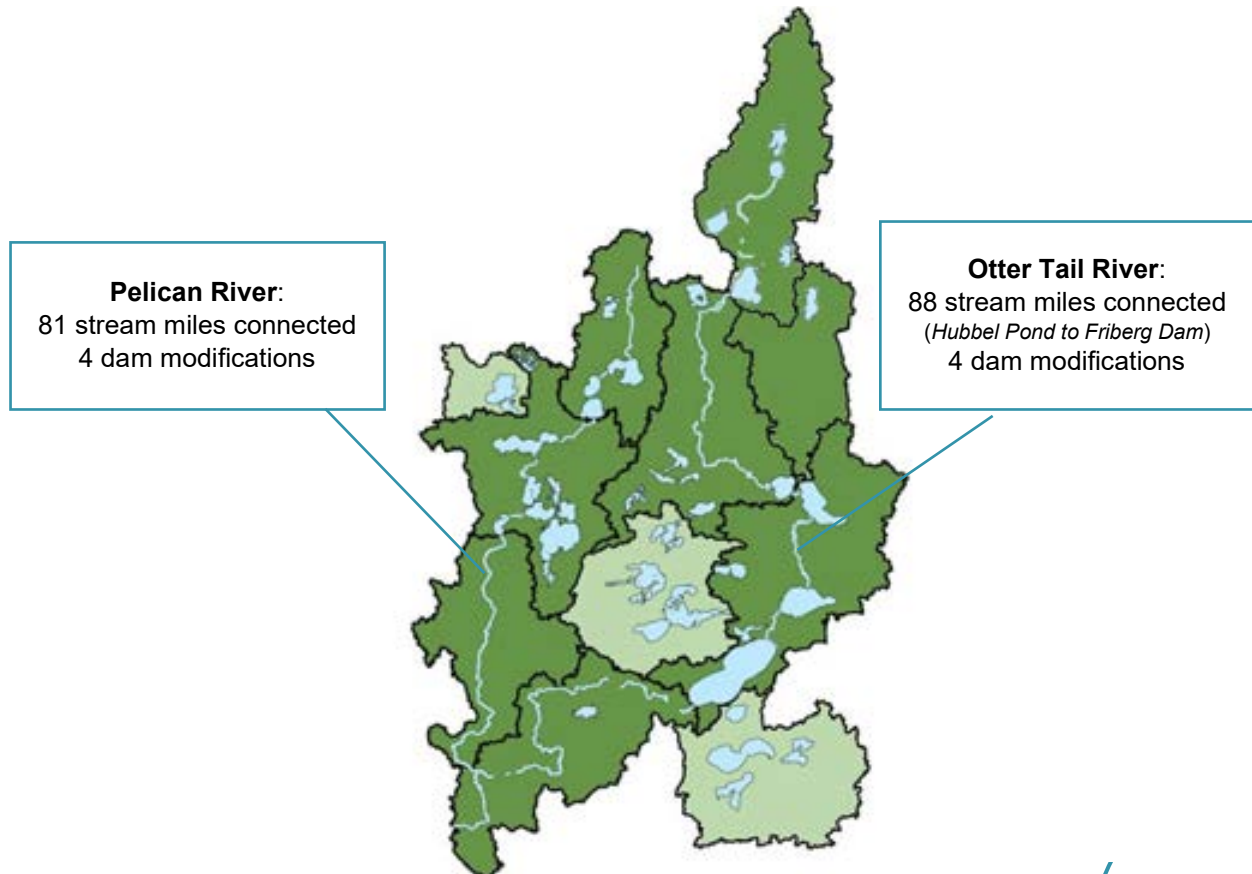
Pelican River and Otter Tail River are the primary focus. Tributaries are the secondary focus.

River Milestones

Goals

The short-term goals are based on the progress that the DNR and watershed partners deemed possible in 10 years.

The long-term goal is to have both rivers fully connected for fish passage.



Targeting

A subgroup that included Steering Committee members, MPCA staff, and DNR staff discussed and set goals for what could reasonably be accomplished in 10 years. Project locations were targeted based on having physical connectivity as a stressor in the *Otter Tail Stressor Identification* report (MPCA 2019b), a DNR culvert inventory, and DNR data on the status of dams in the watershed. These goals and targeted locations were reviewed by the Technical Advisory and Policy Committee and approved (Figure 5.4).

Pelican River targeted dams:

- Little Floyd
- Bucks Mill
- Pelican Rapids
- Elizabeth

Otter Tail River targeted dams:

- Rush Lake
- Otter Tail Lake
- Phelps Mill
- Orwell

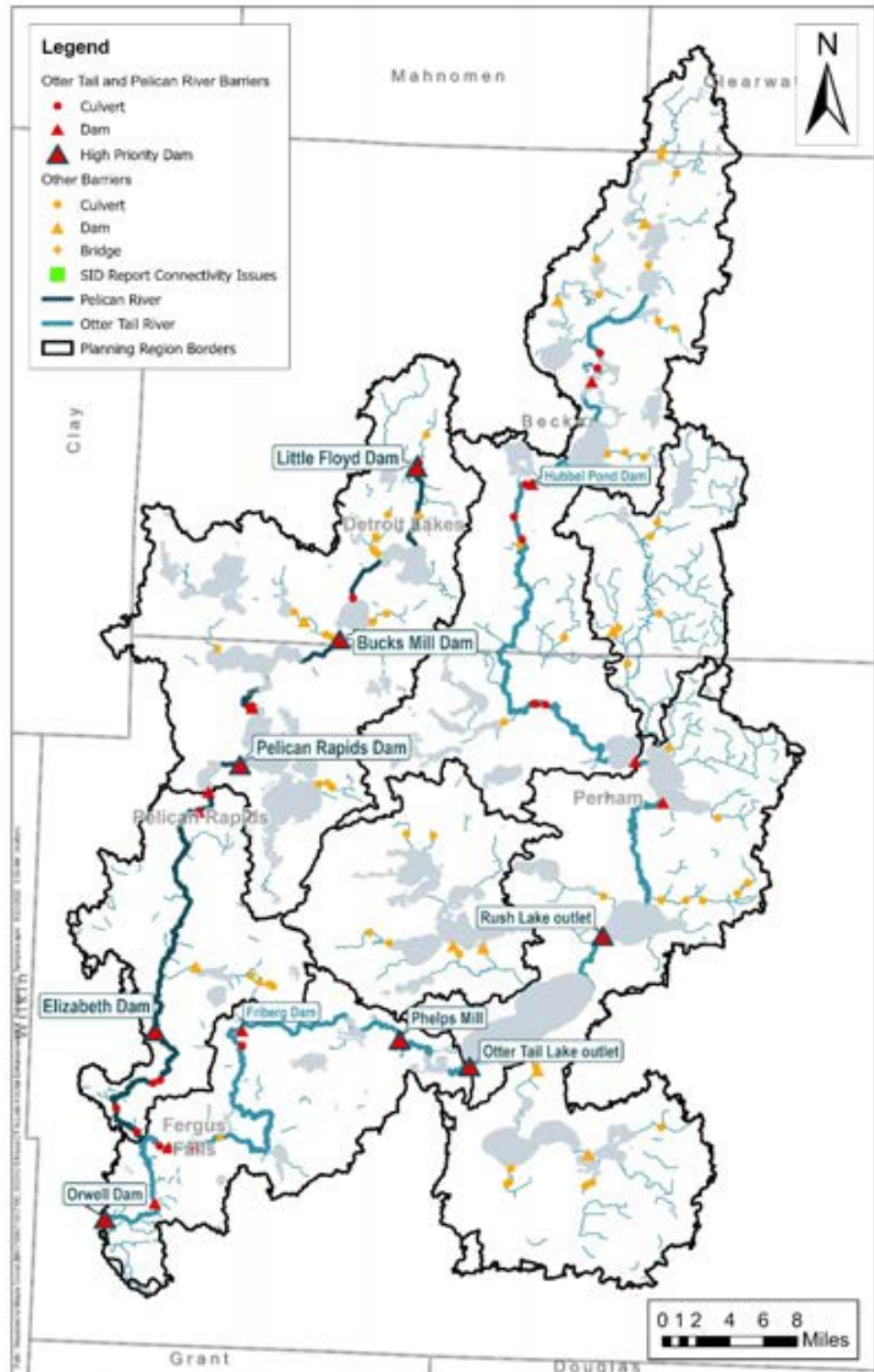


Figure 5.4. Focus areas for connectivity enhancement in the OTW.

Goal: Water Retention



Description

Historical alterations to the flow of water on the landscape, such as ditching and wetland loss, have decreased the water storage on the landscape in Minnesota. In the OTW these historical changes have been minimal; much of the natural storage has been preserved, and there are hundreds of lakes holding a large volume of water. To address the temperature and precipitation trends in the watershed, the activities implemented in this plan aim to enhance the resiliency of the watershed to future changes.

Issues Addressed

- Altered hydrology

Metric

Acre-feet of water storage.

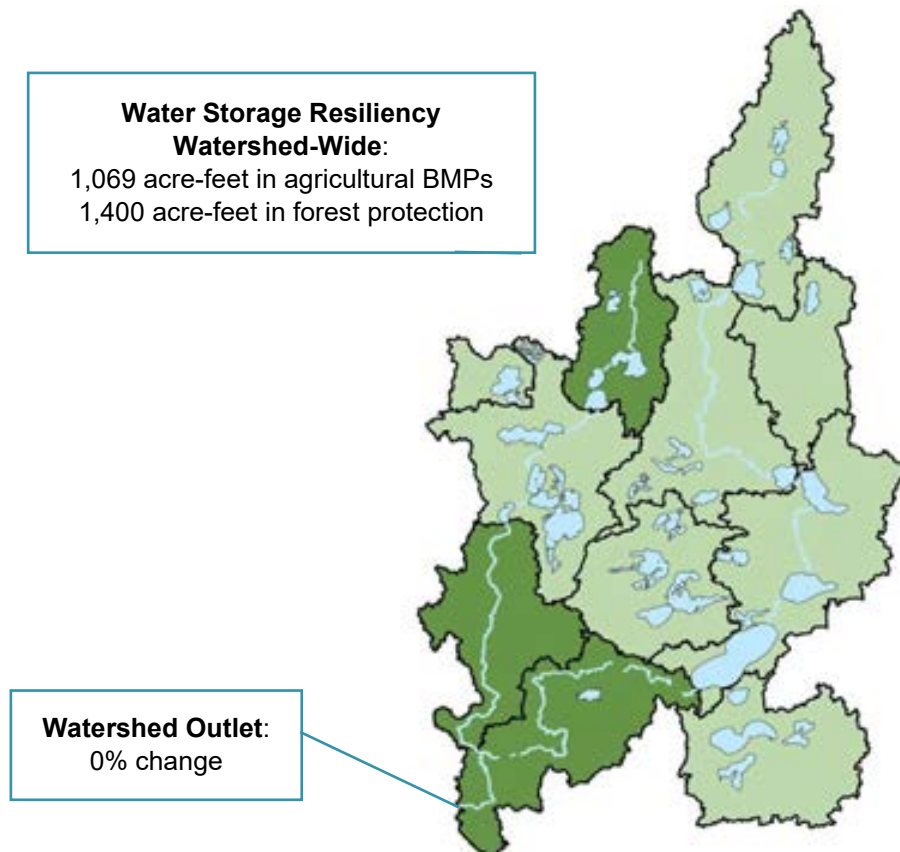
Focus Resources

Restorable wetlands (compensation planning framework).

Milestones

Goals

The Red River Basin Commission's Long-Term Flood Solutions Report set a goal of 0% volume change at the Orwell Dam (pour point-of-planning area). Planning Partners aim to also build resiliency to changing precipitation patterns through agricultural BMPs, forest protection, and wetland restoration. See Section 7 for more information on resiliency.



Targeting

Figure 5.5 was collaboratively created by planning partners through the Compensation Planning Framework process. Red and orange areas show focus subwatersheds for wetland restoration and are based on being mentioned in other local or regional plans and the Minnesota Prairie Plan.

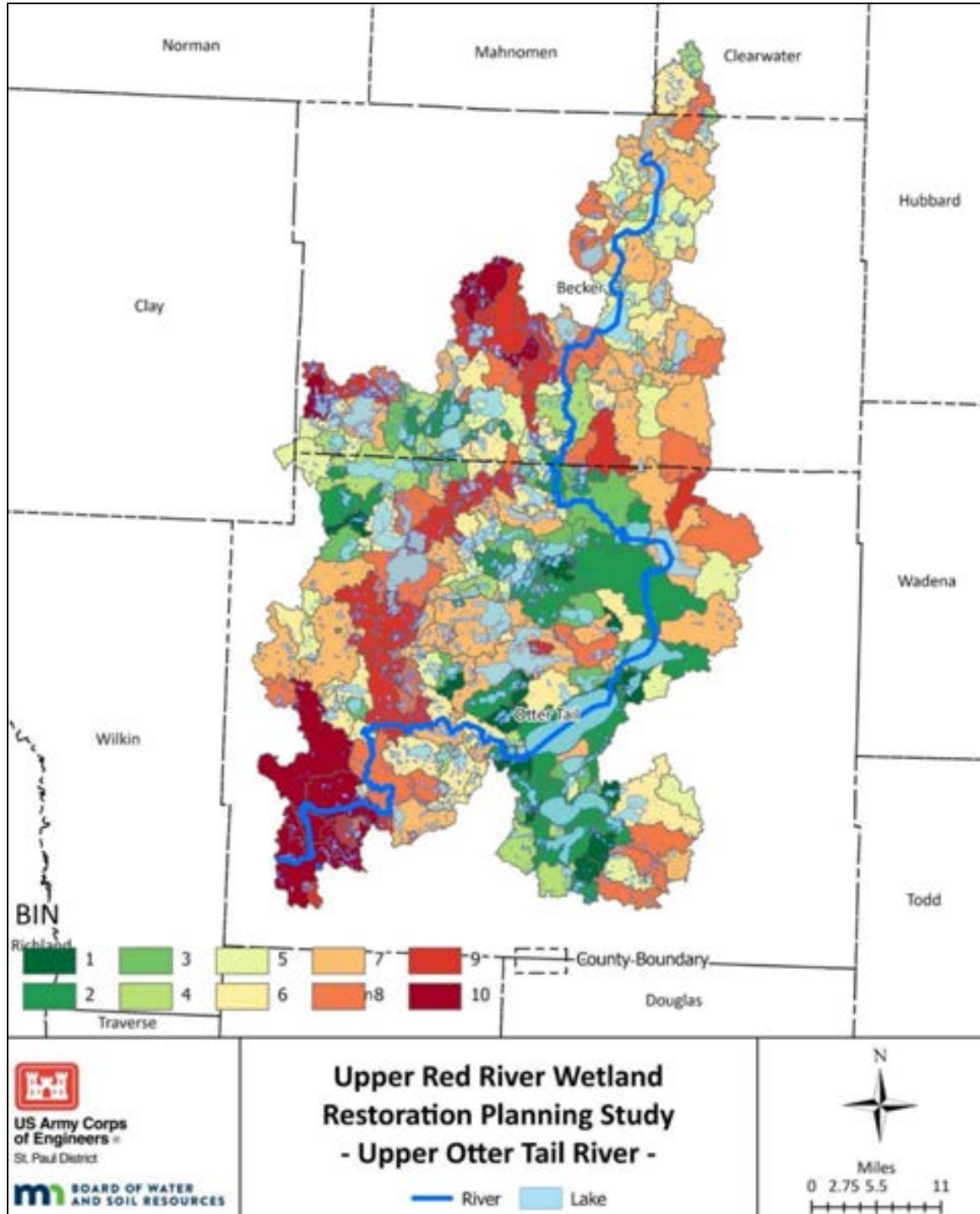


Figure 5.5. Focus areas for wetland restoration and storage in the OTW.

Goal: Stream and Ditch Stabilization



Description

Over time, streambanks can erode due to natural processes or from channelization. Upstream hydrology changes can also cause incision and other types of erosion in channels as a result of high flows, fast moving water, and a lack of stream sinuosity and natural streambed features. Riparian corridors provide benefits such as pollutant filtration, slowing flood waters, wildlife habitat and continuity, and bank stabilization. Deep roots of riparian and bank vegetation hold soil in place, and the loss of this vegetation contributes to sediment loading downstream.

Issues Addressed

- Unstable stream channels

Metric

Miles of streambank stabilized, miles of riparian buffers, miles of riparian easements.

Focus Resources

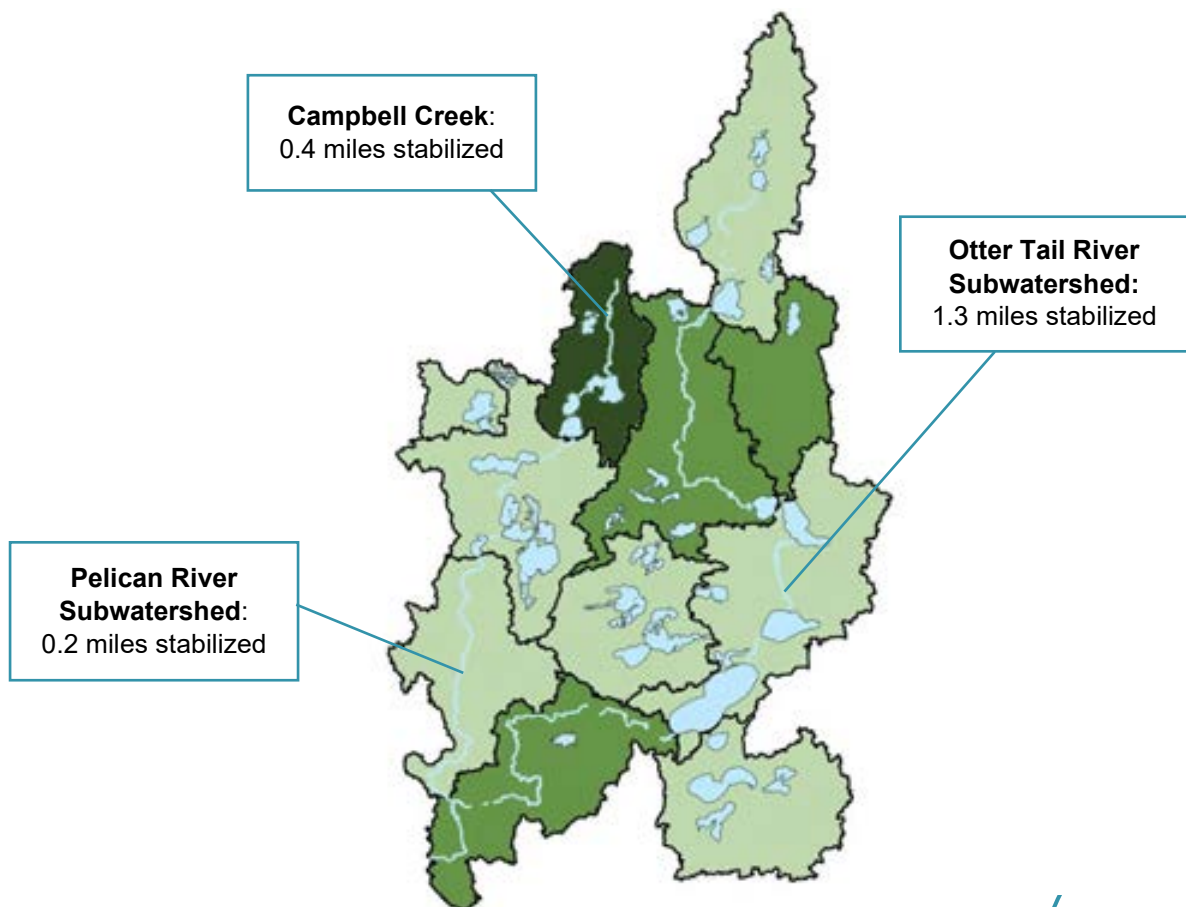
Sediment impaired streams, bluffs, and localized streambank erosion.

Subwatershed Milestones

Goals

The short-term goal is to make 5% progress towards the long-term goal (1.8 miles).

The long-term goal for stabilization (Figure 5.6) is 36 miles. This information was combined from local data, the MPCA Stressor Identification Study, and the DNR Geomorphology Study.



Targeting

A subgroup that included Steering Committee members, MPCA staff, and DNR staff discussed and set targeted areas for stream stabilization and riparian buffers. Unstable stream channels were identified from local partner data, the *MPCA Otter Tail River Watershed Stressor Identification Report* (MPCA 2019b), and the DNR Geomorphology Study (Figure 5.6).

These goals and targeted locations were reviewed by the Technical Advisory and Policy Committee and approved.

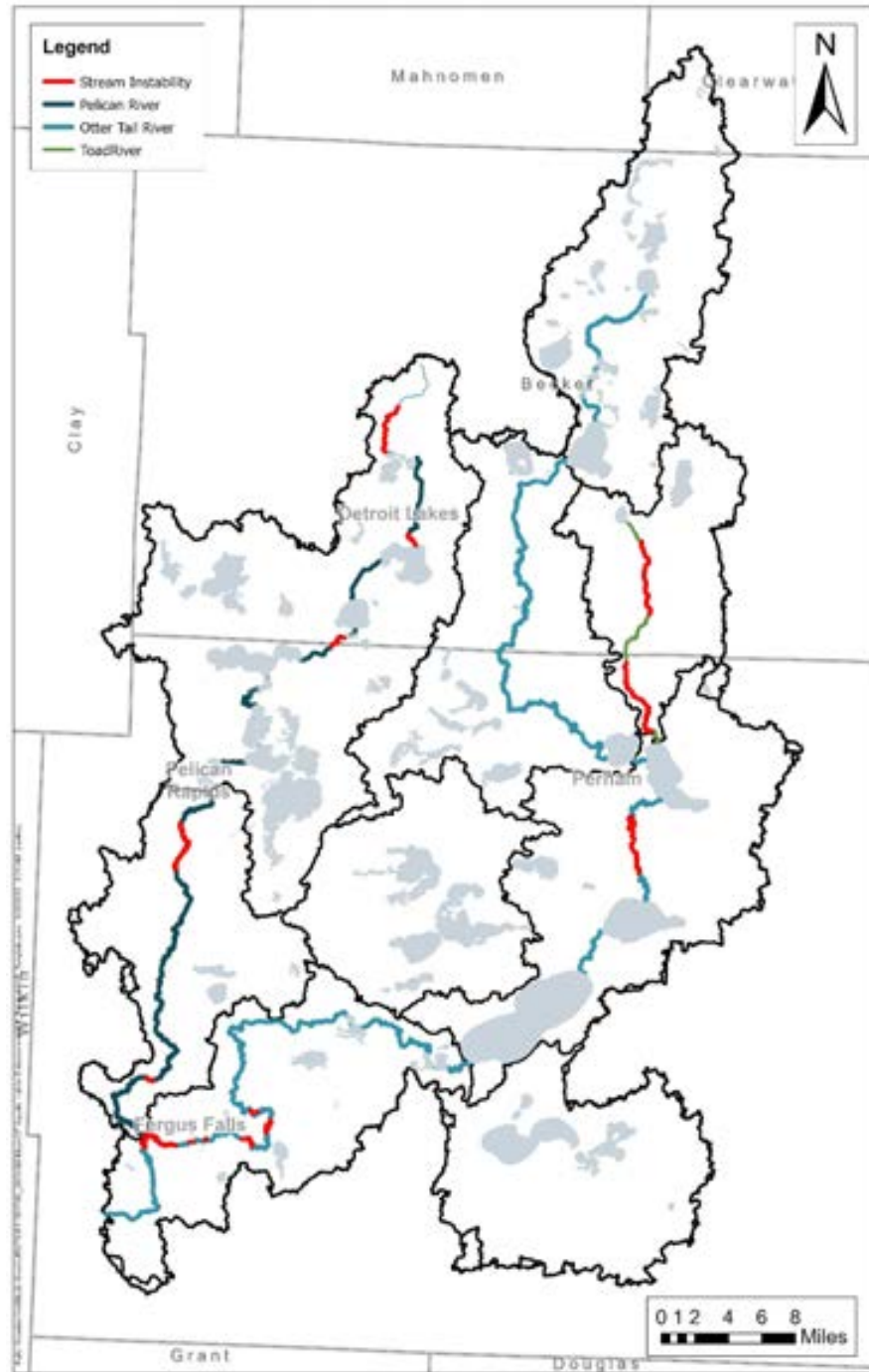


Figure 5.6. Focus areas for stream stabilization in the OTW.

Goal: *E. coli* Reduction



Description

E. coli exists in the guts of humans and warm-blooded animals such as livestock, birds, and pets. While some sources of *E. coli* may not be harmful, high levels of fecal bacteria in the environment could also lead to the presence of pathogens that can make people and animals sick. Water quality monitoring has identified six *E. coli* impairments in the planning area (over the State standard) (Figure 5.7). This goal aims to implement bacteria management projects in areas with impairments with the intent to decrease *E. coli* concentrations in impaired streams and prevent new impairments. More monitoring will also be necessary to better understand the issue.

Issues Addressed

- High *E. coli*

Metric

Number of projects and number of impairments removed.

Focus Resources

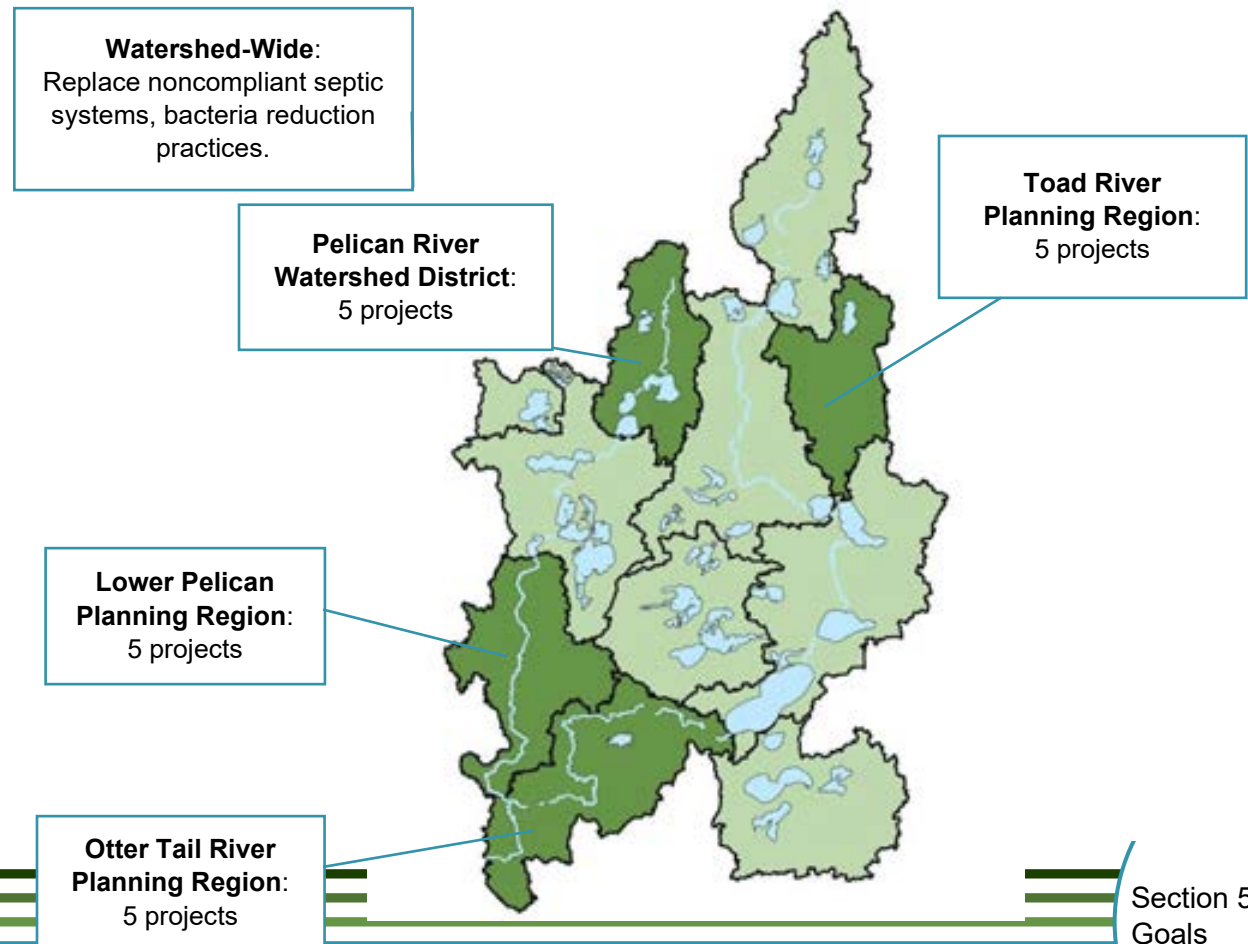
E. coli impaired streams, Spill Response Area for Fergus Falls source water.

Goals

The short-term goal is to complete 20 projects (2/year pace) to make progress towards preventing and removing impairments.

The long-term goal is to prevent any new impairments and remove existing impairments.

Planning Region Milestones



Targeting

Figure 5.7 identifies streams that are impaired or nearly impaired for *E. coli*. These areas are targeted for bacteria reduction projects.

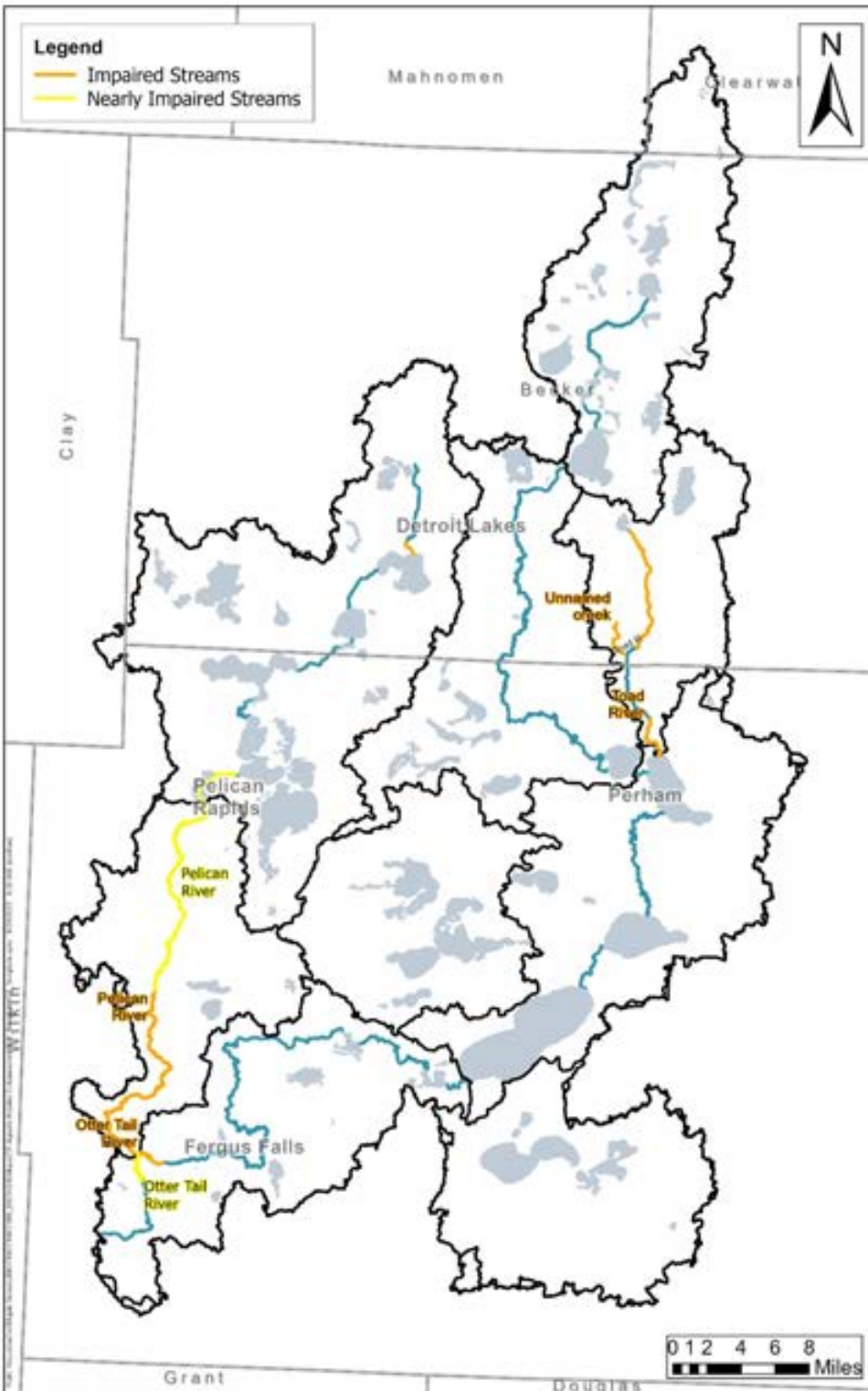


Figure 5.7. Focus areas for bacteria reduction in the OTW.

Goal: AIS Prevention and Management



Description

AIS programs are managed at the county, watershed district, and state (DNR) level. Most of the highly visited and developed lakes of Becker and Otter Tail counties are in the OTW. The counties receive annual funding from the state legislature for the prevention and management of AIS, and each county has an AIS Coordinator on staff. The Watershed Districts work with the counties and use their local funding for AIS prevention and management within their Districts.

Issues Addressed

- AIS

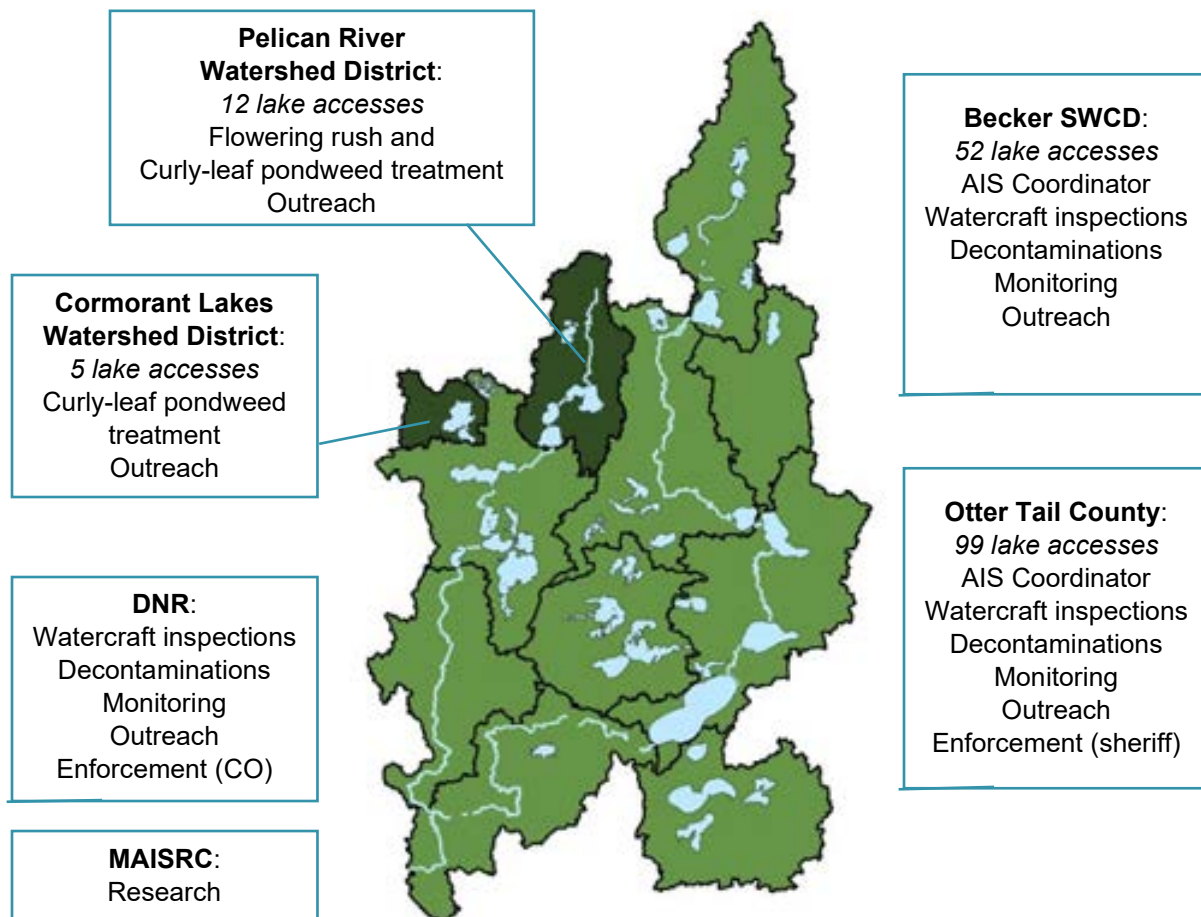
Metric

Existing program metrics: inspections, compliance, decontaminations, outreach, monitoring, and enforcement.

Focus Resources

Refer to current county and watershed district AIS plans.

AIS Programs related to each entity





6. Targeted Implementation Schedule



Section 6. Targeted Implementation Schedule

The Targeted Implementation Schedule is the culmination of the planning process, bringing together the identification of issues in the watershed, the goals that planning partners created to make progress toward improving the issues, and the funding mechanisms and actions to help achieve those goals. The Targeted Implementation Schedule, or action table, lists actions that planning partners will take and identifies where, when, and how these actions will be implemented over the course of this 10-year plan.

The actions in the Targeted Implementation Schedule were developed by gathering information from existing water plans, the WRAPS, and what's currently being implemented in the watershed.

Building on Existing Watershed Successes

Watershed partners have a strong track record of successful projects and partnerships in the OTW. Some common project types are listed below; they reflect the variety of land uses and resources in the watershed. For a full list and map of projects implemented see the MPCA's Healthier Watersheds page at <https://www.pca.state.mn.us/business-with-us/healthier-watersheds-tracking-the-actions-taken>.

 Unused well sealing	 Stormwater Management	 Erosion Control	 Manure & Feedlot Practices	 Agricultural Practices
 Forestry Management	 Lakeshore Restoration	 Streambank and Riparian Restoration	 Septic System Improvement	 AIS Prevention & Management

At the beginning of the planning process, the Technical Advisory Committee was led through an exercise to build common ground and learn about each other. Participants were asked to discuss and write success stories of natural resource improvement in the watershed, and why those projects were successful. Common themes for success included people, funding mechanisms, scale, timeline of project, values behind the work/approach, goals and priority vs opportunity, and partnerships. These themes can be carried forward in the future to guide successful implementation.

Reasons behind the success in the watershed:

- **People:** *capable staff, willing landowners, trust, persistence*
- **Partnerships:** *cooperation, supportive and proactive boards, shared values*
- **Funding Mechanisms:** *funding sources are increasing*
- **Values behind the work/approach:** *respect, communication, selling the projects to the decision-makers, landowner buy-in, quality of life values on the results of the successes, shown benefits to landowners and to the public*
- **Priority vs Opportunity:** *resource need, willing landowners*

Looking Forward: Targeting Conservation Action Where to focus outreach first

There are different levels of prioritization and targeting in this plan. Planning Regions were prioritized for where to spend time on outreach and project development by stacking all the issue prioritization maps in Section 3. This stacking resulted in Figure 6.1.

Targeting projects

Targeting includes where projects should be done and with whom. For the OTW, targeting data is available to the individual parcel level for use in outreach. These data sets are meant to target the root causes of watershed issues. For example, agricultural land management practices are targeted to where the best sediment or phosphorus reduction can be achieved.

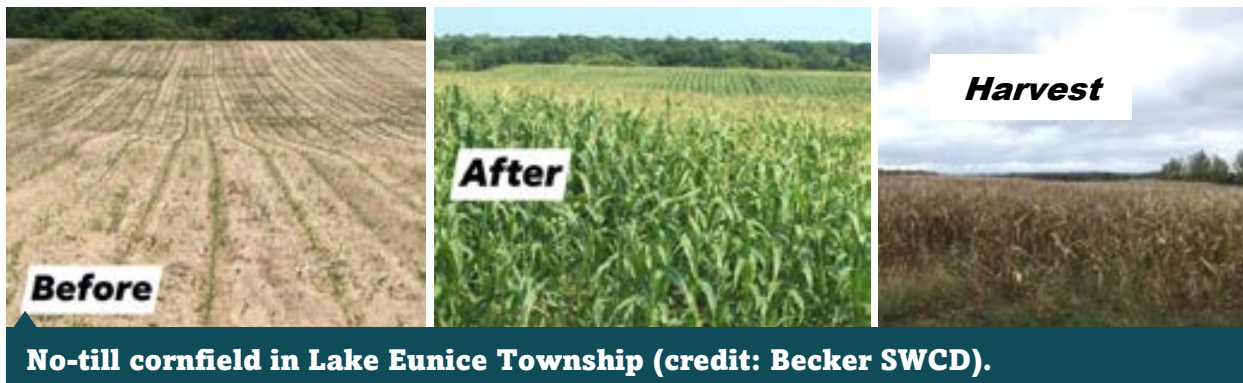
All targeting data are shown per goal in maps in Section 5. Some specific parcel-level models used include PTMApp and RAQ scoring.

PTMApp is a Geographic Information Systems (GIS) tool that was used to provide targeting for projects and practices on agricultural lands. This plan leverages PMTApp data to identify where new practices are feasible in the OTW. The practices include cost estimates, estimated water quality benefits, and estimated contributions to regional and watershed-wide measurable goals. PTMApp estimates existing pollutant loads and water quality benefits for a wide range of practices. Practices for this plan that are identified by PTMApp align with voluntary local implementation trends, have the highest cost-benefit ratios, and best sediment and phosphorus reduction potential as measured at the edge of the field. A PTMApp benefits calculator is provided per practice type on page 103.

The Riparian, Adjacency, Quality (RAQ) targeting method prioritizes areas for land protection. It highlights privately-owned forest parcels that are near water (Riparian), Adjacent to other protected lands, and have high Quality species to protect. Protecting private forests benefits surface water quality, habitat, and groundwater quality.



Figure 6.1. Where to focus outreach first in the OTW.



Funding Levels

Actions in this plan are assigned a funding level (Table 6.1). Level 1 funding includes current reliable baseline funding such as county and watershed tax levies, state programs such as BWSR Capacity Funding for SWCDs, DNR Shoreline and MPCA Subsurface Sewage Treatment System (SSTS) funding for counties.

Level 2 funding is the new operating level for watershed partners when this plan is completed and is made up of Level 1 funding plus watershed-based implementation funding (WBIF). WBIF is noncompetitive funding from the Clean Water Fund of the Clean Water Land and Legacy Amendment that planning partners will receive to implement plan actions.

Level 3 funding is everything else including federal programs (i.e., CRP, EQIP), state programs (i.e., SFIA), and grants (i.e., Lessard Sams, 319). There is likely much more project funding occurring in the watershed in addition to these totals as it is difficult to document projects by all entities, including private landowners and lake associations. Funding is described in more detail in Section 9 of this plan.

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

Table 6.1. Funding levels in the OTCWMP.

Funding Level	Description	Estimated Plan Total (10 years)	Estimated Annual Average
1	Current Baseline Funding	\$20,000,000	\$2,000,000
2	Baseline + WBIF (WBIF = \$632,500/yr)	\$26,330,000	\$2,633,000
3	Partner and Other funding (CRP, SFIA, NRCS, MPCA, etc.)	\$44,000,000	\$4,400,000



Shoreline restorations by East Otter Tail SWCD and Pelican River Watershed District.

Implementation Programs

Section 8 describes the programs that will be used for implementing this plan. Each action in the Targeted Implementation Schedule has an Implementation Program icon associated with it. For SWCDs and Counties, the programs are described in Figure 6.2.

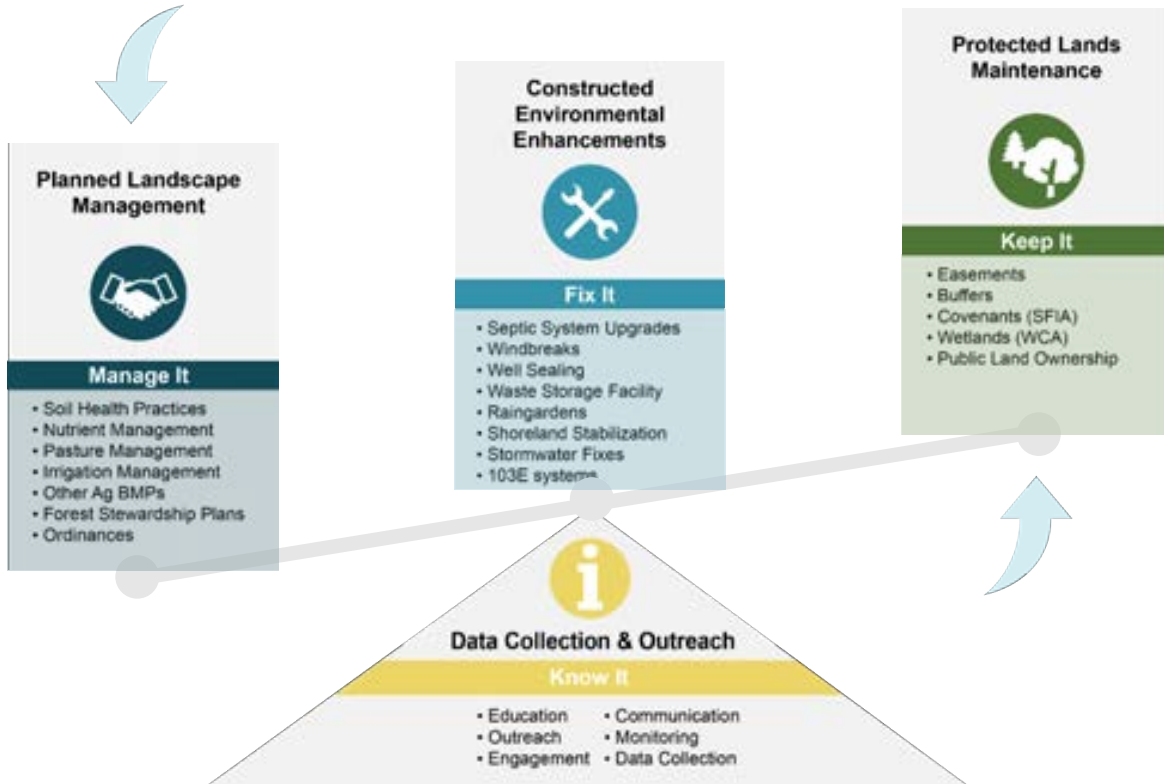


Figure 6.2. Implementation Programs for SWCDs and counties in the OTW.

The Watershed Districts have many of the same programs, but they are grouped differently (Figure 6.3). These programs reflect some of the different project types that Watershed Districts are involved in such as Capital Improvement Projects (large, one-time projects over \$100,000), enforcing rules and regulations, and Aquatic Invasive Species (AIS) management with locally generated WD funding (not from state funds).










 Operations/ Admin	 Aquatic Invasive Species	 Capital Improvement Projects
 Data Collection	 Drainage Systems Management	 Education
 Incentive Programs	 Rules/ Regulatory	 Special Studies

Figure 6.3. Implementation Programs for Watershed Districts in the OTW.

Implementation

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

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

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

The Targeted Implementation Schedule is presented in five tables in the next few pages. Actions that are tailored to specific planning regions are presented in the subwatershed tables and watershed-wide actions are in their own table. The Pelican River Subwatershed area includes the Pelican River Watershed District and the Cormorant Lakes Watershed District. Actions are split between these tables based on what each entity will lead. The Pelican River Subwatershed table includes actions for the counties and SWCDs, while the Watershed District tables include actions where they are the lead.

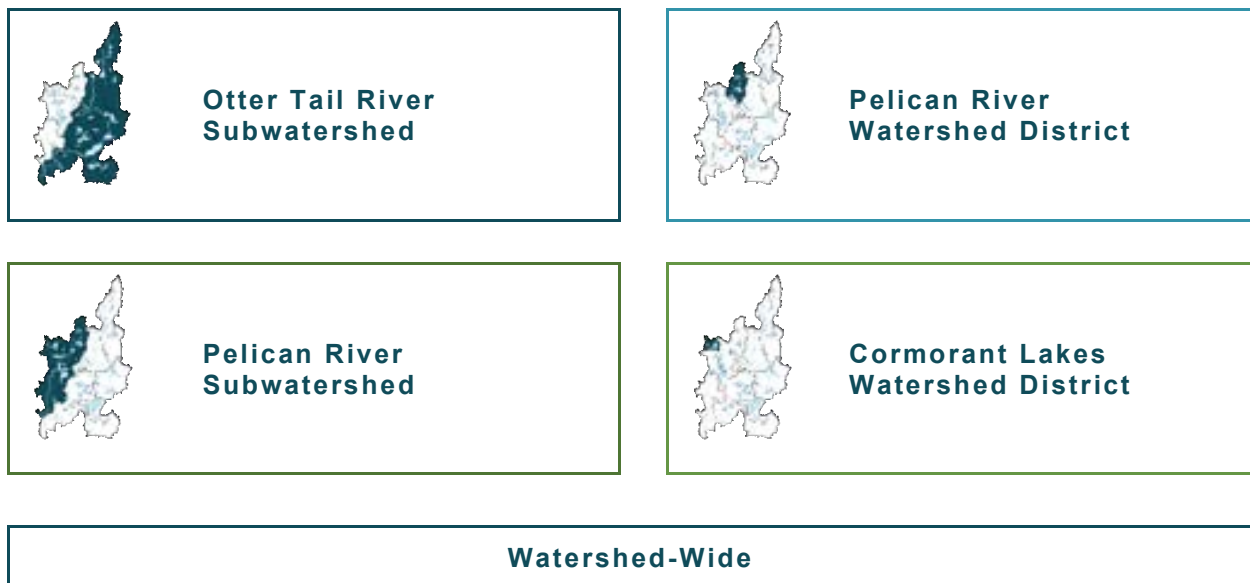













Figure 6.4. Targeted implementation table grouping.

Otter Tail River Subwatershed Implementation Table

Actions	Targeting and Measuring			Measurable Goals									Responsibility	Timeline					Estimated Costs		
	Program	Focus Resources	10-Year Output <i>Water quality benefits are reported at field edge</i>	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention	AIS Prevention and Mgmt	Responsibility/Partners (Bold = Lead)	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost
Soil Health Practices (cover crops, reduced tillage, perennial crops, conservation crop rotation, prescribed grazing)		Critical Soil Loss Acres	8,885 acres 8,770 lbs/yr phosphorus 14,218 tons/yr sediment 28,081 lbs/yr nitrogen	●	●	●	○	○	○	○	○	○	○	SWCDs, NRCS, BWSR, MDA	●	●	●	●	●	2*	\$1,332,750
Groundwater Agricultural Practices (nutrient management, irrigation water management, precision irrigation technology)		Nitrogen Infiltration Risk, DWSMAs	5,323 acres 426 lbs/yr phosphorus 4,471 tons/yr sediment 5,536 lbs/yr nitrogen	●	●	○	●	○	○	○	○	○	○	SWCDs, NRCS, BWSR, RCPP, MDA	●	●	●	●	●	2*	\$798,450
Drinking Water Protection Practices (Fergus Falls surface water intake protection activities, including nutrient reductions and spill response)		Hoot & Wright Lakes, Spill Response Area	Included in phosphorus and sediment reduction practices	●	●	○	○	○	○	○	○	○	○	City of Fergus Falls, MDH, SWCD	●	●	●	●	●	2*	Costs not available
Structural Agricultural Practices (sediment basins; grade stabilizations, filter strips)		Focus Lakes & Streams	1,530 lbs/yr phosphorus 1,745 tons/yr sediment (For resource goals, see pages 71, 72, 74).	●	●	○	○	○	○	○	○	○	○	SWCDs, NRCS, BWSR	●	●	●	●	●	2*	\$570,000
Bacteria Reduction Projects (waste pit closures, manure storage, livestock fencing and crossing, agricultural waste systems, retention basins)		Impaired Streams	10 projects (1/year pace)	○	○	○	○	○	●	○	○	○	○	NRCS, SWCDs, MPCA, Counties, cities	○	○	○	○	○	2*	\$500,000
Forest Stewardship Plans		Focus Lakes & Streams, LSP	3,306 acres, 27 plans	○	○	○	○	○	○	○	○	○	○	SWCDs, DNR, BWSR, Private Foresters	○	○	○	○	○	2*	\$16,200
Forest, Prairie, and Land Protection (SFIA, 2c, Easements, Acquisition)		Focus Lakes & Streams, LSP	3,306 acres	○	○	○	○	○	○	○	○	○	○	SWCDs, BWSR, DNR, cities, counties, MDH, MPCA, BWSR (RIM), Tamarac NWR, USFWS	○	○	○	○	○	3	\$1,256,000
Stormwater Management (storm sewer maintenance, street cleaning, construction stormwater treatment, rain gardens, green infrastructure)		Focus Lakes & Streams, Fergus Falls	439 lbs phosphorus/yr (For resource goals, see page 71)	●	●	○	○	○	○	○	○	○	○	Cities, SWCDs, Counties, COLA, Lake Associations, LIDs	○	○	○	○	○	2*	\$4,390,000
Buffer and Shoreline Management (shoreline restoration, riparian buffers, riparian enhancement)		Focus Lakes & Streams	20 projects (2/year pace)	●	●	○	○	○	○	○	○	○	○	SWCDs, Counties, DNR, COLA, Lake Associations, LIDs	●	●	●	●	●	2*	\$80,000
Stream and Ditch Stabilization		Focus Areas	1.4 miles	○	●	○	○	○	○	○	○	○	○	SWCDs, Counties, BWSR, DNR	○	○	○	○	○	2*	\$130,000
Fish Passage Projects		Otter Tail River	4 dams, 88 miles of river	○	○	○	○	○	○	○	○	○	○	DNR, SWCDs, Counties, LIDs	○	○	○	○	○	3	\$1,200,000

● Primary Goal this action will address | ○ Secondary Goal this action will address

Total Level 2 Funding Scenario (Baseline + WBIF):	2	\$7,817,400
Total Level 3 Funding (Partner Projects, Other Funding):	3	\$2,456,000

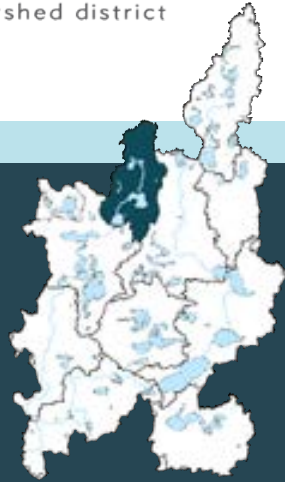
*All these practices can be done with Level 3 funding as well.

Pelican River Subwatershed Implementation Table

Actions	Targeting and Measuring			Measurable Goals										Responsibility	Timeline					Estimated Costs		
	Program	Focus Resources	10-Year Output <i>Water quality benefits are reported at field edge</i>	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention	AIS Prevention & Mgmt	Responsibility/Partners (Bold = Lead)	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost	
Soil Health Practices (cover crops, reduced tillage, perennial crops, conservation crop rotation, prescribed grazing)		Critical Soil Loss	6,392 acres 5,730 lbs/yr phosphorus 10,229 tons/yr sediment 21,380 lbs nitrogen/yr	●	●	●	○	○				○		SWCDs, NRCS , PRWD, CLWD, BWSR, MDA	●	●	●	●	●	2*	\$958,800	
Groundwater Agricultural Practices (nutrient management, irrigation water management)		Nitrogen Infiltration Risk, DWSMAs	1,576 acres 126 lbs/yr phosphorus 1,324 tons/yr sediment 1,639 lbs nitrogen/yr	●	●	○	●	○				○		SWCDs, NRCS , BWSR, PRWD, CLWD, RCPP, MDA	●	●	●	●	●	2*	\$236,400	
Structural Agricultural Practices (sediment basins; grade stabilizations, filter strips)		Focus Lakes & Streams	540 lbs/yr phosphorus 126 tons/yr sediment (For resource goals, see pages 71, 72, 74).	●	●						○	●		SWCDs, NRCS , BWSR, PRWD, CLWD	●	●	●	●	●	2*	\$440,000	
Bacteria Reduction Projects (waste pit closures, manure storage, livestock fencing and crossing, agricultural waste systems)		Impaired Streams	10 projects (1/year pace)	○	○		○		●					NRCS, SWCDs , MPCA, PRWD, Counties, cities			●	●	●	2*	\$500,000	
Forest Stewardship Plans		Focus Lakes & Streams, LSP	1,655 acres, 14 plans	○	○		○	●						SWCDs, DNR , BWSR, PRWD, CLWD, Private Foresters		●	●	●	●	2*	\$8,400	
Forest, Prairie, and Land Protection (SFIA, 2c, Easements, acquisition)		Focus Lakes & Streams, LSP	1,655 acres	○	○		○	●				○		SWCDs , BWSR, DNR, cities, counties, MDH, MPCA, BWSR (RIM), PRWD, CLWD		●	●	●	●	3	\$712,600	
Stormwater Management (storm sewer maintenance, street cleaning, construction stormwater treatment, rain gardens, green infrastructure)		Focus Lakes & Streams, Detroit Lakes	540 lbs/yr phosphorus (For resource goals, see page 71)	●	●		○				○	○		Cities, SWCDs , Counties, PRWD, CLWD, COLA, Lake Associations, LIDs	●	●	●	●	●	2*	\$70,000	
Buffer and Shoreline Management (shoreline restoration, riparian buffers, riparian enhancement)		Focus Lakes & Streams	20 projects (2/year pace)	●	●						●	○		SWCDs, Counties, DNR , PRWD, CLWD, COLA, Lake Associations, LIDs	●	●	●	●	●	2*	\$80,000	
Stream and Ditch Stabilization		Focus Areas	0.5 mile	○	●						●			SWCDs , Counties, BWSR, PRWD, CLWD, DNR		●	●	●	●	2*	\$50,000	
Fish Passage Projects		Pelican River	4 dams, 81 miles of river							●	●	○		DNR, SWCDs , PRWD, Counties, LIDs	●	●	●	●	●	3	1,200,000	
																			Total Level 2 Funding Scenario (Baseline + WBIF):		2	\$2,343,600
																			Total Level 3 Funding (Partner Projects, Other Funding):		3	\$1,912,600

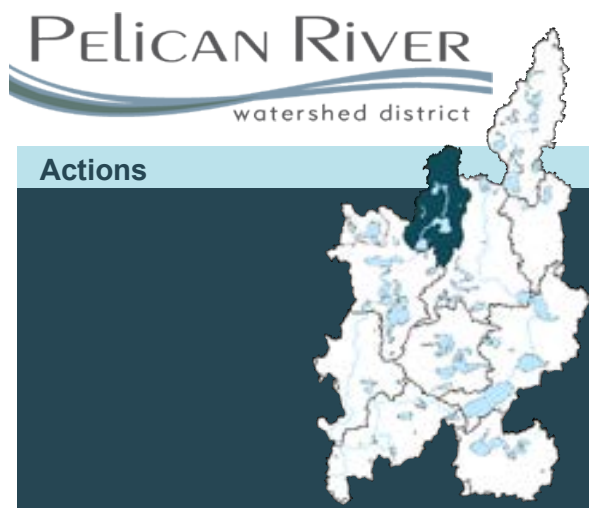
● Primary Goal this action will address | ○ Secondary Goal this action will address

*All these practices can be done with Level 3 funding as well



Pelican River Watershed District Implementation Table

Actions	Targeting and Measuring			Measurable Goals									Responsibility	Timeline					Estimated Costs			
	Program	Focus Resources	10-Year Output	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention	AIS Prevention & Mgmt	Responsibility/Partners (Bold = Lead)	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost	
Water Quality / Phosphorus Reduction																						
Meet Lake St. Clair TMDL (actions in TMDL and tracking system)		Lake St. Clair	Phosphorus load at 2.75 lbs/day	●	○	○	○	○	○	○	○	○	○	PRWD, City of Detroit Lakes, BWSR, MPCA	●	●	●	●	●	2	3	\$1,000,000
Agricultural Land Management (Soil Health, Groundwater Protection, Structural Ag practices, Bacteria reduction, identify areas with high erosion potential)		PRWD Lakes & Streams	Phosphorus reduction: <i>Detroit Lake: 203 lbs/yr</i> <i>Lake St. Clair: 60 lbs/yr</i> <i>Lake Sallie: 303 lbs/yr</i> <i>Campbell Creek 45 lbs/yr</i>	●	●	●	○	○	○	○	○	○	○	Becker SWCD, NRCS, PRWD, BWSR	●	●	●	●	●	2	3	Costs in Pelican Subwatershed
Stormwater Management (rain gardens, sedimentation basins, retrofits, regional wet/dry stormwater basins east of Detroit Lakes)		PRWD Lakes & Streams	Phosphorus reduction: <i>Detroit Lake: 203 lbs/yr</i> <i>Lake St. Clair: 60 lbs/yr</i> <i>Lake Sallie: 303 lbs/yr</i>	●	●	○	○	○	○	○	●	○	○	PRWD, BWSR, City of Detroit Lakes	●	●	●	●	●	2	3	\$7,770,000
Internal Loading Management (explore alum treatment or other methods)		Lake St. Clair North Floyd	Phosphorus reduction: <i>Lake St. Clair: 60 lbs/yr</i>	●	○	○	○	○	○	○	○	○	○	PRWD, BWSR, MPCA	○	●	●	○	○	2	3	\$800,000
Street Sweeping & Sand Use (develop comprehensive program, explore purchasing a street sweeper, appropriate sand use in winter)		PRWD Lakes & Streams	Phosphorus reduction: <i>Detroit Lake: 203 lbs/yr</i> <i>Lake St. Clair: 60 lbs/yr</i> <i>Lake Sallie: 303 lbs/yr</i>	●	●	○	○	○	○	○	○	○	○	PRWD, City of Detroit Lakes, MPCA	●	●	○	○	○	2	3	\$200,000
Stream and Ditch Stabilization		Campbell Creek, Floyd Lakes	Campbell Creek reductions: <i>45 lbs/yr phosphorus</i> <i>126 tons/yr sediment</i> <i>0.4 miles of stabilization</i>	●	●	○	○	○	○	○	○	○	○	PRWD, Becker SWCD, Becker County, BWSR, DNR	●	●	●	●	●	2	3	\$35,000
Maintain Public Drainage Systems (103E, inspections, records, inventories)		Ditches	Implement 103E	○	○	○	○	○	○	○	○	○	○	PRWD, BWSR	●	●	●	●	●	1		\$150,000
Shoreline Surveys (shoreline inventory surveys on lakes with potential for increased development)		PRWD Lakes	At least 2 surveys per lake	○	○	○	○	○	○	○	○	○	○	PRWD	●	●	●	●	●	1		\$50,000
Chloride Management (program to guide de-icing salt on municipal, county, and township roads, assessment of chloride in lakes)		Detroit Lake	Host two trainings on road and sidewalk maintenance, complete a chloride assessment and sampling for at least two years	○	○	○	○	○	○	○	○	○	○	PRWD, City of Detroit Lakes, MPCA	○	●	●	○	○	1	2	\$20,000
Establish water quality goals for shallow lakes		North Floyd, Wine, Abby, & Lind Lakes	Goal for each lake	●	○	○	○	○	○	○	○	○	○	PRWD, MPCA, DNR	●	●	○	○	○	1		\$20,000

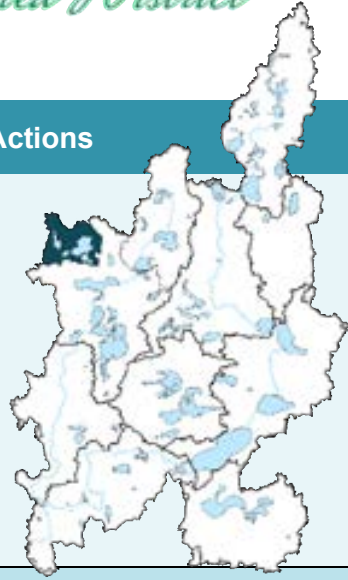


Actions	Targeting and Measuring			Measurable Goals									Responsibility (Bold = Lead)	Timeline					Estimated Costs			
	Program	Focus Resources	10-Year Output	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention		AIS Prevention & Mgmt	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost	
Lake Management Plans		PRWD Lakes	Complete plan for each lake	○	○			○	○				○	PRWD, Lake Associations, COLA	●	●				1	\$150,000	
Data Collection (lake monitoring, stream monitoring, analysis of data, project efficiency monitoring)		PRWD Lakes & Streams	Trend analysis, problem investigation, post data on website and reports	○	○				○				○	PRWD, MPCA, DNR, Becker SWCD, Lake Associations, COLA	●	●	●	●	●	1	\$850,000	
Wetland management and enhancement (Manage, enhance, and restore wetland water quality and function, enforce rules)		Wetlands	Complete wetland inventory, explore opportunities.	●	●								○	PRWD, Becker County, Becker SWCD, NRCS, DNR, MPCA, BWSR, City of Detroit Lakes	●	●	●	●	●	1	\$60,000	
Capital Improvement Projects (Evaluate and inventory opportunities for capital improvement projects that reduce nutrient and sediment loads)		Focus Lakes & Streams	Perform at least one formal evaluation which generates at least 10 project opportunities	●	●		○	○	●	○	○	○		PRWD, City of Detroit Lakes, Becker County, MPCA, DNR, local businesses		●	●	●	●	1	\$100,000	
Rice Lake Wetland Restoration (complete project)		Wetlands, Detroit Lake	Rice Lake Project: 691 acre-feet storage 461 acres restored	●	●								●	PRWD, BWSR, DNR, City of Detroit Lakes	●	●				3	\$1,250,000	
Water Quantity																						
Localized Flooding Resilience (mitigate flooding and prevent flood-related damages to property, public safety, and water resources, prepare for emergency scenarios)		Floodplains	Gather floodplain data and FEMA information, Implement design standards for water-related infrastructure	○	○								●	PRWD, City of Detroit Lakes, MNDOT, DNR, townships, FEMA	●	●	●	●	●	3	\$80,000	
Capital Improvement Projects (Evaluate opportunities for capital improvement projects that reduce stormwater volume and peak flows)		Focus Lakes & Streams, MS4 areas	Perform at least one formal evaluation which generates at least 10 project opportunities	○	○		○	○	○	○	○	○	●	PRWD, City of Detroit Lakes, MPA, DNR		●	●	●	●	2	3	\$100,000
Water Reuse (explore and implement water reuse projects)		Detroit Lake	Implement one project.	○	○								○	PRWD, City of Detroit Lakes		●	●	●	●	2	3	\$100,000
Habitat Management and Protection																						
Buffer and Shoreline Management (i.e. shoreline restoration, remove seawalls, riparian buffers, riparian enhancement)		Focus Lakes & Streams	20 projects, 2 projects/year pace	●	●				○				●	PRWD, City of Detroit Lakes, Becker County, Becker SWCD, DNR	●	●	●	●	●	2	\$80,000	
Land Protection (SFIA, 2c, conservation easements, acquisition of forests, wetlands, or other sensitive areas)		Focus Lakes & Streams, LSP	1 conservation easement or AMA	○	○		○	●						Becker SWCD, PRWD, BWSR, DNR, City of Detroit Lakes, Becker County, MDH, MPCA, BWSR (RIM)			●	●	●	3	Costs in Pelican Subwatershed	



Actions	Targeting and Measuring			Measurable Goals									Responsibility (Bold = Lead)	Timeline					Estimated Costs			
	Program	Focus Resources	10-Year Output	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention		AIS Prevention & Mgmt	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost	
Fish Passage Projects		Little Floyd Lake, Pelican River	2 rock rapids projects (Little Floyd Lake and Bucks Mill Dam)							●	○			DNR, PRWD, Becker County	●	●				3	\$600,000	
Aquatic Invasive Species Prevention and Management																						
Adaptive Management (update and implement aquatic invasive plant management plans, continue mechanical and chemical treatments)		PRWD Lakes	Flowering Rush: <i>Maintain less than 2% occurrence in littoral zone</i> Curly-leaf pondweed: <i>Reduce occurrence by 90%</i>	○										PRWD, Lake Associations, DNR	●	●	●	●	●	1	\$800,000	
AIS Prevention and Monitoring (AIS monitoring, identification, rapid response, research new treatments)		Floyd, Little Floyd, Detroit, Curfman, Long, Sallie, Melissa lakes, Pelican River	At least 2 surveys per lake, Rapid Response Plan, Collaborate with researchers	○										PRWD, Lake Associations, DNR	●	●	●	●	●	1		
Regulatory Programs																						
Ordinances and Rules (see Section 8, Table 8.2, Appendix F)		All	Implement WD rules	●	●		●		○				●	●	PRWD, Becker County, BWSR, MPCA, DNR, City of Detroit Lakes	●	●	●	●	●	1	\$940,000
Education and Outreach Programs																						
Education and Outreach (see Section 8, Tables 8.5-8.6)		All	Implement program	○	○	○	○	○	○	○	○	○	○	PRWD, Becker County, BWSR, MPCA, DNR, City of Detroit Lakes, Lake Associations, Becker COLA	●	●	●	●	●	1	\$100,000	
																			Total Level 1 Funding Scenario (Baseline Funds):		1	\$3,240,000
																			Total Level 2 Funding Scenario (Baseline + WBIF):		2	\$8,085,000
																			Total Level 3 Funding (Partner Projects, Other Funding):		3	\$3,930,000

● Primary Goal this action will address | ○ Secondary Goal this action will address



Cormorant Lakes Watershed District Implementation Table

Actions	Targeting and Measuring			Measurable Goals									Responsibility	Timeline					Estimated Costs		
	Program	Focus Resources	10-Year Output	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention	AIS Prevention & Mgmt	Responsibility/Partners (Bold = Lead)	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost
Water Quality																					
Monitor the water quality of CLWD lakes (Volunteer lake monitoring, analysis of water quality, recognize lake volunteers)		CLWD Lakes	Lake trend data, problem investigation	●										CLWD, Becker COLA, Lake Associations	●	●	●	●	●	1	\$20,000
Agricultural Land Management (Soil Health, Groundwater Protection, Structural Ag practices, Bacteria reduction, identify areas with high erosion potential)		CLWD Lakes	Phosphorus reduction: <i>U. Cormorant: 52 lbs/yr</i> <i>Leif Lake: 18 lbs/yr</i> <i>B. Cormorant: no increase</i>	●	●	●	○				○	○		Becker SWCD, NRCS, CLWD, Becker County, BWSR, CLWD Engineer	●	●	●	●	●	2	Costs in Pelican Subwatershed
Stormwater Management (Promote rain gardens, sedimentation basins)		CLWD Lakes	Phosphorus reduction: <i>U. Cormorant: 52 lbs/yr</i> <i>Leif Lake: 18 lbs/yr</i> <i>B. Cormorant: no increase</i>	●	●		○				○	●		Becker SWCD, CLWD, Becker County, BWSR, CLWD Engineer	●	●	●	●	●	2	\$700,000
Shoreline Stabilization (stabilize eroding shoreline)		CLWD Lakes	Phosphorus reduction: <i>U. Cormorant: 52 lbs/yr</i> <i>Leif Lake: 18 lbs/yr</i> <i>B. Cormorant: no increase</i>	●	●									CLWD, Becker SWCD, Becker County, BWSR, CLWD Engineer	●	●	●	●	●	2	\$100,000
Regulatory Programs (Section 8, Table 8.2, Appendix G)																					
Maintain current rules and update as needed		Lakes and wetlands	Implement WD rules	○	○		○	○	○			○		CLWD, Becker SWCD, Becker County	●	●	●	●	●	1	\$944,000
Protect wetlands and ponds (Continue District inspections of wetlands and bring violations to SWCD)		Wetlands	Implement WD rules	○	○			○				○		CLWD, Becker SWCD, Becker County, BWSR	●	●	●	●	●	1	
Protect lakes during building projects (Permitting program for projects near water bodies, erosion control, stormwater management for building permits)		CLWD Lakes	Implement WD rules	●	●						○	○		CLWD, Becker SWCD, Becker County	●	●	●	●	●	1	
Aquatic Invasive Species Prevention and Management																					
Manage Current AIS in District Lakes (Provide support and coordination with lake associations, treat invasive plants)		CLWD Lakes	Curly-leaf pondweed managed to less acres than current	○									●	CLWD, Lake Associations, DNR, Becker SWCD	●	●	●	●	●	1	\$380,000
AIS Prevention and Monitoring (Partner on AIS monitoring, identification, and education)		CLWD Lakes	No new AIS infestations										●	CLWD, Lake Associations, DNR, Becker SWCD, Becker COLA	●	●	●	●	●	1	\$80,000

CORMORANT LAKES Watershed District



Actions	Targeting and Measuring			Measurable Goals									Responsibility	Timeline					Estimated Costs							
	Program	Focus Resources	10-Year Output	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention		AIS Prevention & Mgmt	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost					
Water Quantity																										
Maintain Channel and Water Flow According to Established Levels (Maintain agreement with Pelican Lake and DNR permit for water discharge from Big Cormorant outlet control structure)		Big Cormorant outlet	Operate Big Cormorant outlet according to agreement																CLWD, DNR, PGOLID	●	●	●	●	●	1	Cost included in CLWD Regulatory Program
Alleviate Damage to Property due to High Water When Possible (Delineate subwatersheds and channels, investigate controls for high water, look into water storage)		CLWD Lakes	Operate Big Cormorant outlet according to agreement	○	○														CLWD, CLWD Engineer	●	●	●	●	●	1	Cost included in CLWD Regulatory Program
Education and Outreach Programs																										
Septic System and Septic Tank Education (Improve performance of inspection and enforcement of regulation surrounding septic systems)		Groundwater and Lakes	Noncomplying systems located and replaced	●			●		●										CLWD, Becker County, MPCA, Becker SWCD	●	●	●	●	●	2	\$318,000
Promote awareness and protection of groundwater resources (geothermal systems, abandoned wells)		Groundwater	Educational program				●											CLWD, DNR, Becker County, Becker SWCD	●	●	●	●	●	2		
Educate riparian landowners about buffer strips, shoreland protection and restoration (Shoreline inventory, identify grant funding for restoration projects)		CLWD Lakes	Shoreline inventory every 5 years, educational program	○	●	○	○				○	○						CLWD, SWCD, County, DNR, Lake Associations	●	●	●	●	●	2		
Inform and Educate about Watershed Policies and Programs (Improve public awareness of watershed information, attend lake association meetings, hold annual public meetings, online newsletter)		CLWD Lakes	Attend 2 Lake Association meetings/year, Annual newsletter	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CLWD, Lake Associations, County, COLA	●	●	●	●	●	2		
Habitat Management and Protection																										
Maintain and Improve Habitat for Fish and Wildlife (Coordinate projects to improve habitat such as identifying potential acquisition sites for AMAs, easements, and shoreland protection, work with local clubs to obtain habitat grants)		CLWD Lakes	1 conservation easement or AMA (coordinate with SWCD on easements and Forest Plans)	○	○		○	●			○	○	○					CLWD, DNR, Becker SWCD, BWSR, Lake Associations, Local Sportsmen's Clubs			●	●	●	3	Costs in Pelican Subwatershed	

● Primary Goal this action will address | ○ Secondary Goal this action will address

Total Level 1 Funding Scenario (Baseline Funds):	1	\$1,424,000
Total Level 2 Funding Scenario (Baseline + WBIF):	2	\$2,542,000
Total Level 3 Funding (Partner Projects, Other Funding):	3	Pelican Subwatershed

Watershed-Wide Implementation Table

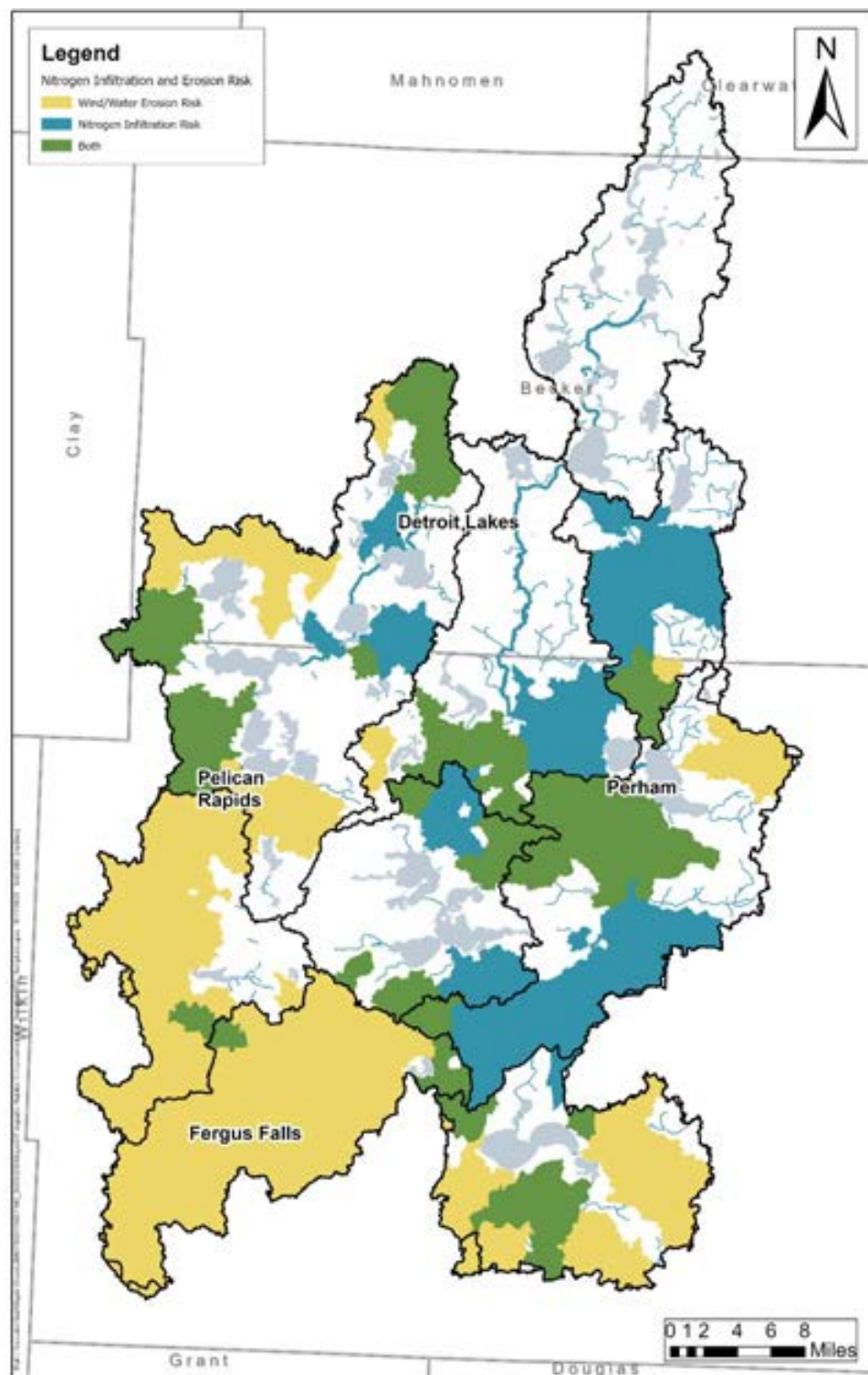
Actions		Measuring	Measurable Goals										Timeline					Estimated Costs		
Action	Program	10-Year Output	Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention	AIS Prevention & Mgmt	Responsibility/Partners (Bold = Lead)	2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Funding Level	Estimated Total 10-Year Cost
Regulation and Ordinances (See Section 8 and Appendix H)		Continue current program, update & refine as needed	●	●	●	●	●	●				●	Counties, PRWD, CLWD, SWCDs, MPCA, DNR, BWSR	●	●	●	●	●	1	\$6,591,200
Education and Outreach (Landowners Schools, Public, see Section 8, Tables 8.5-8.6)		Implement program	●	●	●	●	●	●	●	●	●	●	SWCDs, PRWD, CLWD, Counties, Lake Associations, Cities	●	●	●	●	●	2	\$480,000
Develop a watershed outreach plan to promote consistent messaging and strategies		1 Plan	●	●	●	●	●	●	●	●	●	●	SWCDs, PRWD, CLWD, Counties, BWSR	●					2	\$5,000
Track progress towards goals during implementation		Create tracking program and track progress	●	●	●	●	●	●	●	●	●	●	SWCDs, PRWD, CLWD, Counties, BWSR	●	●	●	●	●	2	\$5,000
Storage Practices (wetland restoration, floodplain restoration)		100 acre-feet to build resilience	○	○		○				○	●	○	USFWS, SWCDs, PRWD, CLWD, NRCS, DNR, BWSR		●	●	●	●	2 3	\$29,500 \$29,500
Well Sealing		15 wells/year				●							MDH, SWCDs, Counties	●	●	●	●	●	2	\$150,000
Subsurface Sewage Treatment Systems (Replace noncomplying systems)		250 systems/year (on average 10 systems with WBIF and the rest with Level 3 funding).	●	●		●		●					Counties, landowners, SWCDs, PRWD, CLWD	●	●	●	●	●	2 3	\$1,200,000 \$28,800,000
Stream Restoration		1 project	○	○			●	○	○	●	○		DNR, PRWD, SWCDs				●	●	3	\$500,000
Surface Water Monitoring (Lakes, Streams, USGS gages, see Section 8, Figure 8.3)		Continue current program	●	●	●	●	●	●					MPCA, PRWD, CLWD, Lake Associations, White Earth Nation, USFWS, SWCDs, USGS, DNR	●	●	●	●	●	3	Cost Unavailable
Groundwater Monitoring (Monitoring wells, township testing, see Section 8)		Continue current program				●							DNR, MDA, MDH, SWCDs	●	●	●	●	●	3	Cost Unavailable
Land Retirement Programs (CRP)		Maintain current CRP	○	○	○	○	●	○			○		FSA, NRCS, SWCDs, USFWS	●	●	●	●	●	3	Cost Unavailable
Ag Water Quality Certification		2 Farms/year	●	●	○	○	○	○					MDA, SWCDs	●	●	●	●	●	3	\$2,000,000
Aquatic Invasive Species Management and Prevention		Continue county programs										●	Becker SWCD, OT County, DNR, White Earth Nation, USFWS, PRWD, CLWD, COLA, Lake Associations, LIDs, MAISRC	●	●	●	●	●	3	\$4,208,000
Total Level 1 Funding Scenario (Baseline Funds):																		1	\$6,591,000	
Total Level 2 Funding Scenario (Baseline + WBIF):																		2	\$2,389,500	
Total Level 3 Funding (Partner Projects, Other Funding):																		3	\$35,537,500	

● Primary Goal this action will address | ○ Secondary Goal this action will address

Water Quality Benefits Calculator for Agricultural Practices

A PTMAp scenario was developed during the planning process to estimate water quality benefits for projects in priority areas. A benefits calculator was created by using the best practices in each priority area (best load reduction and best cost effectiveness) for targeting soil health and groundwater protection. This calculator can be used to track progress during implementation.

Goals for tracking these benefits: Phosphorus Reduction • Sediment Reduction • Soil Health • Groundwater Protection



Soil Health

Benefits Calculator:
Target: Critical Soil Loss
(where most soil erosion is occurring)

Practice Type	NRCS Code	Average Load Reduction			Average Cost	Average Size (acres)
		Sediment (tons/yr)	Phosphorus (lbs/yr)	Nitrogen (lbs/yr)		
No till	329	1.75	0.25	4.79	\$50	1.0
Cover crops	340	1.45	0.23	4.57	\$50	1.0
Nutrient Management	590	0.84	0.08	1.04	\$15	1.0
Riparian Buffer	390	28.93	5.85	107.59	\$6,100	3.0
Filter Strip	393	2.74	0.57	10.59	\$1,900	2.0
Grassed Waterway	412	6.16	0.78	15.02	\$4,800	2.3
WASCOB	638	15.13	2.33	32.69	\$9,000	0.2

Groundwater Protection

Benefits Calculator:
Target: Nitrogen Infiltration Risk
(where there is highest risk of nitrogen infiltrating groundwater)

Practice Type	NRCS Code	Average Load Reduction			Average Cost	Average BMP Size (acres)
		Sediment (tons/yr)	Phosphorus (lbs/yr)	Nitrogen (lbs/yr)		
No till	329	0.12	0.04	0.67	\$50	1
Cover crops	340	0.11	0.03	0.64	\$50	1
Nutrient Management	590	0.43	0.08	1.04	\$15	1
Riparian Buffer	390	22.57	7.28	137.46	\$8,100	3.8
Filter Strip	393	2.42	0.88	17.29	\$1,900	2.0
Grassed Waterway	412	4.84	0.76	14.91	\$4,800	2.2
WASCOB	638	11.09	3.06	42.71	\$9,000	0.2



7. Resiliency



Section 7. Resiliency

Introduction

The OTW (and greater Minnesota) is experiencing climate variability that impacts people, communities, and livelihoods. DNR weather records since the early 1900s show that precipitation is increasing by 0.18 inches/decade in the OTW and temperature is increasing by 0.23 °F/decade (Figures 7.1 and 7.2). Winters and nights are getting warmer, and storm events are increasing in severity, with greater 1–3-inch rainfalls. These changes cause damage to infrastructure and buildings, increase streambank erosion and stormwater runoff, impact crop yields, and alter water storage on the landscape. Climate variability is an emerging issue in this plan (Section 3).

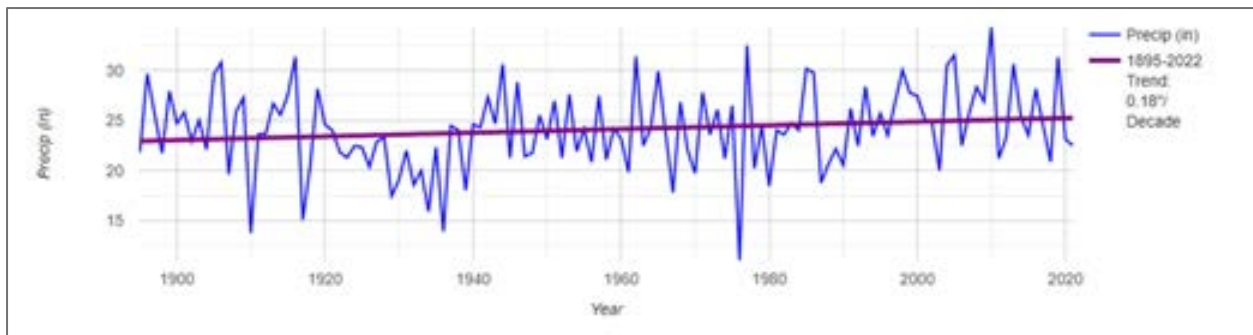


Figure 7.1. Precipitation trend in the Otter Tail Watershed.

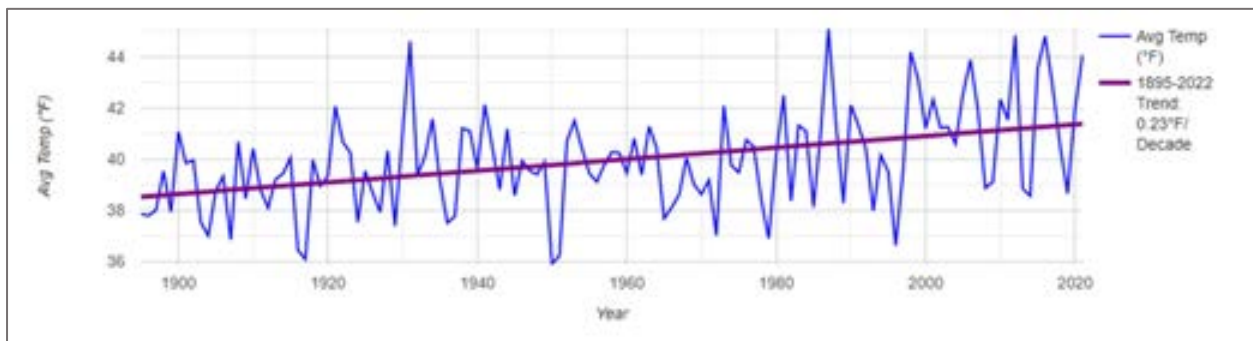


Figure 7.2. Temperature trend in the Otter Tail Watershed.

Variability in 2021-2022

The OTW recently experienced both ends of the weather extreme spectrum, with drought conditions throughout 2021 and intense precipitation in the spring months of 2022 (Figure 7.3). January-June precipitation increased from 7.1 inches in 2021 to 13.6 inches in 2022. In 2021, there were three days with 1 inch or greater precipitation from April-November, and 2022 had four days with precipitation greater than 1 inch between April and November of which two were greater than 2 inches.

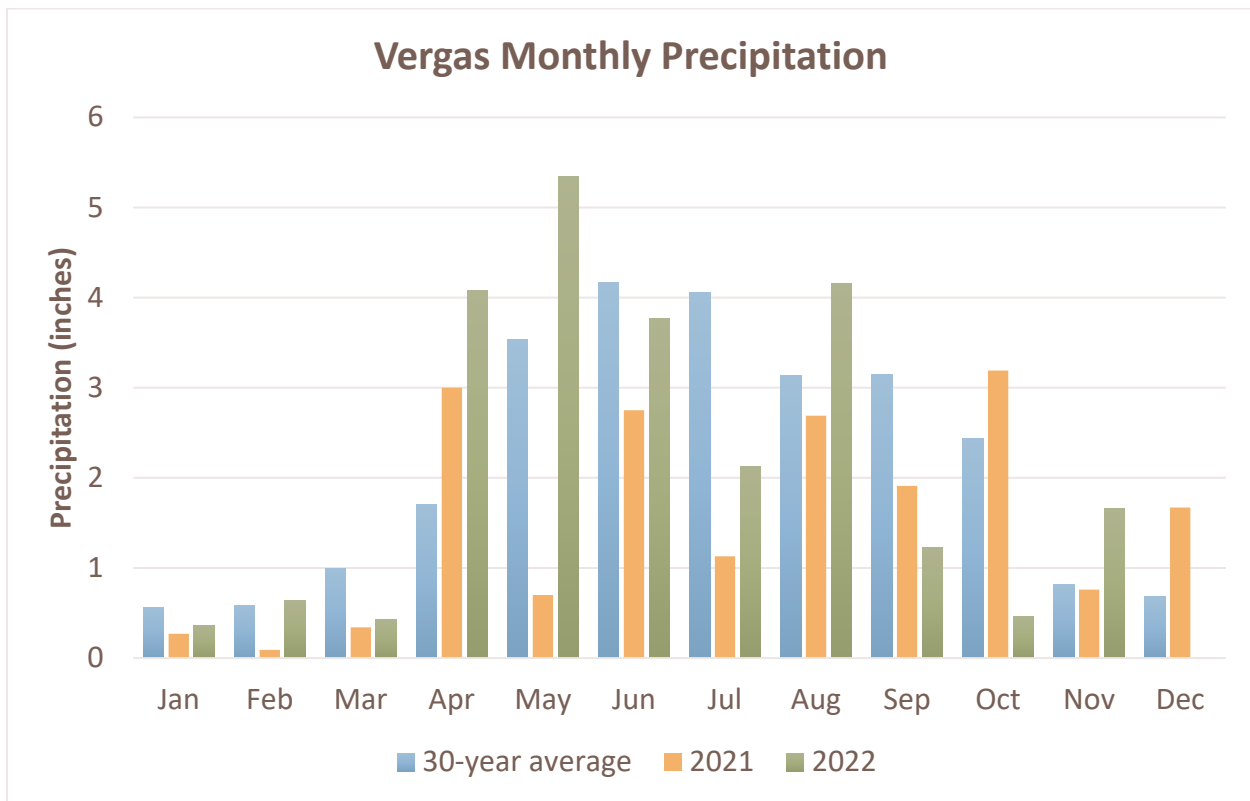


Figure 7.3. Total precipitation each month in Vergas in 2021 and 2022 (2022 Data ends in November as that is when this plan was finalized).

The effects of highly variable climate like the OTW experienced in 2021 and 2022 are not only felt by the environment, but they also have real impacts on communities and individuals. Figures 7.5 and 7.7 show pictures of the OTW during the drought of 2021. The impact of drought on the recreational use of lakes is captured in image 7.5a where a tractor is used to pull a boat to shore. The extremes in precipitation caused the lake level of Lake Lida, one of the great fishing lakes in the OTW, to go from 18 inches below the Ordinary High Water Level in Fall 2021 to 12 inches above in Spring of 2022 (Figure 7.4). The differences in 2021-2022 also impacted agriculture, as shown in Figure 7.6. The snow melt and heavy rains in spring caused high water in the Otter Tail River as shown in Figure 7.7.

Extreme precipitation like the OTW saw in spring of 2022 is becoming more commonplace. Due to the increased frequency of large rain events, there is a higher potential for flood events, damage to buildings, increased erosion, and more. Flooding was named as a significant hazard facing Becker County in their Hazard Mitigation Plan and was considered a moderate hazard in the Otter Tail County Hazard Mitigation Plan. Flooding due to climate variability was discussed as an emerging issue in this plan, and other focus issues such as sediment and stormwater capture flooding’s effects.

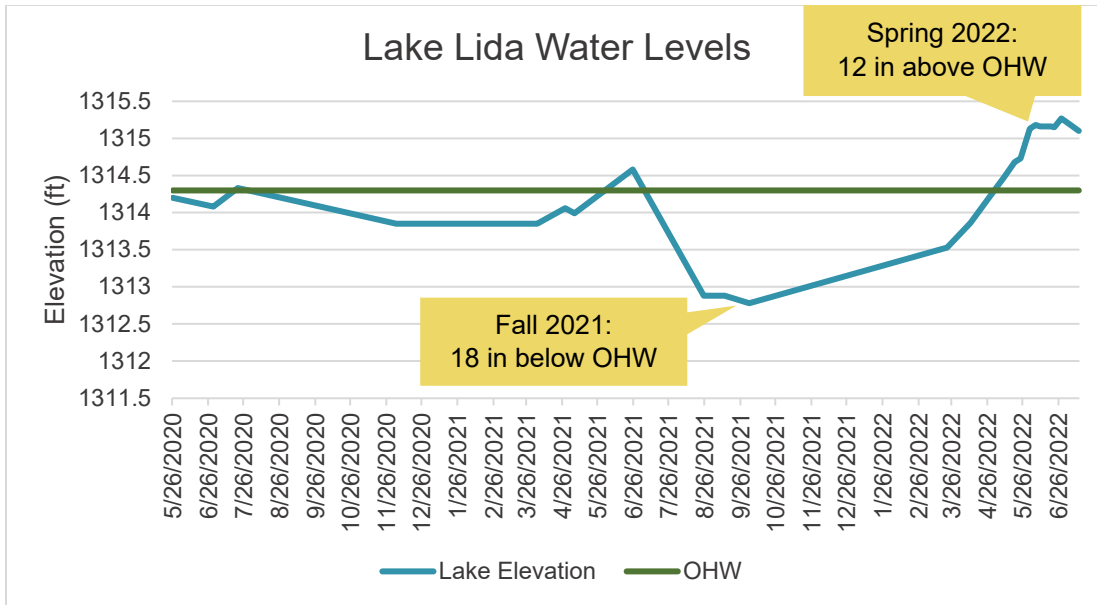
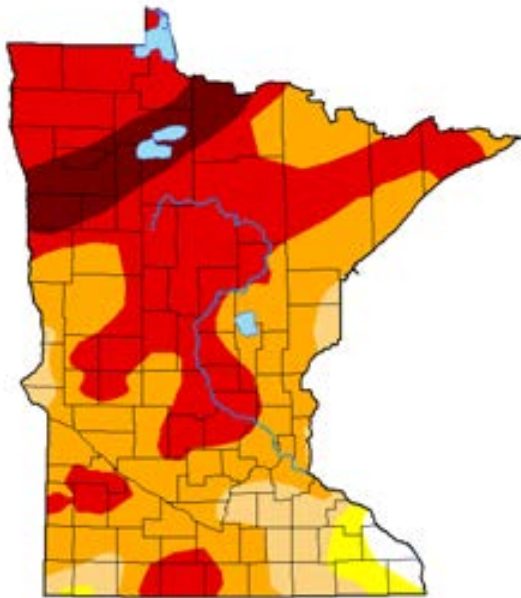


Figure 7.4. Lake Lida water levels from 2020-2022. Credit: DNR. Data from <https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=56074700>.



Figure 7.5. Photos of drought in 2021. A) using a tractor to pull a boat off Otter Tail Lake, B) the Pelican River in Pelican Rapids, C) Otter Tail Lake, D) dry culvert (credit: Chris LeClair).

U.S. Drought Monitor Minnesota



August 17, 2021
(Released Thursday, Aug. 19, 2021)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.15	98.85	95.56	88.29	48.77	8.07
Last Week (8-10-2021)	1.15	98.85	95.36	77.77	42.29	7.37
3 Months Ago (5-18-2021)	40.43	54.57	21.81	0.78	0.00	0.00
Start of Calendar Year (12-29-2020)	1.50	98.40	23.40	0.28	0.00	0.00
Start of Water Year (9-29-2020)	54.95	45.05	8.38	0.00	0.00	0.00
One Year Ago (8-18-2020)	73.22	26.78	10.51	0.00	0.00	0.00

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

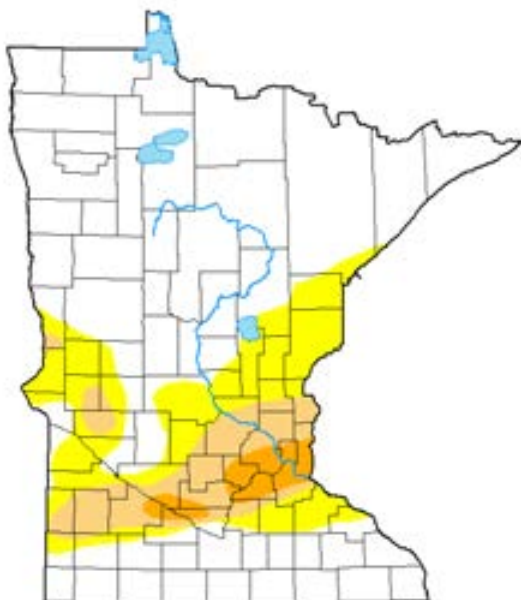
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
Curtis Riggs
National Drought Mitigation Center



droughtmonitor.unl.edu

U.S. Drought Monitor Minnesota



August 9, 2022
(Released Thursday, Aug. 11, 2022)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	71.89	28.14	11.29	2.87	0.08	0.00
Last Week (8-02-2022)	65.84	34.16	13.83	4.02	0.00	0.00
3 Months Ago (5-10-2022)	95.81	4.19	0.00	0.00	0.00	0.00
Start of Calendar Year (12-04-2021)	30.22	69.78	38.55	9.28	0.08	0.00
Start of Water Year (9-29-2021)	6.58	93.50	76.21	50.44	23.58	0.00
One Year Ago (8-10-2021)	1.15	98.85	95.36	77.77	42.29	7.37

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
Richard Tinker
CPC/NOAA/NWS/NCEP



droughtmonitor.unl.edu

Figure 7.6. Drought conditions in August of 2021 versus August of 2022 (credit: Farm Service Agency).



Figure 7.7. The Otter Tail River near Cotton Lake A) in 2021 during drought, B) in 2022 during high water (credit: Becker SWCD).

Climate Resiliency and This Plan

Resilience is the ability of a system to experience change but not be affected.

Resilience can be social, economic, and ecological (MGLP, 2021). Social resilience is organization and regulation. For example, having a Lake Association or Lake Improvement District build a social framework to implement lake projects. Ecological resilience includes landscape diversity, water retention, and fixing past hydrological alterations. For example, protecting forests at the watershed and landscape scale provides resilience to increasing precipitation trends (Figure 7.7). Economic resilience includes providing cost share for private landowners to adapt practices that increase ecological resilience.

This plan includes actions and programs that build social, economic, and ecological resilience.

- Social resilience programs and actions:
 - Regulatory program
 - Outreach and education program
 - Partnerships between planning partners, lake associations, Lake Improvement Districts, and other government agencies and organizations
- Economic resilience programs and actions:
 - Cost share incentives for practices
 - New state funding for local projects, which also supports local staff capacity, local contractors, and local consultants.
- Ecological resilience programs and actions:
 - Forest management and protection
 - Cover crops
 - Wetland restoration
 - Stormwater management



Figure 7.8. Resiliency management scales example for a lake. Source: Midwest Glacial Lakes Partnership.

It is essential to build resilient communities so when climate related events occur, the community is able to withstand or mitigate the impacts. Resiliency includes both 1) adaptation recognizing adverse events will occur more often and being prepared for them, and 2) mitigation, which is the ability to experience a weather event and minimize the impacts. Adaption and mitigation can be approached through both social (which includes planning, education, and regulation) and environmental lenses (includes water storage, drainage management, landscape diversity) (BWSR 2019).

Resiliency in the OTR can take multiple forms, from physical construction to ensure durable infrastructure, protection of natural resources that store water, streambank stabilization to withstand rain events, urban stormwater management, to education and disaster planning. It should cover the land at multiple scales, including actions that protect specific resources or buildings at the individual scale, ordinances and regulation at the local and state scale, and actions to protect/restore drainage, forests, and wetlands at the regional scale.

Planning includes acknowledging the potential for a range of weather events on the watershed and developing actions to mitigate the effects. Plans such as this section and the Becker and Otter Tail counties hazard mitigation plans prepare LGUs for adverse weather events. Minnesota has resources available for local planners to utilize when building resiliency, such as

BWSR’s Climate Change Trends and Action Plan, which gives concrete steps to implementing resiliency.

This plan can be used as a tool to increase OTW resiliency. Many issues named in this plan are influenced or worsened by extreme climate events, including primary issues of erosion, soil health, forest/wetland loss, phosphorous loading, and secondary issues such as unstable streams, altered hydrology, and *E. coli*. Using the goals and implementation actions identified in Sections 5 and 6 of this plan, achieving short and long term watershed goals will have a secondary outcome of building resiliency. Protecting forests and wetlands and enhancing soil health are critical plan goals for creating a watershed that is able to withstand extreme climate events.

Climate Resiliency Benefits

Implementation of this plan also makes progress towards protecting water storage in the forest soils, adding water storage in agricultural soils, protecting carbon storage in the forests and sequestering carbon with agricultural practices.

Annual Carbon Benefits:

Protected Carbon Storage
78,264 tons



Sequestered Carbon
7,920 tons



Storage Benefits:

Protected Water Storage
1,370-1,420 acre-feet



Additional Storage
1,069 acre-feet



Real-World Equivalent:

This amount of carbon is equivalent to removing 18,570 gas vehicles driven for one year



Real-World Equivalent:

An acre-foot is equivalent to a football field covered in 1 foot of water



References

Carbon storage benefits: Forests

Using the plan's Forest Management Goal, the carbon stored in the existing forests was quantified. Because this storage already exists, it was called "protected carbon storage" in the plan. Existing forests were estimated to be at least 40 years old on average.

Russell, M., 2020. Forest Carbon Fact Sheet for Minnesota. Analysis for Forest Resources Association. https://forestresources.org/pdf/Data_and_methods_for_forest_carbon_fact_sheets.pdf Accessed August 2021.

Carbon sequestration benefits: Cover Crops

In the implementation scenario for the plan's Agricultural Lands Management goal, 45% of the total goal acres would be new cover crop implementation. This number of acres was used to quantify carbon sequestration as this would be new carbon capture.

Using the Field to Market National Indicators Report, data modeling, and a literature review, estimates were created for Minnesota to determine the sequestration potential of on farm management techniques. These values enable estimation of per acre sequestration potential for BMP implementation.

Field to Market: The Alliance for Sustainable Agriculture, 2021. Environmental Outcomes from On-Farm Agricultural Production in the United States (Fourth Edition). ISBN: 978-0-578-33372-4

Precipitation data

Precipitation data was obtained from the Minnesota Climatology Office using their High DENSITY radius retrieval tool. The zip code 56587 was used to obtain the precipitation.

https://climateapps.dnr.state.mn.us/HIDradius/radius_new.asp

Water storage benefits: Forests

Using the plan's Forest Management Goal, the amount of storage was quantified that would be lost if existing forests were cleared for agricultural production or subdivisions for development. Therefore, it was called "protected water storage" in the plan.

Senay, G. B. and Kagone, S., 2019, Daily SSEBop Evapotranspiration: U. S. Geological Survey Data Release, <https://doi.org/10.5066/P9L2YMV>

Water storage benefits: Cover Crops

In the Leaf, Wing, Redeye Comprehensive Watershed Management Plan, the storage gained from adding cover crops to the landscape was quantified with PTMApp data and a proprietary hydrologic analysis tool at Houston Engineering. The Otter Tail River Watershed was deemed very similar in climate, latitude, soils, land use, and hydrology to the Leaf, Wing, Redeye Watershed, so the storage per acre was used from that plan (found here:

https://www.eotswcd.org/uploads/files/Redeye1W1P_FinalDraft-min-1.pdf).



8. Plan Programs



Section 8. Plan Implementation Programs

This section of the plan describes the programs that will be used for implementing this plan. For SWCDs and Counties, there are four main categories: Planned Landscape Management (“Manage It”), Protected Lands Maintenance (“Keep It”), Constructed Environmental Enhancements (“Fix It”), and Data Collection and Outreach (“Know It”). For the OTW, the scale is evenly balanced between programs, highlighting the good quality and diverse resources in the watershed (Figure 8.1).

Implementation: A Balancing Act

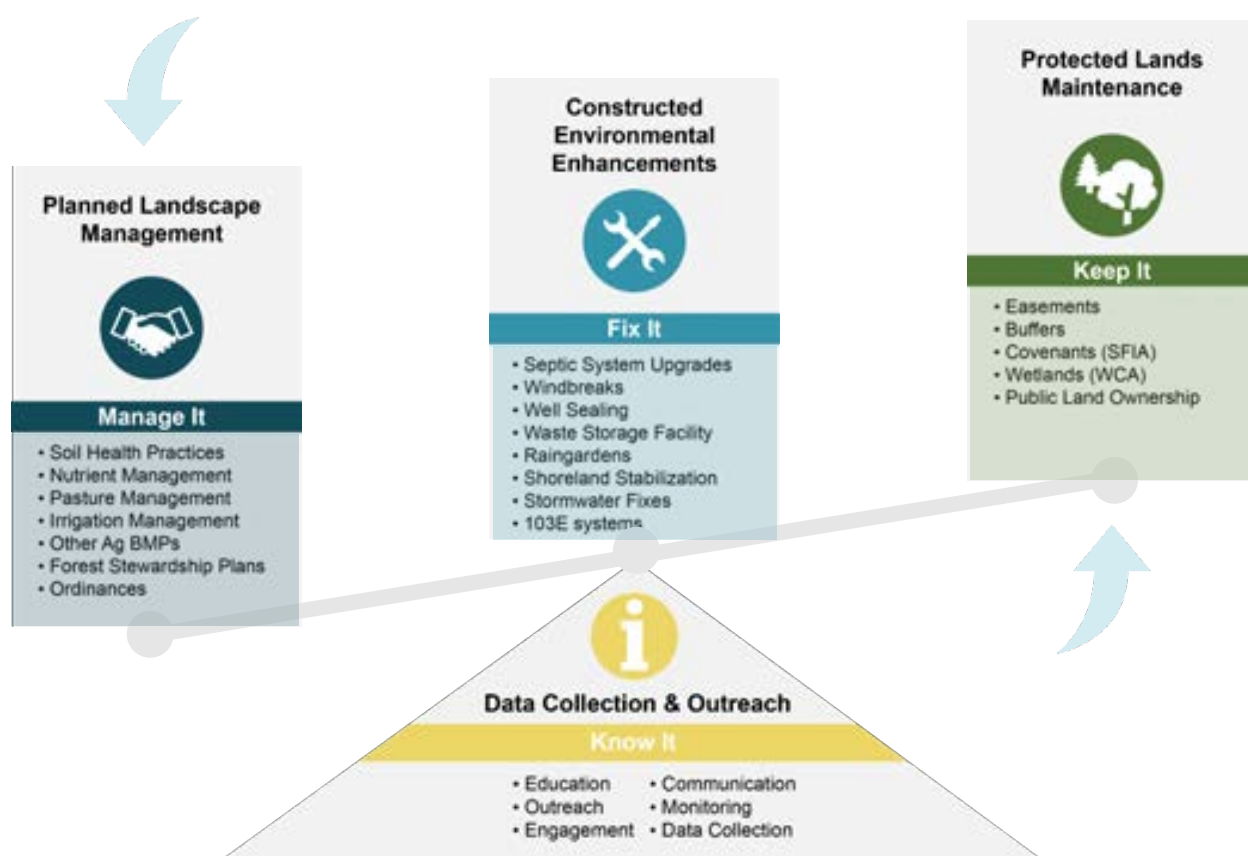


Figure 8.1. Implementation programs for SWCDs and Counties in the OTW.

The Watershed Districts have many of the same programs, but they are grouped differently (Figure 8.2). These programs reflect some of the different project types that Watershed Districts are involved in such as Capital Improvement Projects (large, one-time projects over \$100,000), enforcing rules and regulations, and Aquatic Invasive Species (AIS) management with locally generated WD funding (not from state funds).

Watershed Districts










 Operations/ Admin	 Aquatic Invasive Species	 Capital Improvement Projects
 Data Collection	 Drainage Systems Management	 Education
 Incentive Programs	 Rules/ Regulatory	 Special Studies

Figure 8.2. Implementation Programs for Watershed Districts in the OTW.

Comprehensive Plans

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

Current Water Plans in the OTW

- Becker County Water Plan (2017)
- Otter Tail County Water Plan (2009)
- Pelican River Watershed District Comprehensive Watershed Management Plan (2020)
- Cormorant Lakes Watershed District Watershed Management Plan (2012)

Current Comprehensive Land Use Plans in the OTW

- Becker County Comprehensive Plan (2003)
- City of Detroit Lakes Comprehensive Plan (2020)
- City of Pelican Rapids Comprehensive Plan (2014)
- City of Perham Comprehensive Plan (2015)
- City of Fergus Falls Master Plan (2016)
- City of Battle Lake Comprehensive Plan (2012)

Other regional and state plans: [DNR Shallow Lakes Plan](#), [BWSR Climate Change Trends and Action Plan](#), [MN Non-point Source Management Plan](#), [MN Prairie Plan](#), [MN Water Plan](#).

Manage It

Planned Landscape Management



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

Applicable Goals: *Phosphorus Reduction, Sediment Reduction, Soil Health, Groundwater Protection, Water Retention, Bacteria Reduction, Land Protection & Management, Stream Stabilization, Aquatic Connectivity, AIS Prevention & Management.*

Implementation of this plan will involve programs that will be actively targeted through education and outreach to prioritized areas for management (Section 4). Projects in non-priority areas will be considered on an opportunity basis based on if they address priority issues via practices that are effective with meaningful results and/or fit into the overall resource strategy.



Landscape in the OTW in fall. Photo Credit: Darren Newville.

Cost-Share Programs

Cost-share programs or projects are those where the cost of installing a project is shared between the landowner(s) and several agencies including SWCSs, Watershed Districts, state and federal agencies, or special interest groups. Installing a project or implementing a practice to include cost-share for things like cover crops and reduced tillage, forest enhancement, or irrigation water management are applicable examples that meet plan goals.



Incentive Programs

Private Forest Management

Forest Stewardship Plans

Forest owners can gain knowledge of how to manage their woodlands by having a Forest Stewardship Plan created in cooperation with the Minnesota Department of Natural Resources’ (DNR) 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.

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.

Sustainable Forest Incentive Act (SFIA)

SFIA is considered in the “Keep It” program because most people that start with an 8-year covenant move to a 50-year covenant. In addition, the SFIA covenant is more restrictive than 2C designation. See more information on page 122.

Conservation Reserve Program (CRP)

CRP is administered by the Farm Service Agency of the 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. Contract duration is 10-15 years.

Regulation and Enforcement

Counties and cities will meet once a year to discuss ordinances and counties will notify each other of any proposed ordinance amendments. Activities will be tracked by the individual counties. An effort will be made to compile the information watershed-wide. A full comparison of Otter Tail County, East Otter Tail, and West Otter Tail SWCDs, Becker County, Becker SWCD, and PRWD and CLWD Ordinances is provided in Appendix I.



**Rules/
Regulatory**

Aggregate Sand and Gravel Mining

The MPCA oversees air permits, hazardous waste licenses, stormwater and wastewater management, and storage tanks for aggregate sand and gravel mining operations (<https://www.pca.state.mn.us/business-with-us/aggregate-sand-and-gravel>). Local ordinances are in place in Otter Tail and Becker Counties that include additional guidelines for aggregate mining in those jurisdictions.

»» *Regulations: Minnesota Statutes 298.75, 394.25*

Bluffland Protection

Blufflands are managed under several State programs including programs for shoreland management and Wild and Scenic Rivers. Minimum structure setbacks from bluffs and related development standards apply to land in shoreland for this watershed. The Statewide shoreland program includes land within 1,000 feet of any public lake, pond, or flowage or 300 feet of any public water river or stream, or the landward extent of their floodplains. Only land around public waters with a shoreland classification is regulated. There are differences in the ordinances between each county (setback, height, practices allowed, etc.) (Appendix I).

Construction Stormwater

Construction stormwater management is the practice of preventing and/or reducing the movement of pollutants, particularly sediment, from a site during and after construction. All construction projects should follow construction BMPs, but projects disturbing one acre or more of land will require a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS)

Permit from the MPCA. Projects disturbing less than one acre of soil, if that activity is part of a larger common plan of development or sale that covers more than one acre, may also require permit coverage. This type of project includes housing developments in second tier shoreland areas or in rural residential areas. Otter Tail County has local oversight over construction erosion control for areas within the designated shoreland management areas. In Becker County an ordinance addresses construction soil erosion. PRWD includes construction erosion control as part of their Stormwater Pollution Prevention Plan, and CLWD requires permits for numerous practices in the shore impact zone (1,000 feet from a lake). See Table 8.2 for more details.

»» *Regulations: Minnesota Rules, chapter 7090*

Feedlots

Minnesota rules govern the collection, transportation, storage, processing, and land application of animal manure and other livestock operation wastes. The MPCA oversees the compliance, enforcement and permitting of feedlots within the OTW planning area.

»» *Regulations: Minnesota Rules Chapter 7020*

Groundwater Use

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

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

Groundwater Protection Rule

The MDA administers the Groundwater Protection Rule, which went into effect on June 24, 2019. The rule has two parts: Part 1 restricts the application of nitrogen fertilizer in the fall and on frozen soils over vulnerable groundwater; Part 2 responds to community water supply wells with elevated nitrate. Both Parts 1 and 2 apply in the OTW. Currently, part 2 applies specifically to the Perham, Oak Grove MHP, and Battle Lake MHP DWSMAs.

»» *Regulations: Minnesota Rules Chapter 1573*

Hazard Management

Hazard mitigation may be defined as any action taken to eliminate or reduce the future risk to human life and property from natural and human-caused hazards. Climate change adaptation also plays a part in hazard management. These requirements direct the state to administer cost-sharing. Hazard Mitigation Local Emergency Management Programs are deployed in each of the contributing counties within the OTW boundary.

»» *Regulations: Minnesota Statute, chapter 12*

Invasive Species

Invasive species, both aquatic and terrestrial, can cause ecological and economic damage to water resources and forests. The DNR has regulatory authority over aquatic plants and animals, and terrestrial animals. For aquatic species, permits are required by the general public for transporting lake water, invasive species, and for treating invasive species. Otter Tail County has aquatic invasive



**Aquatic
Invasive
Species**

species prevention and management regulations prescribed under its Dock and Riparian Use Ordinance administered by the Land and Resources Department. In Becker County, the SWCD oversees aquatic invasive species prevention and management. PRWD has a Readiness Response Plan for invasive species and chemically manages aquatic invasive plants, and CLWD partners with the Becker County AIS Task Force and Lake Associations to prevent the spread of invasive species and chemically manage aquatic invasive plants.

»» *Regulations: Minnesota Statute 84D*

Noxious Weed Law

Noxious weeds affect the natural, native balance of ecological functions. The Noxious Weed Law in Minnesota is administered by the MDA through Counties. The State maintains noxious weed lists of those species to eradicate, control, restrict, and specially regulated plants. Becker County also maintains its own additional noxious weed list, as approved by the MDA.

»» *Regulations: Minnesota Statutes 18.75-18.91*

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

Minnesota Drainage Law enables multiple landowners to collectively construct, improve, and repair drainage systems across property boundaries and governmental boundaries.

These drainage systems can be open ditches and/or subsurface tile. Drainage systems have their own laws and requirements that LGUs must uphold. These ditches are managed by the county and watershed districts for the benefit of the landowners.

Otter Tail and Becker counties are the drainage authorities in the watershed planning area. The PRWD also has jurisdiction over drainage systems within their district's boundary.

»» *Regulations: Minnesota Statute 103E*



**Drainage
Systems
Management**

Shoreland Management

Minnesota has shoreland management rules that are administered by the DNR. Local governmental units are required to have land use controls that protect shorelands along lakes and rivers, and they can adopt more strict ordinances than the state's if desired. Otter Tail and Becker counties have DNR Approved Ordinances, but they are slightly different. The DNR published an Innovative Shoreland Standards Showcase website that may be helpful to local governments as they implement this plan:

https://www.dnr.state.mn.us/waters/watermgmt_section/shoreland/innovative-standards.html.

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

Shoreline Regulatory Comparisons

Tables 8.1 and 8.2 summarize shoreline regulatory comparisons between the local governments in the OTW, including the Cities of Detroit Lakes and Fergus Falls because they have MS4 permits. Other non-MS4 towns follow the state's minimum guidelines. Watershed partners will look for ways to streamline local permitting processes and meet annually to share any changes to regulatory programs. Minimum Impact Design Standards (MIDS) can be promoted in the watershed to minimize development impacts to water resources.

Table 8.1. Shoreline Regulatory Comparisons between local governments in the OTW.

	General Development Lakes	Recreational Development Lakes	Natural Environment Lakes
Definition (MN DNR)	<i>General Development Lakes usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline and are more than 15 feet deep.</i>	<i>Recreational Development Lakes usually have between 60 and 225 acres of water per mile of shoreline, between 3 and 25 dwellings per mile of shoreline, and are more than 15 feet deep.</i>	<i>Natural Environment Lakes usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winter kill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep.</i>
Maximum Impervious Surface	Detroit Lakes: 25%, up to 30% with mitigation. Otter Tail, Becker: 25%	Detroit Lakes: 25%, up to 30% with mitigation Otter Tail, Becker: 25%	Detroit Lakes: 25%, up to 30% with mitigation Otter Tail, Becker: 25%
Minimum Water Frontage and Lot Width	Otter Tail, Becker: 100 ft Detroit Lakes: 100 ft Fergus Falls: 125 ft	Otter Tail, Becker: 150 ft Detroit Lakes and Fergus Falls: 150 ft	Otter Tail: 200 ft Becker: 250-350 ft* Detroit Lakes and Fergus Falls: 200 ft
Minimum Lot Area	Otter Tail, Becker, Fergus Falls, Detroit Lakes: 20,000 ft ²	Otter Tail, Becker, Fergus Falls, Detroit Lakes: 40,000 ft ²	Otter Tail, Fergus Falls, Detroit Lakes: 80,000 ft ² Becker: 120,000-140,000 ft ² *
Minimum Setback from Ordinary High Water Level	Otter Tail, Becker, Fergus Falls, Detroit Lakes: 75 ft	Otter Tail, Becker, Fergus Falls, Detroit Lakes: 100 ft	Otter Tail, Fergus Falls: 200 ft Becker, Detroit Lakes: 150 ft

*Becker County has three tiers of Natural Environment lakes.



Table 8.2. Comparison of Shoreland Permit Requirements and Rules between Watershed Districts in the OTW.

	Watershed District Shoreland Permit Requirements and Rules	
	Cormorant Lakes Watershed District	Pelican River Watershed District
Definitions Same for both WDs	<ul style="list-style-type: none"> Shoreland zone is within 1,000 feet of the OHWL of a lake or pond, and 300 feet from a river or stream Shore impact zone is land between the OHWL and ½ the setback. On agricultural land the shore impact zone is 50 feet from the OHWL 	<ul style="list-style-type: none"> Shoreland zone is within 1,000 feet of the OHWL of a lake or pond, and 300 feet from a river or stream Shore impact zone is land between the OHWL and ½ the setback. On agricultural land the shore impact zone is 50 feet from the OHWL
Impervious surface area (ISA)	<ul style="list-style-type: none"> Permit required to add 1 acre ISA anywhere for property draining to waters of the state or to a storm sewer Need a permit to have ISA greater than 25% of lot area, or ISA of 10,000 ft² in a shoreland zone 	<ul style="list-style-type: none"> Permit required to add 1 acre ISA anywhere for property draining to waters of the state or to a storm sewer Need permit to have ISA in 25% of lot area, 10,000 ft² in a shoreland zone
Construction	<ul style="list-style-type: none"> Permit required for construction of highway, road, parking lot, or public water access Construction of subdivisions, planned development units require a permit Permit required to make changes to stormwater infrastructure Permits can't result in stormwater discharge rates greater than a 5-year 24-hour rainfall event All actions must control runoff rates, nutrients, and sediments Development within 1,000 feet of a lake requires a stormwater runoff plan All new residential commercial, industrial structures shall have finished floor elevations 18 inches above the highest recorded water level 	<ul style="list-style-type: none"> Permit required for construction of highway, road, parking lot, or public water access Construction of subdivisions, planned development units require a permit Permit required to make changes to stormwater infrastructure Permits can't result in stormwater discharge rates for greater than a 5-year 24-hour rainfall event All actions must control runoff rates, nutrients, and sediment
Water crossings, bridges, culverts	<ul style="list-style-type: none"> Permit required to change bridges, culverts, and inlets to waters Permit required to use beds of any waters for roadways, and it must meet a public benefit, regain adequate hydraulic capacity, retain adequate navigational capacity, not adversely affect water quality, and is the minimal impact solution to alternatives 	<ul style="list-style-type: none"> Permit required to change bridges, culverts, and inlets to waters
Dredging	<ul style="list-style-type: none"> Permit required to dredge protected water or wetland Disposal site must not be below the OHWL or a floodplain 	<ul style="list-style-type: none"> Plans involving dredging must be given to the district 10 days prior to work



Watershed District Shoreland Permit Requirements and Rules		
	Cormorant Lakes Watershed District	Pelican River Watershed District
Near shore actions	<ul style="list-style-type: none"> No phosphorus fertilizer may be applied in the shore impact zone, a permit is required for phosphorus fertilizer applied outside the zone that impairs waters No refuse, garbage, or vehicles shall be deposited within the shore impact zone 	<ul style="list-style-type: none"> The district may require a plan for stormwater containing greater than 10 pounds of phosphorus or 2,000 pounds of sediment/year
Vegetation	N/A	<ul style="list-style-type: none"> Landowners must maintain a vegetated buffer on land adjacent to a public drainage ditch system Buffer must be 16.5 feet wide, and is measured from the crown of the bank
Shoreline alterations	<ul style="list-style-type: none"> Actions involving shoreline stabilization must use non-polluting material Ice ridge alterations are only allowed to repair shoreline damage, or to create a 4-foot-wide walkway Permit required to make changes to land, ISA, or vegetation in a shore impact zone Permit required to alter land below the OHWL of a wetland or public water 	<ul style="list-style-type: none"> Actions involving shoreline stabilization must use non-polluting material Ice ridge alterations are only allowed to repair shoreline damage, or to create a 4-foot-wide walkway Permit required to make changes to land, ISA, or vegetation in a shore impact zone
Rip-rap	<ul style="list-style-type: none"> Permit required to install or remove rip-rap/beach sand blanket in the shore impact zone No rip-rap or filter material should be placed more than 6 feet waterward of the OHWL Rip-rap should be durable, natural stone and at a gradation that will stabilize the embankment Slope of rip-rap should not be greater than 3:1, finished slope shall be no steeper than 2:1 	<ul style="list-style-type: none"> Permit required to install or remove rip-rap/beach sand blanket in the shore impact zone No rip-rap or filter materials should be placed more than 6 feet waterward from the OHWL
Retaining walls	<ul style="list-style-type: none"> Retaining walls are only allowed to correct slope instability/erosion Permit required to install or remove retaining walls in the shore or bluff impact zone The base of the wall must be above the highest known water level 	<ul style="list-style-type: none"> Retaining walls are only allowed to correct slope instability/erosion Permit required to install or remove retaining walls in the shore or bluff impact zone The base of the wall must be above the highest known water level

Subsurface Sewage Treatment Systems

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

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

Waste Management

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

»» *Regulations: Minnesota Statutes 115.55, Minnesota Rules Chapters 7001, 7035, 7045, 7150, 7151, 9215, 9220*

Wellhead Protection and Well Code

The purpose of the Wellhead Protection Program is to prevent contamination of public drinking water supplies by identifying water supply recharge areas and implementing management practices for potential pollution sources found within those areas. The program has since expanded to Source Water Protection to include supplies which rely on surface water. Wellhead Protection is administered at the Public Water System level in coordination with the Minnesota Department of Health.

Minnesota Well Code applies to all wells and borings including well sealing and irrigation well construction (not just drinking water).

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

Operations and Maintenance

After projects are installed and practices are implemented, regular on-site inspections and maintenance to ensure the continued function and success is required by the BWSR Grants Administration Manual, MPCA Stormwater Manual, and NRCS Practice Standards. These details, along with records, including notes and photos should be included with each project’s Operations and Maintenance Plan. BWSR’s recommended inspection plans, according to the Grants Administration Manual, include the following:

Conservation practice with a minimum effective life of 10 years:

● *The ends of Years 1, 3, and 9 after the certified completion are recommended.*

Capital improvement projects with a minimum effective life of 25 years:

● *The ends of Years 1, 8, 17, and 24 after certified completion is a recommended minimum.*

Keep It

Protected Lands Maintenance



“Keep it” programs are those that involve permanent landscape protection. This includes conservation easements, Aquatic Management Areas, public land ownership, and Sustainable Forest Incentive Act covenant lands.

Applicable Goals: *Land Protection, Groundwater Protection, Phosphorus Reduction, Sediment Reduction, Water Retention.*

Implementation of this plan will involve programs that will be actively targeted through outreach to prioritized areas for protection (Section 4). Projects in non-priority areas will be considered on an opportunity basis.

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. Multiple benefits include water quality and habitat protection. The easements are individually tailored agreements with an organization such as the BWSR, DNR, Minnesota Land Trust, or the United States Fish and Wildlife Service (USFWS). Watershed Districts and SWCDs can also hold easements and do so for large projects.

Sustainable Forest Incentive Act

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

Wetlands

Wetlands are protected by the Minnesota Wetland Conservation Act (WCA). The overall goal of the act is no net loss of wetlands. Draining, filling and in some cases, excavating in wetlands is prohibited unless (a) the drain, fill, or excavation activity is exempt from requiring replacement or (b) wetlands are replaced by restoring or creating wetland areas of at least equal public value. Replacement can be buying credits or creating/restoring a wetland (usually credits are encouraged over an on-site replacement). Becker SWCD and Otter Tail County serve as the local LGU for implementing WCA. Wetlands in Minnesota are also protected by the Clean Water Act (regulated by the United States Army Corps of Engineers (USACE) and Minnesota Public Waters (regulated by the DNR and MPCA).

»» *Regulations: Minnesota Rules, part 8420.0105*

Buffers

In 2015, Minnesota enacted legislation requiring buffers of perennial vegetation of an average of 50 feet with a minimum of 30 feet on public waters and 16.5 feet for public drainage systems. This program is regulated by BWSR and implemented at the county level. Each county has an ordinance for buffer management. PRWD enforces buffers within their jurisdiction.

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

Land Acquisition

For areas with unique and important resources that meet state or local goals, Watershed Districts, the DNR, USFWS, counties, cities, townships, wildlife clubs, 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 and Waterfowl Protection Areas that are used for small game hunting and waterfowl migration.

Fix It

Constructed Environmental Enhancements



“Fix it” programs include installation of on-the-ground, usually permanent or long-term constructed enhancements including septic system upgrades, erosion control, rain gardens, cattle fencing, well sealing, and more.

Applicable Goals: *Bacteria Reduction, Phosphorus Reduction, Sediment Reduction, Stream Stabilization, Groundwater Protection, Water Retention, Aquatic Connectivity.*

Low-Interest Loans

Low-interest loans may be made available to landowners through LGUs and state agencies to privately finance septic system replacement, small community wastewater treatment systems, agricultural best management practices, and other projects that can improve water quality.

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 on lakeshore, and well sealing are applicable examples that meet the goals of this plan. Implementation of this plan will involve cost-share programs that will be actively targeted to prioritized areas for projects. Non-priority areas will be considered on an opportunity basis.

Capital Improvements

Capital improvements are large projects that require significant investment and have longer lifespans than that for smaller projects or annual practices. These types of projects and activities often require feasibility studies before design and construction can proceed and are often led by Watershed Districts, as well as by SWCDs, municipalities, and other organizations. Capital improvement projects often involve collaboration amongst multiple public and private organizations or governmental departments and are often good candidates for state or federal grant funding. Stream restoration, ditch improvement, urban stormwater projects, dam modifications, and wetland restorations are examples of capital improvement projects within the plan boundary (Table 8.3).



Capital Improvement Projects



Construction on Rice Lake Wetland Restoration. Credit: PRWD.

Table 8.3. Proposed Capital Improvements in the OTW.

Project and Description	Funding	Responsible Parties	2023-2024	2025-2026	2026-2027	2028-2029	2030-2031
Campbell Creek Watershed Restoration— <i>including streambank stabilization, wetland restoration, installation of agricultural BMPs</i>	\$4 million MPCA, BWSR, DNR, Local	PRWD, Becker SWCD	●	●	●	●	●
Rice Lake Wetland Nutrient Reduction Project	\$1.25 million Grants, PRWD	PRWD	●				
Regional Urban Stormwater Management and Treatment	\$10 million Grants, PRWD, City of Detroit Lakes	PRWD, City of Detroit Lakes	●	●	●	●	●
St. Clair Lake TMDL Implementation	\$2 million Grants, PRWD, City of Detroit Lakes	PRWD, City of Detroit Lakes	●	●	●	●	●
Ditch 14 Wetland Complex Nutrient Reduction	\$5 million Grants, PRWD	PRWD, City of Detroit Lakes			●	●	●
Detroit Lake – South Shore/Long Bridge Nutrient Reduction	\$250,000	PRWD, City of Detroit Lakes		●	●		
Pelican River/Detroit Lakes Nutrient Reduction - North Side Regional Stormwater Management Study/Practices	\$200,000	PRWD, City of Detroit Lakes	●	●	●		
Lake Alum Treatments – including St. Clair and Floyd	\$1.5 million Grants, PRWD	PRWD	●	●	●	●	
Holiday Beach erosion control	\$200,000 Grants, CLWD	CLWD		●	●		
Bluewater Bay north peninsula erosion control	\$200,000 Grants, CLWD	CLWD	●	●			
Sediment/nutrient reduction projects (similar to Blackhawk Road culvert)	\$300,000 Grants, CLWD, Road Authority	CLWD	●	●	●	●	●

Operations and Maintenance

“Fix It” programs also follow the Operations and Maintenance plan requirements as listed on page 121.



Know It | Data Collection and Outreach



“Know It” programs are integral to achieving the plan’s goals. Programs are those that include inventories, monitoring, and public outreach efforts.

Data Collection and Monitoring

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



Data Collection

Current Data Collection and Monitoring Efforts

Currently, a wide variety of monitoring is carried out on multiple government and local organization levels (Table 8.4). These existing data helped determine the current conditions of surface water, groundwater, habitat, and land resources in this plan and developed a starting point for measuring goals moving forward. Because these are already established projects, they don’t cost additional funds for this plan.

Table 8.4. Summary of ongoing water quality & quantity monitoring programs. RS = rivers & streams, L = lakes, W = wetlands, and GW = groundwater.

Parameters	MPCA	DNR	MDH	MDA	County & SWCD	WDs	Lake Assoc.
Nutrients	RS, L, W, GW	RS, L		RS, GW	GW	RS, L	RS, L
Suspended Solids	RS, W	RS		RS		RS	
Productivity	RS, L	RS				RS, L	RS, L
Pesticides				RS, L, W, GW			
Bacteria	RS		GW			RS	
Biology	RS, W	RS, L					
Water level/Flow	RS, L	RS, L				RS, L	
Invasive Species		RS, L			L, RS	RS, L	RS, L
Fish Contaminants	RS	L					
Chlorides	RS, L, W, GW	RS	RS, L, GW			RS, L	
Sulfates	RS, L, W	RS, L	RS, L, GW				



Surface Water

As part of the Watershed Approach, the MPCA, DNR, and local partners conduct intensive lake and stream monitoring in each watershed on a 10-year cycle. This assessment includes water chemistry and biological parameters, and leads to Stressor Identification (SID), Total Maximum Daily Load (TMDL), and Watershed Restoration and Protection Strategy (WRAPS) reports, among others, to be used in the comprehensive watershed planning process. The OTW was first assessed in 2018 with the reports completed in 2021; the next round of intensive watershed monitoring and assessment is scheduled to begin in 2027.

There are many active lake associations that conduct general condition monitoring annually, including total phosphorus, chlorophyll-a, and transparency parameters. This monitoring is coordinated county-wide in Becker and Otter Tail Counties by the Coalition of Lake Associations (COLAs) and paid for by the individual lake associations.

The PRWD conducts extensive monitoring on District lakes and streams for water quality and quantity. Results can be found here: <https://prwd.org/our-water/>.

The CLWD works with volunteers to monitor District lakes and funds the lab testing.

Tamarac National Wildlife Refuge and the White Earth Division of Natural Resources conduct lake and stream monitoring within their jurisdictional areas.

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

- the Otter Tail River subwatershed near Elizabeth, MN (S005-142)
- the Pelican River subwatershed near Fergus Falls, MN210 (S005-556)
- the Otter Tail River pour point at Breckenridge, CSAH16 (S002-000) [note: this site is outside the planning area, but at the pour point of the Otter Tail major watershed.]



Water quality monitoring on Pelican Lake.

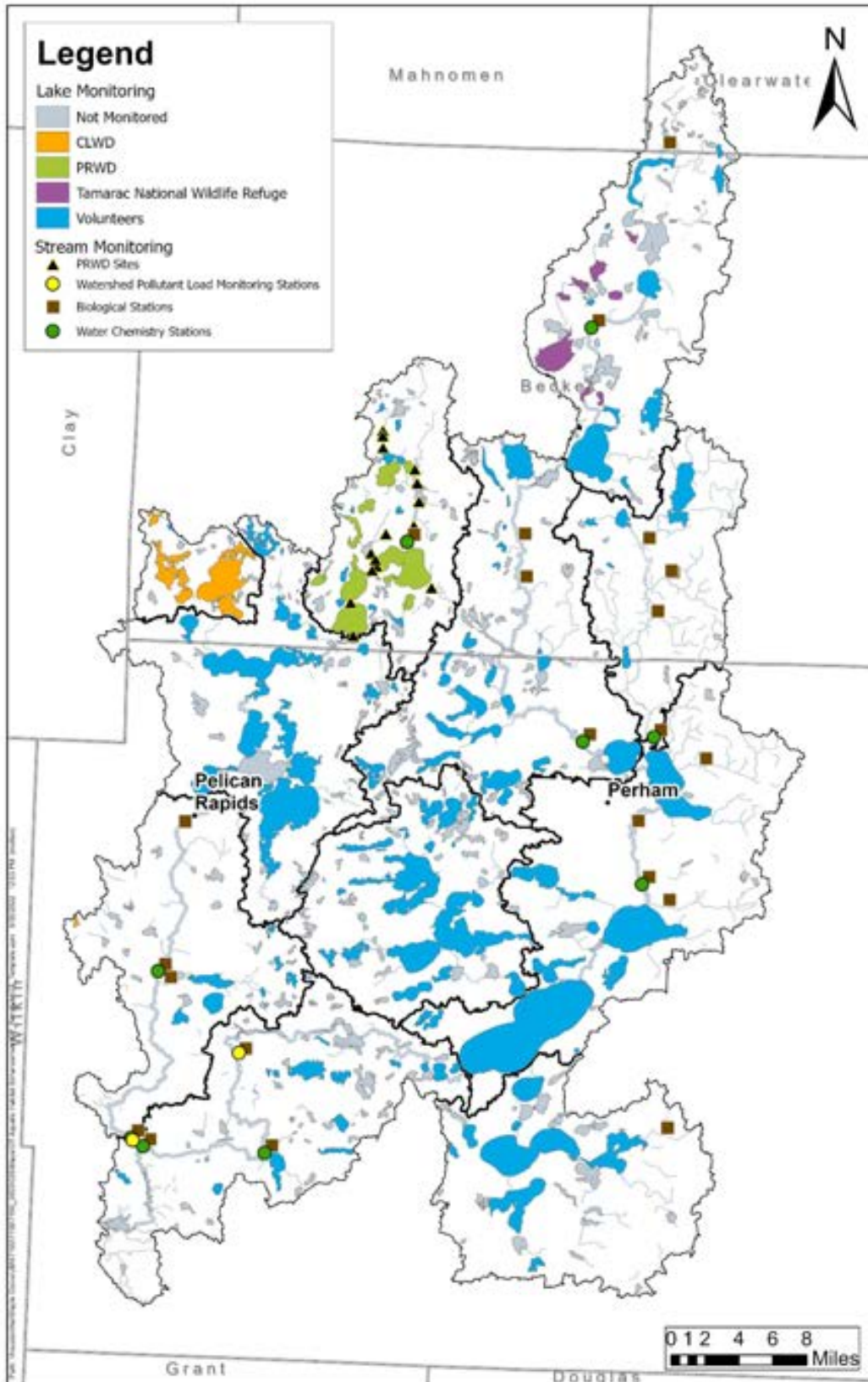


Figure 8.3. Surface water monitoring sites in the OTW.



Groundwater

The roles in groundwater monitoring in Minnesota are spread between four agencies:

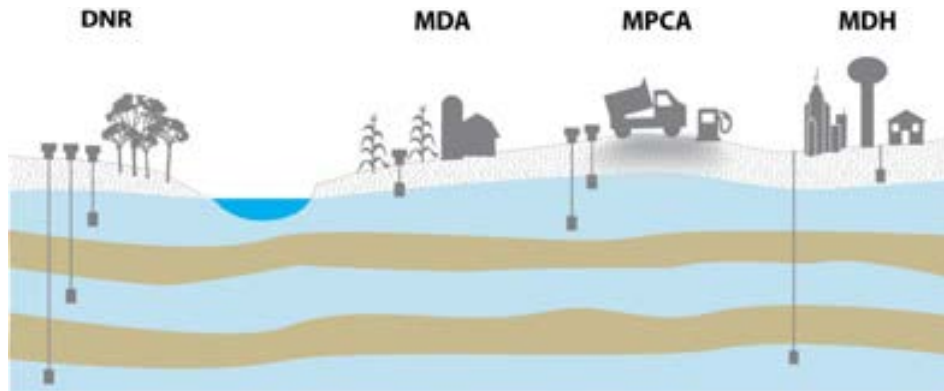


Figure 8.4. Groundwater Monitoring by Agency. (Image credit: DNR)

The DNR monitors groundwater availability and ecological impacts through the Cooperative Groundwater Monitoring network. There are 28 monitoring observation wells in the OTW (MDH 2022). Otter Tail County Land and Resource and Becker SWCD are the local entities that work to monitor the wells in the watershed through the DNR's Cooperative Network.

The MDA monitors groundwater for agricultural chemicals and fertilizer contamination.

The MPCA monitors groundwater for industrial contamination.

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

The SWCDs have participated in the MDA's Township Testing Program and Central Sands Private Well Network that work with property owners to test their wells. Results from this testing were used in the Groundwater Protection Goal of this plan (Section 4).



Land Stewardship

Land Stewardship practices are tracked in eLINK (BWSR database) and NRCS databases. Records of existing practices were used in this plan to determine common practices.

The *OTW Landscape Stewardship Plan* provides the current number of acres in each minor watershed that are protected, the potential acres for additional protection, and a protection goal. These numbers were used in this plan in the Land Protection Goal, and as these statistics get updated in the future it will show progress toward this goal.



Habitat

During intensive watershed monitoring, the streams and lakes in the watershed are tested for biological parameters including fish and macroinvertebrate indices of biological integrity (IBI). Any impaired or vulnerable biological communities are further evaluated to determine what kind of pollutants, or stressors, are causing the reduction in biological diversity.

Forest habitat is described in the *OTW Landscape Stewardship Plan*. Areas for restoration and enhancement and recommended species assemblages are outlined in the plan.

PRWD and CLWD conduct aquatic vegetation surveys and shoreline inventories of the lakes in their Districts on a rotation. They aim to get to each main lake at least every 5 years.

Filling Data Gaps

This planning process has identified data gaps to be filled through implementation of this plan. The lead organization(s) and specific plan goal(s) are listed as well.

- Conduct university research locally and promote more research in the watershed.
 - Goals: Soil Health, Groundwater Protection, E. coli Reduction, Aquatic Invasive Species
 - Leads: Universities, Watershed Districts
- Use DNA source testing to determine sources of *E. coli* impairments
 - Goals: E. coli Reduction
 - Leads: MPCA
- Participate in the completion of the Geologic Atlas for the full watershed and gain a better understanding of how to use it.
 - Goals: Groundwater Protection
 - Leads: Minnesota Geological Survey
- Complete a study to better understand sustainable withdrawal from an aquifer. This study is a general ask and could be conducted by any agency, organization, or partnership.
 - Goals: Groundwater Protection
- Score your shore, lake shoreline inventories, riparian inventories, and buffer inventories to identify locations for shoreline and streambank restoration.
 - Goals: Phosphorus Reduction, Sediment Reduction
 - Leads: DNR, LGUs
- Gain an understanding of nutrient movement and pollution sources in lakes. Complete a TMDL for Lake Alice.
 - Goals: Phosphorus Reduction
 - Leads: MPCA, LGUs, City of Fergus Falls

Outreach and Project Development



Public participation and engagement are essential for successfully implementing this plan. The implementation of actions in this plan is

voluntary and requires willing landowner participation.

Landowners have varying levels of understanding of conservation practices, programs, and funding opportunities available. Many times, the first step towards adopting conservation practices is outreach. Outreach can be conducted in a variety of ways, including mailings, workshops, and social media. It can be targeted to landowners in priority areas to help target conservation practices in those areas to reach plan goals (Figure 8.5).

The second step is project development, including site visits, technical assistance, peer-to-peer networks, kitchen table discussions, and demonstration plots. Sometimes the outreach and project development can take years before landowners adopt the practices. Once the landowner is interested in adopting practices, incentives and cost-share programs can help them get started. For example, incentives for farmers to adopt cover crops from the SWCD or EQIP can help them implement the practice for a few years to ensure profitability and or reduce risk. The goal of projects is long term adoption by the operator.



- Mailings*
- Workshops*
- Social Media*
- Local Radio*
- Local Newspapers*
- Newsletters*



- Sites visits*
- Technical Assistance*
- Peer-to-Peer Networks*
- Demonstration Plots*
- Co-ops*

Figure 8.5. Communications strategies.



Fish Lake Dam Modification Dedication celebration (2018).

Outreach

Watershed partners already implement numerous outreach strategies. Current and future strategies are outlined in Table 8.5 along with their frequency.






Table 8.5. Outreach strategies in the OTW.

<p style="text-align: center;">Events</p> <ul style="list-style-type: none"> • Landowner forums • Well testing clinics • Pairing well testing clinics with water quality and treatment option consultations • County Fairs • Tree Sale • Breakfast on the farm • Rain garden/Rain barrel workshops • Ag BMP workshops • Salt/chloride workshop <p> Frequency: Once a year for each type</p>	<p style="text-align: center;">Local Media</p> <ul style="list-style-type: none"> • Social Media • Press Releases • Monthly Otter Tail “Snapshot” (submitted articles about projects by LGUs) • Local radio programs and ads • Plat book ads <p> Frequency: Quarterly</p>
<p style="text-align: center;">Mailings</p> <ul style="list-style-type: none"> • Contribute information to Lake Association and LID Newsletters • SWCD Newsletters • Watershed District Newsletters • County Tax mailings • Resource guide/map about plan <p> Frequency: Quarterly</p>	<p style="text-align: center;">Public Engagement</p> <ul style="list-style-type: none"> • Maintain citizen lake and stream volunteers • Outstanding Conservationist of the Year • Maintain Citizen Advisory Committee • Conduct public surveys • Display local monitoring data on LGU websites <p> Frequency: Track number of people interacted with</p>
<p style="text-align: center;">Meetings</p> <ul style="list-style-type: none"> • Lake Association and LID meetings • COLA meetings • LGU Board meetings • Township meetings • Local Service Club meetings <p> Frequency: Visit each group once a year</p>	<p style="text-align: center;">School Outreach</p> <ul style="list-style-type: none"> • 4H • Detroit Lakes Water Fest • Sucker Creek Program • Ag in the Classroom • Tamarac Fall Festival • Water Watch Programs • Envirothon • FFA • Water Fest <p> Frequency: Each entity two programs a year</p>
<p style="text-align: center;">Outreach Effectiveness can be tracked by:</p> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> </div> <ul style="list-style-type: none"> • Number of participants at each event • Number of events and meetings • Number of people reached • Hours spent on outreach <div style="text-align: center;"> </div> </div>	

Project Development

Project development is outreach targeted to landowners to specifically develop projects to achieve plan goals in priority areas. Project development strategies are outlined in Table 8.6 along with their frequency.

Table 8.6. Project Development activities in the OTW.

<p style="text-align: center;">Peer-to-Peer</p> <ul style="list-style-type: none"> Peer-to-Peer meetings (i.e., soil health, irrigation) to discuss project implementation and make local connections Build relationships with co-ops and agronomists Continued communication and cooperation between NRCS and SWCDs in developing projects Participate in group meetings (i.e., irrigators, corn/soy producers, soil health team) <p> Frequency: Twice per year</p>	<p style="text-align: center;">Site Visits & Technical Assistance</p> <ul style="list-style-type: none"> Forest stewardship plans and forest protection options Agricultural BMPs Lakeshore projects Participation in drinking water protection plan development and implementation meetings <p> Frequency: As requested based on outreach and walk-ins</p>
<p style="text-align: center;">Demonstration Plots</p> <ul style="list-style-type: none"> Develop demonstration plots and hold workshops with technical information and cost share for implementation <p> Frequency: Twice per year</p>	<p style="text-align: center;">Targeted Outreach</p> <ul style="list-style-type: none"> Compliance letters Targeted mailings/post cards Signage at completed projects Invite-only events <p> Frequency: Twice per year</p>
<p>Project Development can be tracked by:</p> <ul style="list-style-type: none"> Number of projects implemented Number of people reached Number of people that adopted practices Number of people that adopted practices by word of mouth (neighbors, newspaper, social media, etc.) 	



Sunset over a cornfield by Elizabeth, MN.

Achieving Plan Goals

The focus of this plan is to protect and enhance the resources in the watershed. Table 8.7 summarizes the different levels of Plan Implementation Assessment. Projects will be tracked during plan implementation using a system set up for the watershed.

Table 8.7. Plan Implementation Assessment.

Level	Description	Timeframe	OTCWMP Application
Tracking	Gathering and compiling numbers about the practices, acres, and miles of river achieved in plan implementation.	Ongoing	Outputs in Targeted Implementation Schedule (Section 6). Projects will be tracked with a system 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	Benefits calculator (Section 6, page 103). Staff capacity. Programs implemented.
Evaluating	Comparing the resource results associated projects, practices, or programs to the stated resource goals and outcomes in the plan.	5-year update	Analysis of lake water quality trends, Analysis of loading at WPLMN sites, WRAPS Cycle 2 in 2027.
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.



Ice houses on Detroit Lake.



Environmental Justice and Health Equity

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

Figure 8.6 highlights areas to focus on environmental justice in the OTW. The MPCA and MDH have additional information available at the links below.

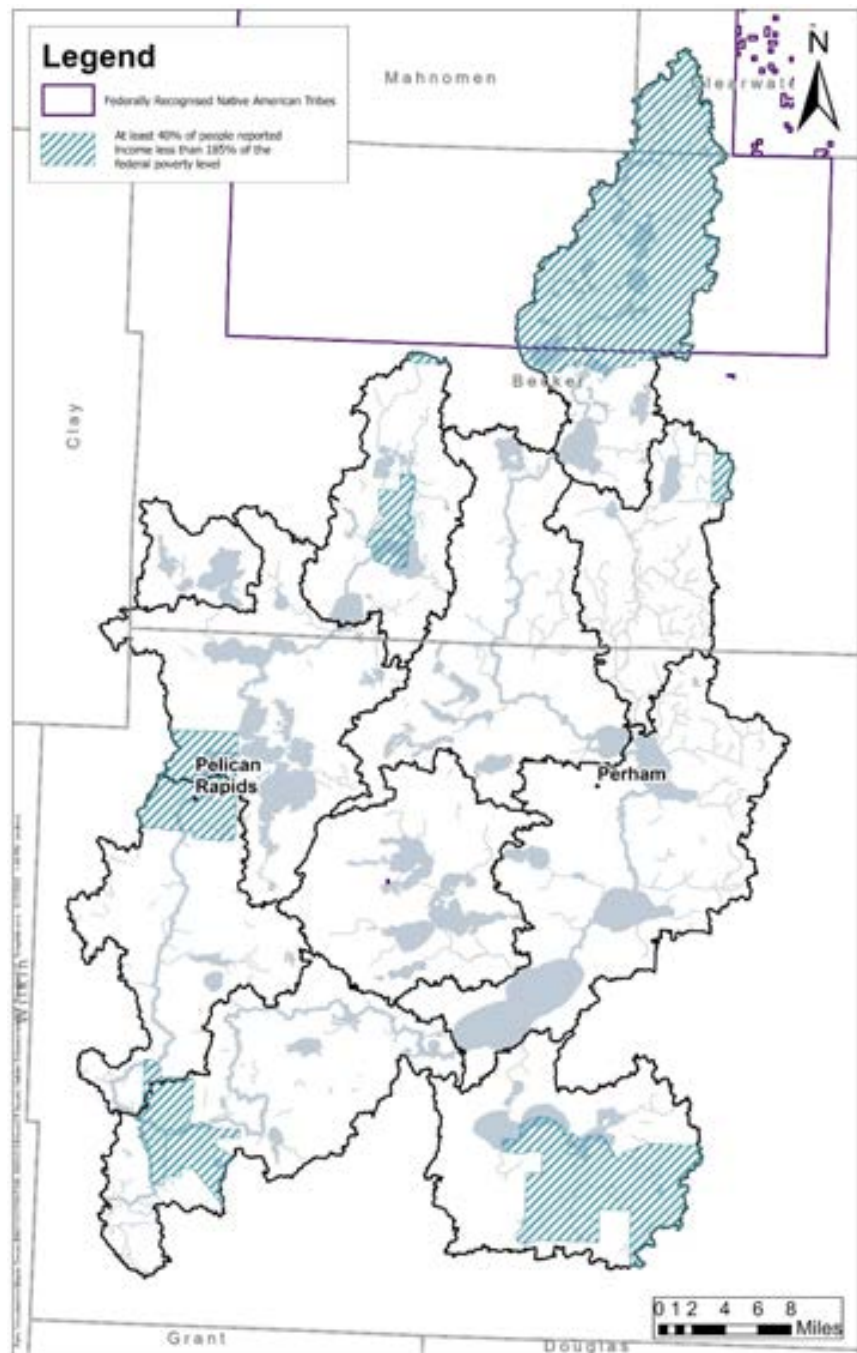


Figure 8.6. Focus areas for Environmental Justice.

Links

<https://www.pca.state.mn.us/about-mpca/environmental-justice>

<https://www.health.state.mn.us/communities/equity>



9. Plan Administration



Section 9. Plan Administration and Coordination

Plan Administration describes how the plan will be implemented, how the watershed partners will work together, how the funding will move between them, and who will handle the administrative duties. The Otter Tail Comprehensive Watershed Management Plan (OTCWMP) will be implemented through a Memorandum of Agreement (MOA) between East Otter Tail SWCD, West Otter Tail SWCD, Otter Tail County, Becker SWCD, Becker County, Cormorant Lakes Watershed District (CLWD) and Pelican River Watershed District (PRWD). This MOA largely contains the same framework that was included in the MOA for developing this plan (Appendix J). Clay, Clearwater, and Mahnomon counties and SWCDs, and the White Earth Nation were offered the opportunity to participate in both the planning and implementation MOAs but declined due to having such a small percentage in the OTCWMP area (<1%). The Local Government Units (LGUs) in the MOA will be collectively referred to as the Otter Tail Watershed Partnership (OTWP).

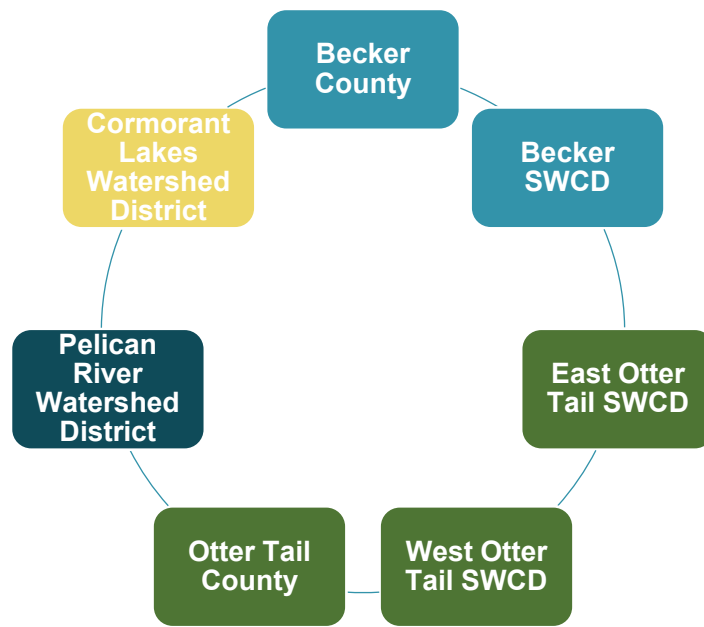


Figure 9.1. OTWP.

Decision-Making and Staffing

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

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

Table 9.1: Roles for OTCWMP Implementation. The LGUs will be collectively referred to as the OTWP. Citizens will be updated as implementation progress is made.

Committee Name	Description	Primary Implementation Role and Functions
OTWP	The collective group of LGUs in the MOA.	<ul style="list-style-type: none"> • Combination of Policy Committee, LGU staff, and fiscal agent roles.
Policy Committee	One board member from each MOA entity.	<ul style="list-style-type: none"> • Meet twice a year or as needed. • Annual review and confirmation of Advisory Committee recommendations. • Direction to Advisory Committee on addressing emerging issues. • Recommend approval of the annual work plan by the individual boards of the MOA members. • Review the implementation funds from plan participants.
Administration Committee: Local Fiscal and Administrative Agent	One of the participating LGUs as decided by the Policy Committee.	<ul style="list-style-type: none"> • Convene committee meetings. • Prepare the annual work plan. • Prepare and submit grant applications/funding requests. • Research opportunities for collaborative grants. • Report on how funds were used. • Compile annual results for annual assessment.
Technical Advisory Committee	One staff member from each MOA entity, state agencies, and federal agencies.	<ul style="list-style-type: none"> • Meet annually or additionally as needed. • Review the status of available implementation funds from plan participants. • Review and identify collaborative funding opportunities. • Review and provide input for the annual work plan submitted to BWSR. • Biennial review and confirmation of priority issues. • Evaluate and recommend response to emerging issues. • Prepare plan amendments. • Implement the targeted implementation schedule. • Update on projects completed and where funding was spent (MOA entities and state agencies).

Collaboration

The OTWP acknowledges the value of collaboration between planning partners to achieve successful plan implementation. Benefits of successful collaboration for the OTWP include consistent implementation of actions watershed-wide, increased likelihood of funding, and resource efficiencies gained. There is already a considerable amount of collaboration and shared services between the OTWP (Figure 9.2).

Engineer and Technician	<ul style="list-style-type: none"> •East Otter Tail SWCD •West Otter Tail SWCD •Becker SWCD
Watershed Coordinator	<ul style="list-style-type: none"> •East Otter Tail SWCD •West Otter Tail SWCD •Otter Tail County
Shoreline Specialist	<ul style="list-style-type: none"> •East Otter Tail SWCD •West Otter Tail SWCD
Irrigation Collaborative	<ul style="list-style-type: none"> •Becker SWCD •East Otter Tail SWCD •West Otter Tail SWCD
Stormwater Regulation, Shoreline Regulation, and related Projects	<ul style="list-style-type: none"> •Pelican River Watershed District •Cormorant Lakes Watershed District •Becker County •City of Detroit Lakes
Local Forestry Technical Team	<ul style="list-style-type: none"> •Otter Tail Watershed •Redeye Watershed •Long Prairie Watershed
Red River Valley Conservation Service Area (TSA1)	<ul style="list-style-type: none"> •Technical Services •Engineering •GIS

Figure 9.2. Shared services and collaboration between watershed partners.

This collaboration is an advantage for implementation in the watershed. Where possible and feasible, the OTWP will pursue opportunities for collaboration with fellow OTWP members to gain program efficiencies, pursue collaborative grants, and provide technical assistance following a hierarchy approach (Figure 9.3). The OTWP will also review similarities and differences in local regulatory administration to identify local successes and identify changes needed in the future to make progress towards goals outlined in this plan.

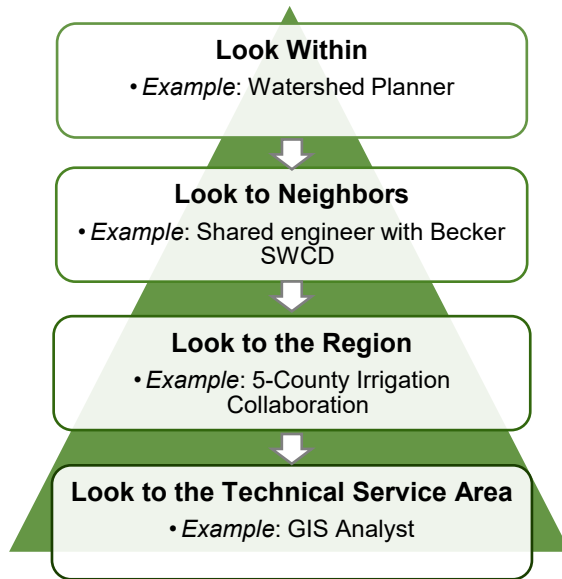


Figure 9.3. Hierarchy approach to collaboration in the OTW.

Collaboration with Other Units of Government

The OTWP will continue to coordinate and cooperate with other governmental units at all levels. Coordination with state agencies including BWSR, DNR, MDH, MDA, and the MPCA will continue as they are experts in many of the topic areas included in this plan, have been participating members of the planning Technical Advisory Committee, and will be members of the implementation Technical Advisory Committee. Cooperation with units of government such as cities (including Detroit Lakes, Fergus Falls, Pelican Rapids, and Perham), township boards, county boards, joint powers boards, NRCS, Tamarac National Wildlife Refuge, White Earth Nation, and other water management authorities are a practical necessity to facilitate watershed-wide activities. Examples of collaborative programs in the watershed include EQIP (NRCS), CRP (FSA), Minnesota Agriculture Water Quality Certification (MDA), Targeted Township Testing (MDA), Farm Bill Biologist (Pheasants Forever or SWCDs), Wellhead Protection for DWSMAs (MRWA and MDH), local Forestry Protection Team, and WRAPS (MPCA).

OTCWMP implementation actions and goals were developed through a collaborative process. Some agency goals, objectives, directions, and strategies for resource management within the plan area have not been selected as priority issues. The responsibility for achieving the goals associated with lower priority tier issues remains with the respective agency or organization.

Collaboration with Others

Local support and partnerships will drive the success of final outcomes of the actions recommended for implementing this plan. Because this plan's focus is voluntary land stewardship practices, collaborations with landowners in the watershed is of paramount importance. Many of the existing collaborations in the watershed have been involved in the development of this plan and are committed to protecting and enhancing the OTW resources. Partners for these collaborations include, but are not limited to, individual Lake Associations,

Lake Improvement Districts, Otter Tail Coalition of Lake Associations (COLA), Becker COLA, University of Minnesota Aquatic Invasive Species Research Center (MAISRC), Isaac Walton League- Prairie Woods Chapter, Friends of Sucker Creek Preserve, The Nature Conservancy, Central Minnesota Irrigators (CMIC), Central Lakes College Agriculture and Energy Center (CLC), Ducks Unlimited, Trout Unlimited, MN Deer Hunters Association, Pheasants Forever, local sportsman’s club, National Wild Turkey Federation, Northwest AqwaTek Solutions, Minnesota Rural Water Association (MRWA) Minnesota Waters, Freshwater Society, local co-ops, University of Minnesota Extension, civic groups, private businesses, individuals, and foundations. The OTWP collaborates with these groups for education, outreach, monitoring, and project implementation.

Regional Collaborations

● **Regional Conservation Partnership Program (RCPP): Implementing Innovative Irrigation Practices to Protect Groundwater Quality and Quantity.** This project, sponsored by the Minnesota Department of Agriculture, is a partnership of 20 Minnesota SWCDs, CLC Agriculture and Energy Center, AgCentric, Northern Center of Agricultural Excellence, Mille Lacs Band of Ojibwe, Irrigators Association of Minnesota, Central Minnesota Irrigators, Todd-Wadena Electric Coop, Reinke Manufacturing, RD Offutt Farms, RESPEC Consulting, University of Minnesota, Minnesota Board of Water and Soil Resources, and Minnesota Department of Health.
<https://www.agcentric.org/rcpp-precision-irrigation/>



Center -pivot irrigation.

Funding

The OTWP will pursue funding opportunities collaboratively to implement the activities prescribed in the targeted implementation schedule (**Section 6**). Table 9.4 lists the most used programs and grants for executing the implementation programs described by this plan and used within the targeted implementation schedule. The funding grants and programs are cross-referenced to plan implementation programs, thereby showing potential sources of revenue for implementation. Programs will be coordinated uniformly throughout the watershed where possible with the intent to increase the capacity of the group as a whole.

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

Level 1 funding is based on the annual revenue and expenditures for Becker County, Becker SWCD, East Otter Tail SWCD, West Otter Tail SWCD, Otter Tail County, PRWD, and CLWD. The current level of investment by each local government unit is expected to remain the same during the OTCWMP 10-year time period. Local funds include county allocations for SWCD support and tax levies. State funds include state programs and conservation delivery grants, including the Natural Resources Block Grant, SWCD Local Capacity Building Grants, DNR Shoreland Program, and MPCA Septic System Program. (Table 9.2).

Table 9.2. Level 1 funding for the OTW.

Funding Level	Annual Local Estimate	Annual State Estimate	Annual Federal Estimate	Annual Total Estimate
Level 1	\$1,632,500 (82%)	\$369,400 (18%)	0 (0%)	\$2,001,800

Level 2 funding describes the baseline funding plus additional funding that could be obtained to implement the plan - noncompetitive watershed-based funding. Watershed-based funding is estimated to be \$1,265,049 for the first biennium of implementation (2023-2024), which is \$632,525 annually. The total estimated funding for Level 2, which is just the funding that is administered by the OTWP, is \$2,633,000 annually and \$26,330,000 over the 10-year life of the OTCWMP (Table 9.3). Administration costs are estimated at 10% of the watershed-based funding annually (~\$63,250).

Level 3 funding consists of other funding sources including projects implemented by state agencies (DNR, MPCA, MDH, MDA), state programs such as SFIA and Lessard Sams Outdoor Heritage Fund, and federal programs such as Section 319, CRP and EQIP. BWSR also has easements and competitive Clean Water Fund grants available. There is likely much more project funding occurring in the watershed in addition to these totals as it is difficult to document projects by all entities, including private landowners and lake associations.

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

Funding Level	Description	Estimated Plan Total (10 years)	Estimated Annual Average
Level 1	Current Baseline Funding	\$20,000,000	\$2,000,000
Level 2	Baseline + Watershed-Based Implementation Funding	\$26,330,000	\$2,633,000
Level 3	Partner funding (CRP, SFIA, NRCS, etc.)	\$44,000,000	\$4,400,000

Plan funding can also be broken down by management strategy. Overall, 90% of the plan funding exists for implementing conservation and 10% for Outreach & Data Collection (Know It) (Figure 9.4). In Figure 9.4, Watershed District programs were grouped into SWCD and County categories and are included in the totals.

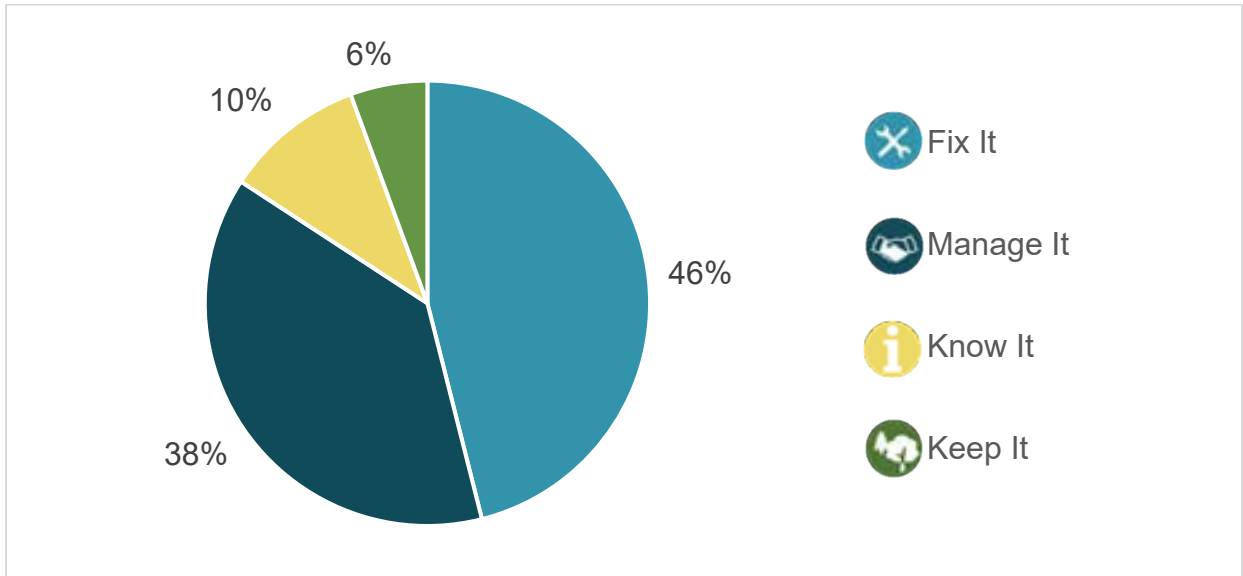


Figure 9.4. Estimated implementation funding for the OTCWMP (per program), including SWCD, County, and Watershed District projects.



Floyd Lake.

Table 9.4. Funding sources available for implementing the OTCWMP

Source	Organization	Program/Fund Name	Type of Assistance	Form of Assistance				
State Funding	BWSR	Clean Water Fund	Financial	Grant	●	●	●	●
	BWSR	Reinvest in Minnesota (RIM)	Financial	Easement			●	
	BWSR	Natural Resources Block Grant	Financial	Grant	●	●		
	BWSR	SWCD Local Capacity Service Grants	Financial	Grant	●	●	●	●
	BWSR	Erosion Control & Mgmt Program	Financial	Grant	●	●		●
	DNR	Conservation Partners Legacy	Financial	Grant	●		●	
	DNR	Aquatic Invasive Species Control	Financial/ Technical	Grant		●		
	DNR	Forest Stewardship Program	Technical	Cost Share		●	●	
	DNR	Aquatic Management Area, Wildlife Management Area	Financial	Fee Title Acquisition			●	
	DNR/Revenue	Sustainable Forest Incentive Act	Financial	Incentive payment			●	
	MPCA	Clean Water Partnership	Financial	Loan	●		●	●
	MPCA	Section 319 Small Watersheds Focus program	Financial	Grant	●		●	
	MPCA	State-Revolving Fund	Financial	Loan	●		●	
	MPCA	Surface Water Assessment Grant	Financial	Grant				●
	MPCA	Point Source Implementation Grant	Financial	Grant	●		●	
	MPCA	Water Infrastructure Fund	Financial	Grant/Loan	●		●	
	MPCA	Small Community Wastewater Treatment Program	Financial	Grant/Loan	●		●	
	MDH	Source Water Protection Grants (Implementation and Competitive)	Financial	Grant	●	●	●	●
	MDA	Nitrate Testing	Technical	Monitoring				●
	MDA	Agricultural BMP Loan Program	Financial	Loan	●	●		
	LSOHC	Outdoor Heritage Funds	Financial	Grant			●	
LCCMR	Environmental Trust Fund	Financial	Grant	●		●		
Legislature	Bonding	Financial	Bond	●				
Federal Funding	FSA	Conservation Reserve Program	Financial	Cost Share		●	●	
	FSA	Grassland Reserve Program	Financial	Cost Share		●	●	
	NRCS	Conservation Innovation Grant	Financial	Grant	●			
	NRCS	EQIP	Financial	Cost Share	●	●		
	USGS	Stream Gaging Network	Technical	Monitoring				●
	USACE	Planning Assistance	Technical	Planning		●		
	EPA	State Revolving Fund	Financial	Loan	●			

Source	Organization	Type of Assistance	Form of Assistance				
Other Funding	Ducks Unlimited	Financial/ Technical	Easement/Cost Share				
	Trout Unlimited	Financial/ Technical	Easement/Cost Share				
	Muskies, Inc	Financial/ Technical	Easement/Cost Share				
	The Nature Conservancy	Financial	Easement				
	Minnesota Land Trust	Financial	Easement				

Local Funding

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

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

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

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

Road Authorities:

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

Drainage System Costs (Minnesota Statute 103E):

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

Ad Valorem Levy

The two Watershed Districts in the OTW plan area have tax levy authority. The ad valorem levy produces revenue from all taxable properties within the Watershed Districts based upon property valuation.

- [General Fund \(MS 103D.905\)](#). The ad valorem levy is used to pay most of the general operating costs of the Districts and may be used for the construction, or implementation, and maintenance of projects that are of common benefit to the Districts. The annual ad valorem tax levy may not exceed 0.048 percent of taxable market value or \$250,000, whichever is less. The Districts are also permitted under MS 466.06 to levy outside of the general fund levy for liability insurance. The Districts are required to include the liability insurance premium as a separate line item in its levy certification to the county. Since this fund is normally used for the basic organizational needs of the Districts, it is difficult to fund large projects using this funding source.
- [Basic Water Management Project Fund \(MS 103D.605\)](#). An ad valorem levy can also be used to pay the costs attributable to the basic water management features of projects initiated by petition of a political subdivision (county, city, township, SWCD, school district, or other political subdivision of the state, but not another watershed district) within the Districts or by petition of at least 50 resident owners whose property is within the watershed districts. The annual levy cannot exceed 0.00798 percent of taxable market value for more than 15 consecutive years.
- [Survey and Data Acquisition Fund \(MS103D.905\)](#). The Districts may also make a special levy once every five years to pay for making necessary surveys and acquiring data. The ad valorem levy may not exceed 0.02418 percent of estimated market value.
- [Emergency Projects of Common Benefit Fund \(MS 103D.615\)](#). Under certain conditions, the Districts may declare an emergency and order work to be done without a contract. The cost of work can be paid for by an ad valorem tax levy, if the cost is not more than 25 percent of the most recent administrative ad valorem levy (MS 103D.615) or in combination with a special assessment.

Special Assessments

A special assessment is a tax levied on a property to pay for local public improvement that will benefit that property, such as a drainage ditch or a targeted benefit project.

- [Preliminary Fund \(MS 103D.905\)](#). This fund is used for preliminary work on proposed projects of the Districts.
- [Emergency Projects of Common Benefit Fund \(MS 103D.615\)](#). Under certain conditions, the Districts may declare an emergency and order work to be done without a contract. The cost of work can be paid for by a special assessment or in combination with an ad valorem levy.
- [Construction or Implementation Fund \(MS 103D.905\)](#). The construction or implementation fund is used to establish an account for funding sources from ad valorem levies, special assessments, stormwater charges, loans, grants, or bonds for the construction or implementation of projects.
- [Repair and Maintenance Fund \(103D.905 & 631\)](#). The Repair and Maintenance Fund is for repairing and maintaining Districts projects. The parcel assessment must be made pro rata according to original benefits determined at the time of project implementation or construction.

Bonds and Loans

- **Bond Sales (MS 103D.905).** Watershed Districts may establish an account for the proceeds of special assessments, stormwater charges, loan repayments, and ad valorem tax levies pledged by the Districts for the payment of bonds or notes issued by the Districts. The fund is to be used for the payment of the principal, premium, administrative surcharge, or interest on the bonds and notes issued by the Districts and for payments required to be made to the Federal government.
- **Loans.** Watershed Districts may borrow funds from federal, state, member county, or financial institutions authorized to do business in Minnesota under 103D. The Districts have used 10- year, low-interest Clean Water Partnership loans from the MPCA to build storm water facilities, conduct lake alum treatments, and purchase land rights easements.
- **Permitting: Fees, Bonds, Sureties, Escrows, Letter of Credit (MS 103D.345).** Watershed Districts may establish fees to implement the District's Rules permitting program such as site investigation, project review, engineer or other consultant services, and post construction monitoring. Government agencies (federal, state, political subdivision) are exempt from the fee charges.
 - Permit application fee: PRWD has an application fee of \$10 for processing all applications. CLWD has no application fee.
 - Field Inspection Fees: The inspection fees are used to cover the actual costs related to a field inspection. Inspection costs include investigation of the area affected by the proposed activity, analysis of the proposed activity, services of a consultant or engineer, and any required subsequent monitoring of the proposed activity. Costs of monitoring an activity authorized by permit may be charged and collected as necessary after issuance of the permit.
 - Permit Performance: The Districts may require an applicant for a permit to file a bond, surety, escrow, or letter of credit with the Districts in an amount set by the Board of Managers or the District Engineer and conditioned on performance by the applicant of authorized activities in conformance with the terms of the permit.

Water Management Districts

A Water Management District (WMD) is an optional funding mechanism available to watershed districts for specific projects. This is based on contributing areas to specific pollution problems or to a water resource issue. A WMD should be closely tied to hydrologic boundaries, but watershed districts may consider ecological, economic, social, geopolitical, and land use factors for certain purposes.

The watershed district (WD) develops a fee structure based on who contributes to a specific pollution problem or to a water resource issue. For example, the fee can be based on land contribution of water volume if it is a flooding or water storage issue or it can be based on phosphorus contribution if it is a water quality issue that is being addressed in the project.

The water management district must first be established, then a project must be ordered through formal hearing and adoption processes. Only a Watershed District can establish a WMD. A WMD must be created through a plan amendment or revision and can only be utilized

for projects established by WD via MS 103D. A WMD should be defined by an area of project need or benefit.

Key Statutes include:

- Water management districts and their charge systems must be established under MS Chapter 103D.729.
- Water management district charges may only be used to pay the costs of projects initiated under [MS Chapters 103B.231, 103D.601, 103D.605, 103D.611, or 103D.730](#). Stormwater projects under MS Chapter 103D.730 must be initiated and ordered to be implemented through formal hearing and adoption processes.
- The mechanisms and principles of MS Chapter 444.075 must be followed for the development of water management district charges established through MS Chapter 103D.729.

In 1997, the PRWD amended its 1994 Water Management Plan to provide the WMD funding mechanism to finance water quality improvement projects. The 1997 amendment stated any WMD created would be permanent and funds may be collected via stormwater charges (MS 444. 075) apportioned amongst the property owners in the WMD on the basis on their relative contribution of sediments and nutrients in stormwater runoff.

In February of 2000, the PRWD District Board of Managers ordered the establishment of the Stormwater Treatment Facility Project (MS103D.730) and to fund the project through a district wide WMD (MS103D.729) by collecting stormwater charges (MS444.075). The 2005-2014 Revised Management Plan stated the maximum annual amount of charges for the Stormwater Treatment Facility Project would be capped at \$500,000. For this planning period, the District is not proposing an increase to this amount. These funds can be used by the District to build, construct, reconstruct, repair, enlarge, improve, or in any other manner obtain stormwater systems, including mains, holding areas and ponds, and related facilities for the collection and disposal of stormwater.

The 2005-2014 Revised PRWD Watershed Management Plan provided the framework for the establishment of eight (8) WMDs based upon the Lake Water Quality Management Areas (LWQMAs) as outlined in Figure 9.5 to fund projects not considered to have district-wide benefit or impact. This plan will continue to use the LWQMAs to allow for up to eight additional WMDs for projects that are not of District-wide benefit. It is the intent that these smaller WMDs would be perpetual, the maximum annual charge would be capped at \$50,000 for this plan period and will use the methods to determine charges as outlined below. Changes to these proposed planning regions, methods to determine charges, the length of time in force, or the amount charged will require a plan amendment.

This plan establishes the right of the CLWD to establish a WMD to pay for projects in the future as well. In the past,



Figure 9.5. Pelican River Watershed District Lake Water Quality Management Areas.

CLWD has not used WMDs for funding projects. If CLWD established a WMD, the entire CLWD would be a WMD.

● *Process to Create Water Management Districts*. BWSR has provided guidance for creating WMDs as outlined below. These steps have been addressed in previous plans as well as by this plan.

1. Amend comprehensive watershed management plan to create a WMD. Amendment must include:
 - Description of area to be in the WMD (recommend supporting with maps).
 - The amount to be raised by charges (total amount is necessary if fixed time for WMD to be in force, otherwise annual maximum (cap) amount, if WMD is established in perpetuity).
 - The potential methods that will be used to determine the charges (should utilize a contribution basis as the mechanism for fee structures).
 - The length of time the WMD will be in force (for WMDs established in perpetuity, watershed districts are strongly encouraged to establish a local appeal process and evaluate the water management district in each ten-year plan amendment).
2. Approval of plan amendment under M.S. § 103D.411 or as part of a revised plan under M.S. § 103D.405, or M.S. § 103B.801:
 - Watershed District plan amendment process: <https://bwsr.state.mn.us/amendments-and-extensions>
 - Watershed District plan revision process: <https://bwsr.state.mn.us/development-and-revision>
 - CWMP amendment process: see page 153.

● *Process to Establish a project in the Water Management Districts*. During this plan period, if the Watershed District determines a new WMD is needed to fund projects, these steps must be completed prior to any collection of charges.

1. Watershed District establishes project(s) in the WMD following appropriate statute (M.S. § 103B.231, 103D.601, 103D.605, 103D.611, or 103D.730).
 - Project(s) implemented must be ordered by the Watershed District managers.
 - Order for project(s) must specify funding method(s).
 - Watershed District must notify counties, cities, and townships within the affected area at least 10 days prior to hearing or decision on projects(s) implemented under this section of statute.
2. Watershed District refines methodology for computing charges based on final project scope.
3. Watershed District determines and sets charges for all properties within the WMD after identifying scope of project and deciding method(s) of funding the project.
4. Watershed District develops collection mechanism:

- Request county or counties to collect.
 - Contract with a private vendor (e.g., electric cooperative).
 - Billing and collection by Watershed District.
5. Watershed District establishes a separate fund for proceeds collected from the fee or stormwater utility charges.
- Resolution of disputes—local governments may request BWSR to resolve disputes pursuant to M.S. § 103D.729, Subd. 4, except a local appeal process is encouraged to address disputes for WMDs established in perpetuity.
- Stormwater Utility Charges. The purpose of the Stormwater Utility charge is to collect revenue to pay the cost of WMD programs and projects. As outlined in the 1997 Plan Amendment, WMD charges are based on the parcel’s relative contribution of nutrients (phosphorus and sediment) and the rate of stormwater runoff to a downstream waterbody within the WMD area. Factors such as slope, land use, and the proportion of impervious surface to pervious surface may be used to further refine the runoff estimate from an acre of land. Total fees are based upon the amount of the funds that must be expended to control or treat the runoff. Fees are apportioned based upon each parcel’s proportionate share of the runoff divided into the planned expenditures. The following options may be used to establish charges with the WMDs:
1. *Runoff Volume* – This approach uses standard runoff coefficients for parcels having different land use characteristics. The basis for this is that average discharge is affected by land use in predictable ways. The approach makes no allowance for differences in a parcel’s slope or soil type, except those differences which are generally associated with the differences in land uses. Standard “delivery rates” estimated for the region are applied to take into account the amount of the runoff which is actually expected to reach a downstream waterbody.
 2. *Total Phosphorous Export* – This approach takes into account the stormwater discharges from different land uses parcels have significantly different downstream impacts on lake water quality. The key nutrient is phosphorous, so using standard phosphorous export coefficients for different land uses permits assignment of treatment costs to the parcels that create the problem. Standard “delivery rates” estimated for the region are applied to take into account the amount of the runoff which is actually expected to reach a downstream waterbody.
 3. *A combination of runoff volume and phosphorus export*. Using the standard “delivery rates,” runoff coefficients and total phosphorous export coefficients are used to determine the total phosphorous contribution for each type of land use in the WMD. This contribution is then converted to a percent of the total phosphorus runoff for the entire WMD. This percent is then multiplied by the dollar amount needed on an annual basis to fund the project then divided again by the number of acres of each land use in the WMD to determine the charge per acre for the land use. These charges are then applied to each parcel to determine the charge per parcel.

A per parcel minimum and maximum will be assessed each year (For example: for 2020 the minimum was \$32 per parcel and the maximum was \$70 per parcel). These charges are

collected by the Becker County Auditor. Credits may be assigned to a parcel where best management practices have been implemented or for properties with internal drainage.

● Local Appeal Process. Because WMDs established under this plan are proposed to be perpetual, the following local appeal procedure is established from the resolution adopting the plan establishing a WMD:

1. Upon receipt of the BWSR order approving the plan establishing a WMD, the Watershed District shall publish notice of its resolution adopting the plan in a newspaper in general circulation within the District.
2. Any landowner affected by the WMD may, within 30 days of first publication of notice of the resolution, appeal the establishment of the WMD to the Watershed District by filing a letter stating the basis for the appeal.
3. Within 30 days of receiving a letter of appeal, the Watershed District shall hold a hearing on the appeal, giving the appellant an opportunity to be heard and to present evidence why the WMD should not be established. The hearing shall be noticed as required for a special meeting under statutes chapter 103D.
4. The hearing shall be recorded in order to preserve a record for further review. The record of the appeal shall include the recording, any documentary evidence provided by the appellant, and all records related to the establishment of the WMD.
5. Within 30 days of the hearing, the Watershed District shall adopt and mail findings and an order on the appeal to the appellant and the BWSR.
6. Further appeal, if any, shall be as provided in Statutes Chapter 103D and existing authorities and procedures of the BWSR Board.



Detroit Lake sand bar.

State Funding

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

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

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

Collaborative Grants

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

Federal Funding

Federal funding includes all funds derived from the federal tax base. This includes programs such as the EQIP administered by NRCS and 319 administered by the MPCA. Federal agencies can be engaged following the approval of this plan and prior to implementation, to create an avenue to access federal resources for implementation. Opportunity may exist to leverage state dollars through some form of federal cost-share program. Where the purpose of an implementation program aligns with the objectives of various federal agencies, federal dollars will be used to help fund the implementation programs described by this plan. For example, the NRCS will likely provide support for agricultural best management practices, while the FSA may provide land-retirement program funds such as CRP (Table 9.4).

Other Funding Sources

Foundations, nonprofit organizations, and private contributions (including landowners and corporate entities) will be sought for plan implementation activities. Local foundations may fund education, civic engagement, and other local priority efforts. Several conservation organizations are active in the watershed, such as The Nature Conservancy, Becker COLA, Otter Tail COLA, Ducks Unlimited, Trout Unlimited, MN Deer Hunters Association, Pheasants Forever, Sportsman's Clubs, National Wild Turkey Federation, Northwest AqwaTek Solutions, Minnesota Waters, Freshwater Society, CLC Agriculture Center, White Earth, and local co-ops (i.e., Breakfast on the Farm). These organizations acquire funding of their own and may have project dollars and technical assistance that can be leveraged. Major cooperators and funding sources are private landowners who typically contribute 25% of project costs and many donate land, services, or equipment for projects or programs.

Work Planning

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

Local Work Plan

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

Funding Request

The OTWP will collaboratively develop, review, and submit a watershed-based funding request from this plan. This request will be submitted to and ultimately approved by the Policy Committee prior to submittal to BWSR. The watershed-based funding request will be developed based on the 2023-2024 priority projects outlined in the targeted implementation schedule and any adjustments made through self-assessments.



Otter Tail River near Fergus Falls in winter.

Assessment, Evaluation, and Reporting

Accomplishment Assessment

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

Partnership Assessment

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

Five-Year Evaluation

Beginning in 2023, this plan will be in effect for ten years. Over the course of the plan's life cycle, progress toward reaching goals and completing the implementation schedule may vary. New issues may emerge as the plan progresses, and/or new monitoring data, models, or research may become available. Therefore, in 2028-2029, a five-year evaluation will be undertaken to determine if the current course of actions is sufficient to reach the goals of the plan, or if a change in the course of actions is necessary. At the 10-year mark, and every five years after, the plan will be fully re-evaluated.

Reporting

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

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

Plan Amendments

The OTCWMP is effective for 10 years per the BWSR Order approving it. Activities described in this plan are voluntary, not prescriptive, and are meant to allow flexibility in implementation. An amendment will not be required for addition, substitution, or deletion of any of the actions, initiatives, and projects if those changes will still produce outcomes that are consistent with achieving the plan goals. This provision for flexibility includes changes to the activities except for those of capital improvement projects, which will follow the applicable procedures and statutory requirements.

During the time this plan is in effect, it is likely that new data giving a better understanding of watershed issues and solutions will be generated. Administrative authorities, state policies, and resource concerns may also change. New information, significant changes to the projects, programs, or funding in the plan, or the potential impact of emerging concerns and issues may require activities to be added to the plan. If revisions are required or requested, the Policy Committee will initiate a plan amendment process following their MOA Bylaws.

Formal Agreements

The OTWP is a coalition of Becker SWCD, Becker County, East Otter Tail SWCD, West Otter Tail SWCD, Otter Tail County, PRWD, and CLWD. The Policy Committee entered into a MOA for planning the CWMP for the OTW through a One Watershed One Plan Grant from BWSR (Appendix J). The entities will draft a MOA for purposes of implementing this plan. The Policy Committee is advisory to the individual County, Watershed District and SWCD Boards under the umbrella of the MOA.



Sun dogs near Elizabeth in winter. Photo Credit: Pete Waller.