UPPER / LOWER RED LAKE
WATERSHED PLAN
2025-2035

CLEAN WATER LAND & LEGACY AMENDMENT

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ACRONYM LIST

1W1P: One Watershed, One Plan

AMAs: Aquatic Management Area

AIQ: Aquatic Invasive Species

BCLARA: Beltrami County Lakes and Rivers Association

BMP: Best Management Practice

BWSR: Board of Water and Soil Resources

CIP: Capital Improvement Project

CREP: Conservation Resource Enhancement Program

CRP: Conservation Reserve Program

CSG: Cooperative Stream Gaging

CSP: Conservation Stewardship Program

CWF: Clean Water Fund

DNR: Minnesota Department of Natural Resources

DWSMA: Drinking Water Supply Management Area

EHC: Evaluation of Hydrologic Change

EQIP: Environmental Quality Incentives Program

EPA: Environmental Protection Agency

FEMA: Federal Emergency Management Agency

FSA: Farm Service Agency

FSI: Forest Stand Improvement

HSPF: Hydrological Simulation Program - FORTRAN

GAM: Grants Admission Manual

LCCMR: Legislative-Citizen Commission on Minnesota Resources

LGU: Local Government Unit

LSOHC: Lessard-Sams Outdoor Heritage Council

MDA: Minnesota Department of Agriculture

MDH: Minnesota Department of Health

MnDOT: Minnesota Department of Transportation

MOA: Memorandum of Agreement

MPCA: Minnesota Pollution Control Agency

MRWA: Minnesota Rural Water Association

NCCSA: North Central Conservation Service Area

NPDES: National Pollutant Discharge Elimination System

NRCS: Natural Resources Conservation Service

NWS: National Weather Service

PFA: Public Facilities Authority

PFAS: Per- and Polyfluorinated Substances

PPM: parts per million

RAQ: Riparian, Adjacency, Quality

RIM: Reinvest in Minnesota

RLDNR: Red Lake Department of Natural Resources

RLWD: Red Lake Watershed District

RRVSCA: Red River Valley Conservation Service Area

SDS: State Disposal System

ACRONYM LIST

SFIA: Sustainable Forest Incentive Act

SNA: Scientific and Natural Area

SSS: Soil Texture, Slope, Stream Proximity

SSTS: Subsurface Sewage Treatment System

SWCD: Soil and Water Conservation District

TMDL: Total Maximum Daily Load

TNC: The Nature Conservancy

TSS: Total Suspended Solids

ULRLW: Upper/Lower Red Lake Watershed

ULRLW CWMP: Upper/Lower Red Lake Watershed Comprehensive Watershed Management Plan

USDA: U.S. Department of Agriculture

USACE: U.S. Army Core of Engineers

USGS: U.S. Geological Survey

USFS: U.S. Forest Service

USFWS: U.S. Fish and Wildlife Service

WBIF: Watershed Based Implementation Funding

WCA: Wetland Conservation Act

WMA: Wildlife Management Area

WMD: Water Management District

WRAPS: Wetland Restoration and Protection Strategy

WRP: Wetland Reserve Program

UPPER / LOWER RED LAKE
WATERSHED PLAN

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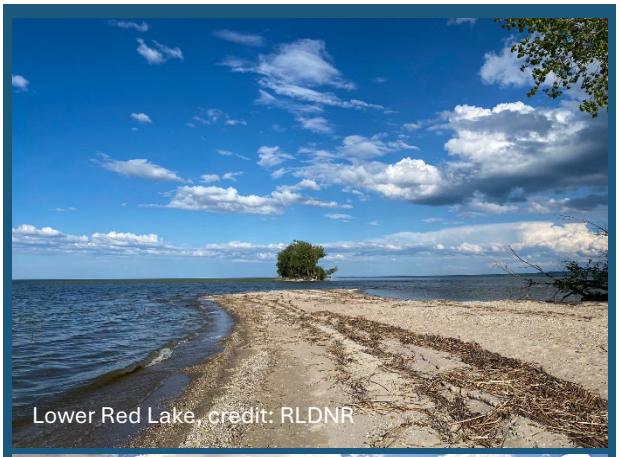
EXECUTIVE SUMMARY

SECTION 1.
EXECUTIVE SUMMARY

Introduction

The Upper/Lower Red Lake Watershed (ULRLW) spans 1,940 square miles. Three quarters of the ULRLW consists of open water or wetlands. The watershed is rich with natural resources and is a vast patchwork of peatlands, forests, and agricultural lands.


Lower Red Lake, credit: RLDNR


Pasture in the ULRLW

Upper and Lower Red Lakes combined is the largest body of water (288,800 acres) in Minnesota with its boundaries completely within the borders of Minnesota (MNDNR, 2013). They are significant lakes for walleye fishing for both the Minnesota tourism economy and the Red Lake Nation economy and traditions. All the drainage from within the smaller subwatersheds ends up in the Red Lakes and eventually outlets into the Red Lake River at the Red Lake Dam. The outflows at the dam are controlled by the U.S. Army Corps of Engineers (USACE). The dam's impact on the lakes water levels can take long periods of time due to its outlet capacity; however, it can have immediate impacts downstream when released.

The ULRLW planning partners have a long history of cooperation and working together. In 2023-2024, they built on these relationships to develop the ULRLW Comprehensive Watershed Management Plan (ULRLW CWMP) through the One Watershed, One Plan (1W1P) program administered by the Board of Water and Soil Resources (BWSR), Minnesota Statutes §103B.801. The purpose of the plan is to guide the watershed managers (local counties, watershed districts, tribal governments, and soil and water conservation districts [SWCD]) as they work to manage the watershed's resources for the enjoyment of future generations and for maintaining a healthy local economy. The plan describes the watershed, a list of priority issues that will be addressed through the plan, measurable goals, and implementation actions that address the issues and make progress toward the goals.

Planning Partners developed a Sense of Place and Vision Statement for the watershed during the planning process. This statement can be used to guide future work in the ULRLW.

SENSE OF PLACE

We are home to the largest lakes within Minnesota and the largest patterned peatlands in the nation.

We are the homeland of the Red Lake Nation.

We are home to residents and visitors who enjoy our lakes, rivers, and forests, and work our farmlands.

VISION

We envision a future of cooperation among residents, and tribal, state, and local agencies with shared goals of preserving our cultural and natural resources for future generations.

Planning Area

The planning area spans four counties (Beltrami, Koochiching, Clearwater, and Itasca) and the Red Lake Nation (Figure 1.1). Major towns include Blackduck, Northome, Kelliher, Red Lake, and Redby, along with many other smaller communities such as Puposky and Funkley.

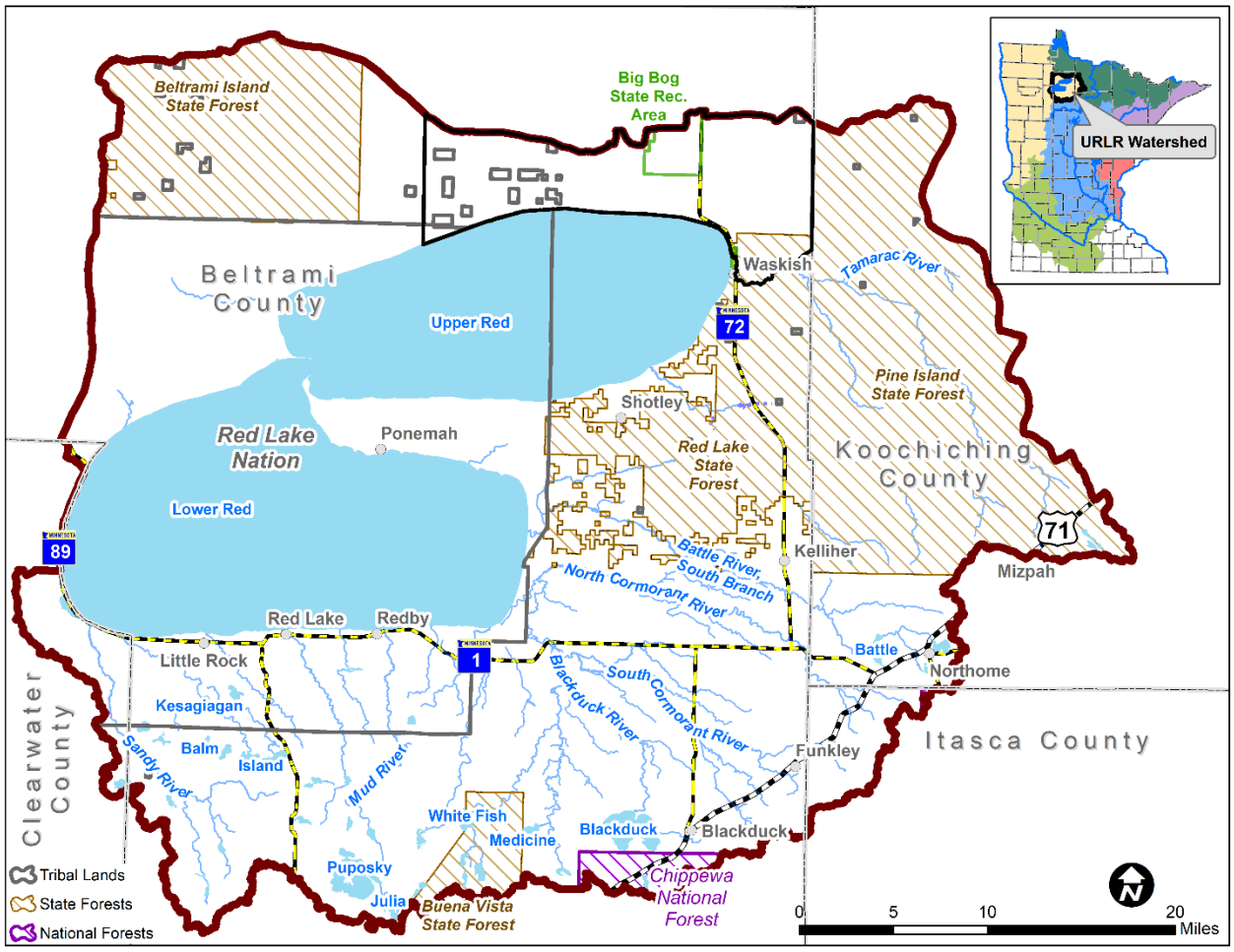


Figure 1.1. Location of the ULRLW.

Roles and Responsibilities

The ULRL CWMP was developed under a Memorandum of Agreement (MOA) between Beltrami County, Beltrami SWCD, Red Lake Watershed District (RLWD), and Red Lake Nation. Clearwater, Itasca, and Koochiching Counties declined to participate because their amount of land within the watershed boundary is so small.

The 1W1P process uses existing authorities, therefore a representative from each MOA member was appointed by their respective boards to serve on the Policy Committee, the decision-making body for this plan. Beltrami SWCD was the fiscal agent and the plan coordinator for this project.

The plan content was developed by the Advisory Committee made up of state agencies and local stakeholders. The Steering Committee, made of staff from the MOA governmental units, BWSR, and consultants, guided the planning process and timeline and produced the final plan.

Community Engagement

Public Kickoff

Public kickoff meetings were held in Kelliher in August of 2023 and Red Lake Nation in October 2023. Local participants learned about the planning effort and completed a survey providing input on their concerns to be addressed by the plan. Figure 1.2 shows results to the Penny Voting Prioritization, in which attendees were given three pennies to place on the station with the resources most important to them. To see the full results of the survey, see Appendix B.

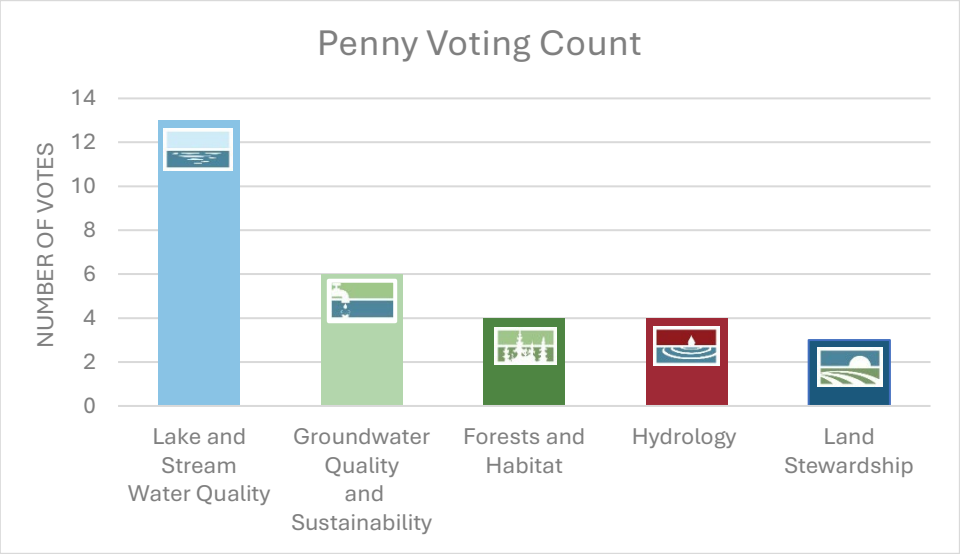


Figure 1.2. Results of penny voting prioritization at Kelliher public meeting

Planning Process

The ULRLW plan was developed by the planning committee throughout 2023-2024. In the fall of 2023, subject meetings were held with the Advisory Committee and subject matter experts to brainstorm and develop actions to address the issues within the watershed. The four subjects were: Forests & Habitat, Groundwater & Agriculture, Hydrology, and Surface Water. Over the winter of 2023-2024, the Steering Committee developed measurable goals based on the issues. In the spring of 2024, the goals and actions of the plan were further developed and reviewed. The Policy Committee approved the plan content along each step.

Priority Issues

Input from the public, existing plans, studies, the Advisory Committee, and subject matter experts was used to develop issue statements. After the subject meetings, the Steering Committee met to finalize issue statements by combining similar issues for clarity and simplicity. The revised issues were then reviewed and approved by the Policy Committee. The priority issues that will be the focus of implementation efforts over the next 10 years are listed in Table 1.1.

Table 1.1. Priority issues in the ULRLW.

Resource	Issue Theme	Description
 Lakes & Streams	**Nutrients**	Excess nutrients contribute to excess algal growth along with recreational and biological impairments.
 Lakes & Streams	**Bacteria**	Bacteria runoff impacts aquatic recreation and human health.
 Lakes & Streams	**Protection**	Forest loss, fragmentation, and patchwork land ownership impacts water quality and habitat.
 Lakes & Streams	**Protection**	Changes to the definition of waters of the U.S. has potential to leave some wetlands with less protections.
 Lakes & Streams	**Eroding Watercourses**	Eroding watercourses and sedimentation contribute to impairments and reduced habitat quality.
 Hydrology	**Altered Hydrology**	Historical ditching, improperly sized culverts, and a dam alter the natural flow of water, increasing flashiness and erosion, and degrading habitat.
 Groundwater	**Groundwater**	Groundwater quality and quantity need ongoing testing and lacks an easy solution.
 Land Stewardship	**Soil Health**	Decreased soil health can reduce agricultural productivity, water holding capacity, and climate resiliency.
 Forests & Habitat	**Forest Health**	Forest health and habitat is vulnerable to climate variability, pests, invasive species, and lack of management, which can affect species composition and forest productivity.
 Forests & Habitat	**Aquatic Connectivity**	Aquatic connectivity barriers impact biological communities and stream morphology.
 Forests & Habitat	**Riparian Alteration**	Riparian and in-lake alteration from development impacts water quality, lake health, and fish communities.

Measurable Goals

Seven measurable goals, listed in Table 1.2, were developed by the Steering and Advisory Committees to set a quantifiable expected change by the end of the 10-year plan. The goals are summarized below and are detailed in Section 4 of this plan.

Table 1.2. Measurable goals in the ULRLW.

Goal Name	Goal Description
Agricultural Land Management	Implement best management practices (BMPs) on **2,805 ACRES** of pastureland and **4,224 ACRES** of cropland.
Riparian Enhancement	Implement **2 MILES** of riparian enhancement projects.
Lake Enhancement	Reduce phosphorus loading to Bartlett Lake by **5 POUNDS/YEAR** and Blackduck Lake by **37 POUNDS/YEAR**.
Forest Management	Implement **12,000 ACRES** of Forest Management Plans (100 plans), and plant **2,000 ACRES** of trees.
Protection	Protect **9,170 ACRES** with Sustainable Forest Incentive Act (SFIA) or easements.
Drinking Water Protection	Seal **100 UNUSED WELLS**.
Hydrologic Enhancement	Explore opportunities for peatland restoration and complete **ONE FEASIBILITY STUDY** and **ONE PROJECT**.

Implementation

Implementation activities and costs are presented in Section 4 of this plan. A variety of actions, including agricultural BMPs, stream stabilizations, conservation practices, and education and outreach actions, will take place in the watershed over the course of the 10-year plan. There are tables for each of the seven goals, which include actions to make progress toward goals, targeted resources, entities responsible for implementation, a timeline, and cost estimate. The estimated total funding currently available annually for implementation is $1,426,500, plus any additional partner funding (Table 1.3). This includes current funding available in the watershed, plus watershed-based implementation funding (WBIF) from the Clean Water Land and Legacy Amendment available upon approval of the ULRLW CWMP.

CLEAN WATER LAND & LEGACY AMENDMENT

Table 1.3. Estimated annual funding for implementation.

Description	Annual Total	10 Year Plan Total
Amount needed to implement this plan through MOA Planning Partners	$1,426,500	$14,265,000
Other/Partner Funding Sources *SFIA, Natural Resource Conservation Service (NRCS), Minnesota Department of Natural Resources (DNR), U.S. Fish and Wildlife Service (USFWS), Clean Water Fund (CWF), Lessard-Sams Outdoor Heritage Council (LSOHC)*	$1,875,000	$18,750,000

Overall Prioritization

Five of the seven goals share identical, overlapping priority areas due to similar land use, land ownership, and water quality conditions. These goals can be summarized as Land Protection and Management in Figure 1.3 and include:

Land Protection and Management

- Agricultural Land Management
- Riparian Enhancement
- Lake Enhancement
- Land Protection
- Forest Management

Drinking water is prioritized throughout the watershed, and hydrologic enhancement is prioritized in the northern portion of the watershed (Figure 1.3). Implementation partners will work together in these areas to achieve their measurable goals.

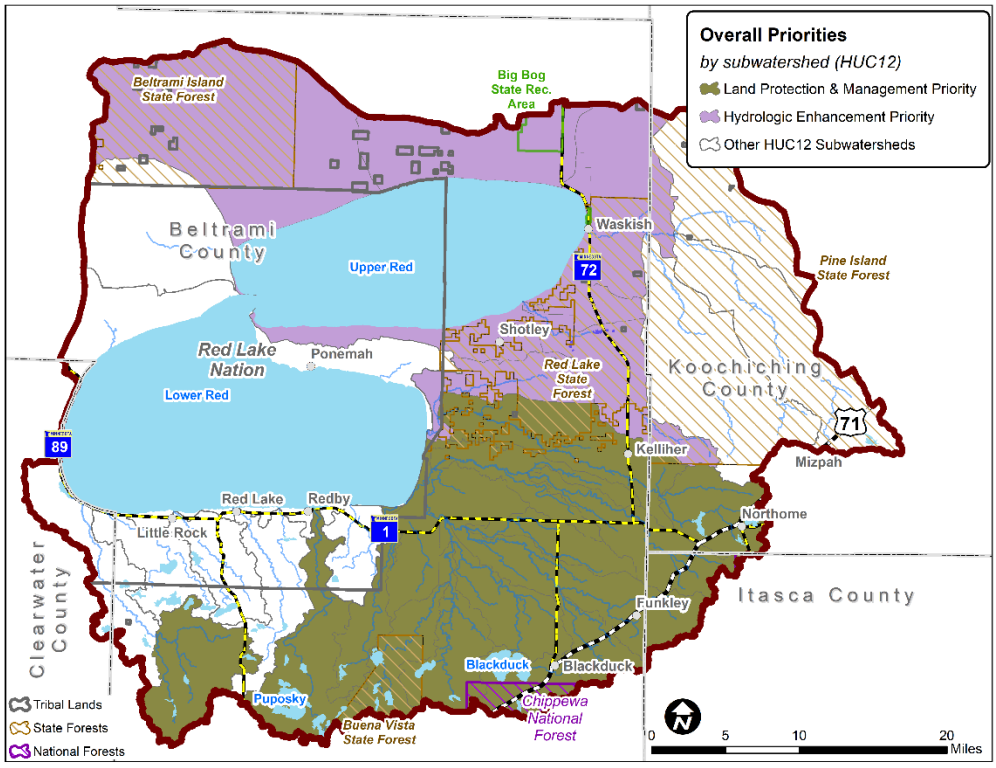


Figure 1.3. Overall implementation priorities in the ULRLW.

Implementation Programs

This plan will be implemented through the programs listed below.

Projects & Practices
- Incentives
- Cost Share
- Land Mgmt
- Protection

Capital Improvements
- Large, one-time projects

Regulation & Enforcement
- Ordinances
- Rules
- Regulations
- Enforcement

Data Collection & Monitoring
- Water quality monitoring
- Inventories
- Survey

Education & Outreach
- Workshops
- Mailings
- Demonstration

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 (Section 6). The ULRLW CWMP will be implemented through an MOA between the planning partners, collectively referred to as the ULRLW Partnership (Figure 1.4).

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

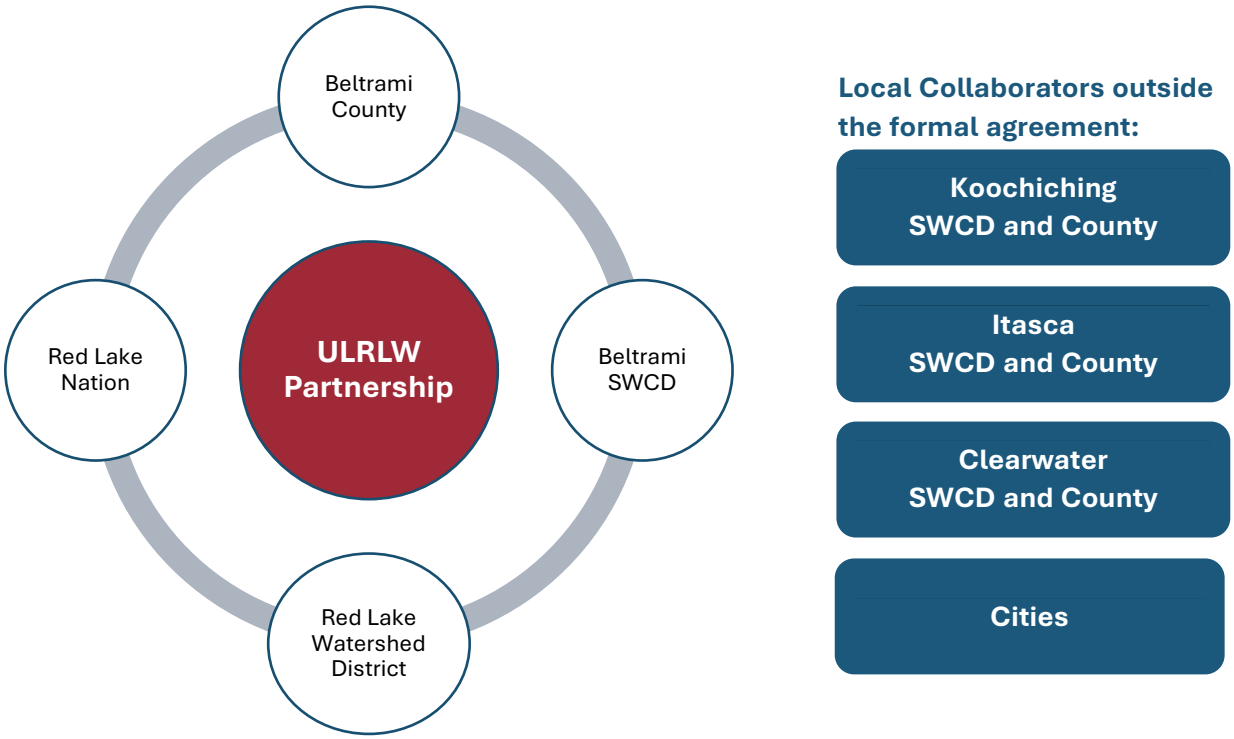


Figure 1.4. ULRLW Partnership members.

RESOURCE NARRATIVE

SECTION 2.
LAND & WATER RESOURCE NARRATIVE

Introduction

Figure 2.1. Walleye, an important fish in Upper and Lower Red Lake.

The ULRLW is, by both flow volume and surface area, the largest drainage basin of the Red River (Koochiching, 2018) (Figure 2.2). The ULRLW covers 1,940 square miles (1,241,690 acres) primarily in Beltrami County but also small portions within Koochiching, Clearwater, and Itasca counties. Lower Red Lake and 60% of Upper Red Lake, over one third (483,246 acres) of the watershed, falls within the boundaries of the Red Lake Reservation (RLWD, 2006). With approximately 214 lakes, the ULRLW is mostly wetlands and open water (MPCA, 2021). Upper and Lower Red Lake combined is the largest body of water (288,800 acres) in Minnesota with its boundaries completely within the borders of Minnesota (MNDNR, 2013). They are significant lakes for walleye fishing for both the Minnesota tourism economy and the Red Lake Nation economy and traditions (Figure 2.1). All the drainage from within the smaller subwatersheds ends up in the Red Lakes and eventually outlets into the Red Lake River at the Red Lake Dam. The outflows at the dam are controlled by the USACE.

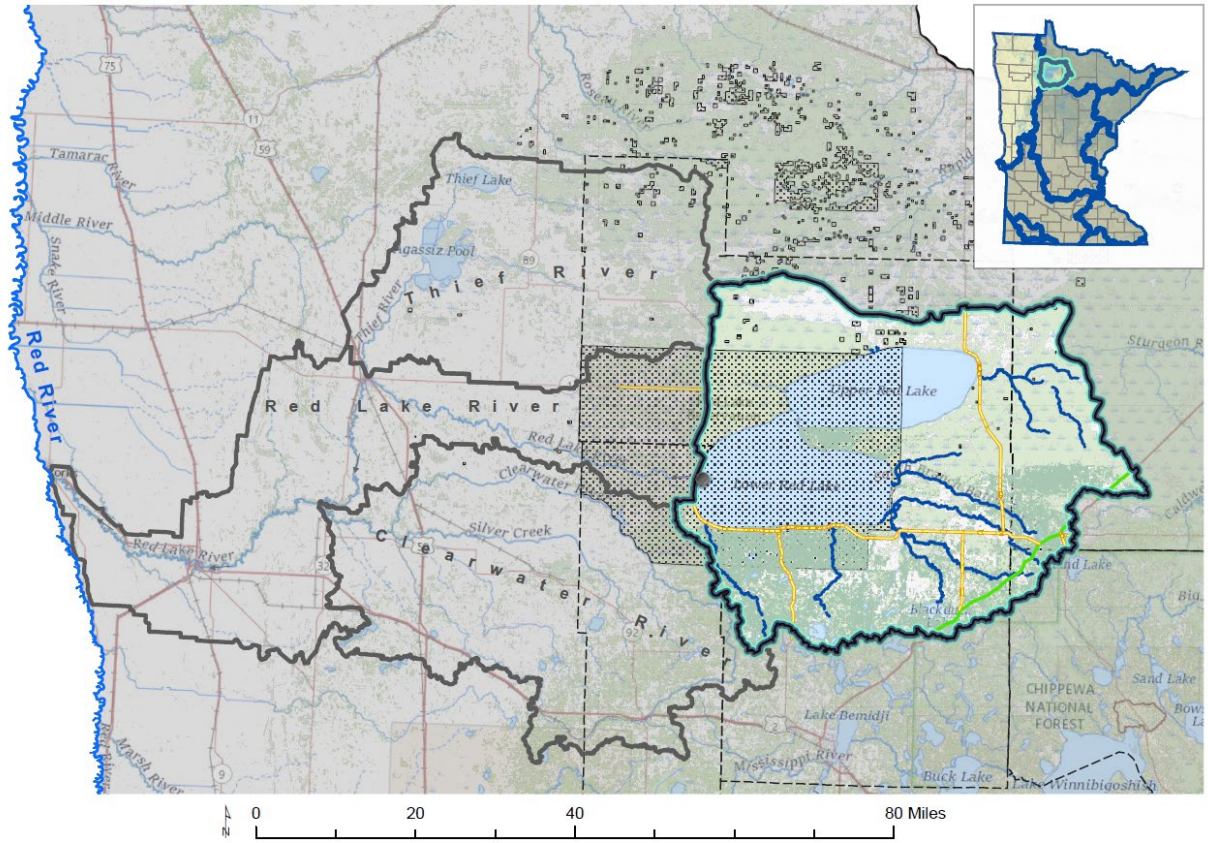


Figure 2.2. Location of the ULRLW.

PAST

Glaciation

The area within the ULRLW Watershed was formed nearly 12,000 years ago when the northern ice sheet melted, allowing water from Lake Agassiz, a glacial lake that covered most of northern Minnesota, to drain north into Hudson Bay. The sediments left behind by Lake Agassiz within the ULRLW formed the Agassiz Lacustrine plain, Agassiz peatlands, Erskine Moraine, and Blackduck till plain. While there is some fall in topography from east to west, especially in the southern part of the watershed, the ULRLW is relatively flat with vast wetlands and peatlands.

Human History

Humans have occupied the Red Lake region since the glaciers retreated approximately 12,000 years ago.

Ojibwe Settlement

The Ojibwe migrated from the northern Great Lakes area to what is now Minnesota during the 17th century.

Beginning in the latter half of the 1800's, the Red Lake Band entered into a number of agreements and treaties with the U.S. governments including the 1863 "Treaty of old crossing" which ceded lands to the United States. Subsequent actions led to the 1904 Land Act that resulted in present day reservation boundaries known as the "Diminished Reservation". The Diminished Reservation is the area around Upper and Lower Red Lake, while the ceded lands stretch all the way to the Northwest Angle (Figure 2.3).

Later in the twentieth century, Red Lake began developing its infrastructure, like water and sewer, improved roads, and better housing.

The Red Lake Department of Natural Resources (RLDNR) manages the tribal natural resources throughout the 1863 Treaty area (Figure 2.3).

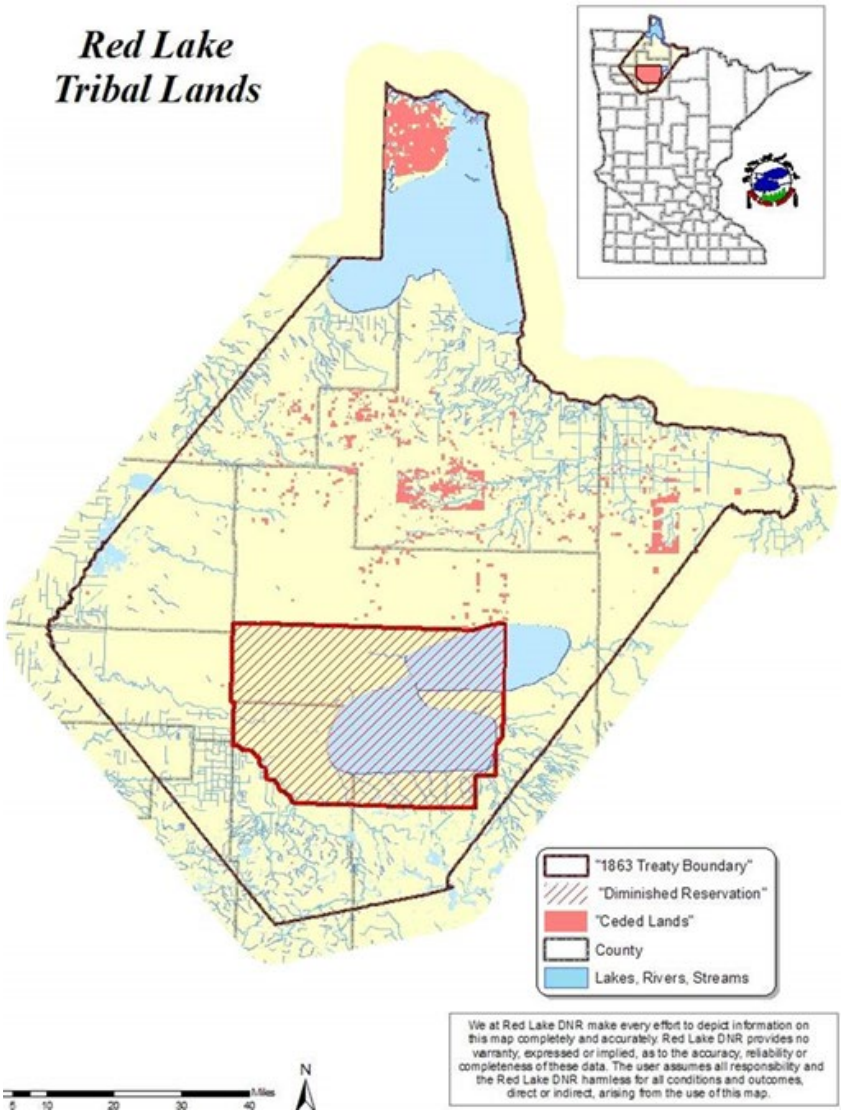


Figure 2.3. Red Lake Tribal Lands (RLDNR).

The Red Lake Reservation is the only reservation in Minnesota that is owned and occupied entirely by members of the Red Lake Band. For more information on the history of the Red Lake Nation, visit https://www.redlakenation.org/tribal-history-historical-photos/.

European Settlement

In the 18th Century, fur traders came to the area and set up several trading posts. In the late 19th century settlers became more permanent, and widespread logging occurred in the pine forests of the area. This cleared the way for agricultural practices. Southwest of Lower Red Lake proved fertile and farming flourished. Later, dairy farms gave way to commodity crops, due to high input costs and low commodity values.

In the northern part of the watershed, the wet peatlands were ditched to drain land for farming (Figure 2.4). However, the ditches did not drain the land adequately due to low slopes and the vast quantities of water, and much of the land was unsuitable for upland row-crop farming. Thus, the cost of ditching that could not be reassessed on profitable agricultural land caused a financial crisis in the region. Settlers paid for land that could not grow crops to support their households, and they would lose the land to the county. The county would then lose that tax revenue that had paid for the ditching and was left with large debts that could not be repaid (Alsop, 2009). This is the mechanism by which the state assumed ownership of much of the land in the region as state forest; the state would pay the ditch debt and receive a wildlife preserve in return. The state compensates counties for the loss of tax revenue from state-owned conservation land through payment in-lieu of taxes. The legacy of the ditches continues to this day, impacting the region's water resources and water quality, and the amount of state land located in Beltrami, Lake of the Woods, and Koochiching Counties.

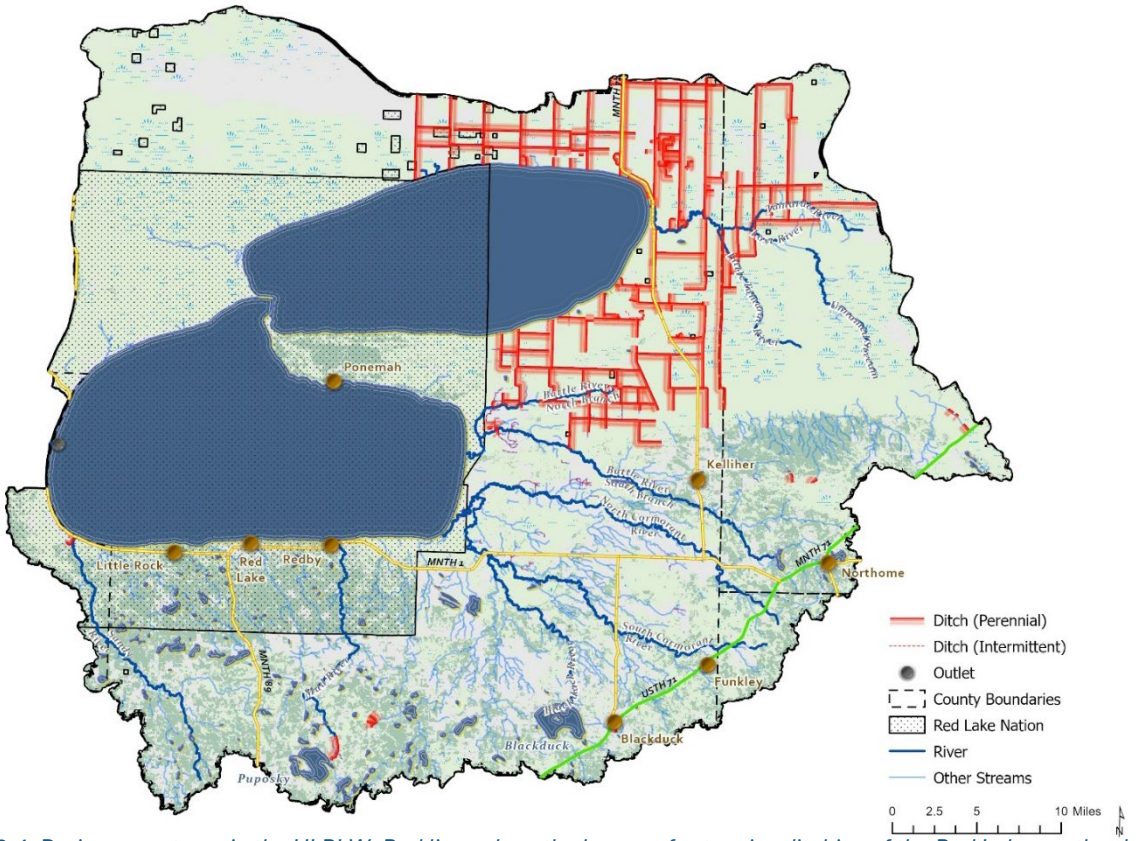


Figure 2.4. Drainage systems in the ULRLW. Red lines show the legacy of extensive ditching of the Red Lake peatlands.

PRESENT

Climate

The climate of the ULRLW is characterized by cold, arctic winters and short summers of moderate temperatures (RLWD, 2006). The growing season is typically May through September, dictating which crops are grown in the area.

The climate of Minnesota has been changing by becoming warmer and wetter. Table 2.1 shows these changes in the ULRLW. Between the years 1895 and 2020, Minnesota has warmed by 3.0 degrees Fahrenheit, while annual precipitation increased by an average of 3.4 inches. While the temperatures and precipitation have been increasing since 1895, the most dramatic changes have come in the past several decades. Heavy rains are now more common and more intense than any time on record (MNDNRa, 2023).

With warming temperatures and warmer winters, ranges of plants and animals are likely to shift. The composition of Minnesota's northern forests is likely to shift from paper birch, quaking aspen, balsam fir and black spruce to oak, hickory, and pine trees. Not only will it cause changes in the composition of the forests, but it will also affect ecosystems by changing the timing of natural processes such as flower blooming and bird migration. This can cause a disruption in the intricate web of relationships between animals and their food sources and between plants and pollinators. The food of one species may no longer be available when that species needs it due to it blooming earlier or later. Some animals may no longer be able to find enough food (EPA, 2016).

Table 2.1. Temperature and precipitation in the ULRLW (MNDNR, 2023b).

Average Temp	Winter	Spring	Summer	Fall	Annual Precip.
1895-2022	6.80°F	37.54°F	64.26°F	40.93°F	24.11”
Change per decade since 1895	+0.45°F	+0.26°F	+0.15°F	+0.18°F	+0.06”

Blackduck River

Credit: RLDNR

Land Cover

Located largely within the Environmental Protection Agency (EPA) Level III Northern Minnesota Wetlands Ecoregion, almost three-quarters of the watershed is wetland, peatland, or open water (Figure 2.5, Figure 2.6). The southern edge of the watershed is in the Northern Lakes and Forest Ecoregion and the North Central Hardwood Forest Ecoregion.

These peatlands are unique and are one of the most unusual landscapes in the United States. Minnesota has over six million acres of peatlands, and the Red Lake Peatland (partially located in ULRLW) is the largest and most diversely patterned peatland in the conterminous United States. Like other types of wetlands, peatlands develop in relatively flat areas where there is sufficient slope for slow movement of water across the landscape acting as a giant filter improving water quality, controlling erosion, and capturing carbon.

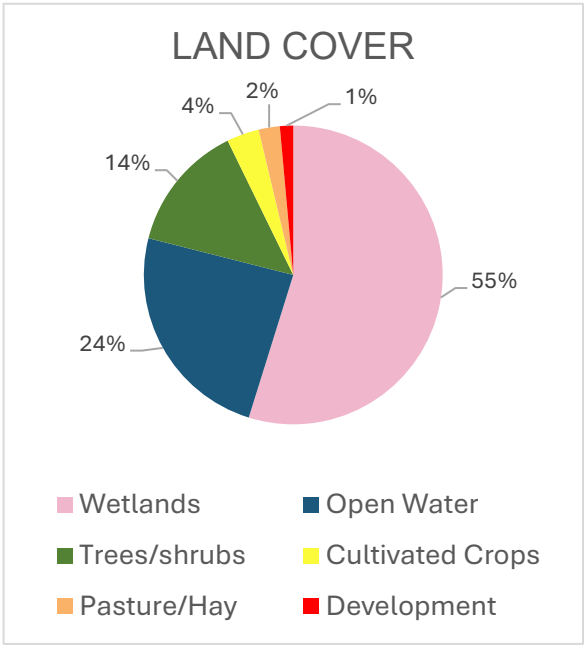


Figure 2.5. Land use percentages in the ULRLW (National Land Cover Database, 2019).

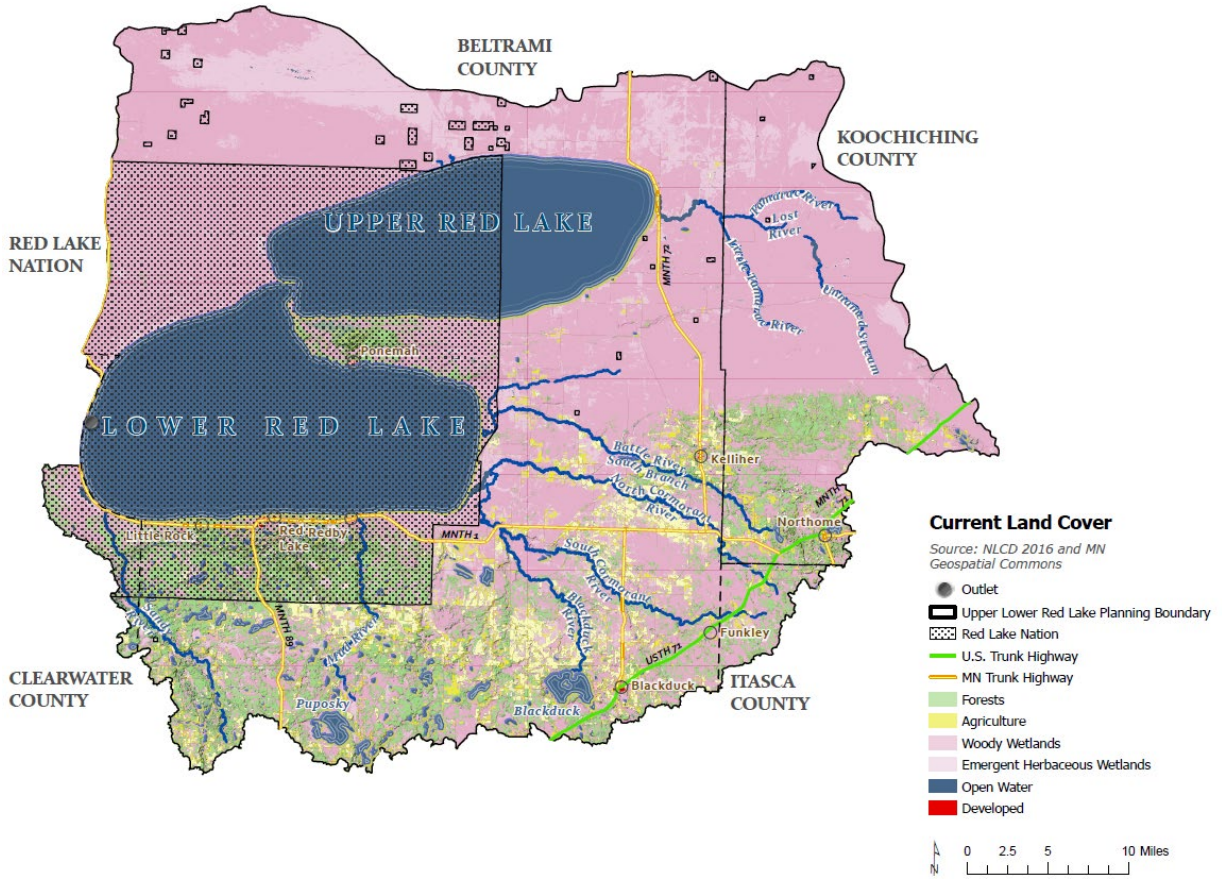


Figure 2.6. Land cover in the ULRLW.

Unlike other wetland types, peatlands have the potential to accumulate dead organic matter called peat which consists of partially decayed vegetation, organic matter, and sphagnum moss. Peat accumulates very slowly; in Minnesota it has been measured at a rate of just 1.5 to 3 inches per century (MNDNR, 2008). The continuous saturation and mineral-poor conditions only allow a narrowly adapted and rare set of plants and animals to live, such as twig-rush, northern bog lemming, short-eared owl, yellow rail, and Wilson's phalarope. Peatlands capture large amounts of carbon dioxide from the atmosphere. They are estimated to store 20-30% of terrestrial carbon globally, an amount equivalent to roughly half of the earth's atmospheric carbon (MNDNR, 2008). They also store large amounts of methane gas. The Red Lake Peatland is the southernmost of the boreal peatlands in North America, just at the edge of the climatic conditions that are conducive for development of boreal peatlands, making it a focal point for research on the impacts of climate change on the earth's boreal peatlands.

The peatlands in the northern part of the watershed transition to forest, pasture, and cropland in the south. Most of the watershed is rural and undeveloped (RLWD, 2006). Cropland makes up 4% and pasture/hay just 2% of the watershed. Less than 2% of the watershed is considered developed (MPCA, 2021). The Red Lake Nation manages its lands predominantly for fish and wildlife habitat and timber production (RLWD, 2006).

Red Lake Peatlands

Credit: Erika Rowe, MNDNR

Water Resources

Surface water makes up 24% of the land cover in the ULRLW (Figure 2.5). Most streams in the watershed are low gradient, with many flowing through large wetland complexes. Due to the close associations between wetlands and streams and easily mobilized wetland soils, some streams in this region are particularly sensitive to disturbance and will require protection if development expands northward in the state. The primary streams draining to Upper Red Lake are the Tamarac River, Shotley Brook, and Manomin Creek, and primary streams draining to Lower Red Lake include Blackduck River, Battle River, Hay Creek, Mud River, Pike Creek, and Sandy River. Tributaries also draining to the Upper and Lower Red Lake include Battle River North and South Branches, North and South Cormorant River, Darrigans Creek, O'Brien Creek, and Perry Creek.

Other than Upper and Lower Red Lake, notable lakes in the watershed are Blackduck Lake, Bartlett Lake, Battle Lake, Julia Lake, Loon Lake, Medicine Lake, Balm Lake, Dellwater Lake, Island Lake, and Whitefish Lake. These lakes are important for recreation in the area.

Impairments

In general, most of the ULRLW is in good condition due to the vast expanses of wetland and forest combined with light development and altered/channelized streams. There are 10 streams within the watershed impaired for Aquatic Life Uses (MPCA, 2021) (Figure 2.7). Many aquatic life impairments within the watershed are the result of lack of adequate habitat, low dissolved oxygen from natural wetland influence, and altered hydrology. Only a few of the aquatic life impairments were due to total suspended solids (TSS). Twelve streams within ULRLW do not support aquatic recreation and are impaired due to bacteria (*E. coli*). These concentrations exceeded the aquatic recreation standards but through microbial source tracking, it was determined that nine of the impairments were linked to anthropogenic sources (human or ruminant). A linkage to human or ruminant sources could not be made for three *E. coli* impairments. Through Microbial Source Tracking results and aerial imagery, it was determined that these impairments are due to natural background wildlife sources (birds and beavers) (MPCA, 2021).

Five lakes are impaired for Aquatic Recreation Uses (MPCA, 2021). These impairments are a result of high total phosphorus, chlorophyll-*a*, and/or Secchi depth (Figure 2.7). The main phosphorus source for the impaired lakes is internal loading. In the case of Blackduck and Bartlett lakes, the cities of Blackduck and Northome used to discharge their sewage into the lakes. In the 1970s, new sanitary sewers were built, and the lakes have improved. However, they still carry the legacy nutrients in their sediments.

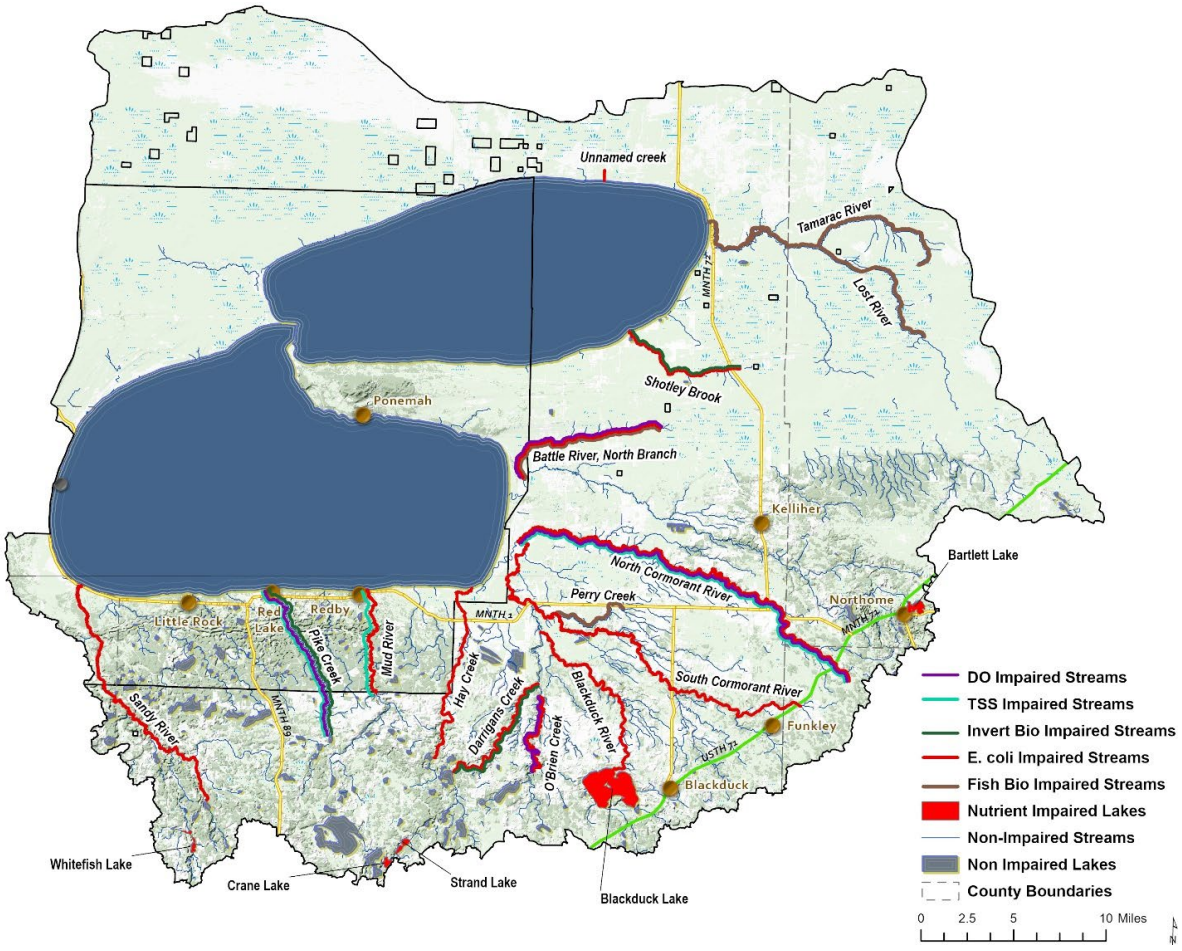
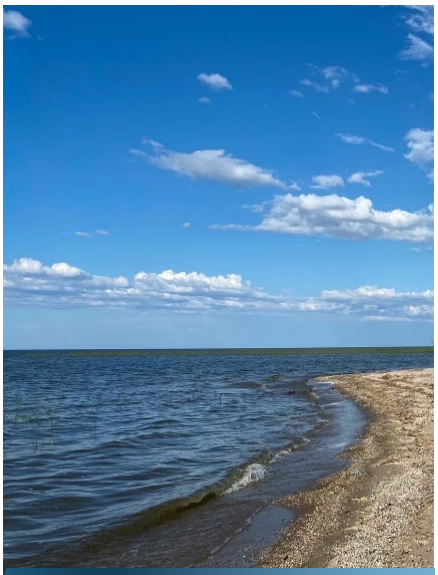


Figure 2.7. Impaired waters in the ULRL (MPCA, 2021).



Lower Red Lake, credit: RLDNR

Upper and Lower Red Lake are relatively shallow in comparison with their vast surface area. Due to its shallowness, nutrients in the lake bottom sediments are subject to becoming resuspended by wind and wave action. Because of their unique structure, the Upper and Lower Red Lake's water quality assessment has been deferred to allow for a site-specific standard to be developed by the Red Lake Nation (MPCA, 2021). The new standard will allow for higher natural nutrient concentrations while still maintaining protection of water quality and prevention of harmful algal blooms.

The Red Lake Nation is a community that is highly dependent on fish as a source of food and an economic resource and is therefore very concerned about mercury and other bioaccumulative chemicals found in fish tissue. A study by the RLDNR and Bemidji State University found Upper Red Lake had higher mercury in walleye than Lower Red Lake and recommended consumption of Red Lake walleye under 15.7 inches in length to avoid very high mercury concentrations (Orgon *et al.*, 2023). Mercury traditionally has been tested by fish tissue, but a new project determined that testing dragonfly larva is just as informative. Red Lake Nation is currently studying mercury inputs from streams through water column measurements as well as dragonfly larva. While most mercury inputs are atmospheric, inputs coming through streams fed by historical ditching may provide an opportunity to impact inputs through special projects. The Blackduck River and eight lakes in the watershed were listed as impaired for mercury in fish tissues in 2016. With concentrations below the reporting limit, none of the waters tested for PCBs in the ULRLW are listed as impaired for PCBs in fish tissue (MPCA, 2017). The Minnesota Department of Health (MDH) has statewide fish consumption recommendations, and the RLDNR is updating their guidelines based on findings of Orgon *et al*. (2023).

Groundwater

The ULRLW contains glacial sediment aquifers that provide moderate amounts of groundwater. The surficial geology of the area consists of mainly glacial tills in the southern region and glacial sands and peatlands surrounding Upper and Lower Red Lake to the north. The glacial till deposits consist of sandy, clay-silt loam with fine to medium gravel and a scattering of boulders.

Groundwater quality overall throughout Minnesota meets or is better than EPA water quality standards; however, there are concerns with naturally occurring arsenic as well as human generated contaminants such as nitrates, pesticides, fuel oils, and industrial chemicals. Beltrami County indicated that over 10% of private wells do not meet the arsenic drinking water standard (10 micrograms per liter). However, all the public wells are meeting the arsenic drinking water standard (Beltrami, 2017). Figure 2.8 shows nitrate concentrations in private wells are nearly all below the drinking water standard of 10 mg/L.

There are three Drinking Water Supply Management Areas (DWSMAs) located in Blackduck, Kelliher, and Northome (Figure 2.8). All DWSMAs have similar potential sources of contamination

identified within 200 feet of the system's water sources such as: buried sewer lines, hazardous substance storage, and petroleum storage tanks. Blackduck and Kelliher's sources have low vulnerability while Northome's sources has moderate vulnerability (MDH, 2023).

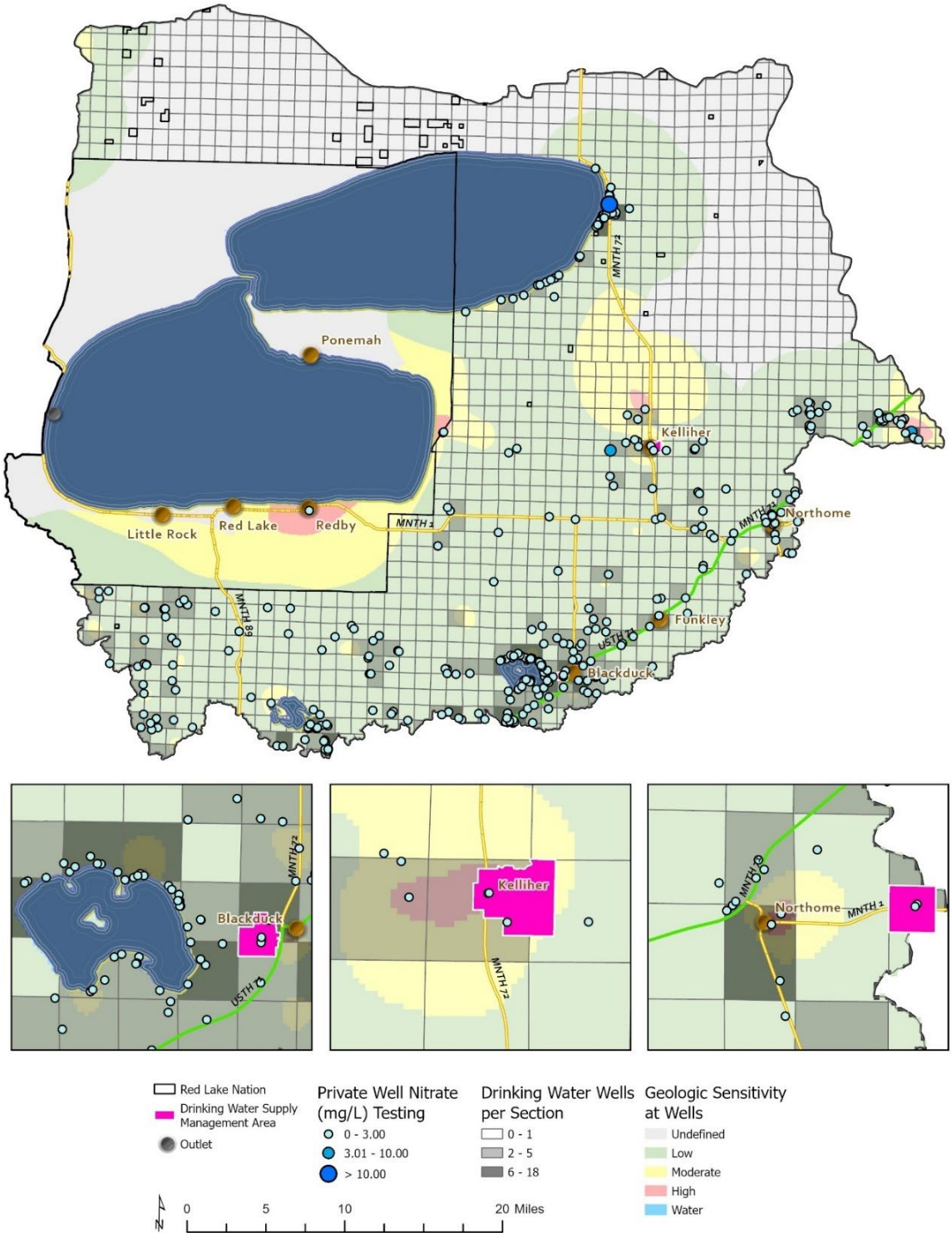


Figure 2.8. Groundwater wells, DWSMAs, and geologic sensitivity (low to high based on the time it takes contaminants at the surface to reach to reach the aquifer).

The Red Lake Nation has its own public water system in their Public Works Division. Red Lake Water and Sewer is responsible for providing safe, adequate water for those connected to the main lines of the community water system. Their drinking water is sourced from groundwater and is regularly tested to ensure the safety of its people.

Habitat

Big Bog State Recreation Area

There are a variety of unique habitats in the watershed, many of which are protected and open to public recreation. There are two Scientific and Natural Areas (SNAs) and parts of Pine Island, Red Lake, Buena Vista, and Beltrami Island State Forests are within the watershed. Not only are there large mammals such as moose, white-tailed deer, black bear, and bobcats, but also a range of unique species such as the burrowing owl, the great gray owl, and the Connecticut warbler. There is one area of critical habitat in the watershed for the federally threatened/endangered species — the gray wolf. The Big Bog State Recreation Area and SNAs are important areas and lie along a major flyway for migratory birds. The Big Bog State Recreation Area is also unique in its rare plant resources and has long been a source of medicinal plants for the Ojibwe People. Many native plants such as the yellow-eyed grass, bog rush, and two kinds of sundews are on Minnesota's endangered or threatened species list (MNDNR, 2023c). There is a total of 21 federally endangered and threatened species in Minnesota and 15 state listed endangered and threatened species. Only one state threatened species, the Canada lynx, lies within the ULRLW (USFWS, 2008).

There are many sites in the watershed that are classified as "outstanding" or "moderate" biodiversity significance by the Minnesota Biological Survey. According to the MNDNR Watershed Context Report, "outstanding sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes (MNDNR, 2017)." Moderate sites slightly differ in that they contain occurrences of rare species, moderately disturbed native plant communities and have a strong potential for recovery (MNDNR, 2017). In addition, there are Lakes of Outstanding Biological Significance, which meet at least one criteria for having an exceptional aquatic plant, waterbird, or amphibian species (Figure 2.9). These lakes include Upper and Lower Red, Blackduck, Bartlett, Medicine, Balm, Julia, Puposky, Sandy, and Medicine.

Bog Rush (MNDNR)

Sturgeon (Joyce Palm)

Sundew (MNDNR)

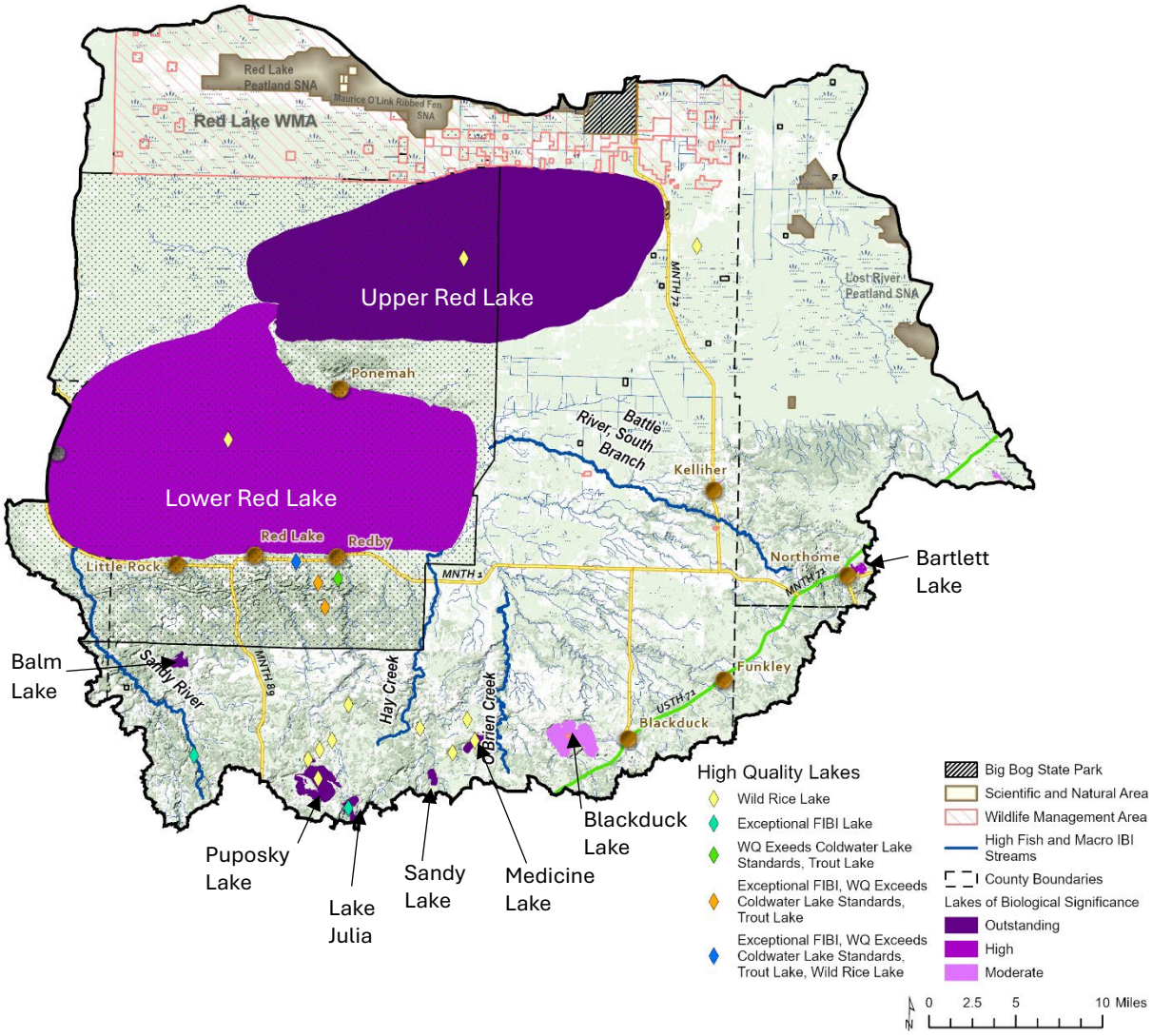


Figure 2.9. Outstanding resources in the ULRLW.

Fisheries

For their size and history, Upper and Lower Red Lake have been identified as unique resources. They are the largest walleye lakes in the state of Minnesota. Besides walleye, species such as northern pike, crappie, bullhead, and native rough fish are all important recreational fisheries. All of Lower Red Lake and about two-thirds of Upper Red Lake is within the reservation with the remaining being State of Minnesota Waters. The lakes are jointly managed by MNDNR and RLDNR under a Memorandum of Understanding that was first signed in 1999 in the effort to restore the walleye fishery after it collapsed. As part of that agreement, the Red Lake Fisheries Technical Committee was formed with members from RLDNR, MNDNR, Bureau of Indian Affairs, and the University of Minnesota.

Commercial fishery voluntarily suspended the fishing season in 1997 to assist in the recovery of walleye. By 2006, the walleye had rebounded to sustainable numbers, and the harvest of walleye was authorized again by both governments. Today, the lake remains healthy, and the annual safe harvest of walleye on the reservation is estimated to be over a million pounds. Smaller lakes are

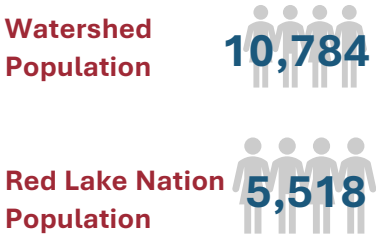
stocked in cooperation with the USFWS to provide some unique opportunities on the reservation, including brook trout and lake trout. Lakes such as Island, Green, Kinney, and Squaw Smith are all managed for trout (MPCA, 2021). The tribe received a grant through USFWS in 2006 to re-introduce lake sturgeon, which was last reported in the Red Lakes in the 1950's. About 10,000 six-to-eight-inch lake sturgeon are stocked in Lower Red Lake annually. Approximately 90,000 have been stocked since 2007 (RLDNR, 2023).

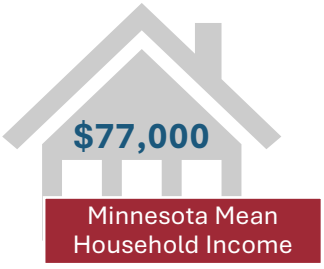
In addition to fisheries, wild rice is an important resource in the watershed. Wild rice (Manoomin in Ojibwe) is a cultural resource to many, particularly members of Minnesota's Dakota and Ojibwe tribal communities, and is an important economic resource to those who harvest and market it (MPCA, 2023). Wild rice has been documented on many mid to small sized lakes, wetlands, and ponds in the southern portion of the watershed, as well as on tributaries to both Upper and Lower Red Lake (MPCA, 2021).

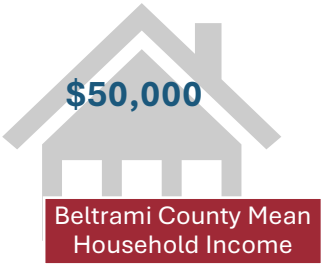
Socioeconomics and population

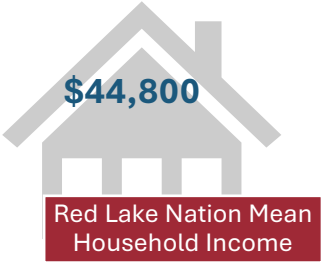
The population of the watershed in 2010 was 10,784 (MPCA, 2021). The population saw little change between 2000 and 2010, and there are approximately 5.6 people per square mile (MNDNR, 2017). However, recreational properties continue to expand, especially at the southern end of the watershed. Populations are generally not expected to increase because of the publicly owned land, wetlands and peatlands, which are unable to be farmed and developed. The population of the Red Lake Reservation is approximately 5,506, although the entire Reservation is not within the boundary of the ULRLW (2020 census).

The most common job groups in the ULRLW are office & administrative support, sales & related occupations and management occupations. Historically within the Red Lake Nation, the two biggest industries of employment have been commercial fishing and logging (RLDNR, 2013). Today, management, business, sciences and art occupations provide the largest number of jobs within the Red Lake Nation (USCB, 2023b). The mean household income in Beltrami, Koochiching, Itasca, and Clearwater counties is around $50,000, which is less than the Minnesota median of $77,000 (USCB, 2023a). The mean income of households within the Red Lake Nation is $44,800 (USBC, 2023b).



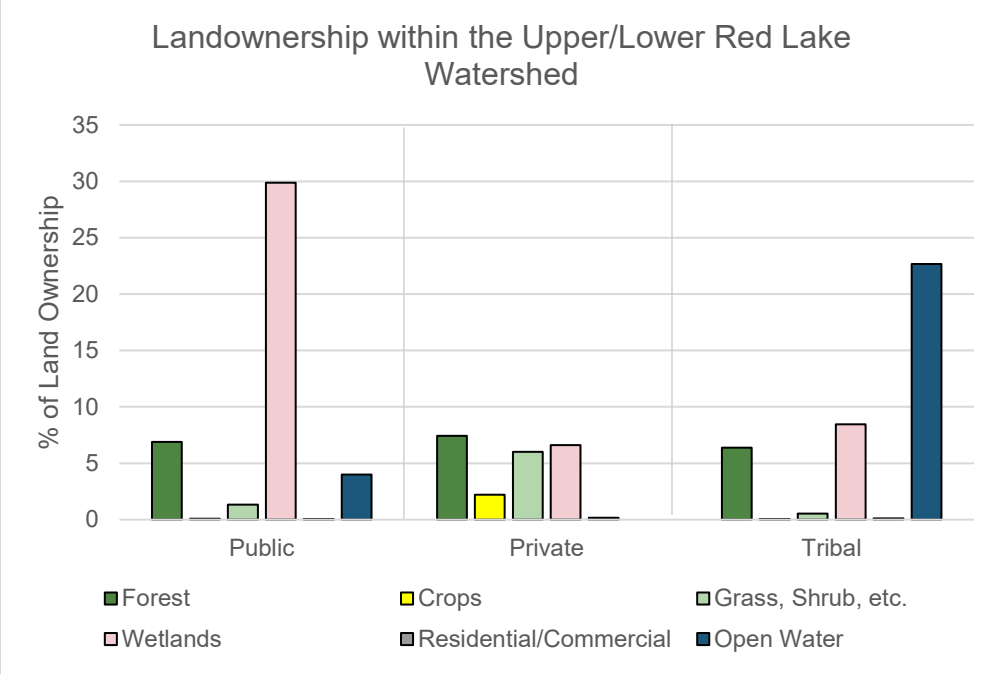






Land Ownership

Tribally owned or managed lands account for 38% of the area of the watershed, followed closely by State owned lands with 37%. About 23% of the land is privately owned with the remaining 2% being federal and county lands (USDA/NRCS, n.d.). Land use by ownership type is represented in Figure 2.10.



Over the past 25 years, six surveys have shown that the main reason people own forestland in Minnesota is for hunting, followed by wildlife habitat, residence, aesthetics and solitude (Beltrami, 2017).

Figure 2.10. Land ownership within the ULRLW (USDA/NRCS, n.d.).

FUTURE

The ULRLW continues to be a focal point for northwestern Minnesota for commerce, recreation, and tourism. The abundant opportunities for walleye fishing are important to the community as well as tourists. From past experiences, it is already known that this precious resource can become vulnerable quickly if not managed properly and if the water quality of the lakes diminishes. In the future, it is essential to continue to improve and protect our resources in the watershed so that the streams, rivers, and lakes can provide cultural, recreational, and habitat value that will allow for these successful industries to continue.

PRIORITY ISSUES

SECTION 3.
PRIORITY ISSUES

"Issues" are concerns or opportunities that can be addressed to protect or restore natural resources in the watershed. The issues for this watershed were developed thoughtfully over the course of four months by assembling issues in existing plans and studies, gathering public input, holding subject meetings with the Advisory Committee and Subject Matter Experts, and then finalizing the issues for this plan (Figure 3.1). This plan section describes the issue gathering and prioritization process in detail.

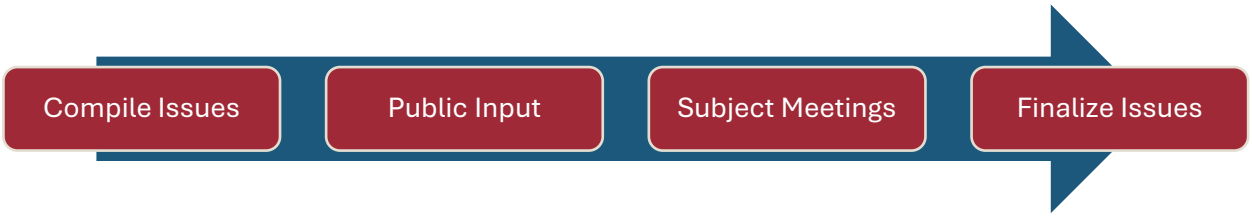


Figure 3.1. Issues gathering and prioritization process.

Compile Issues

The planning process did not start with a blank slate, as there are numerous local and regional plans and studies that already exist for this planning area. These plans and studies provide a prolific backdrop for history and data for developing this plan.

First, issues were collected from the following sources:

- ULRL Watershed Restoration and Protection Strategy Report (WRAPS) and associated documents:
  - *Stressor Identification Report (SID)*
  - *Monitoring and Assessment Report (MAR)*
  - *Total Maximum Daily Load Report(TMDL)*
- Beltrami County Local Water Management Plan
- Koochiching County Comprehensive Local Water Management Plan
- RLWD 10-Year Comprehensive Plan
- Red Lake Band of Chippewa Indians Surface Water Data Summary
- Numerous studies on Bartlett Lake (See Appendix I. for a full list of references)

Additionally, issues were compiled from information gathered at the beginning of the planning process, including state agency priority concern letters (MPCA, BWSR, Minnesota Department of Agriculture [MDA], MDH, and DNR), and a brainstorming exercise at the first Advisory Committee Meeting in July of 2023.

Common themes began to emerge from these diverse sources. The compiled issues were grouped into five resource categories to help frame the concerns: Forests & Habitat, Lake & Stream Water Quality, Land Stewardship, Groundwater Quality & Sustainability, and Hydrology.

Resource Categories

Forests & Habitat

Maintain and protect habitat and forestry resources to benefit the species that are important to the local ecosystem and those that we love to observe, hunt, and fish.

Lakes & Streams

Managing the nutrients, sediment, and bacteria that result from shoreline development, septic systems, agriculture, and industry to improve and protect water quality into the future.

Land Stewardship

Protecting the soils in agricultural lands to preserve productivity and protect the water quality of streams and lakes in the area.

Groundwater

The quality and quantity of groundwater as a resource and a drinking water source.

Hydrology

Alteration of landscape changing water drainage, storage, and connections in the watershed.

Public Input

Public input was gathered from an open house in Kelliher on August 15, 2023, a public meeting in the Red Lake Nation on October 25th, 2023, and a public online survey.

Open House

The open house in Kelliher included attendance from 17 local citizens and local agency staff. Meeting participants were invited to vote with pennies on which resource concern they would spend time and funding resources. The highest priority was lake and stream water quality followed by groundwater quality and sustainability.

Public Open House in Kelliher

Public Survey

The public survey was another method for receiving public input on watershed issues. There were 37 responses, and a full summary report can be found in Appendix B. The top ranked issues were protection of unique and high-quality resources, habitat quality for fish and wildlife, and groundwater quality (drinking water).

Subject Meetings

In August through November 2023, subject-based meetings were held for each of the five resource categories. These meetings were attended by the Advisory Committee and subject matter experts. For example, at the Forestry and Habitat meeting, representatives from the MN DNR Forestry, RLDNR Forestry, MN DNR Wildlife, and RLDNR Fisheries attended as subject matter experts to discuss habitat degradation, peatlands restoration, and conservation easements and acquisition. At these meetings, participants developed the priority issues for the specific subject (resource category) and brainstormed actions that could be implemented to address the issue. Figure 3.2 outlines the full process and products for these meetings.

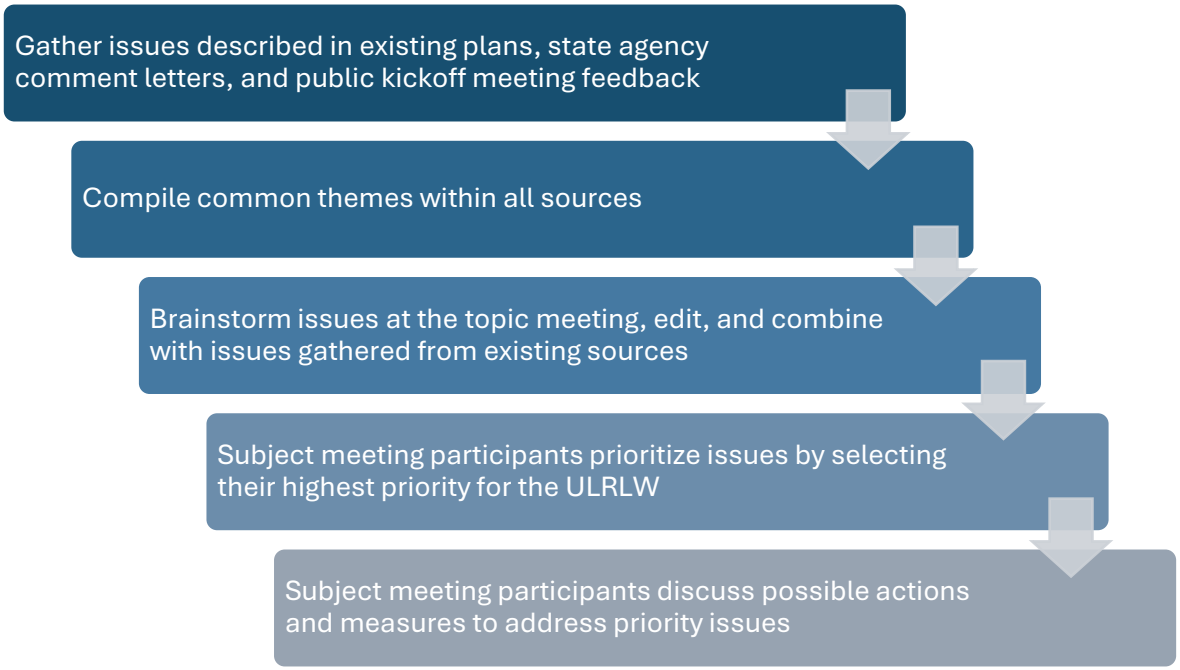


Figure 3.2. Process for subject-based meetings.

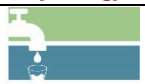
After the subject meetings were complete, the Steering Committee met in the winter of 2023/2024 to evaluate all the issues that were developed at the subject meetings. Issues were combined based on similarity. The revised issues were then reviewed by the Advisory and Policy Committee and approved. The finalized issues are presented on the next page (Table 3.1).

Fishing Pier on Bartlett Lake

Finalized Issues

The final issues, covering all five resource categories, will be the focus for the implementation of this plan (Table 3.1).

Table 3.1. Priority Issues for the ULRLW.

Resource	Issue Theme	Description
 Lakes & Streams	**Nutrients**	Excess nutrients contribute to excess algal growth along with recreational and biological impairments.
 Lakes & Streams	**Bacteria**	Bacteria runoff impacts aquatic recreation and human health.
 Lakes & Streams	**Protection**	Forest loss, fragmentation, and patchwork land ownership impacts water quality and habitat.
 Lakes & Streams	**Protection**	Changes to the definition of waters of the U.S. has potential to leave some wetlands with less protections.
 Lakes & Streams	**Eroding Watercourses**	Eroding watercourses and sedimentation contribute to impairments and reduced habitat quality.
 Hydrology	**Altered Hydrology**	Historical ditching, improperly sized culverts, and a dam alter the natural flow of water, increasing flashiness and erosion, and degrading habitat.
 Groundwater	**Groundwater**	Groundwater quality and quantity need ongoing testing and lacks an easy solution.
 Land Stewardship	**Soil Health**	Decreased soil health can reduce agricultural productivity, water holding capacity, and climate resiliency.
 Forests & Habitat	**Forest Health**	Forest health and habitat is vulnerable to climate variability, pests, invasive species, and lack of management, which can affect species composition and forest productivity.
 Forests & Habitat	**Aquatic Connectivity**	Aquatic connectivity barriers impact biological communities and stream morphology.
 Forests & Habitat	**Riparian Alteration**	Riparian and in-lake alteration from development impacts water quality, lake health, and fish communities.

ADDITIONAL CONCERNS

Resources in the ULRLW are affected by many variables, including concerns that lack detail or have unknown effects on natural resources. These concerns are outlined in this section. Due to their uncertain nature, actions to address them will vary from monitoring to accounting for benefits of other planned actions.

Larger Scope Concerns

Peatlands and Carbon Dynamics in the ULRLW

Peatlands are an extremely valuable land type as they cover 3% of the land on Earth yet store 30% of soil carbon. Most of Minnesota's peatlands occur in the northern part of the state, which account for 12% of the peatlands in the United States (Krause, 2021) (Figure 3.3).

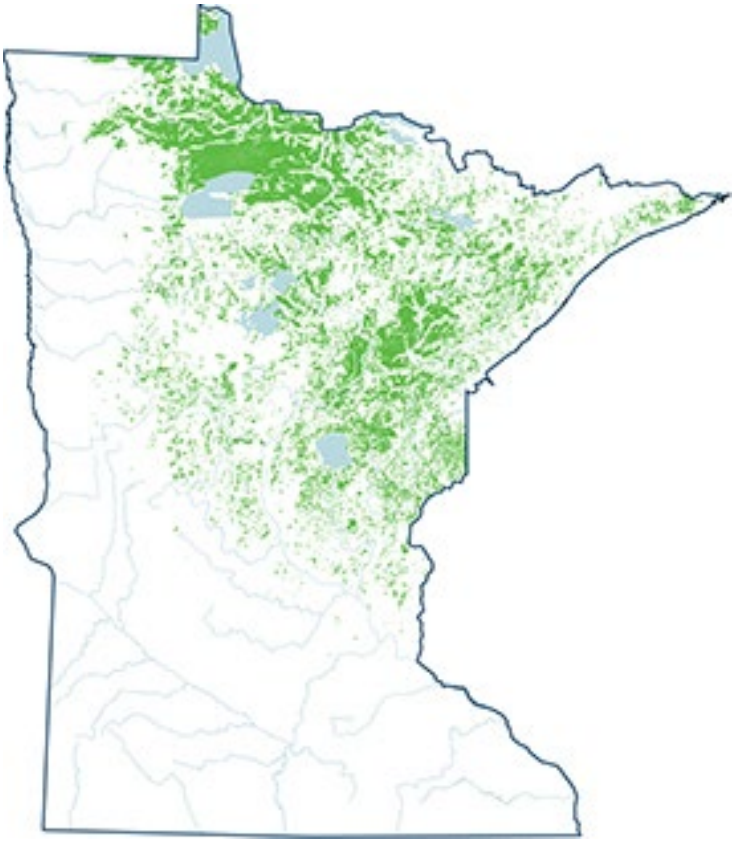


Figure 3.3. Peatlands in Minnesota (DNR).

Peatlands are a valued ecosystem due to their role in the global carbon cycle and the unique habitat that supports many rare species. Colder temperatures and wet soils slow decomposition of organic matter, so carbon is stored in peatlands over time. However, the critical role of peatlands was not always understood; in fact, the saturated land was seen as a barrier to agriculture, and extensive drainage efforts occurred in the early 20th century. These ditches in peatlands largely failed to create land suitable for agriculture while altering its ability to store carbon (Krause, 2021). Draining peat allows anaerobic environments to be exposed to oxygen, allowing for decomposition and release of carbon stored in the peat soil into the air as CO_2. We now have a better understanding of the ecosystem services that peatlands offer in providing habitat, storing water, cycling nutrients, and filtering contaminants (Figure 3.4). Restoration and protection of peatlands is a priority, given that the changing climate is creating conditions that may alter the balance of peatlands from storing carbon to releasing it.

As temperatures rise, the wet surface of the peat begins to dry out, reversing the anaerobic conditions that stored carbon. Aerobic decomposition of peatlands can turn the land from a sink of carbon to a source.

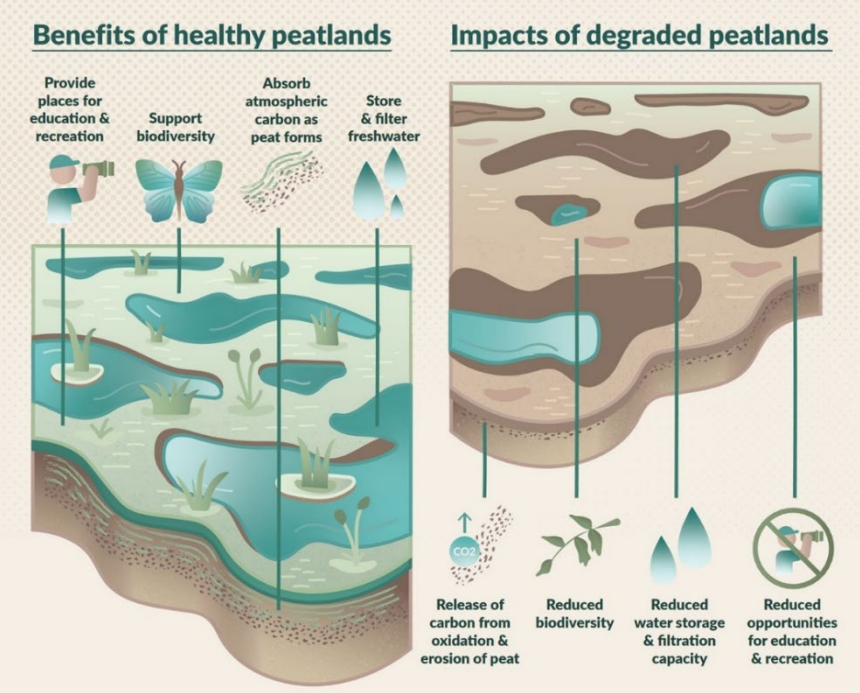


Figure 3.4. Peatland benefits and impacts of degradation.

A study on the Glacial Lake Agassiz Peatland located in the ULRLW reported that bogs and fens in the watershed were likely a carbon sink, annually storing about 12 g carbon/m^2 or 19,000 kg carbon in the watershed (Rivers et al., 1998). However, the article acknowledges that the peatlands serving as a carbon source are within the uncertainty of the model and particularly notes the role of the water table elevation in maintaining an anaerobic environment to store carbon. If water table elevation lowers, carbon fixed from photosynthesis can be released into the atmosphere via aerobic decomposition.

A study in the Northern MN Bog Lake Peatland (east of ULRLW) measured carbon dioxide flux and photosynthesis rates over two years and found that the peatland was a source of carbon during the first dry year, and a sink of carbon over the following year which had sufficient precipitation. The authors concluded that higher temperatures decreased photosynthesis (and therefore carbon fixation) and warned that climate change may make the carbon dynamics of the first year (peatlands releasing carbon) more likely (Shurpali et al., 1995).

Research shows that peatlands in Northern Minnesota are generally a carbon sink, but they need cold and wet conditions to maintain this carbon storage. An understanding of the key role that peatlands have in sequestering carbon and the fine balance of peatlands turning from a carbon sink to source should inform management decisions in the watershed.

Mercury

Mercury is a global pollutant that is transported by air, stored in soil, and chemically transforms and bioaccumulates in water. Mercury is a neurotoxin; it can accumulate to levels in fish that are potentially toxic to humans and wildlife. Of tested waterbodies, 1,696 bodies of water have been declared impaired by mercury in fish tissue and/or in the water in the state of Minnesota (1,249 lakes and 447 rivers) (MPCA, 2023a). Historically, mercury was thought to have been introduced to an area based on local geology. However, it is now understood that 99% of mercury load to Minnesota lakes and streams is from atmospheric deposition. Seventy percent of that atmospheric deposition is from anthropogenic (human) sources see Figure 3.5. The remaining

30% is from natural sources such as volcanoes. The amount of mercury that is mobilized and released into the biosphere has increased since the beginning of the industrial age. It accumulates most efficiently in the aquatic food web. Predators at the top of the food web generally have higher mercury concentrations.

Rather than individual TMDLs for impaired waters, there is a statewide mercury TMDL (Table 3.2).

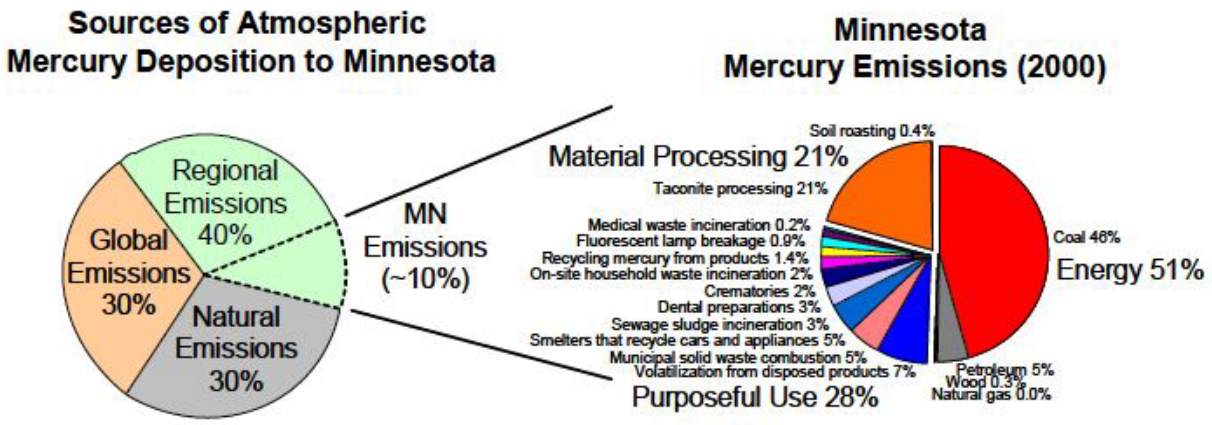


Figure 3.5. Sources of mercury deposition and estimated mercury emission sources in Minnesota (MPCA, 2007).

Minnesota's target level for mercury in fish is 0.2 mg/kg (parts per million, ppm). It is lower than the EPA's 0.3 ppm criterion due to the higher fish consumption rate in the state. The 0.2 ppm corresponds to fish consumption advisory threshold of one meal per week. If mercury is above 0.2 ppm, the consumption advice is one meal per month. Within the ULRLW, there are impairments for Aquatic Consumption/Mercury in fish tissue in these bodies of water: Blackduck River, Dellwater, Balm, Sandy, Upper Red Lake, Blackduck, Julia, Clear, and Dark (MPCA, 2023a). Each impaired water is required to have a Total Maximum Daily Load (TMDL) study. The TMDL is an evaluation of (1) pollutant sources, (2) pollutant load reduction needed to meet water quality standards and (3) allocation of the acceptable load to all sources. The pollution allocation to atmospheric source will be the same for these waters because the source of all MN waters is atmospheric and shared by all mercury-impaired waters of the state (MPCA 2007).

Table 3.2. Minnesota's mercury TMDL emissions reduction goal (MPCA, 2007)

	Annual Statewide Mercury Emissions	
State mercury emissions for 1990	11,272 lb	(5,113 kg)
Mercury Emissions Reduction Goal (0.93 • 1990 emissions)	10,483 lb	(4,755 kg)
Mercury Emissions Goal (1990 Emissions – Reduction Goal)	789 lb	(358 kg)
Emissions reduction as of 2005 (70% of 1990 emissions)	7,931 lb	(3,597 kg)
Emissions reduction remaining as of 2005 to achieve goal	2,552 lb	(1,158 kg)
Percent of 1990 Emissions Reduction Goal remaining as of 2005	24%	

Based on the mercury emissions inventory for 2005, 76% of this emissions reduction goal has been achieved; therefore, as of 2005, 24% of the reduction goal remains.

There are point and nonpoint sources of mercury in Minnesota's fish, including any discharge to a water body by pipe or channel, wastewater treatment plants, industrial waste discharge, and municipal stormwater discharge. Other sources of emissions could be from energy production, material processing, taconite processing, fluorescent lamp breakage, crematories, sewage sludge incinerators, and municipal solid waste combustion. A study measuring spatial and temporal variability of mercury in walleye in Upper and Lower Red Lake sampled fish between 2019 and 2020 and showed that there was a significant difference in mercury concentrations between Upper and Lower Red Lake. Observed differences in mercury concentrations could be linked to wetland area influences. Previous studies have shown that wetlands can act as a massive storage system for mercury (Orgon et al.,2023).

Our ability to understand and model atmospheric transport and deposition of mercury is difficult due to the various chemical forms that mercury can assume. Essentially all mercury emitted to the atmosphere will eventually deposit on the Earth's surface, but it is difficult to predict when and where. After mercury deposits on the surface of the Earth, only a small amount of mercury becomes buried under sediments in lakes, oceans, or river deltas. It's held there for a geologically short amount of time (10,000-100,000 years) and then can be leached, eroded, or volatilized back to the atmosphere.

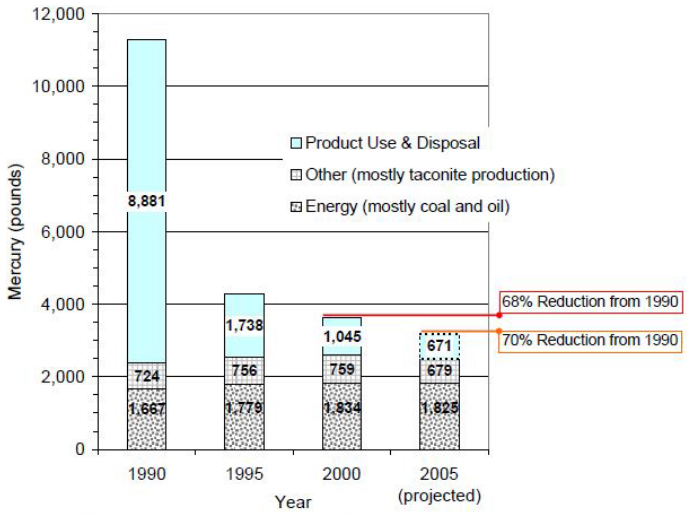


Figure 3.6. Minnesota statewide mercury emissions trend by source (MPCA, 2007).

Future mercury emissions from manufacturing and fuel combustion are expected to decline worldwide and are decreasing at a rate of about 1.3% per year (decline seen in Figure 3.6). Mercury emissions associated with coal combustion are also expected to eventually decline worldwide but could be delayed due to developing countries.

Climate Variability

Temperature and rainfall are increasing throughout Minnesota, and long-term planning efforts should address these changes locally. The BWSR Climate Change Trends and Action Plan Outlines the most visible changes for the state:

- Warming Temperatures: Temperatures in Minnesota have risen 2.5°F since the beginning of the 20th century (MNDNR, 2023). Warming has been concentrated in the winter and at night, while summers have not warmed as much.
- Increased Precipitation: Heavy rains are more common and more intense. Spring precipitation is projected to increase by about 15% to 20% by midcentury (MNDNR, 2023).
- Extreme precipitation: Extreme precipitation events (6 inches or more in a day) are projected to increase in frequency and intensity, resulting in increased flooding, erosion, infrastructure damage, and agricultural losses (MNDNR, 2023).

The DNR's Evaluation of Hydrologic Change (EHC) technical report identified trends in hydrologic conditions in the watershed. The EHC report identified 1998 as the point of greatest hydrologic change within the ULRLW. The watershed is receiving 1.0 more inch of precipitation on average compared to the pre-1998 period, with data going back to the 1890s (DNR, 2023d). While the DNR does not categorize this as a significant increase in precipitation, monthly and yearly variations are significant: since 1998, the ULRLW has experienced a 78% increase in very wet and a 66% increase in extremely dry conditions when accounted for on a monthly basis (DNR, 2023d). Although precipitation is only increasing slightly, times of extreme drought and wetness are occurring more often, putting hydrologic stresses on the watershed.

In the past decade, we have seen these patterns become increasingly variable. The summer of 2021 was marked by extreme and exceptional droughts by late summer of 2021, as rated by the US drought monitor (NDMC, 2023). The fall of 2019 brought high levels precipitation across the Upper Lower Red Lake Basin, nearing the historic 1999 flood levels (Figure 3.7).

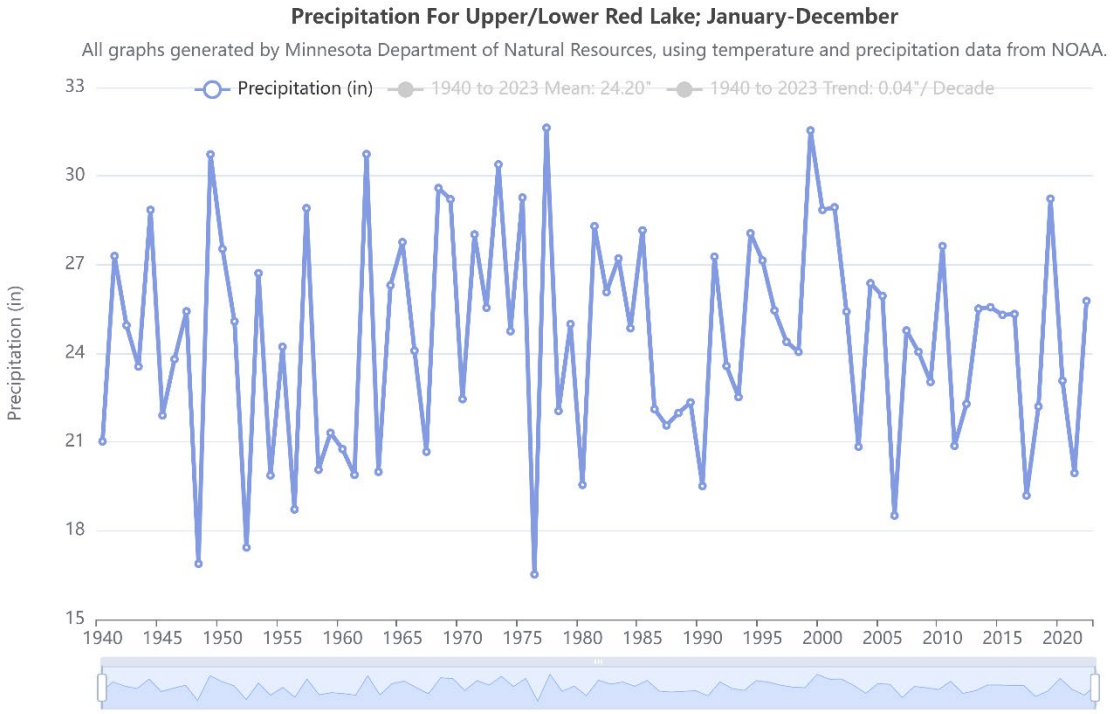


Figure 3.7. Annual precipitation in ULRLW.

In addition to this variability, the annual average precipitation and annual average temperature are increasing across the ULRLW.

0.04 inches annual increase of precipitation per decade.

0.36°F annual average increase of temperature per decade.

0.25°F annual maximum increase of temperature per decade.

0.48°F annual minimum increase of temperature per decade.

Increasing temperature and changing precipitation patterns can affect water resources and other natural resources on the landscape. Heavier, more frequent, and longer duration rainfall events increase soil erosion and runoff, degrading water quality. More extreme weather events are putting additional pressure on drainage infrastructure, leading to a potential for more erosion to occur in systems that do not have adequate outlets or erosion controls in place. Northern forests could significantly change in structure from the spread of emerald ash borer and woody invasive species such as common and glossy buckthorn and invasive honeysuckles. Some areas are expected to transition from coniferous forest to savanna as the climate warms. Wetland health has been impacted due to more frequent extreme rainfall events and prolonged inundation of vegetation that favors invasive species and disrupts the life cycle of aquatic organisms (MNBWSR, 2022).

Other actions in this plan will help to address and mitigate changes in temperature and precipitation. Increasing carbon storage by conservation practices, forestry protection and restoration, and wetland/upland buffers are examples of practices that can mitigate and improve the resiliency of the watershed to future increases in temperature and precipitation. Plan goals related to hydrologic restoration and stream and ditch bank stabilization are described in Section 4.

Local Concerns

Local concerns are important considerations to water and land management. Associative resource categories and goals in the plan can address components of these concerns.

Headwaters Accountability

The planning region partners recognize that the ULRLW is the headwaters to numerous downstream water resources including Red Lake River and the Red River of the North. Responsible management in this watershed not only immediately benefits landowners within the ULRLW but has long term benefits on landowners downstream.

Ice Fishing Waste

Credit: Robyn Dwight

A common concern during ice fishing season is the cleanliness of water resources and shorelines resulting from litter and human waste left on water bodies. Keep It Clean is an organization jointly created by the Lake of the Woods Tourism Bureau, the MN DNR, Lake of the Woods SWCD, Roseau County SWCD, and The Friends of Zippel Bay State Park to promote cleanliness at Lake of the Woods, a common spot for anglers in the winter months. The Upper Red Lake and Mille Lacs Lake Associations joined soon after its creation. During the 2022-2023 ice fishing season, the campaign grew from three to over fifty lakes and SWCDs. Beltrami SWCD and Upper Red Lake Area Association along with other local partners have implemented a successful waste removal and education program. Additionally, Minnesota passed a law in 2023 making it illegal to leave garbage or waste on the ice. Given the high levels of winter use, it is important that garbage and human waste is managed. Continuing to support the Keep It Clean program and monitor increased use of these water bodies during winter will be important moving forward.

Invasive Species

Eastern larch beetle devastating northern Minnesota tamaracks (DNR)

Invasive species are any non-native species that have the potential to cause ecological or economic harm, including both terrestrial and aquatic species. The biggest invasive species threats are from forest pests that may invade parts of the watershed, partly due to increasing temperatures. These potentially include new or worsening infestations of Eastern Larch Beetle, Spruce budworm, pine bark beetles, and Emerald ash borer. Wilts, rusts, and other diseases may become more common too. Other terrestrial invasive species may have localized concerns and County Agriculture Inspectors will continue to enforce the Minnesota Noxious Weed Law (MN Statutes 18.75-18.91). Noxious weeds are defined as any annual, biennial, or perennial plant that the Commissioner of Agriculture designates to be injurious to public health, the environment, public roads, crops, livestock, or other property. Buckthorn, wild parsnip, purple loosestrife, leafy spurge, spotted knapweed, and other invasive species are of the greatest concern in this watershed. See below for links to County Agriculture Inspector information.

- https://www.beltramiswcd.org/agricultural
- https://www.co.koochiching.mn.us/301/Invasive-SpeciesNoxious-Weeds
- Weed and Seed Program - Clearwater County, MN

Regarding aquatic invasive species (AIS) in the planning area, Upper Red Lake is infested with starry stonewort and zebra mussels. However, as of 2024, only zebra mussel veligers (larval stage) have been found, suggesting the characteristics of the lake such as pH, substrate, and depth are preventing zebra mussels from growing (Pribyl, n.d.). Blackduck is listed for starry stonewort and faucet snail. Clearwater, Koochiching, Itasca, and Beltrami SWCDs all have their own AIS programs in place, with a dedicated funding source. These programs will remain, and this plan will aim to supplement those efforts as needed.

- https://www.beltramiswcd.org/lakeshore
- https://koochichingswcd.org/ais/
- https://clearwaterswcd.com/aquatic-invasive-species
- Aquatic Invasive Species (itascaswcd.org)

Population Growth in the Red Lake Nation

The population in the Red Lake Nation is growing at a rapid rate. Land use planning is needed for responsible growth that protects and benefits natural and cultural resources.

Emerging Concerns

Emerging concerns are similar to other prioritized issues in the watershed but are outside of the scope of this plan and still have an impact on land and water-based resources. They may become more central issues in the watershed in the future and can be addressed more fully in revisions of the plan in the coming years.

Increasing Algae Blooms

Algae naturally occurs in almost all surface waters. They are an essential source of food for aquatic organisms, but under the right circumstances, algae can grow very rapidly and form dense populations. A few of these blooms produce toxins that can kill fish, mammals and birds and may cause human illness. Other algae are nontoxic but can clog the gills of fish and invertebrates, submerge aquatic vegetation, and eat all the oxygen in the water as they decay (NOAA, 2023). Phosphorus is the leading pollutant in Minnesota lakes that fuels the growth of algae. In 25% of Minnesota lakes, levels of phosphorus and algae are too high, so the lakes are not meeting the water quality standard for recreation. With increasing temperatures due to climate change, a warmer climate promotes even more algae growth. The Minnesota Pollution Control Agency (MPCA) recommends that landowners and residents can help reduce phosphorus in lakes by (MPCA, 2023b):

- Reducing urban stormwater with rain gardens, rain barrels, and fewer impervious surfaces.
- Use phosphorus-free lawn fertilizer, keep grass clippings and other yard waste out of storm drains, and pick up after pets.
- Reduce runoff from cropland by planting cover crops, increasing organic matter, and reducing tillage.
- Plant deep-rooted native plants along ditches, lakes, and streams to slow down and filter runoff.
- Manage manure responsibly to keep it out of lakes and streams.

Contaminants of Emerging Concern

There are several contaminants of emerging concern that have not been traditionally addressed in watershed plans. Recent research has identified several emerging anthropogenic contaminants that raise health concerns (Capolupo et al., 2021; Martin et al., 2022; Valbonesi et al., 2021). These include per- and polyfluorinated substances (PFAS), microplastics, estrogenic compounds, wastewater treatment plant land application, pharmaceuticals, and more. While not of immediate concern, these other contaminants can be monitored and addressed if found to be exceeding healthy limits.

GOALS & IMPLEMENTATION

SECTION 4.
GOALS AND IMPLEMENTATION

Introduction

Goals and Implementation are the culmination of the planning process: bringing together the identification of issues in the watershed, the goals that planning partners created to make progress towards addressing the issues and implementing the actions to achieve the goals. In this plan, the actions are organized by goal, so this section combines the goals and actions with the following format:

1. Measurable Goal fact sheet;
2. Map showing where implementation will be prioritized and targeted; and
3. Targeted Implementation Schedule including actions, timelines, responsibilities, and costs.

Measurable Goals

Goals describe the measurable change desired in the priority resources and how progress will be tracked. Goals are developed to address all the issues, although it is not a one-to-one process as a single goal can address multiple issues. The Steering Committee drafted seven goals that will guide the implementation of this plan. The goals were reviewed and revised by the Advisory Committee, and then approved by the Policy Committee. They address all the priority issues of the plan (Section 3).

Different data sets and models were used to determine the goal numbers. Data on past accomplishments in the watershed from local sources, NRCS, and the MPCA's Healthier Watersheds website was used to determine the current rate of implementation for agricultural BMPs, riparian enhancement projects, forest stewardship plans, land protection, and well sealing. These past numbers informed the goal numbers for the next ten years. The WRAPS, TMDL, and Lakes of Phosphorus Sensitivity Significance studies were used to develop goals for the lakes. Partners from local, state, and tribal agencies met in a subcommittee to develop the goal for hydrologic restoration.

The seven goals are summarized below by name.


Agricultural Land Management


Riparian Enhancement


Lake Enhancement


Forest Management


Land Protection


Drinking Water Protection


Hydrologic Restoration

In this section, goals are laid out over two pages each with the descriptions below. Detailed information on actions and costs to reach these goals is described in Section 5 of this plan.

- Description: Background and justification for the goal.
- Resources: Resource categories addressed by the goal: surface water quality, hydrology, habitat & forestry, groundwater, and land stewardship.
- Issues Addressed: Which priority issues the goal addresses (Section 3).
- Outcomes: What the goal is working towards in laymen's terms.
- Goals: The short-term goal is the quantity of how much progress will be achieved during the ten-year plan. The desired future condition is the long-term outcome we are striving to attain in the resource, regardless of the time frame.
- Prioritization and Targeting: Map(s) of where work towards the goal will be prioritized and targeted.

Targeted Implementation Schedule

The Targeted Implementation Schedule outlines the actions that will be taken during implementation of the plan to achieve each goal, who will do them, where they will be targeted, and how much it will cost. Funding is summarized in two categories (Table 4.1), and these categories are additive. Each action in the Targeted Implementation Schedule has a funding level associated with it. The funding in black describes the funding used by MOA planning partners, while funding in green is partner projects or funding that does not go through MOA planning partners. Sometimes an action has two funding levels. An example of two funding levels is if the project is funded with both state and federal funding sources. Inflation was not considered in future costs. For more details about funding, see Section 6.

Table 4.1. Funding levels in the ULRLW.

Description	Annual Total	10 Year Plan Total
Amount needed to implement this plan through MOA Planning Partners: *Baseline + WBIF + 319 Funding + Grants*	$1,426,500	$14,265,000
Other/Partner Funding Sources *SFIA, NRCS, DNR, USFWS, CWF, LSOHC, etc*	$1,875,000	$18,750,000

Implementation of each action will occur through one of five programs, described below and indicated through the icon in the 'Program' column of the targeted implementation schedule. Further detail on implementation programs is described in Section 5.

GOAL: AGRICULTURAL LAND MANAGEMENT

Description

Agricultural production is an important part of the local economy and supplies food, creates jobs, boosts investment in local businesses, and generates tax revenue. Managing agricultural land to improve soil health is important for improving production, downstream water quality, and climate resilience. Soil health is defined as the ability of soil to function as a vital living ecosystem. Biologically active soil stores carbon in the soil, improves the ability of soil to infiltrate and holds water in the soil profile. It also improves nutrient cycles, making nutrients more available to plants.

Resources

Issues Addressed

- Soil Health
- Nutrients
- Bacteria
- Groundwater

Outcomes

- Higher crop yields
- Improved water quality
- Improved fish and wild rice habitat
- Climate change resilience

In addition to the agricultural community, the fisheries and wild rice industries also benefit from soil health and maintaining soil on the land. Six percent of the land in the ULRLW is in crop/pasture/hay production, but twenty-four percent is open water. Management of the soil could help prevent soil from eroding into the streams and lakes. Upper and Lower Red Lake have been identified as a unique resource, being the largest walleye lakes in the state of Minnesota. Also, the Red Lake Nation is a community that is highly dependent on fish as a source of food and an economic resource. Keeping the soil healthy and in place allows for water quality to improve, while also improving the fish and plant habitats.

BMPs that address upland pollutant sources (keeping the nutrients on the land before they get to the water) such as cover crops, nutrient management, prescribed grazing, pasture water management, and conservation tillage will be implemented through this goal. The short-term goal is to have BMPs on 10% of pasture and croplands in the watershed.

Goals

Metric: # of acres of BMPs (i.e. cover crops, no-till, and grazing management).

Short-Term (Ten-Year) Goal

Implement BMPs on **2,805 acres** of pastureland and **4,224 acres** of cropland (10% of agricultural acres in the watershed).

Desired Future Condition

Continued annual implementation of BMPs on agricultural land, contributing to clean water, food, and air.

Prioritization and Targeting

Agricultural land management will be prioritized in areas where there are priority streams, *E.coli* impairments, and the highest sediment load (Figure 4.1). See impairments in Table 4.3 and Figure 2.7. This goal focuses on upland pollutant sources, separating it from the nearshore focus of the riparian enhancement goal. Programs will be targeted to agricultural land based on the highest risk to water quality (Figure 4.2). Achieving this goal also will achieve the secondary benefits illustrated in Table 4.2.

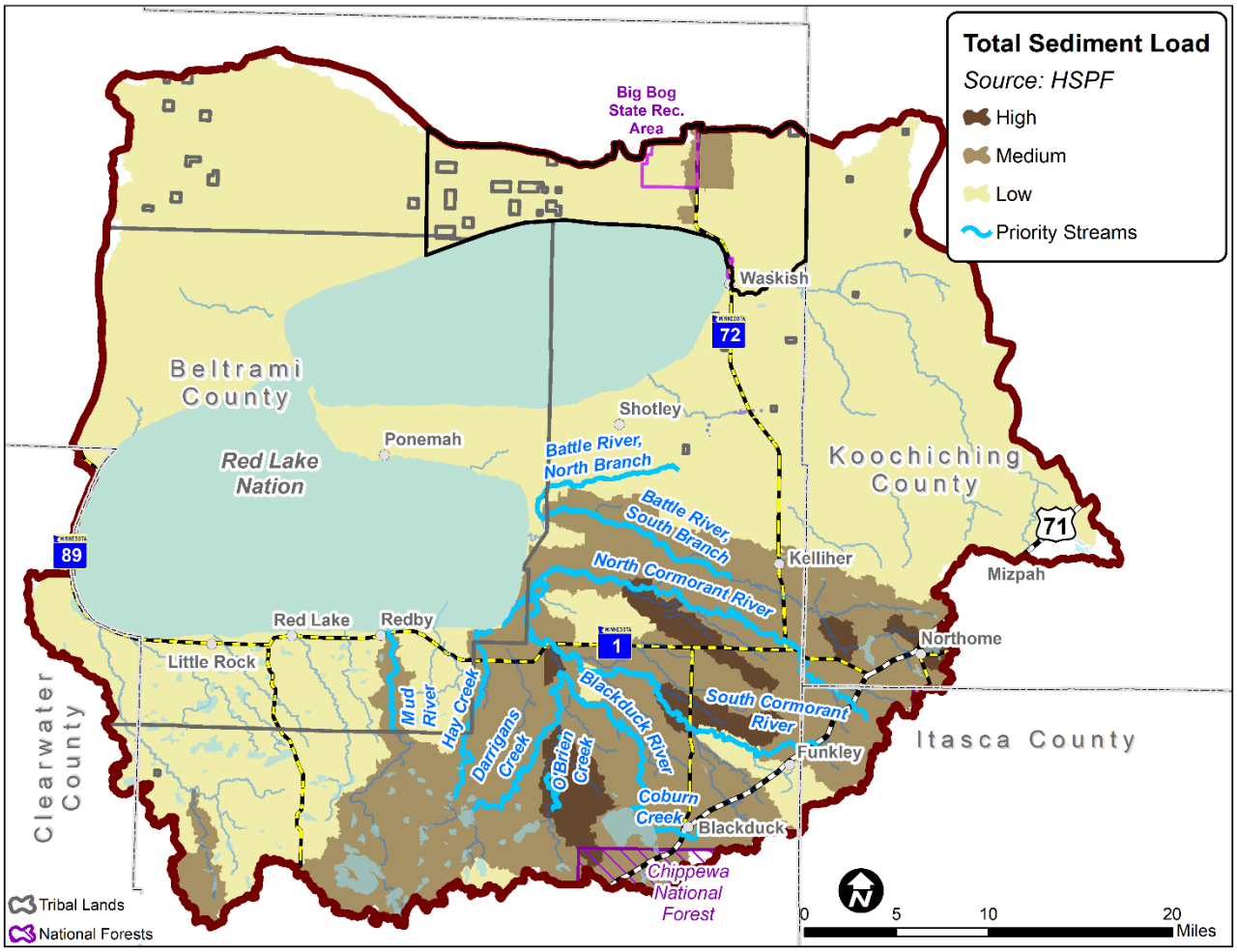


Figure 4.1. Total sediment load and priority streams in the ULRLW.

Table 4.2. Secondary stacked benefits. Work toward this goal also makes progress towards reductions in phosphorus, sediment, and nitrogen to surface and groundwater and sequesters carbon. For details on calculations, see Appendix C & D.

Benefits	Parameter	Reduction	Real World Equivalent
Surface Water Quality Benefits (HSPF SAM)	Sediment	133 tons reduced (6%)	133 dump trucks of sediment
	Phosphorus	499 pounds reduced (3%)	250,000 pounds of algae
	Nitrogen	5,629 pounds reduced (3%)	1,317 bags of nitrogen fertilizer
Climate Resiliency Benefits	Carbon Sequestration from Ag BMPs	939 metric tons of CO_2 annually	equivalent to greenhouse gas emissions from 223 vehicles driven for one year

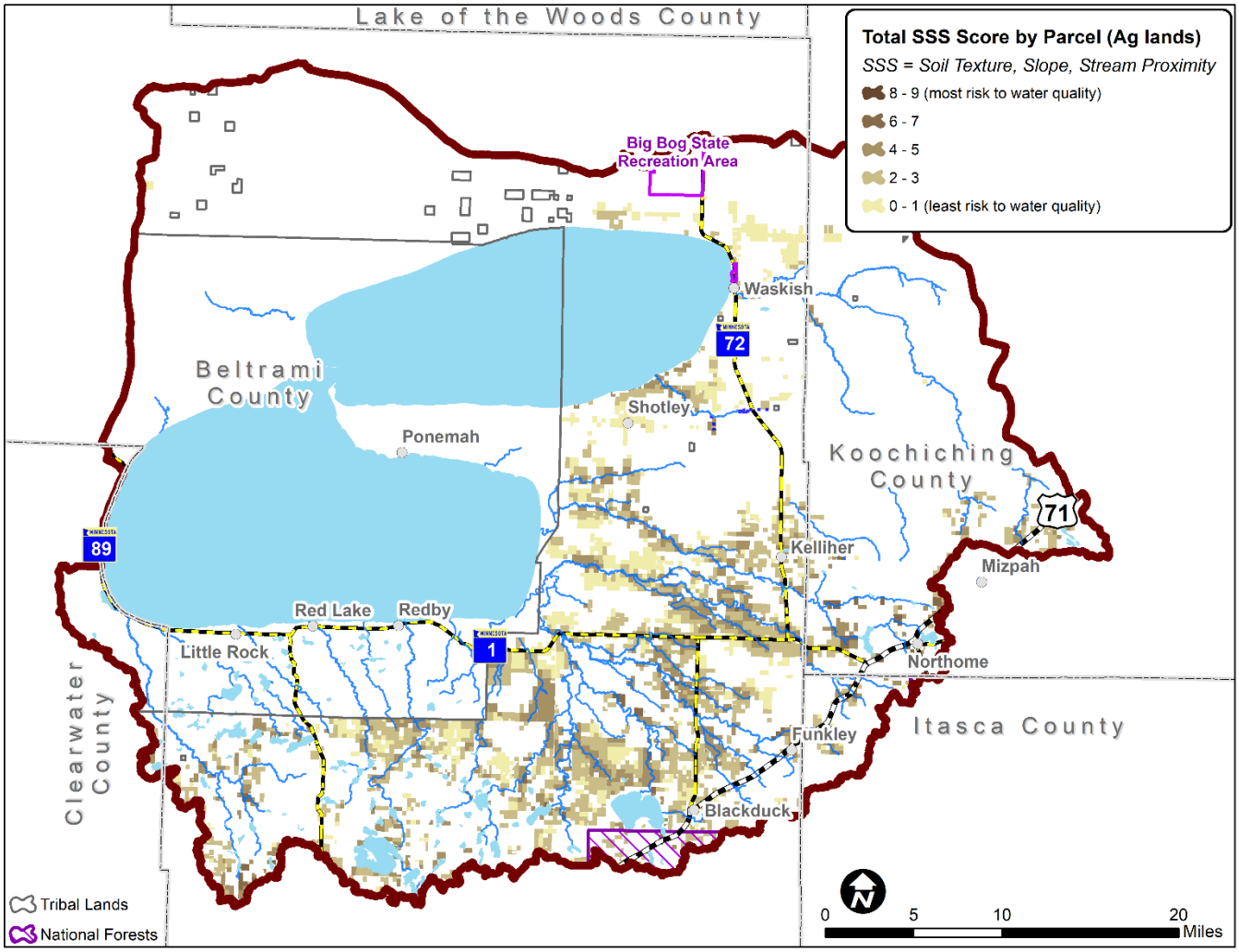


Figure 4.2. Privately owned parcels targeted for agricultural best management practices in the ULRLW based on SSS scoring (Soil Texture, Slope, Stream Proximity).

ACTIONS FOR AGRICULTURAL LAND MANAGEMENT

WHAT			WHERE	WHO	WHEN					COST
Action	**Program**	**Outcome**	**Priority Areas**	**Lead/ Supporting Entities** (lead in bold)	**2025-2026**	**2027-2028**	**2029-2030**	**2031-2032**	**2033-2034**	**Total 10-Year Cost**
Agricultural Water Quality Certification Program *enroll new farms & explore incentives*		Enroll 2 farms per year	Watershed-wide	**Minnesota Department of Agriculture (MDA),** SWCDs, NRCS	●	●	●	●	●	$20,000 $200,000
Cropland Management Practices *cover crops, crop rotations, perennial crops, tillage management, nutrient management, wind breaks, grassed waterways, incentives*		4,224 acres	Cultivated cropland Figure 4.2	**SWCDs, NRCS,** MPCA	●	●	●	●	●	$633,600
Pasture Management Practices *pasture management, rotational grazing, fencing and watering systems, incentives*		2,805 acres	Pasture/Hay land Figure 4.2	**SWCDs, NRCS,** MPCA	●	●	●	●	●	$420,750
Wild Rice Management Practices *main tile line systems, sediment traps, settling ponds, incentives*		5 projects	Wild Rice paddies	**SWCDs, NRCS**	●	●	●	●	●	$100,000
Bacteria Reduction Projects *manure management, feedlot BMPs, waste pit closures, incentives*		10 projects	*E.coli* impairments	**NRCS, SWCDs,** MPCA		●	●	●	●	$200,000
Feedlot Ordinance *continue to implement ordinance*		Continue current program	Watershed-wide	**MPCA**	●	●	●	●	●	NA
Land Retirement Programs *CRP, CREP, WEP, Grazing Easements*		Continue current program	Watershed-wide	**NRCS, SWCDs**	●	●	●	●	●	$100,000
Outreach *provide no till drill and various cover crop applications, provide technical expertise and assistance for implementing practices, partner with MN Soil Health Coalition and Grazing Lands Coalition, annual cattle workshop in partnership with Blackduck Co-op*		Implement outreach program	Figure 4.2	**SWCDs, NRCS,** County, MN Soil Health Coalition, Grazing Lands Coalition, Blackduck Co-op	●	●	●	●	●	$17,000
Buffer Law continue to implement Law		Continue current program	Watershed-wide	**SWCDs, NRCS, Counties,** MDA	●	●	●	●	●	$787,000*
									Baseline + WBIF + 319 Funding	$2,178,350
									Other Funding Sources (MDA, NRCS)	$300,000

GOAL: RIPARIAN ENHANCEMENT

Description

Riparian zones are necessary and beneficial to having a functional stream. Riparian zones can remove excess nutrients and sediment from surface runoff, stabilize stream banks, and reduce water velocity.

Human activity, such as channelizing streams and removing perennial vegetation, reduces bank stability, causing erosion. It can negatively impact wildlife habitat and increase phosphorus, bacteria, and nutrient loads into the streams. Livestock can also have a negative impact on the streambanks by overgrazing the riparian vegetation and eroding the banks.

Generally, ULRLW is in good condition due to the light development and few altered/channelized streams. There are 10 streams within the watershed impaired for Aquatic Life Uses and only a few of those impairments were due to TSS. Twelve streams within the ULRLW are impaired due to bacteria (*E .coli*).

Resources

Issues Addressed

- Eroding Watercourses
- Bacteria
- Nutrients
- Wetland Protection
- Riparian Alterations
- Altered Hydrology

Outcomes

- Reduce sediment entering systems
- Improve habitat
- Decrease bank erosion
- Improve water quality

Streambank stabilization, upland agricultural BMPs, riparian easements, cattle exclusion fencing, and reconnection and restoration of riparian areas are actions that can help meet this goal.

Goals

Metric: Length of stream stabilized, planted with vegetation, or fenced for cattle exclusion.

Short-Term (10-Year) Goal

Implement **2 miles** of riparian enhancement projects.

Desired Future Condition

Stream corridors are vegetated and protective of water quality.

Prioritization and Targeting

Riparian enhancement will be prioritized in areas where there are priority streams, water quality impairments, and the highest sediment load (Table 4.3). Priority resources developed during the WRAPS are highlighted in Table 4.3 on the next page along with their impairments. Targeting studies for where to implement projects along the stream will occur in implementation.

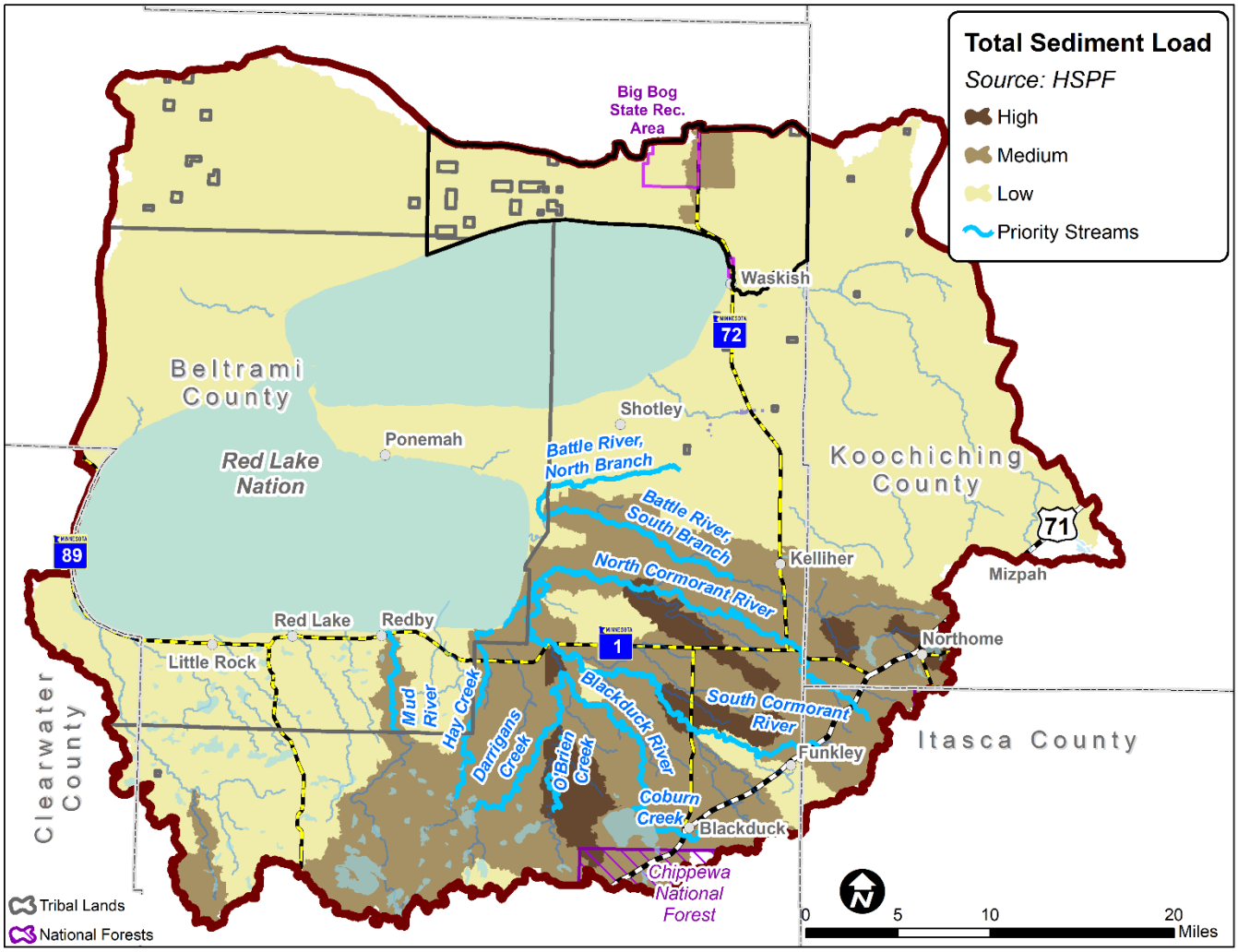


Figure 4.3. Stream priorities and Total Sediment Loading (HSPF) in the Upper/Lower Red Lake Watershed.

Table 4.3. Priority stream reaches and assessments (MPCA 2022).

Stream Name	Reach Description	Impairment	AUID	TSS	DO	Bacteria (*E. coli*)	Fish IBI	Macro-invertebrate IBI	Habitat Minimum MSHA
Battle River, North Branch	Headwaters (Unnamed ditch) to S Br Battle R	*E. coli*, FIBI, DO	09020302-503	Protection	Restoration	Restoration	Restoration	Nearly impaired	Fair score (45<MSHA<66)
Battle River, South Branch	T151 R30W S5, east line to N Br Battle R		09020302-539	Protection	Protection	Potential impairment	Protection	Protection	Fair score (45<MSHA<66)
Blackduck River	South Cormorant R to North Cormorant R	*E. coli*	09020302-512	Potential impairment	Protection	Restoration	------	------	------
	North Cormorant R to Lower Red Lk		09020302-513	Insufficient data	Potential impairment	Protection	Insufficient data	------	Fair score (45<MSHA<66)
	Blackduck Lk to O'Brien Cr	*E. coli*	09020302-510	Nearly impaired	Insufficient data	Restoration	Protection	Potential impairment	Good score (>66)
Coburn Creek	Headwaters to Blackduck Lk		09020302-515	------	------	------	------	------	------
Darrigans Creek	Headwaters (Whitefish Lk 04-0137-00) to O'Brien Cr	*E. coli*, M-IBI	09020302-508	Protection	Insufficient data	Restoration	Protection	Restoration	Fair score (45<MSHA<66)
Hay Creek	Headwaters (Dark Lk 04-0167-00) to Lower Red Lk	*E. coli*	09020302-518	Protection	Insufficient data	Restoration	Protection	Protection	Fair score (45<MSHA<66)
Mud River	T150 R33W S16, south line to Lower Red Lk	*E. coli*, TSS	09020302-541	Restoration	Protection	Restoration	Nearly impaired	Protection	Fair score (45<MSHA<66)
North Cormorant River	Headwaters to Blackduck R	*E. coli*, DO, TSS	09020302-506	Restoration	Restoration	Restoration	Protection	Nearly impaired	Fair score (45<MSHA<66)
O'Brien Creek	T149 R32W S2, south line to T150 R32W S23, north line	*E. coli*, DO	09020302-544	Protection	Restoration	Restoration	------	------	------
	Darrigans Creek to Blackduck River		09020302-514	Insufficient data	Insufficient data	Insufficient data	Protection	Protection	
South Cormorant River	Headwaters to Blackduck R	*E. coli*	09020302-507	Protection	Insufficient data	Restoration	Protection	Nearly impaired	Fair score (45<MSHA<66)

ACTIONS FOR RIPARIAN ENHANCEMENT

WHAT			WHERE	WHO	WHEN					COST
Action	**Program**	**Outcome**	**Priority Areas**	**Lead/ Supporting Entities** (lead in bold)	**2025-2026**	**2027-2028**	**2029-2030**	**2031-2032**	**2033-2034**	**Total 10-Year Cost**
Livestock Exclusion Fencing *fencing away from the stream, alternative water supplies, wastewater filter strips, incentives*		1 mile	*E.coli* impairments, Table 4.3	**SWCDs, NRCS,** MPCA	●	●	●	●	●	$20,000
Riparian Management & Stabilization *Protection & reestablishment of riparian vegetation, stabilize gullies, bank stabilization*		1 mile	Priority Streams, Figure 4.3, Table 4.3	**RLWD, RLDNR,** SWCDs, DNR, MPCA		●	●	●	●	$1,320,000 $1,320,000
In-Stream Management *Installation of riffles to raise channel and reconnect to floodplain, culvert replacements*		Included in the 1 mile Riparian action	Lost River, Shotley Brook, Battle River N. Branch, and Perry Creek	**RLWD, RLDNR,** SWCDs, DNR, MPCA		●	●	●	●	Included in the Riparian Mgmt costs
Barrier Replacement *Replace culverts, crossings, or barriers that are impacting hydrology and/or fish habitat*		Replace 4 barriers	Priority Streams, Figure 4.3, Table 4.3	**Counties, RLDNR, Townships, DNR**	●	●	●	●	●	$2,000,000
Septic System Upgrades *Upgrades to benefit streams.*		19 septic system replacements	Battle, North Cormorant, South Cormorant, and Darrigans Creek	**Counties, RLDNR,** MPCA	●	●	●	●	●	$285,000
Data Collection *Longitudinal assessment, DNA microbial source testing, more E. coli testing in different locations and time of year, ground-truthing and survey of areas that need stream and ditch stabilization, Sturgeon habitat feasibility on the Blackduck and Cormorant Rivers, Flow monitoring of larger rivers that flow into the Red Lakes (especially Cormorant, Blackduck, and Mud Rivers), Culvert and barrier surveys.*		Better understanding of *E.coli* impairments, data for targeting practices	Priority Streams, Figure 4.3, Table 4.3	**RLWD, RLDNR, MPCA,** SWCDs, DNR	●	●	●	●	●	$20,000
Outreach *Outreach to landowners*		Implement outreach program	Priority Streams, Figure 4.3, Table 4.3	**NRCS, SWCDs, RLDNR,** DNR	●	●	●	●	●	$17,000
									Baseline + WBIF + 319 Funding	$1,377,000
									Other Funding Sources (MPCA, LSOHF, CWF)	$3,605,000

GOAL: LAKE ENHANCEMENT

Description

Lakes are biologically, culturally, recreationally, and economically valuable resources in Minnesota. Upper and Lower Red Lake is the largest lake within Minnesota.

Contaminated runoff, including nutrients, has the potential to decrease water quality, impact recreation, and impact aquatic life. Nutrient runoff can come from any human land management practices including development, urban areas, and agriculture.

Five lakes are impaired for Aquatic Recreation Uses within the watershed. These impairments are a result of excess nutrients, which feed algae and plants and make the lake greener. The cities of Blackduck and Northome used to discharge sewage into Blackduck and Bartlett lakes until the 1970s when new sanitary sewers were built. Blackduck and Bartlett lakes have improved but still carry the legacy nutrients in their sediments which are being released over time through internal loading.

Resources

Issues Addressed

- Nutrients
- Soil Health
- Eroding Watercourses
- Riparian Alteration
- Wetland Protection

Outcomes

- Lakes are swimmable and fishable
- Decrease in blue-green algae blooms
- Improvement in water quality

There are many other lakes in the watershed that are in good condition, and watershed partners want to protect these lakes from future decline. Goals for protecting land in the minor watershed of priority lakes are included in the Protection Goal on pages 50-51. A sediment core study was completed on Upper and Lower Red Lake to develop site-specific water quality standards. These new standards are currently under review.

This goal is to focus on preventing more nutrients from entering the lakes and streams. Management strategies such as stormwater management, shoreline restoration and protection projects, septic system improvements, Keep it Clean program, and agricultural BMPs can help improve the water quality. In addition, each county has an AIS Prevention and Management Plan and state funding for outreach, decontaminations, boat inspections, and more. These programs will be continued.

Goals

Metric: Pounds (lbs) of Phosphorus.

Short-Term (10-Year) Goal

Reduce phosphorus loading to Bartlett Lake by **5 lbs/year** and Blackduck Lake by **37 lbs/year** (5% of watershed and septic system loading sources).

Desired Future Condition

Meet TMDLs for Bartlett and Blackduck lakes.

Lake Goals

Individual phosphorus reduction goals were developed for Bartlett and Blackduck lakes since they are impaired for excess nutrients. Ten-year Goals are based on achieving 5% progress towards the watershed and septic system load reductions outlined in the TMDL (MPCA 2021, see Appendix C for details on the TMDLs). The desired future condition for Bartlett and Blackduck lakes is to reach the TMDL. The remaining priority lakes have a protection focus (see pages 50-51). Other goals in this plan including Agricultural Land Management, Protection, Forest Management, and Stream Enhancement can contribute towards protecting the good water quality in these lakes.

Table 4.4. Priority lakes in the ULRLW.

Lake Name	Focus	Total Phosphorus Load (pounds/year)	10-Year Load Reduction Goal (pounds/year)
BARTLETT	Restore	*266	5
BLACKDUCK	Restore	*3,148	37
BALM	Protect	110	Nondegredation
DELLWATER	Protect	36	Nondegredation
LITTLE PUPOSKY	Protect	163	Nondegredation
MEDICINE	Protect	414	Nondegredation
ISLAND	Protect	140	Nondegredation
JULIA	Protect	441	Nondegredation
PUPOSKY	Protect	974	Nondegredation
WHITE FISH	Protect	476	Nondegredation
UPPER RED	Protect	166,996	Watershed Projects
LOWER RED	Protect	33,867	Watershed Projects

**These total loads came from the TMDL (MPCA 2021). The other lake loads are from the Lakes of Phosphorus Sensitivity Significance (DNR 2022).*

Prioritization and Targeting

Lake Enhancement was prioritized for lakes that have General Development or Recreational Development shoreline classifications (Figure 4.4). For more details on prioritization, see Appendix C.

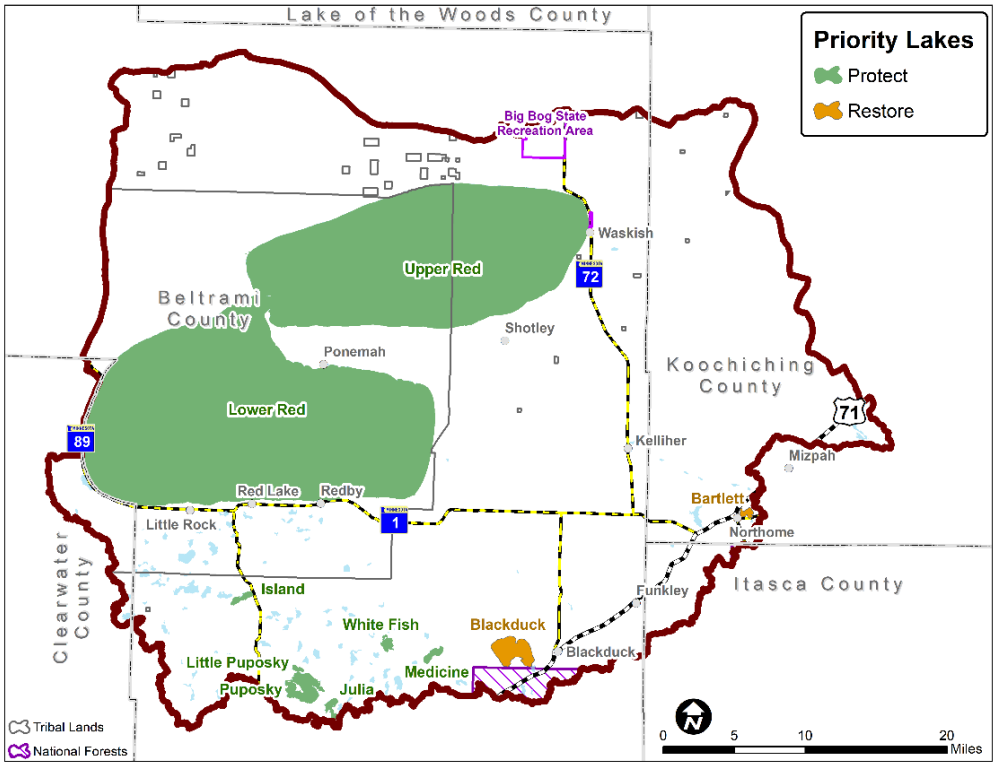


Figure 4.4. Priority lakes in the ULRLW.

ACTIONS FOR LAKE ENHANCEMENT

WHAT			WHERE	WHO	WHEN					COST
Action	Program	Outcome	Priority Areas	Lead/ Supporting Entities (lead in bold)	2025-2026	2027-2028	2029-2030	2031-2032	2033-2034	Total 10-Year Cost
Urban Stormwater Management *infiltration trenches, filtration ponds, minimum impact design, retrofit assessments for cities and golf courses*		6 projects	Blackduck, Northome, Washkish, Red Lake, Redby, Ponemah	**Cities**, **RLDNR, RLWD**, MPCA, MnDOT, RLWD			●	●	●	$100,000
Nearshore Stormwater Management *rain gardens, berms, capture upslope water, technical assistance, incentives*		20 projects	Priority Lakes Table 4.4, Figure 4.4	**SWCDs**, **RLDNR**, Cities, Lake Associations, MPCA	●	●	●	●	●	$100,000
Shoreland Management *buffers, coir logs, willow wattles, aquatic vegetation, technical assistance, incentives*		1,000 linear feet	Priority Lakes Table 4.4, Figure 4.4	**SWCDs**, **RLDNR**, Cities, Counties, Lake Associations, MPCA	●	●	●	●	●	$200,000
Shoreline Ordinance *implement country shoreline ordinance develop and implement ordinance in the Red Lake Nation*		Continue current program	Watershed-Wide	**Counties**, **RLDNR**, DNR	●	●	●	●	●	$787,000
In-Lake Management *feasibility study for water level drawdown, alum treatment, biomanipulation*		1 feasibility study	Blackduck and Bartlett lakes	**SWCDs**, **RLDNR**, **RLWD**, DNR, MPCA, BWSR, Lake Associations				●	●	$50,000
Replace Failing SSTS *assist landowners in upgrading non-compliant septic systems*		24 system replace-ments	Priority Lakes Table 4.4, Figure 4.4	**Counties**, **RLDNR**, MPCA, SWCD	●	●	●	●	●	$750,000
Septic System Ordinance *implement SSTS ordinance*		Continue current program	Watershed-Wide	**Counties**, MPCA	●	●	●	●	●	$787,000
Keep It Clean Program *removing human waste and garbage during winter recreation*		Implement Program	Watershed-Wide	**Keep it Clean Coalition**, DNR, SWCDs, Counties, RLDNR, RLWD	●	●	●	●	●	$20,000 $400,000

Table continued on the next page...

WHAT			WHERE	WHO	WHEN					COST
Action	**Program**	**Outcome**	**Priority Areas**	**Lead/ Supporting Entities** (lead in bold)	**2025-2026**	**2027-2028**	**2029-2030**	**2031-2032**	**2033-2034**	**Total 10-Year Cost**
AIS Prevention and Management *monitoring, inspection, decontamination sites, treatment of AIS*		Continue Current Program	Watershed-Wide	**Counties, RLDNR,** DNR, RLWD, Lake Associations	●	●	●	●	●	$2,042,820
Agricultural Management Practices *cover crops, tillage management, filter strips, grassed waterways, pasture management*		See Agriculture Goal	Watershed-Wide	**SWCDs, NRCS**, MDA, MPCA	●	●	●	●	●	See Agriculture Goal
Water Quality Monitoring *continue lake monitoring program*		Trend Analysis on Priority Lakes	Watershed-Wide	**RLWD, RLDNR, MPCA, SWCDs, BCLARA**	●	●	●	●	●	$200,000
Data Collection *in-lake sediment legacy loads, lake inlet assessments, aquatic plant surveys, lake-wide septic system surveys, impervious surface maps, drone surveys of shoreline, LiDAR comparisons*		Data for targeting practices and implementing projects	Priority Lakes Table 4.4, Figure 4.4	**RLWD, RLDNR, SWCDs**, MPCA, DNR		●	●	●	●	$20,000
Chloride Management *chloride reduction/application training workshop for public works (Tribal roads, county works, cities, towns, etc.) SMART Salting Tool -WAMT*		5 workshops	Cities	**Counties, Cities,** SWCDs, RLDNR		●	●	●	●	$60,000
Outreach Program *Education and outreach to lakeshore landowners, realtors, contractors, and resorts on lake topics, septic systems, Score your Shore.*		Implement outreach program	Watershed-Wide	**SWCDs, RLWD, RLDNR**, Cities, Lake Association, Counties	●	●	●	●	●	$17,000
									Baseline + WBIF + 319 Funding	$2,891,000
									Other Funding Sources (State of MN, MPCA, CWF)	$2,442,820

GOAL: FOREST MANAGEMENT

Description

Forested land is an important economical and recreational resource to the ULRLW as well as the Red Lake Nation. The Red Lake Nation manages its lands predominantly for fish, wildlife, and timber production. 14% of the watershed is covered in trees and shrubs, largely located in the transition from the peatlands in the north to the developed/lake area in the south.

Many sites in the watershed are classified as "outstanding" or "moderate" of biodiversity significance by the Minnesota Biological Survey and with development and climate change, these areas are becoming increasingly at risk. The composition of Minnesota's northern forests is likely to shift from paper birch, quaking aspen, Balsam fir and black spruce to oak, hickory, and pine trees. In addition, Black Ash trees are vulnerable to Emerald ash borer. Creating resiliency and maintaining healthy forests from inevitable events such as wildfires, invasive species, and climate change, is necessary. Increasing forest stewardship plans, tree planting, conservation planning, forest stand improvements, climate assisted migration and invasive species management will all help in managing forests.

Resources

Issues Addressed

- Forest Health
- Land Protections
- Groundwater
- Soil Health

Outcomes

- Improve forest health
- Improve water quality
- Protect carbon storage
- Improve habitat for wildlife
- Improve habitat connectivity
- Climate change resiliency
- Protect forests for recreation
- Protect local economies

Goals

Metric: # of forest stewardship plans, # acres of trees planted, # of acres managed (Forest Stand Improvement [FS]), prescribed burns, buckthorn management)

Short-Term (10-Year) Goal

Implement **12,000 acres** of Forest Management Plans (100 plans).

Plant **2,000 acres** of trees (~200 acres/year).

Desired Future Condition

Continue to manage forestland for habitat, water quality, climate, and invasive species resilience.

Priority Areas

Forest management will be prioritized on private parcels and Red Lake Nation Lands shown in Figure 4.5. State forest lands already have state management plans. To see the breakdown of forest ownership in the watershed, see Table 4.5.

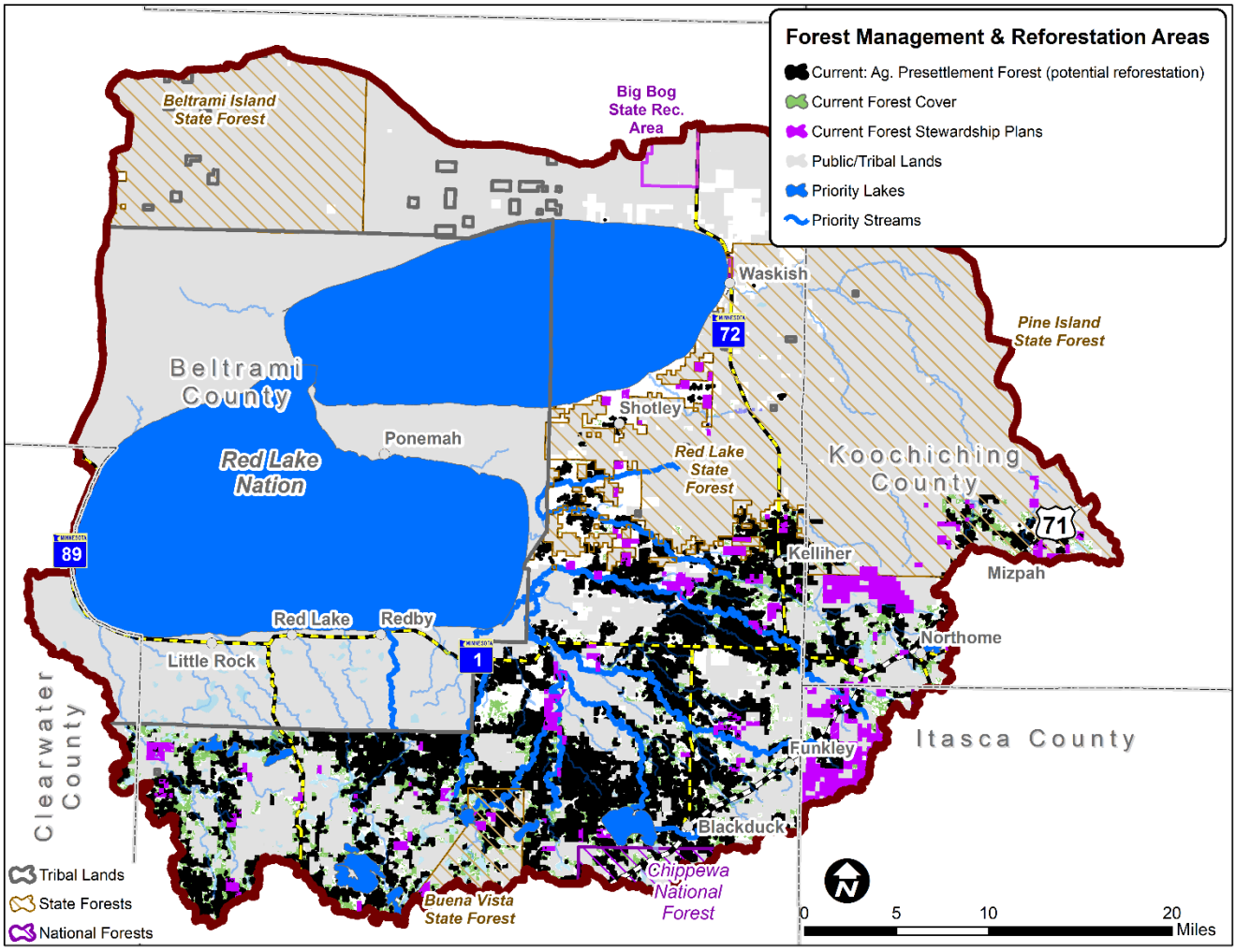


Figure 4.5. Privately owned parcels and Red Lake Nation lands targeted for forest management and tree planting. State lands are shown in white and brown crosshatch and already have management plans.

Table 4.5. Ownership of forests and forested wetlands in the ULRLW.

Ownership	Total	%
State	308,976	41%
Tribal	**169,235**	**23%**
Private	**158,311**	**21%**
County	104,053	14%
Federal	8,700	1%
Other	1,156	0%
Total	750,431	100%

Focus for Tree Planting

Focus for Forest Stewardship Plans

ACTIONS FOR FOREST MANAGEMENT

WHAT			WHERE	WHO	WHEN					COST
Action	**Program**	**Outcome**	**Priority Areas**	**Lead/ Supporting Entities** (lead in bold)	**2025-2026**	**2027-2028**	**2029-2030**	**2031-2032**	**2033-2034**	**Total 10-Year Cost**
Forest Management Plans *Woodland Stewardship Plans on private forest parcels over 20 acres in size, incentives*		12,000 acres, 100 plans	Figure 4.5.	**DNR Forestry, SWCD, Private Consultants**	●	●	●	●	●	$180,000
Develop Small Parcel Forest Program *Conservation planning and management assistance to parcels under 20 acres in size*		Develop program	Forest parcels <20 acres	**SWCDs, Counties, DNR Forestry**			●	●	●	Included in staff time*
Reforestation *tree planting*		2,000 acres	Red Lake Nation	**RLDNR**	●	●	●	●	●	$1,200,000
Forest Health Management *FSI, brush management, prescribed burns, climate assisted migration*		2,000 acres	Figure 4.5.	**NRCS, DNR, SWCD, RLDNR**		●	●	●	●	$1,000,000
Manage Terrestrial Invasive Species *cooperative weed management program*		Implement Current Program	Watershed-wide	**SWCD, Counties, RLDNR, DNR**	●	●	●	●	●	Included in staff time*
Forest Management Coordination *Communication between state, federal, tribal, and private entities about watershed-level forest management*		Annual meeting between entities to share management goals	Watershed-wide	**SWCD, DNR, USFS, RLDNR**	●	●	●	●	●	Included in staff time*
Outreach *Outreach about private landowner programs and tools, Firewise program*		Implement Outreach Program	Figure 4.5.	**SWCD, NRCS, DNR, RLDNR**	●	●	●	●	●	$17,000
									Baseline + WBIF	$197,000
									Other Funding Sources (State of MN, DNR, NRCS, LCCMR, LSOHC)	$2,200,000

**Of the total funding, 40% was estimated to cover staff time for project development, technical design and engineering.*

GOAL: PROTECTION

Description

Humans can have huge impacts on the terrestrial, aquatic, and forest wildlife habitats in many ways. Over 90% of the ULRLW landcover consists of wetlands/peatlands, open water and trees/shrubs. Putting in the effort to preserve, restore, and connect these landscapes will improve the habitat, biodiversity and climate resiliency of the ULRLW, along with surface and groundwater quality.

Minnesota's state agencies that manage surface water, drinking water, and habitat agree that forest and vegetative cover benefits clean surface water, drinking water, and habitat. DNR Fisheries research has shown that once a lakeshed is over 25% disturbed (urban, agriculture, mining), the water quality is negatively affected (Jacobson et al. 2016). According to the MPCA, less than 2% of the ULRLW is considered developed. With such low gradients and the close connection between the wetlands, streams and lakes, this region is sensitive to disturbance and will require protection if development continues to expand northward in the watershed.

The desired future condition is to reach 75% protection in each priority minor watershed, focusing on priority resources first. Protected land uses are defined as surface water, public land, private wetlands, conservation easements, and SFIA lands. The short-term goal is to make progress towards this future condition in priority minor watersheds. Increasing protection also results in secondary benefits such as water and carbon storage (Table 4.7).

Resources

Issues Addressed

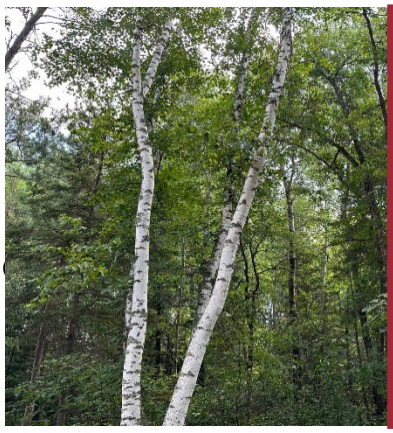
- Land Protection
- Wetland/Peatland Protection
- Forest Health
- Nutrients
- Groundwater
- Aquatic Connectivity

Outcomes

- Protect water quality
- Protect and improve habitat for fish and wildlife
- Protection of fisheries
- Protection of wild rice
- Protect carbon storage in trees, peatlands, and wetlands
- Habitat connectivity
- Climate change resiliency

Goals

Metric: # acres protected (easements, acquisitions, SFIA)



Short-Term (10-Year) Goal

Protect **9,170 acres** with SFIA or easements.

Desired Future Condition

All minor watersheds in the ULRLW are protected to 75% or if 75% is not possible, protect to the potential possible (45,831 acres).

Prioritization and Targeting

Protection will be prioritized in areas of the watershed that have the highest risk of conversion from forest to other land uses and in the minor watersheds of priority lakes and streams (Figure 4.6, Table 4.6). Programs will be targeted to private landowners with forested land near lakes and streams (Riparian), adjacent to other protected lands (Adjacency), and habitat quality (Quality) (Figure 4.7).

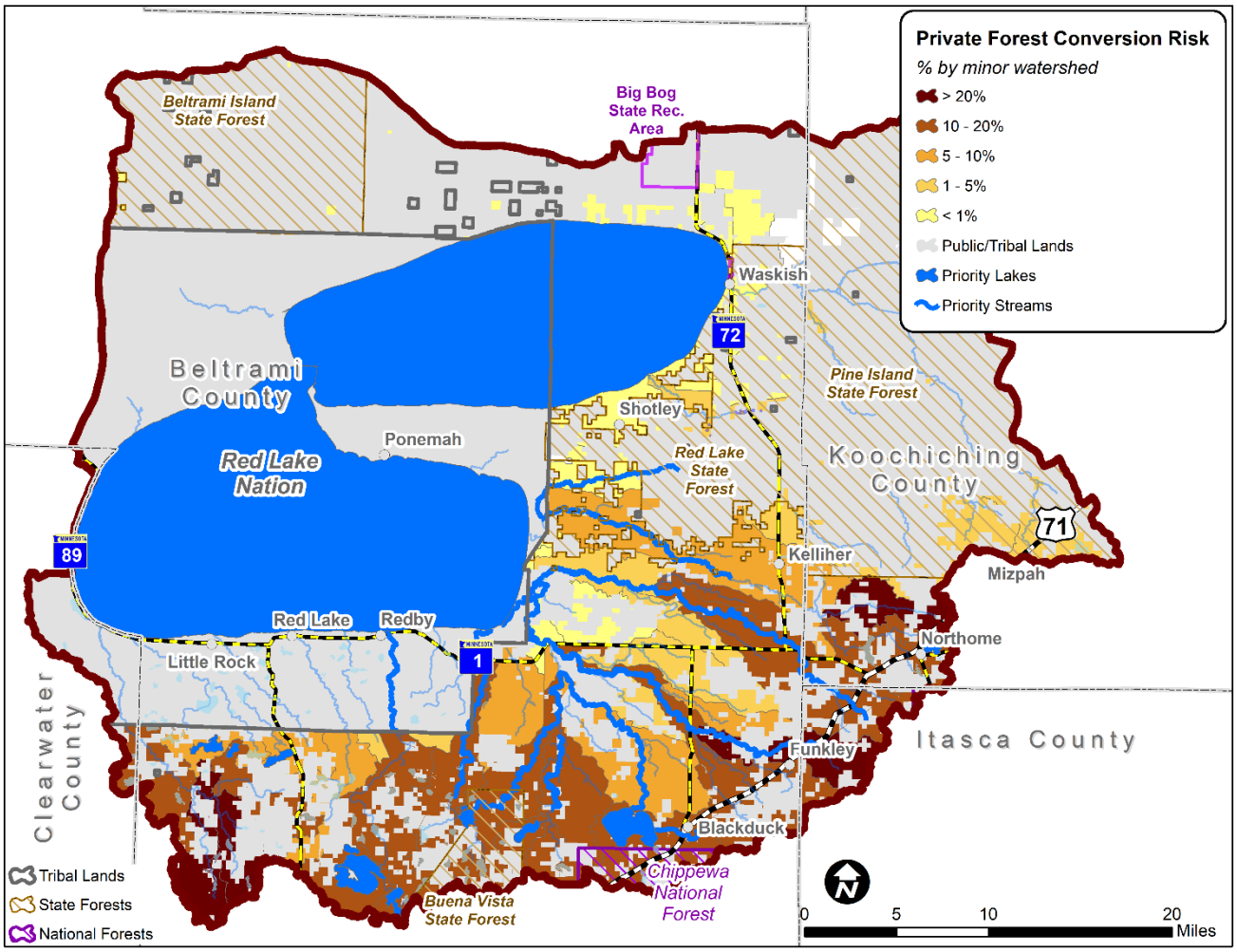


Figure 4.6. Private forest lands with the highest risk for being converted to a different land use type.

Table 4.6. Lakeshed protection goals. Island, Balm, Upper Red, and Lower Red have already reached the 75% protection goal so are not included in this table.

Lake Name	Focus	Current % Protected	10-Year Protection Goal	Long-term Goal (75% or PTP*)
BARTLETT	Restore	61%	93 acres	464 acres
BLACKDUCK	Restore	55%	539 acres	2,694 acres
DELLWATER	Protect	74%	67 acres	67 acres
PUPOSKY & LITTLE PUPOSKY	Protect	60%	253 acres	1,266 acres
MEDICINE	Protect	61%	109 acres	546 acres
JULIA	Protect	59%	775 acres	3,873 acres
WHITE FISH	Protect	53%	721 acres	3,604 acres

*PPT is the potential private land to protect in the minor watershed. Sometimes this is less than 75%.

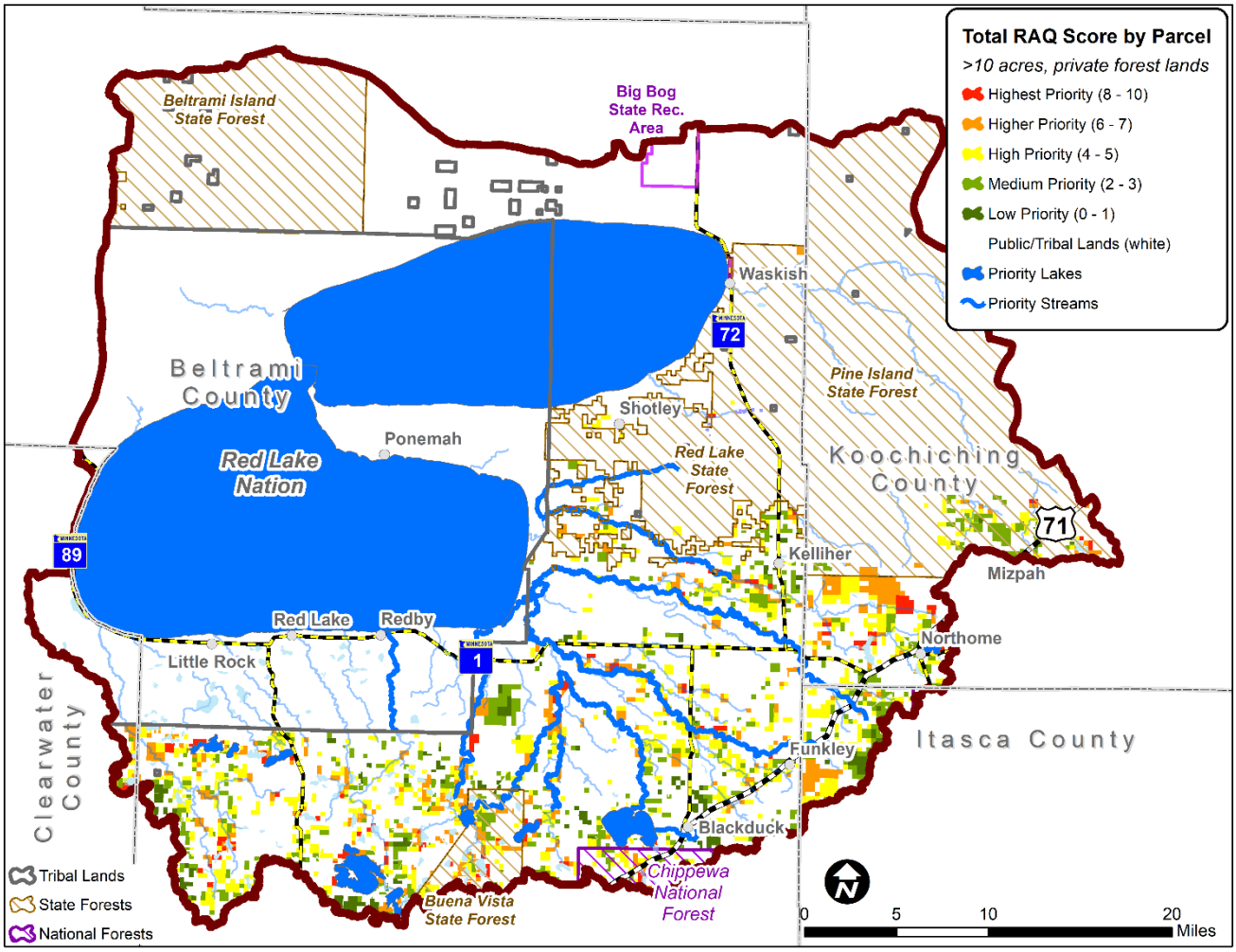


Figure 4.7. Privately owned parcels targeted for protection in the ULRLW based on RAQ scoring (Riparian, Adjacency, Quality).

Table 4.7. Secondary stacked benefits. Work toward this goal also makes progress towards habitat protection, carbon storage protection, and water storage protection. For details on calculations, see Appendix C.

Benefits	Parameter	Quantity	Real World Equivalent
Habitat Benefits	Protected Habitat	9,170 acres of habitat protection	Equivalent to 6,950 football fields
Climate Resiliency Benefits	Protected Carbon Storage	806,717 metric tons of carbon is stored in trees, roots, dead matter, litter, and soil	Equivalent to greenhouse gas emissions from 704,000 vehicles driven for one year
	Protected Water Storage	If 9,170 acres of forest were converted to development or agriculture, 1,440-2,200 acre-feet of water storage would be lost	Equivalent to 1,440-2,000 football fields covered in 1 foot of water

ACTIONS FOR PROTECTION

WHAT			WHERE	WHO	WHEN					COST
Action	**Program**	**Outcome**	**Priority Areas**	**Lead/ Supporting Entities** (lead in bold)	**2025-2026**	**2027-2028**	**2029-2030**	**2031-2032**	**2033-2034**	**Total 10-Year Cost**
Forest and Land Protection *SFIA, easements, acquisitions, incentives*		9,170 acres	Figure 4.6, Figure 4.7. Table 4.6	**SWCDs**, **DNR**, **USFWS**, BWSR, Counties, Minnesota Land Trust	●	●	●	●	●	$10,206,210
Land Use Plan *Develop land use plan for Red Lake Nation*		Complete Plan	Red Lake Nation	**RLDNR**			●	●	●	$50,000
Outreach *Outreach on private landowner programs and tools available*		Implement outreach program	See Figure 4.6, Figure 4.7.	**SWCDs, Counties**	●	●	●	●	●	$17,000
									Baseline + WBIF	$67,000
									Other Funding Sources (State of MN, LCCMR, LSOHC)	$10,206,210

GOAL: DRINKING WATER PROTECTION

Description

All residents in the ULRLW obtain their drinking water from groundwater. In cities, drinking water comes from city wells, while in rural areas the drinking water comes from private wells.

The three DWSMAs for communities in the watershed (Blackduck, Kelliher, and Northome) all have potential contaminant sources. Wells are potential contaminant sources for Blackduck and Kelliher. Wells, underground storage tanks and petroleum product storage without containment are potential contaminant sources for Northome. The Red Lake Nation's drinking water is also sourced from groundwater and is regularly tested by the RLDNR to ensure the safety of its people. Within the watershed, groundwater sources can be protected through proper well abandonment by sealing unused, unsealed wells or conversion to monitoring wells if the well has structural integrity.

Resources

Issues Addressed

- Groundwater Quality
- Groundwater Quantity

Outcomes

- Eliminate contamination from entering groundwater
- Safe drinking water
- Updated infrastructure

There are growing concerns about groundwater contaminants, especially arsenic. Forty percent of new wells that have been installed since 2008 have arsenic levels above the safe drinking water standard. While all public wells within ULRLW are meeting the arsenic drinking water standard, 10% of private wells within Beltrami County do not meet the Federal Safe Drinking Water Act standard of 10 µg/liter. Arsenic occurs naturally in rocks and soil across Minnesota and small amounts can dissolve into groundwater. If any arsenic is detected in private wells, installation of a treatment unit should be considered. For private wells, landowners are responsible for their own testing and paying for a treatment unit, grants and loans may be available for those who qualify.

Goals

Metric: Number of wells sealed and/or number of testing clinics/workshops.

Short-Term (10-Year) Goal

Seal **100** unused wells.

Desired Future Condition

Maintain safe drinking water sources for all watershed residents.

Prioritization and Targeting

Drinking water protection will be prioritized in DWSMAs, public water supply wells, communities in the Red Lake Nation, and private wells throughout the watershed (Figure 4.8).

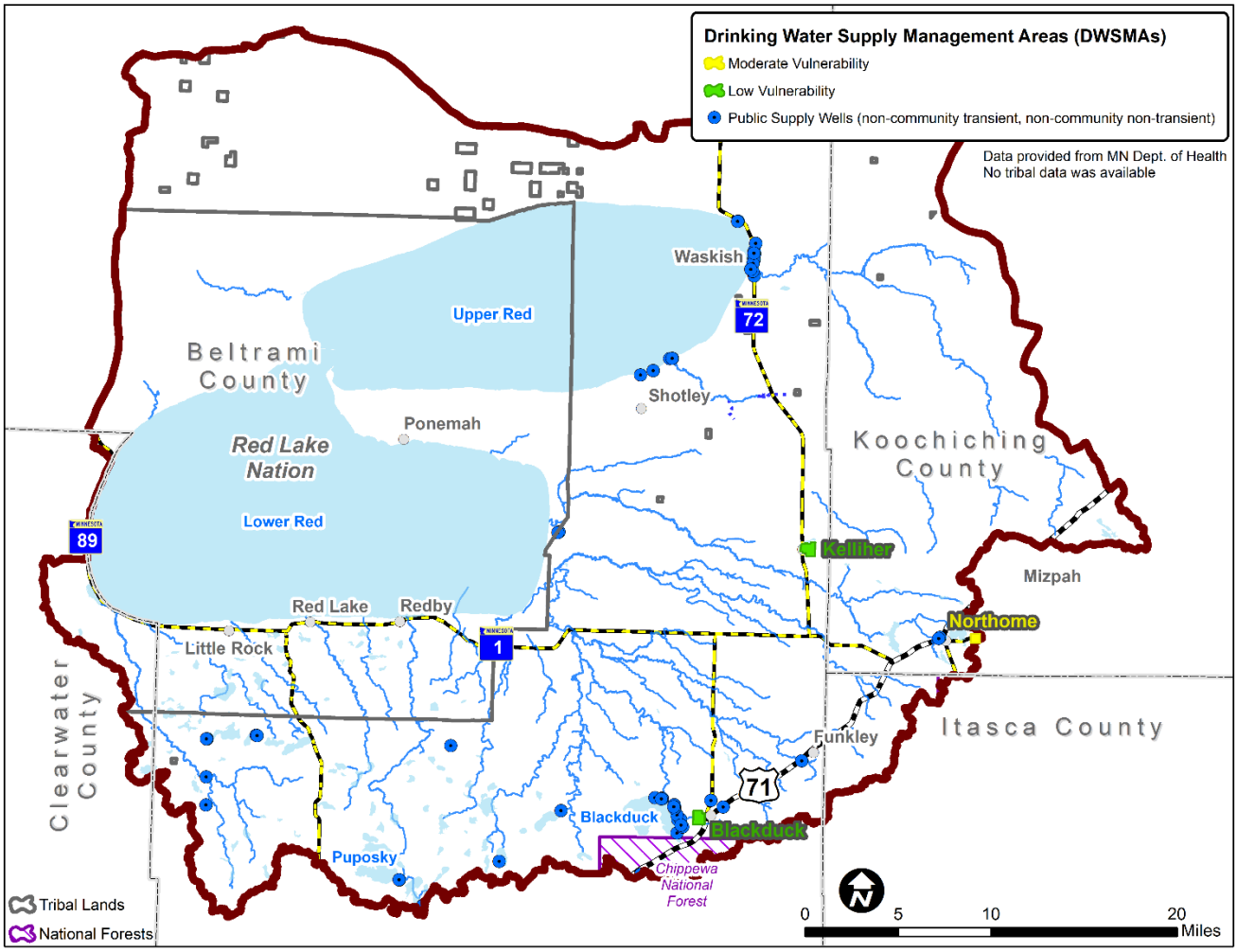


Figure 4.8. DWSMAs and public supply wells in the ULRLW.

ACTIONS FOR DRINKING WATER PROTECTION

WHAT			WHERE	WHO	WHEN					COST
Action	**Program**	**Outcome**	**Priority Areas**	**Lead/ Supporting Entities** (lead in bold)	**2025-2026**	**2027-2028**	**2029-2030**	**2031-2032**	**2033-2034**	**Total 10-Year Cost**
Seal unused wells		Seal 100 wells	Watershed-wide	**SWCDs, RLDNR**, MDH, Counties	●	●	●	●	●	$100,000
DWSMA protection programs *Reinvest in Minnesota (RIM) easements, wellhead protection in DWSMA*		10 acres	Figure 4.8	**Cities, RLDNR,** MDH, SWCDs	●	●	●	●	●	$11,130
Data Collection *Well inventory to find abandoned wells*		Complete inventory	Watershed-wide	**SWCDs, Counties, RLDNR, MDH**			●	●	●	$20,000
Outreach Program *Drinking water testing clinics, wellhead protection, informational presentations about arsenic and nitrates and mitigation*		Implement outreach program	Watershed-wide	SWCD, MDH, Cities, MPCA	●	●	●	●	●	$17,000
Groundwater Atlas *Complete for all counties in the watershed*		Complete studies	Watershed-wide	USGS, SWCDs, DNR			●	●	●	NA
									Baseline + WBIF	$148,130
									Other Funding Sources (MDH)	Other funding can also cover any of the above actions

GOAL: HYDROLOGIC ENHANCEMENT

Description

The peatlands are one of the most unique and unusual landscapes in the United States. Like other types of wetlands, peatlands develop in flat areas acting as a giant filter improving water quality, controlling erosion, and capturing carbon. They are estimated to store 20-30% of terrestrial carbon globally. With recent changes to the definition of waters of the U.S., there is potential to leave some wetlands with less protections.

In the late 19th century, peatlands were ditched to drain land for farming. Due to low slopes and the vast quantities of water, the ditches never drained the land adequately. The legacy of the ditches continues to this day, impacting the region's water resources and water quality. The ditches not only failed to create farmable land, but also altered hydrology within the watershed including partially drained and degraded wetlands, altered natural flow of water, increased flashiness within the system after rain events, and erosion/sedimentation due to increased inputs into streams and ditches.

Resources

Issues Addressed

- Altered Hydrology
- Aquatic Connectivity
- Wetland Protection
- Eroding Watercourses

Outcomes

- Reduced peak flows
- Restored functioning peatlands
- Reduced erosion
- Improved wildlife habitats
- Increased carbon storage

Many aquatic life use impairments (10 total within the watershed) were the result of lack of habitat diversity, low dissolved oxygen from natural wetland influence, and altered hydrology. Restoring altered hydrology could include ditch filling, ditch plugging, stream re-meanders to slow transmission of water, proper culvert sizing, correcting perched culverts, and creating areas of water storage and retention within restored peatland areas.

Goals

Metric: acre-feet storage, # barriers/culverts replaced, acres of peatland restored.

Short-Term (10-Year) Goal

Explore opportunities for peatland restoration and complete **1 feasibility study and 1 project**.

Desired Future Condition

Work towards restoring the natural hydrology of the Red Lake patterned peatlands.

Priority Areas

Hydrologic restoration will be prioritized in the northern part of the watershed where there are drainage systems and altered watercourses on public lands (Figure 4.9).

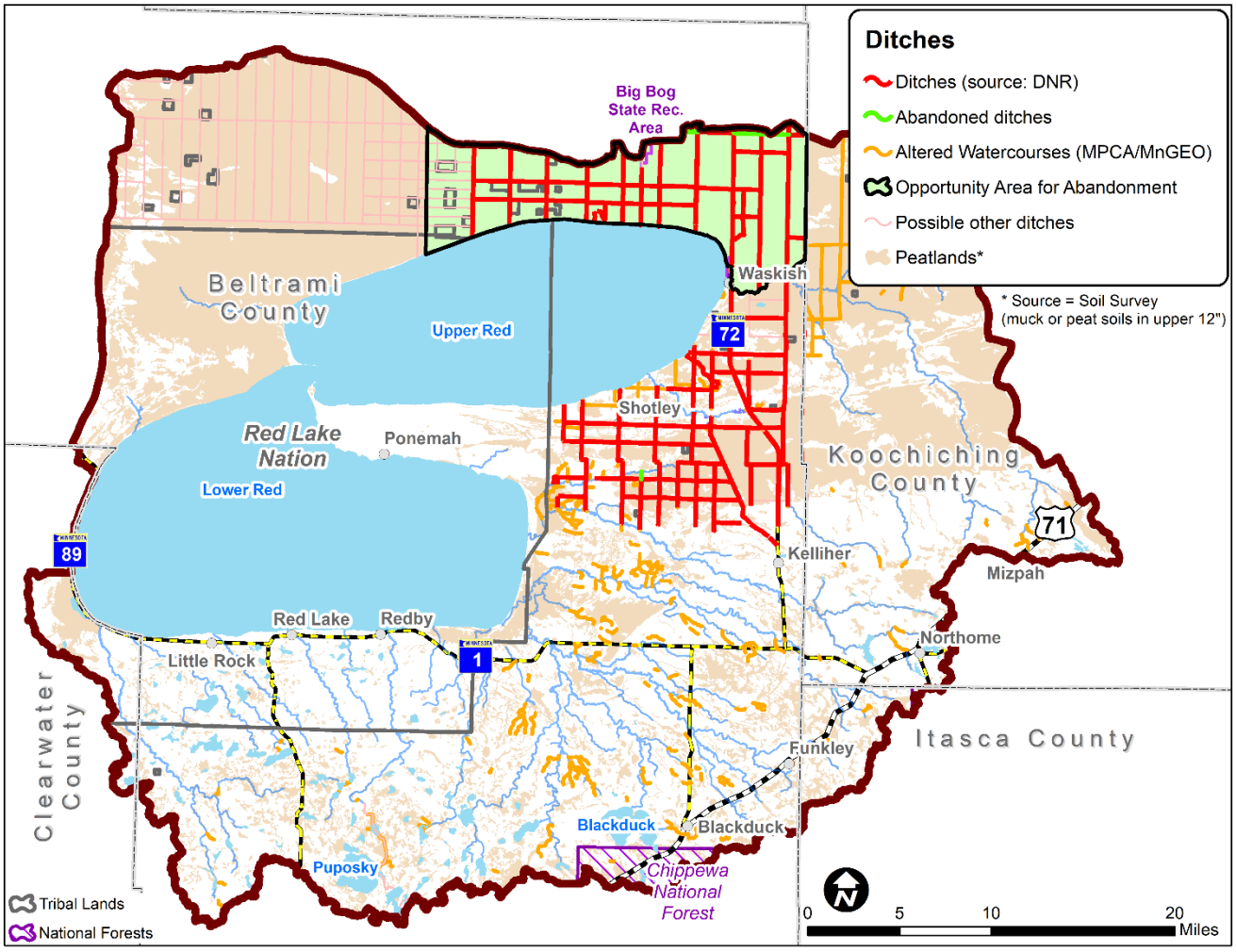


Figure 4.9. Drainage systems, altered watercourses, and peatlands in the ULRLW.

ACTIONS FOR HYDROLOGIC ENHANCEMENT

WHAT			WHERE	WHO	WHEN					COST
Action	**Program**	**Outcome**	**Priority Areas**	**Lead/ Supporting Entities** (lead in bold)	**2025-2026**	**2027-2028**	**2029-2030**	**2031-2032**	**2033-2034**	**Total 10-Year Cost**
Explore Peatland Restoration *Target areas for hydrologic restoration and determine feasibility*		1 feasibility study	Figure 4.9	**USFWS, DNR, Counties,** SWCDs, RLDNR	●	●	●			$80,000
Peatland Restoration Pilot Project *Restore peatland hydrology based on feasibility study*		1 pilot project	Figure 4.9	**USFWS, DNR, Counties,** SWCDs, RLDNR	●	●	●			$75,000 $75,000
Data Collection *Hydroconditioning, LiDAR comparisons*		Gather data needed for targeting projects	Watershed-wide	**RLWD, RLDNR, DNR,** MPCA, SWCD			●	●	●	$20,000
Wetland Conservation Act (WCA) *Implement WCA*		Continue current program	Watershed-wide	**Counties, SWCDs, DNR, BWSR**	●	●	●	●	●	$787,000
									Baseline + WBIF	$882,000
									Other Funding Sources (USFWS, DNR, BWSR, LSOHC)	$155,000

OVERALL PRIORITIZATION

Five of the seven goals overlap their priority areas. These goals can be summarized as Land Protection and Management in Figure 4.10 and include:

Land Protection and Management

- Agricultural Land Management
- Riparian Enhancement
- Lake Enhancement
- Land Protection
- Forest Management

Drinking water is prioritized throughout the watershed, and hydrologic enhancement is prioritized in the northern portion of the watershed (Figure 4.10). Implementation partners will work together in these areas to achieve their measurable goals.

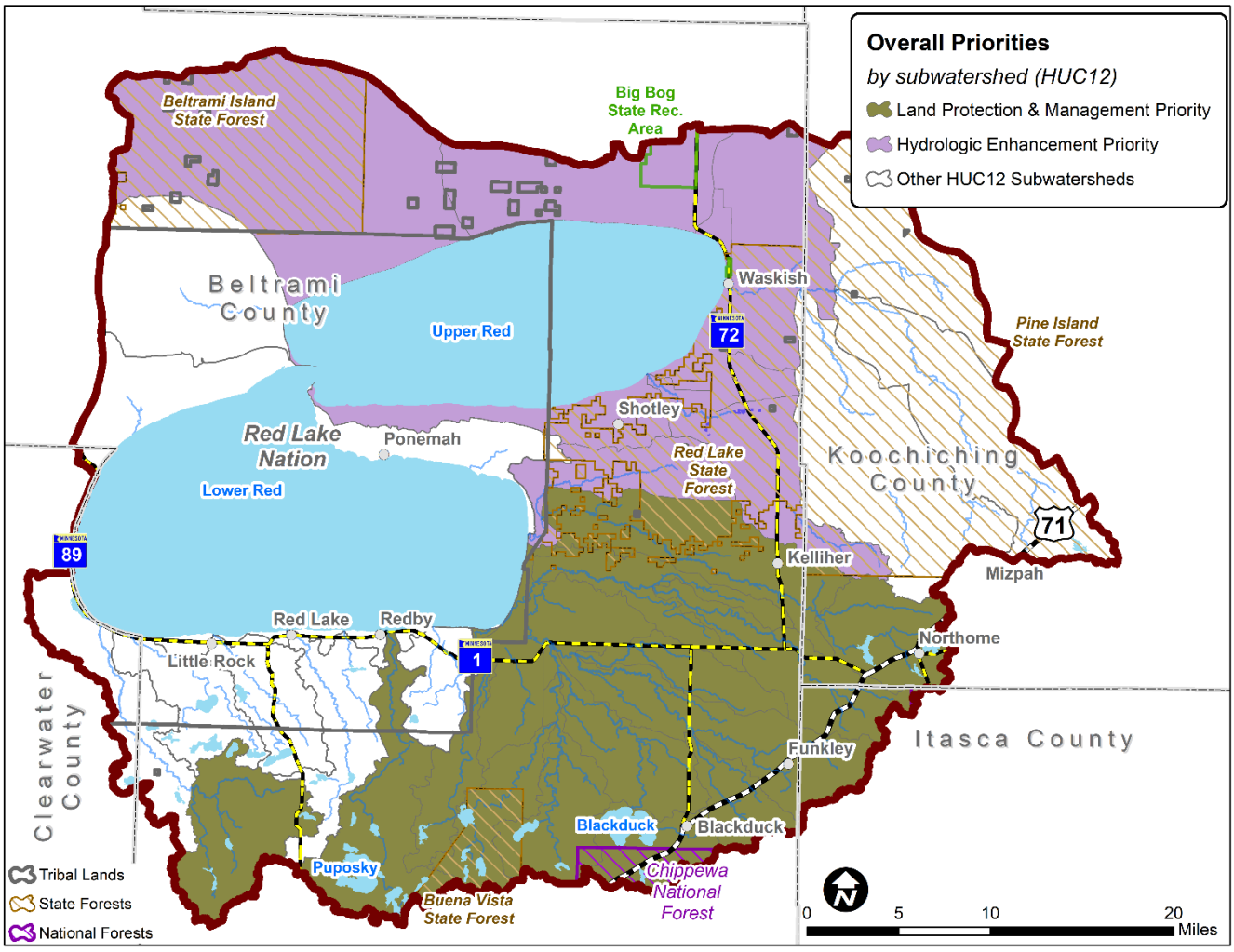


Figure 4.10. Overall implementation priorities in the ULRLW.

Figure 4.11 shows how the local baseline funding, WBIF, and 319 funding will be distributed across goals. Some goals, such as Protection, will mainly use other funding sources for implementation such as LSOHC and SFIA funding directly from the state. This funding is just estimated for planning purposes, and actual implementation could look somewhat different.

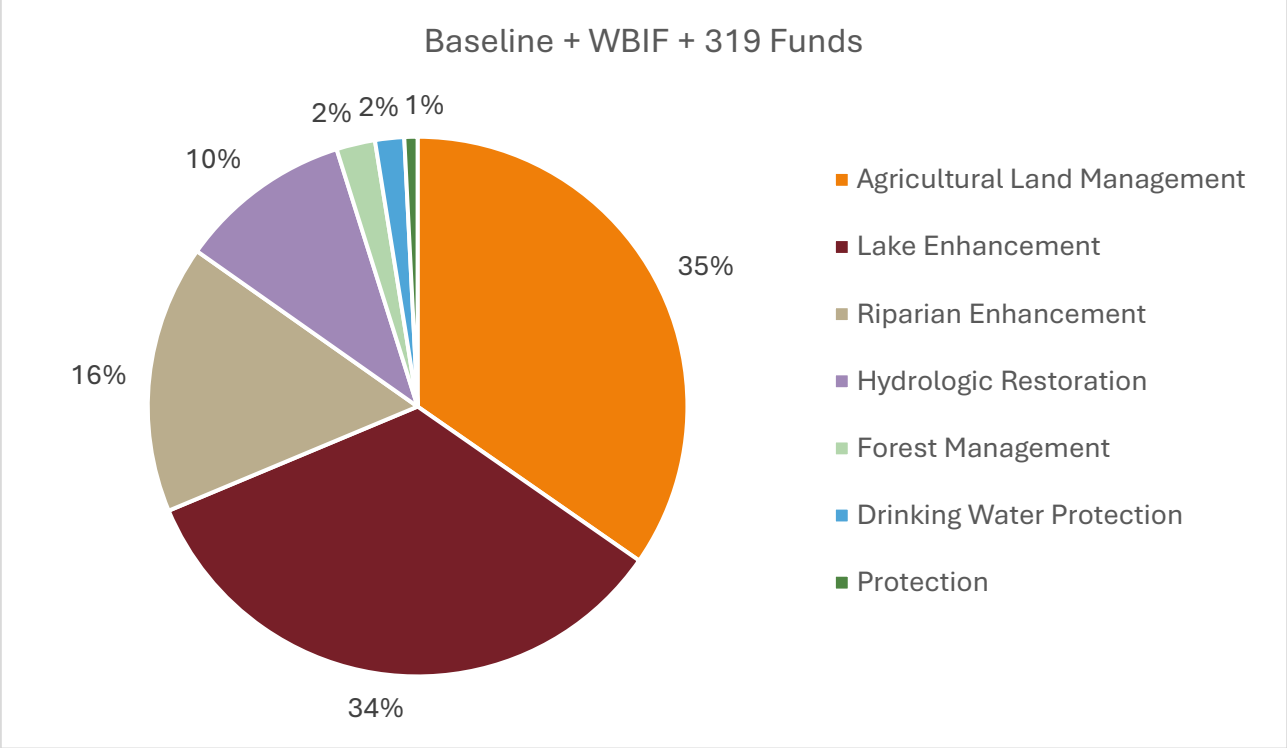


Figure 4.11. Estimated distribution of baseline, WBIF, and 319 funding across goals.

PLAN PROGRAMS

SECTION 5.
IMPLEMENTATION PROGRAMS

Implementation programs are the funding mechanism to implement actions in the targeted implementation schedule (Section 4). This plan establishes common implementation programs within the plan area and describes them conceptually in this section. There are five main programs: Projects and Practices, Capital Improvements, Regulatory, Data Collection and Monitoring, and Outreach and Communication (Figure 5.1).

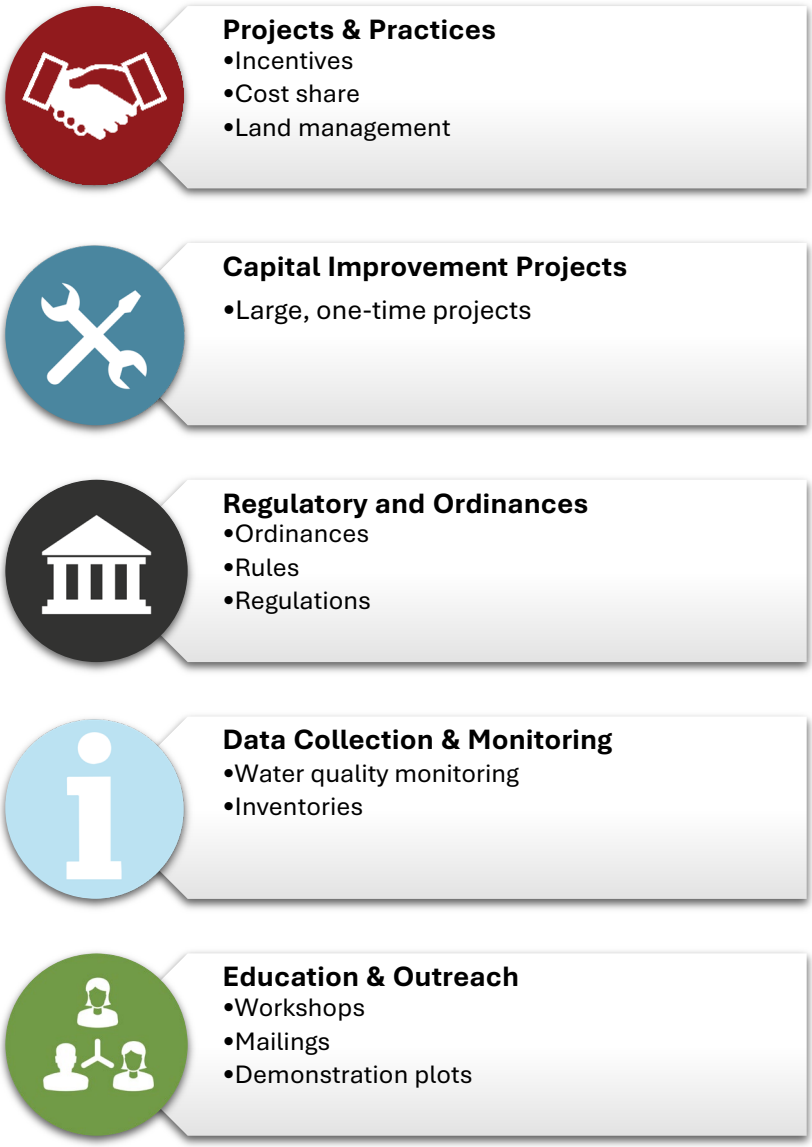


Figure 5.1. Implementation Programs for the ULRLW.

PROJECTS AND PRACTICES IMPLEMENTATION PROGRAM

Dollars used to implement projects and practices on the landscape are funded by the Projects and Practices Implementation Program. This implementation is broken into a variety of subprograms, as shown on the next few pages. These programs are typically administered by the SWCDs in the watershed and apply to most of the plan goals.

Financial Assistance Programs

Financial assistance programs or projects are those where the cost of installing a project is shared with the landowner(s). Implementing soil health practices such as cover crops and no till, or forest enhancement are applicable examples that meet plan goals.

Financial assistance programs can also be used for structural practices. Implementing fencing and water sources for grazing cattle away from streams, water and sediment control basins, grade stabilizations, shoreline restorations on lakeshore, and well sealing are applicable examples that meet the goals of this plan.

Land Protection

Conservation Easements

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

RIM Wild Rice Conservation Easement Program

The RIM Wild Rice Conservation Easement Program protects wild rice lakes through permanent conservation easements on privately owned lands in Minnesota's Northern Forest region. This program is available in Beltrami County.

Land Acquisition

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

Land Retirement Programs

Conservation Reserve Program (CRP)

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

Wetland Reserve Program (WRP)

The WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The NRCS provides technical and financial support to help landowners with their wetland restoration efforts. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection.

Lands eligible for WRP are wetlands farmed under natural conditions; farmed wetlands; prior converted cropland; farmed wetland pasture; certain lands that have the potential to become a wetland as a result of flooding; rangeland, pasture, or forest production lands where the hydrology has been significantly degraded and can be restored; riparian areas which link protected wetlands; lands adjacent to protected wetlands that contribute significantly to wetland functions and values; and wetlands previously restored under a local, State, or Federal Program that need long-term protection.

Low-Interest Loans

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

Private Forest Management

There are many different options for managing forests on privately-owned lands. These can range from permanent protection to management plans described in this section.

Forest Stewardship Plans

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

Forest 2C Designation

Landowners with DNR-registered Woodland Stewardship Plans are 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.

The 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 (DNR).

Operations and Maintenance

After projects are installed, regular on-site inspections and maintenance to ensure the project's continued function and success is required by the BWSR Grants Administration Manual (GAM), for projects funded through BWSR grants. 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 GAM, 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 Project | Above: During construction, Below: After construction

CAPITAL IMPROVEMENT IMPLEMENTATION PROGRAM

A capital improvement project (CIP) is defined as a major non-recurring expenditure for the construction, repair, retrofit, or increased utility or function of physical facilities, infrastructure, or environmental features. Capital improvements are beyond the "normal" financial means of the Partnership and therefore require external funding.

Section 4's Lake Enhancement and Hydrologic Enhancement goals have CIP actions. Some projects include RV dump stations and AIS decontamination stations. Additional discussions are needed among plan participants to develop the specific process for implementing capital improvements with base funding. Specifically, members of the Policy Committee or the ULRLW Steering Committee's individual and representative Boards are expected to discuss the means and methods for funding new capital improvements with potential funding partners before an implementation timeline can be established.

CIPs completed through this plan will be operated and maintained by the owner of the project for the lifespan of the project.

As highlighted throughout this plan, public drainage systems are prevalent throughout much of the plan area. As such, planning partners will engage drainage authorities about plan efforts and goals. Drainage authorities will be highly encouraged to coordinate and be involved during implementation of the targeted implementation schedule to make progress towards measurable goals, including sediment delivery, private and public flood risk reduction, and ditch stability. Based on this two-way engagement, drainage authorities could access implementation funds to adopt drainage actions in the targeted implementation schedule (Section 5) during 103D and 103E processes and procedures when the opportunity arises within the planning area.

Operations and Maintenance

Entities within the plan area are engaged in the inspection, operation, and maintenance of capital projects, stormwater infrastructure, public works, facilities, natural and artificial watercourses, and legal drainage systems. Operation and maintenance of natural watercourses, legal ditches, impoundments, and small dams will continue under regular operations and maintenance plans of the entities with jurisdiction over these systems. These details, along with records including notes and photos, should be included with each project's Operations and Maintenance Plan. BWSR's recommended inspection plans for projects funded through BWSR grants, according to the GAM, include the following requirements below. Ditch projects and Watershed District projects funded by other sources are not subject to the GAM.

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.

REGULATORY AND ORDINANCES IMPLEMENTATION PROGRAM

Many plan issues can be addressed in part through the administration of statutory responsibilities and local ordinances. In many cases, local ordinances have been adopted to conform to (or exceed) the standards and requirements of the state statutes. The responsibility for implementing these programs will remain with the respective counties or appointed local government units (LGUs). The RLWD has rule making authority per MS 103D.341 and permitting authority per 103D.345. Current rules were adopted in 2015 and could periodically change per life of this plan. The RLWD Rules are available by reference in Appendix G. To review current rules, please see the RLWD website (http://www.redlakewatershed.org/).

Counties and the watershed district will aim to meet approximately once a year to discuss ordinances, and counties will notify each other of any proposed ordinance amendments. A full comparison of how local ordinances are used to administer statutory responsibilities is provided in Appendix E.

Aggregate Management

Individual counties manage the development of and extraction of aggregate resources through local zoning and ordinances. The MPCA has regulatory authority at these facilities for industrial stormwater and wastewater. Aggregate extraction facilities must obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit from the MPCA for stormwater and wastewater discharges.

Aquatic Invasive Species

AIS can cause ecological and economic damage to water resources. The DNR has regulatory authority over aquatic plants and animals. Permits are required by the general public for transporting lake water, invasive species, and for treating invasive species. In Beltrami county, the county oversees AIS programs with assistance from Beltrami SWCD.

Buffers

The Riparian Protection and Water Quality Practices statute (Minnesota Statue Section 103F.48, commonly referred to as the Buffer Law) requires a 50-foot average continuous buffer of perennial vegetation with a 30-foot minimum width along all public waters and a 16.5-foot minimum width continuous buffer of perennial vegetation along all public drainage systems. Beltrami County administers drainage law through its local ordinances. Public drainage systems within the RLWD are administered by the RLWD through their Drainage Rule. In most situations, landowners have the option of working with their SWCD to determine if other alternative practices aimed at protecting water quality can be used in lieu of (or in combination with) a buffer.

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

Construction Erosion Control

Temporary construction erosion control is the practice of preventing and/or reducing the movement of sediment from a site during construction. Projects disturbing one acre or more of land will require a NPDES Permit from the MPCA. The RLWD regulates construction erosion control through their Rules.

- Regulations: Minnesota Rules, Chapter 7090

Feedlots

Feedlot rules, regulations, and programs were established under MN Rules 7020 to govern the collection, transportation, storage, processing, and land application of animal manure and other livestock operation wastes. The program is administered through the MPCA, but local counties may accept delegation of this authority. Beltrami County is not a delegated feedlot county, meaning MPCA enforces feedlot regulations in the ULRLW.

- Regulations: Minnesota Rules, Chapter 7090

Floodplain Management

Floodplain zoning regulations are intended to guide development in the floodplain consistent with the magnitude of the flood threat to minimize loss of life and property, disruption of commerce and governmental services, extraordinary public expenditure for public protection and relief, and interruption of transportation and communication. The DNR and the Federal Emergency Management Agency (FEMA) are in the process of updating floodplain maps on a county basis. Current flood maps can be found on the DNR website at https://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/access-flood-maps.html. Floodplain zoning regulations are enforced through local county ordinances and RLWD rules.

- Regulations: Minnesota Statutes 103F, 104, 394

Water Use

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

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

Hazard Management

Hazard management 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. Extreme weather events and infrastructure resilience also play a part in hazard management. Local emergency management departments are deployed in each of the contributing counties within the 1W1P boundary.

Noxious Weed Law

Noxious weeds affect the natural, native balance of ecological functions. The Noxious Weed Law in Minnesota is administered by the MDA through SWCDs. The state maintains noxious weed lists of those species to eradicate, control, restrict, and specially regulated plants.

- Regulations: Minnesota Statute 18

Public Drainage Systems

Drainage authority is granted to counties and watershed districts through MN Statute Chapter 103E to establish, construct, and in perpetuity maintain public drainage systems. County boards serve as the drainage authorities for public drainage systems in Beltrami County.

- Regulations: Minnesota Statute 103E

Shoreland Management

The Minnesota Legislature has delegated responsibility to LGUs to regulate the subdivision, use, and development of shorelands along public waters to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources. Many counties specifically target steep areas due to their disproportionate impact on sediment erosion when the shoreline becomes unstable. This statute is administered and enforced as a shoreland ordinance for Beltrami County.

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

Solid Waste Management

Minnesota's Waste Management Act has been in place since 1980 and establishes criteria for the management of all types of solid waste including mixed municipal solid waste, construction and demolition waste, and industrial waste. In order to receive annual grant funding to assist in implementing waste management programs, each county must have an MPCA approved Solid Waste Management Plan. Beltrami County has an approved plan. Counties can also adopt Solid Waste Ordinances to use as a supplement in enforcing MPCA Rules. All participating 1W1P counties have a solid waste ordinance that is administered by the county.

- Regulations: Minnesota Statutes 115A, 400

Subsurface Sewage Treatment Systems

The SSTS Program is administered by the MPCA to protect the public health and environment. SSTS Ordinances are adopted and enforced at the county level to meet state requirements. All participating counties administer Minnesota Rules Chapter 7080 through 7083 for SSTSs through local ordinances.

- Regulations: Minnesota Rules, chapters 7080 through 7083

Storing Garbage and Other Waste on Lake Ice

In 2023, a new law was passed that states: any person using a shelter, a motor vehicle, or any other conveyance on the ice of state waters may not deposit garbage, rubbish, cigarette filters, debris from fireworks, offal, the body of a dead animal, litter, sewage, or any other waste outside the shelter, motor vehicle, or conveyance, unless the material is: Placed in a container that is secured to the shelter, motor vehicle, or conveyance, and not placed directly on the ice or in state waters. For the purposes of this section, 'sewage' means excrementitious or other discharge from the bodies of human beings or animals, together with such other water as may be present.

- Regulations: Minnesota Statute 97C.363

Well Code

The MDH administers the well code, which includes well construction standards to protect groundwater resources and requirements to seal unused wells.

- Regulations: Minnesota Rules 4725

Wellhead Protection

The MDH administers the state wellhead protection rule that sets standards for wellhead protection planning. Municipalities within the watersheds have completed wellhead protection plans. A map identifying completed wellhead protection plans can be found at: https://mdh.maps.arcgis.com/apps/View/index.html?appid=5051b7d910234421b0728c40a1433baa .

- Regulations: Minnesota Rules, Chapter 4720.5100 – 4720.5590

Wetland Conservation Act

The Minnesota Legislature passed the WCA of 1991 to achieve no net loss of, increase the quantity, quality, and biological diversity of, and avoid direct or indirect impacts to Minnesota's wetlands. LGUs are responsible for administering, regulating, and educating landowners on WCA. The Environmental Services Department of Beltrami County serves as the WCA LGU.

- Regulations: Minnesota Rules, Chapter 8420

Work in Public Waters

The DNR maintains a list of public water basins, wetlands, and rivers in the state. Work done in public waters to make a change in the course, current, or cross-section, or a transfer of ownership, requires either receiving a general or individual permit. Exceptions to the need for a permit are included on the DNR website.

- Regulations: Minnesota Statute 103G.245

Comprehensive or Land Use Plans

Counties and municipalities within the ULRLW are responsible for land use planning, which is administered through local zoning ordinances. Comprehensive or land use plans have been adopted by the local governmental units within the watershed. From a regulatory perspective, management of lands and resources may overlap with the local government entities listed below. Therefore, meeting goals and strategies of local planning may also involve other governmental or non-governmental entities. Local government units within the ULRLW that have comprehensive and/or land use plans are provided in Table 5.1. Please note this is not intended to be all-inclusive.

Table 5.1. Comprehensive and Land Use Management Plans adopted within the ULRLW 1W1P planning area.

Local Governmental Unit	Comprehensive or Land Use Management Plan (Year adopted/Revised)
Beltrami County	Beltrami County Local Water Management Plan (2017)
Red Lake Nation	Red Lake Band of Chippewa Indians Integrated Resource Management Plan (2011)
RLWD	RLWD Comprehensive Plan (2006/2018)

DATA COLLECTION AND MONITORING IMPLEMENTATION PROGRAM

The Data Collection and Monitoring Implementation Program funds actions which close data gaps to allow for tailored, science-based implementation strategies. The program also funds ongoing efforts aimed at the development and assembly of data and information.

Monitoring

Ongoing surface water monitoring programs are led by local and state entities. The DNR Cooperative Stream Gaging (CSG) database is a shared repository of monitoring data between the DNR, MPCA, USGS, and National Weather Service (NWS). CSG sites are at the east side of Upper Red Lake and the west side of Lower Red Lake (Figure 5.2). The Red Lake Nation monitors stream, lake, and groundwater water quality as well.

Local entities that monitor water quality include Beltrami SWCD, RLWD, RLDNR, River Watch, International Water Institute, and other citizen organizations such as lake associations (Figure 5.2). Some macroinvertebrate sampling occurs in the watershed by groups such as River Watch, SWCDs, RLDNR, and the MPCA. Results from these networks and other ongoing tracking and monitoring programs can be used to document measurable water quality and quantity changes resulting from implementation. MPCA conducts Index of Biological Integrity surveys for invertebrates and MNDNR conducts these surveys for fish to determine water quality, which is how impaired waters are determined along with chemical and physical assessments. Multiple organizations monitor AIS activities including DNR, counties, SWCDs, RLWD, and RLDNR. MPCA monitors watersheds on a 10-year cycle, and the ULRLW is expected to be monitored in 2025. New data will go into an updated WRAPS report, which will be used for informing ULRLW CWMP progress and any new recommendations or issues.

Other ongoing monitoring efforts also track groundwater supply quantity and quality trends. Current programs include Public Water Supplier Monitoring, MPCA's Ambient Groundwater Monitoring Program, DNR high-capacity permitting program, and the DNR Observation Well Network (monitored by SWCDs). These programs have provided valuable information but are not yet extensive enough to fully assess the state of groundwater in the region.

During implementation, the Data Collection and Monitoring Implementation Program will build on the data and information processes already established by plan participants. The Data Collection and Monitoring Implementation Program will be collaborative (especially where efforts cross administrative boundaries), with partnership entities sharing services wherever possible.

It will be important to continue monitoring on priority lakes and streams to track water quality as projects and land management practices are implemented.

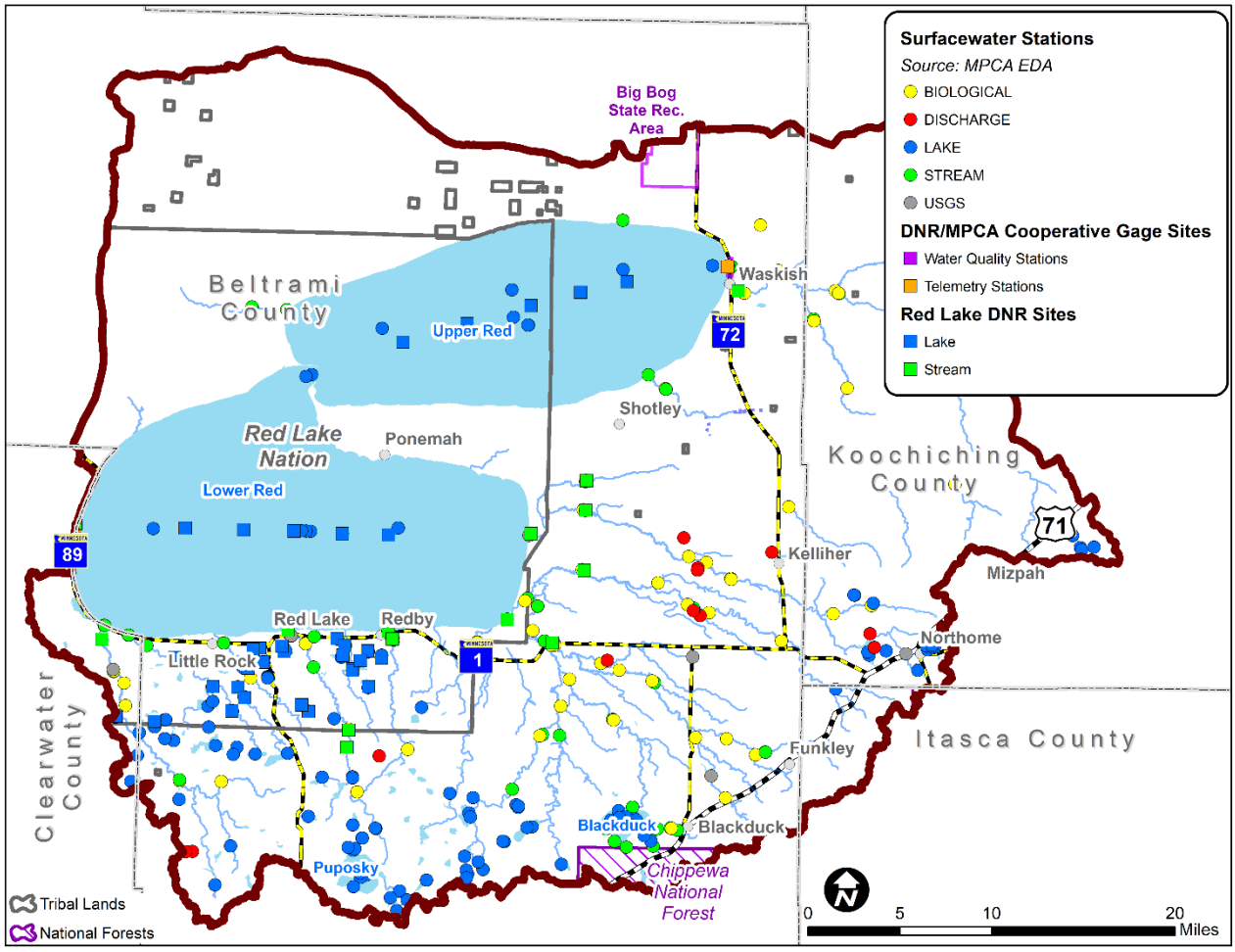


Figure 5.2. Monitoring sites in the ULRLW. Disclaimer: this map may not contain every site ever monitored.

Battle River, South Branch

Data Gaps

During the planning process, the Advisory and Steering Committees identified data gaps in the watershed. These data sets can be collected during implementation to target projects.

RIPARIAN ENHACEMENT

- Longitudinal assessment
- DNA microbial source testing
- More *E. coli* testing in different locations and time of year
- Ground-truthing and survey of areas that need stream and ditch stabilization
- Sturgeon habitat feasibility on the Blackduck and Cormorant Rivers
- Flow monitoring of larger rivers that flow into the Red Lakes (especially Cormorant, Blackduck, and Mud Rivers)

LAKE ENHANCEMENT

- Feasibility study for water level drawdown, alum treatment, biomanipulation
- In-lake sediment legacy loads
- Lake inlet assessments
- Aquatic plant surveys
- Lake-wide septic system surveys
- Impervious surface maps
- Drone surveys of shoreline
- LiDAR comparisons
- Trend analysis
- Blackduck stormwater feasibility
- Investigate human impacts to lakes from winter ice fishing

FOREST MANAGEMENT

- Landscape stewardship plan

DRINKING WATER PROTECTION

- Well inventory to find abandoned wells
- Complete Groundwater Atlas for all counties in the watershed

HYDROLOGIC ENHANCEMENT

- Target areas for hydrologic restoration and determine feasibility
- Culvert inventory, barrier inventory
- Hydroconditioning
- LiDAR comparisons
- Flow monitoring to determine direction of ditch flow
- General flow monitoring of streams

PROTECTION

- Landscape stewardship plan
- Rerun the RAQ scoring with a heavy weight on priority resource adjacency
- Determine subwatershed protection needs for stream functioning

Coburn Creek

EDUCATION AND OUTREACH IMPLEMENTATION PROGRAM

The Education and Outreach Implementation Program funds actions to increase engagement and understanding to make progress toward plan goals. The program is operated through sharing of services. Expectations are that a common set of template education and outreach materials will be developed for use across the watersheds but delivered by the staff within each county and/or planning region. Engaging landowners is critical for understanding issues impacting residents and solutions that are viable. Actions may include development of educational materials, newsletters, coordination of volunteer activities, and public meetings to raise awareness and gain a better understanding of the consequences of individual decisions on water management. Also included are general media campaigns, citizen and LGU surveys, and social media.

Specific activities designed for engaging landowners in each topic area include the following items below. These are just examples that will be expanded upon implementation.

RIPARIAN ENHACEMENT

- Outreach to landowners about project and cost share opportunities

FOREST MANAGEMENT

- Outreach about private landowner programs and tools, Firewise program
- Conservation planning and management assistance to parcels under 20 acres in size
- Communication between state, federal, tribal, and private entities about watershed-level forest management

HYDROLOGIC ENHANCEMENT

- Communicate with local landowners and wild rice producers about hydrologic enhancement opportunities

LAKE ENHANCEMENT

- Keep it Clean
- Education and outreach to lakeshore landowners, realtors, contractors, and resorts on lake topics, septic systems, Score your Shore.

PROTECTION

- Outreach to landowners about project and cost share opportunities

AGRICULTURAL LAND MGMT

- provide no till drill and various cover crop applications
- provide technical expertise and assistance for implementing practices
- partner with MN Soil Health Coalition and Grazing Lands Coalition, annual cattle workshop in partnership with Blackduck Coop

DRINKING WATER PROTECTION

- Drinking water testing clinics, wellhead protection, informational presentations about arsenic and nitrates and mitigation

This program is also dedicated to engaging area youth in natural resource management, building upon current efforts. These example activities center around educating youth on the importance of natural landscape and the environmental issues that impact it.

- River Watch
- River of Dreams
- Water Fest
- Conservation Day
- Envirothon
- FFA, 4-H
- County Fairs
- Ag in the Classroom
- Northwest Minnesota Soil Contest
- Science Fair Judging

Achieving Plan Goals

This plan focuses both on restoration and protection activities. Figure 5.3 below summarizes the different levels of measuring progress and how it will be implemented in this plan. Projects will be tracked during plan implementation using a system set up for the watershed.

Figure 5.3. Achieving plan goals in the ULRLW.

PLAN ADMINISTRATION

SECTION 6.
PLAN ADMINISTRATION

Plan Administration describes how the plan will be implemented, how the watershed partners will work together, how the funding will move between them, and who will handle the administrative duties. This plan will be implemented by the ULRLW Partnership, shown in Figure 6.1. The Implementation MOA will be very similar to the Planning MOA (Appendix F), with refinements clarifying roles for implementing the plan. Other local collaborators include cities and Koochiching County and SWCD.

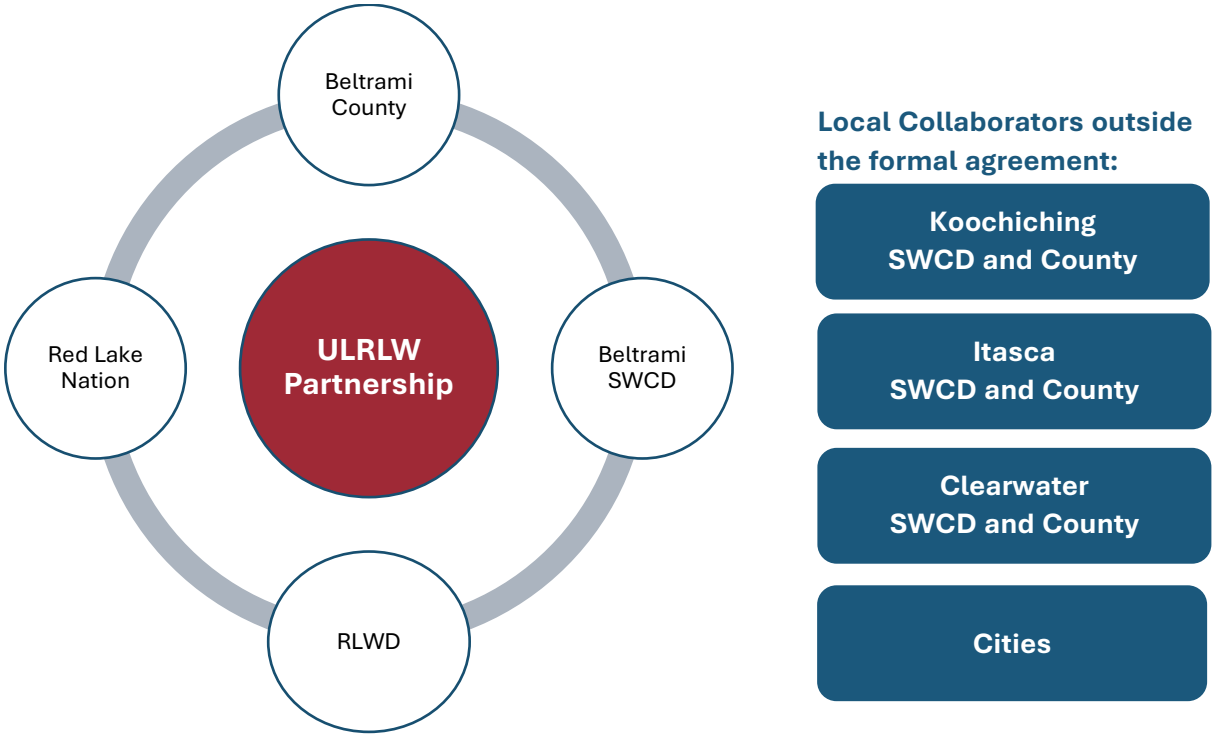


Figure 6.1. ULRLW Partnership members.

Decision-Making and Staffing

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

Three committees will serve this plan during implementation: Table 6.1 outlines the probable roles and functions of these committees. Expectations are that the roles of each committee will shift and change focus during implementation. Fiscal and administrative duties will be assigned to a member LGU through a Policy Committee decision as outlined in the formal agreement. Responsibilities for annual work planning and serving as the fiscal agent can be revisited by the Policy Committee in the future if needed.

Table 6.1. Anticipated roles for ULRLW CWMP Implementation.

Committee Name	Primary Implementation Roles/Functions
Policy Committee *One board member from each entity on the MOA* (Figure 6.1)	• Meet two to four times a year or as needed • Review the implementation funds from plan participants • Approve the annual work plan • Approve annual fiscal reports • Approve annual reports submitted to BWSR • Annual review and confirmation of Advisory Committee priority issue recommendations • Direction to Advisory Committee on addressing emerging issues • Approve plan amendments • Implement county ordinances and state statutory responsibilities separately from plan implementation • Approve grant applications • Approve annual assessment
Advisory Committee *State and Federal Agencies, local stakeholders*	• Meet annually or as needed • Review and provide input for the annual work plan • Review and identify collaborative funding opportunities • Recommendations to ULRLW Steering Committee on program adjustments • Assist with execution of the targeted implementation schedule
Steering Committee *Staff from MOA entities, BWSR staff, consultants*	• Meet monthly or as needed to review projects • Review the status of available implementation funds from plan participants • Review annual fiscal reports • Review annual reports submitted to BWSR • Biennial review and confirmation of priority issues • Evaluate and recommend response to emerging issues • Prepare plan amendments • Prepare the annual work plan • Prepare and submit grant applications/funding requests • Research opportunities for collaborative grants • Implement the targeted implementation schedule
Local Fiscal/Administrative Agent and Coordinator	• Convene committee meetings • Report on how funds were used • Compile annual results for annual assessment

Collaboration

Collaboration Between Planning Partners

The ULRLW planning partners have a long history of cooperation and working together. The benefits of successful collaboration between planning partners include consistent implementation of actions watershed-wide, increased likelihood of funding, and resource efficiencies gained. The planning partners will pursue opportunities for collaboration with fellow planning partners to gain administrative and program efficiencies, pursue collaborative grants, and provide technical assistance. The planning partners will also review similarities and differences in local regulatory administration to identify local successes and changes needed in the future to make progress towards goals outlined in this plan. Current collaborations between MOA entities on programs and grants are shown in Figure 6.2.

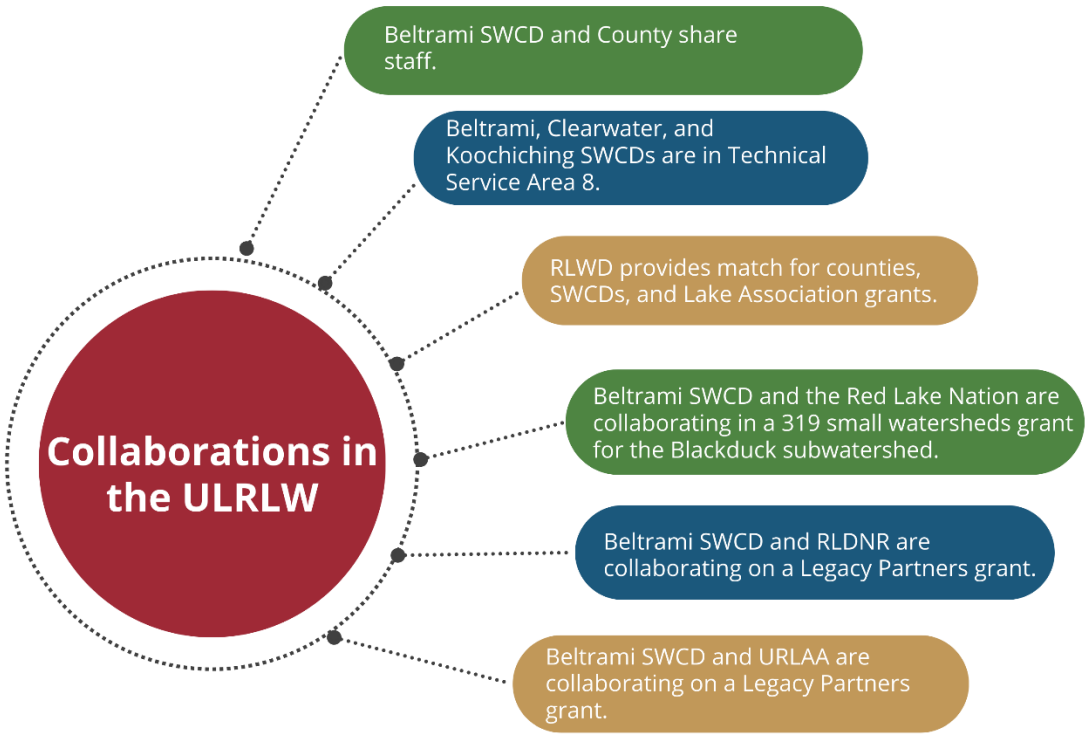


Figure 6.2. Current collaborations between MOA entities in the ULRLW.

Collaboration with Other Units of Government

The ULRLW Steering Committee will continue coordination with other governmental units. This cooperation and coordination occurs at the local, state, federal, and/or tribal level. At the state/federal level, coordination between the Partnership and agencies such as BWSR, USACE, DNR, MDH, EPA, and the MPCA occur through legislative and permit requirements. Local coordination between the Partnership and comparable units of government such as municipalities, city councils, township boards, county boards, and the RLWD board are a practical necessity to facilitate watershed-wide activities. Examples of collaborative programs in the watershed include the Environmental Quality Incentives Program (EQIP) (NRCS), CRP (FSA), Minnesota Agriculture Water Quality Certification (MDA), EPA funding for Tribal Governments,

Farm Bill Biologist (MDA), Wellhead Protection for city DWSMAs (Minnesota Rural Water Association [MRWA] and MDH), Minnesota Forest Resource Council and WRAPS (MPCA). Collaboration with Tribal Nations can occur on projects, monitoring, and outreach. Any potential project collaborations involving Red Lake Nation would be subject to Tribal Council approval.

The ULRLW Steering Committee will continue to foster an environment that enhances coordination and cooperation to the maximum extent possible throughout the implementation of this plan.

Collaboration with Others

Local support and partnerships will drive the success of final outcomes of the actions prescribed for implementing this plan. Because this plan's focus is voluntary land stewardship practices, collaborations with landowners in the watershed is of utmost importance. There are many actions in the plan that describe working with individual landowners on providing cost share and technical assistance for implementing land stewardship practices.

The ULRLW CWMP expects to continue and build upon existing collaboration with others, including non-governmental organizations, while implementing this plan. Many of these existing collaborations are aimed to increase habitat and recreational opportunities within the plan area while providing education and outreach opportunities. Partners for these collaborations include, but are not limited to, lake associations, Beltrami County Lakes and Rivers Association (BCLARA), International Water Institute, TNC, Ducks Unlimited, MN Deer Hunters Association, Pheasants Forever, Sportsman's Clubs, National Wild Turkey Federation, local co-ops, University of Minnesota Extension, civic groups, private businesses, individuals, and foundations.

Blackduck River, Photo credit: RLDNR

Funding

This section describes how the plan will be funded and how that funding will be used. The current funding level (Baseline) is based on the estimated annual revenue and expenditures for plan participants combined and allocated to the plan area based on the percentage of each county's land area in the ULRLW. Baseline funding includes locally generated funds such as county taxes, state program and conservation delivery grants, including the Natural Resources Block Grant and SWCD Local Capacity Building Grants, and federal funding for the Red Lake Nation from the EPA (Table 6.2).

Table 6.2. Baseline funding in the ULRLW.

Funding Level	Annual Local Estimate	Annual State Estimate	Annual Federal Estimate	Annual Total
Baseline	$430,000	$70,000	$200,000	$700,000

Upon the completion of this plan, WBIF is available for the planning partnership from the Clean Water Land and Legacy Amendment. In addition, the planning partnership has a 319 Small Watersheds grant from the EPA (through the MPCA). The total of the Baseline, WBIF, and 319 Grant are needed to fully implement this plan (Table 6.3).

In addition, there are other entities funding and completing projects in the watersheds. "Other" funding summarizes projects that help make progress to plan goals, but that are not administered by planning partners (counties, SWCDs, RLWD, RLDNR). 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.

Table 6.3. Funding for implementing this plan.

Description	Annual Total	10 Year Plan Total
Baseline + WBIF + 319 Funding *Amount needed to implement this plan through MOA Planning Partners*	$1,426,500	$14,265,000
Other/Partner Funding Sources *SFIA, NRCS, DNR, USFWS, CWF, LSOHC*	$1,875,000	$18,750,000
Total	$3,301,000	$33,010,000

Local Funding

Local revenue is defined as money derived from either the local property tax base or in-kind services of any personnel funded from the local tax base. Examples include local levy, county allocations, and local match dollars (see Local Funding Authorities in Appendix H). Watershed districts can establish water management districts (WMD) to fund projects under current law (103D). These WMDs must be included in watershed plans adopted by watershed districts.

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.

Water Management Districts

This funding option can only be used to collect charges to pay costs for projects initiated under MS 103D.601, 103D.605, 103D.611, or 103D.730. To use this funding method, Minnesota law (MS 103D.729) requires that the area to be included in the WMD be described, the amount to be charged identified, the methods used to determine the charges be described, and the length of time the WMD is expected to remain in force specified.

Description of WMDs

This plan establishes the watershed as a WMD, although the RLWD must go through proper procedures to turn the WMD on. The RLWD may create different WMDs under future plan amendments.

Duration of Existence of WMDs

The Policy Committee anticipates that the WMDs will provide funding to assist with the implementation of a variety of runoff, bank stabilization, flood damage reduction, and/or water quality related projects. The WMDs will remain in existence in perpetuity. Annual assessment of charges could vary from no charges to the maximum WMD revenue limit of the planning region.

Use of Funds

The primary use of funds collected from charges within WMDs will support projects that help achieve the goals of the planning regions, which benefits residents within a WMD.

Annual Charge Amount

The maximum WMD revenue limit within each WMD is based on 0.10% of the taxable market value within each planning region. This value will change each year as property values increase or decrease over time.

Method to Determine Charges

The methods proposed to establish the charges will be based upon the proportion of the total annual runoff volume and/or solids load contributed by a parcel or may be based on the drainage area of the parcel within a WMD.

Option 1: The runoff volume method will:

- use soils and land use data to determine the existing curve number for each parcel within a WMD;
- use the curve number for each parcel and the annual average precipitation depth to compute the annual runoff volume for each parcel;
- sum the annual average runoff volumes for all parcels within a WMD to determine the total annual runoff volume; and
- compute the percentage of the annual runoff volume from each parcel as the ratio of the annual average runoff volume from the parcel and the total annual average runoff volume for the WMD (i.e., the “runoff ratio”).

Option 2: The solids load contribution method will:

- use the Revised Universal Soil Loss Equation and a sediment delivery ratio representing the portion of the solids and sediment reaching a watercourse to compute the annual average sediment and solids load for each parcel;
- sum the annual average solids and sediment loads for all parcels within a WMD to determine the total annual average sediment and solids load; and
- compute the percentage of the annual average sediment and solids load from each parcel as the ratio of the annual average sediment and solids load from the parcel and the total annual average sediment and solids load for the WMD (i.e., the “sediment ratio”).

Option 3: The combination runoff volume and solids load method will:

- consider both runoff volume and solids load contribution and would follow the methodologies listed above for both solids contribution and runoff volume;
- add the runoff ratio and/or the sediment ratio to compute the charge ratio for each parcel within the WMD. The amount charged to a specific parcel is the sum of the runoff ratio and the sediment ratio for the parcel divided by the sum of the runoff ratio and the sediment ratio for all parcels within the WMD; and

- apply the charge ratio to the total amount of revenue needed for the WMD to carry out the stormwater related projects, programs, and activities described by the plan to achieve the stormwater related goals within that WMD.

Option 4: The drainage area method will:

- determine the drainage area of each parcel of land within the planning region;
- compute the charge based on the charge ratio which is determined by taking the drainage area of that parcel within the planning region divided by the total area of the planning region; and
- apply the charge ratio to the total amount of revenue needed for the WMD to carry out the stormwater related projects and programs described by the plan to achieve the stormwater related goals within that WMD.

Selection of the appropriate process of determining charges will be established and further refined in Step 3 of the process described in the next section.

Process to be Used to Create WMDs

BWSR has provided guidance as to the process of creating a WMD. The process involves eight steps. The first two steps are addressed through this CWMP developed according to the current BWSR 1W1P Operating Procedures. Steps 3 through 8 must be completed prior to any collection of charges in any WMD.

Step 1. Amend ULRLW CWMP to create a WMD

Amendment must include:

- Description of area to be in the WMD
- 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)
- The method that will be used to determine the charges
- The length of time the WMD will be in force (perpetuity is acceptable)

Step 2. Approval of plan amendment under M.S. § 103D.411 or as part of a revised plan under M.S. § 103D.405

- Revised plan, or petition and amendment, sent to BWSR
- BWSR gives legal notice, and holds hearing if requested
- BWSR orders approval or prescribes plan or amendment
- BWSR notifies Watershed District managers, counties, cities, SWCDs

Step 3. Watershed District establishes project(s) in the WMD

- 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

Step 4. Watershed District refines methodology for computing charges based on final project scope

Step 5. Watershed District determines and sets charges for all properties within the WMD after identifying scope of project and deciding method(s) of funding

Step 6. Watershed District develops collection mechanism

- Request county or counties to collect,
- Contract with a private vendor (e.g. electric cooperative), or
- Billing and collection by Watershed District

Step 7. Watershed District establishes a separate fund for proceeds collected from the fee or stormwater utility charges

Step 8. Resolution of Disputes

Local governments may request BWSR to resolve disputes pursuant to M.S. § 103D.729, Subd. 4, except a local appeal process must be completed first for disputes involving WMDs established in perpetuity

Local Appeal

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 order of BWSR approving the plan establishing a WMD, the Watershed District shall publish notice of its resolution adopting the plan in a newspaper in general circulation in the ULRLW CWMP area.
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.

State Funding

State funding includes all funds derived from the State tax base. Examples of state funding includes conservation delivery, state cost share, Natural Resources Block Grants, CWFs, and SWCD Local Capacity Building Grants.

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 CWF 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

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

Federal Funding

Federal funding includes all funds derived from the Federal tax base. For example, this includes programs such as EQIP, CRP, and the Conservation Stewardship Program (CSP).

Partnerships with federal agencies are an important resource for ensuring implementation success. An opportunity may exist to leverage state dollars through some form of federal 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 6.4).

Additional Funding Sources

Current programs and funding (Level 1) will not be enough to implement the full targeted implementation schedule. As such, the success of implementing the plan will depend on collaboratively sought competitive state, federal, and private grant dollars as well as increased capacity.

Plan participants may pursue grant opportunities collaboratively or individually to fund implementation of the targeted implementation schedule. Within the targeted implementation schedule, actions are assigned implementation programs. Table 6.4 shows the most used state and federal grants for executing the actions described by this plan cross-referenced to plan implementation programs, thereby showing potential sources of revenue for implementation.

Several non-governmental funding sources may also provide technical assistance and fiscal resources to implement the targeted implementation schedule. This plan should be provided to all non-governmental organizations as a means of exploring opportunities to fund specific aspects of the targeted implementation schedule.

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

Table 6.4. Implementation programs and related funding sources for the ULRLW. Note: List is not all-inclusive.

Program/Grant		Primary Assistance Type	Projects & Practices	Capital Improvement Projects	Data Collection & Monitoring	Education & Outreach
Federal Programs/Grants						
NRCS	Conservation Innovation Grant (CIG)	Financial	•			
	Conservation Stewardship Program (CSP)	Financial	•			
	Environmental Quality Incentives Program (EQIP)	Financial	•			
	Agricultural Conservation Easement Program (ACEP)	Easement	•			
FSA	Conservation Reserve Program (CRP)	Easement	•	•		
	Conservation Reserve Enhancement Program (CREP)	Easement	•	•		
	Farmable Wetlands Program (FWP)	Easement	•			
	Grasslands Reserve Program (GRP)	Easement	•			
	Wetland Reserve Program (WRP)	Easement	•	•		
FSA/ USDA/ NRWA	Source Water Protection Program (SWPP)	Technical				•
USFWS	Partners for Fish and Wildlife Program	Financial/ Technical	•			
FEMA	Hazard Mitigation Grant Program (HMGP)	Financial	•	•		
	Pre-Disaster Mitigation (PDM)	Financial	•	•		
	Flood Mitigation Assistance (FMA)	Financial	•	•		
	Risk Mapping, Assessment, and Planning	Technical	•	•		
EPA	Water Pollution Control Program Grants (Section 106)	Financial			•	•
	State Revolving Fund (SRF)	Loan	•			
	Drinking Water State Revolving Fund (DWSRF)	Loan	•			
	Section 319 Grant Program	Financial	•		•	•
State Programs/Grants						
LSOHC	Lessard Sams Outdoor Heritage Fund	Financial	•	•	•	•
DNR	AIS Control Grant Program	Financial/ Technical	•			•
	Conservation Partners Legacy Grant Program	Financial	•	•		
	Pheasant Habitat Improvement Program (PHIP)	Financial	•			

Program/Grant		Primary Assistance Type	Projects & Practices	Capital Improvement Projects	Data Collection & Monitoring	Education & Outreach
	Flood Hazard Mitigation Grant Assistance	Financial	•	•	•	•
	Forest Stewardship Program	Technical	•			
	AMA Program	Acquisition	•			
	Wetland Tax Exemption Program	Financial	•			
BWSR	CWF Grants	Financial	•	•		•
	Erosion Control and Management Program	Financial	•			
	SWCD Capacity Funding	Financial	•		•	•
	Natural Resources Block Grant (NRBG)	Financial	•			•
	RIM	Financial	•	•		•
MPCA*	Surface Water Assessment Grants (SWAG)	Financial			•	•
	Clean Water Partnership	Loan	•			
MDH	Source Water Protection Grant Program	Financial	•		•	•
MDA	Agriculture BMP Loan Program	Financial	•			
	Minnesota Agricultural Water Quality Certification Program	Financial	•			•
PFA	Public Facilities Authority (PFA) Small Community Wastewater Treatment Program	Financial	•	•		
Other Funding Sources						
Red River Watershed Management Board		Financial/ Technical	•	•	•	•
Ducks Unlimited		Financial/ Technical	•	•	•	•
Trout Unlimited		Financial/ Technical	•	•	•	•
Muskies, Inc		Financial/ Technical	•	•	•	•
TNC		Financial	•	•	•	•
Minnesota Land Trust		Financial	•	•	•	•

**The MPCA has many more grant programs here: https://www.pca.state.mn.us/business-with-us/grants-loans-and-contracts*

Work Planning

Local Work Plan

Work planning is envisioned to align the priority issues, availability of funds, and roles and responsibilities for implementation. A biennial work plan will be developed by the ULRLW Steering Committee based on the targeted implementation schedule and any adjustments made through self-assessments. The work plan will then be presented to the Policy Committee, who will ultimately be responsible for approval. The intent of these work plans will be to maintain collaborative progress toward completing the targeted implementation schedule.

State Funding Request

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

Assessment, Evaluation, and Reporting

Accomplishment Assessment

The ULRLW Steering Committee will provide the Policy Committee with an annual update on the progress of the plan's implementation, with input from the Advisory Committee. For example, any new projects will be tracked against their goal metrics such as acres of forest management, number of bacteria reduction projects, and tons of sediment reduced. A tracking system will be used to measure progress and will serve as a platform for plan constituents. Tracking these metrics will also make them available for supporting future work plan development, progress evaluation, and reporting.

Partnership Assessment

Biennially, the ULRLW Steering Committee will review the ULRLW CWMP 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 Advisory Committee, SWCD and county boards, RLWD, Red Lake Nation, and partners such as state agencies and non-governmental organizations. This feedback will be presented to the Policy Committee to set the coming biennium's priorities for achieving the plan's goals and to decide on the direction for grant submittals. Also, this feedback will be documented and incorporated into the 5-year evaluation. Plan partners intend to pursue watershed-based funding to meet goals and plan implementation schedules.

Five-year Evaluation

This plan has a 10-year life cycle beginning in 2025. To meet statutory requirements, this plan will be updated and/or revised every 10 years. Over the course of the plan life cycle, progress towards reaching goals and completing the implementation schedule may vary. In addition, new issues may emerge and/or new monitoring data, models, or research may become available. As such, in 2030-31 and at every 5-year midpoint of a plan life cycle, an 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.

Reporting

LGUs have several annual reporting requirements. A number of these reporting requirements will remain a responsibility of the LGUs. The Plan Coordinator, with the assistance of the ULRLW Steering Committee, will be responsible for reporting related to grants and programs developed collaboratively and administered under this plan. In addition to annual reports, the ULRLW Steering Committee, with input from the Advisory Committee, may also develop a State of the Watershed Report. 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 annually 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 ULRLW CWMP as required by state law and policy. The ULRLW Steering Committee will assist in developing the required reports and roles and responsibilities will be defined in the MOA Bylaws.

Plan Amendments

The CWMP is effective through 2035 per the BWSR order approving it. Activities described in this plan are voluntary, not prescriptive, and are meant to allow flexibility in implementation. Amendments to this Plan will follow the most current BWSR 1W1P Operating Procedures. This provision for flexibility includes changes to the activities.

During the time this plan is in effect, it is likely that new data giving a better understanding of watershed 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 JPA bylaws.

Formal Agreements

The ULRLW CWMP will be implemented by the ULRLW Partnership (Figure 6.1).

The Partnership previously entered into a formal agreement through an MOA for planning the ULRLW CWMP (Appendix F). The entities will draft an MOA for purposes of implementing this plan. The Policy Committee of the ULRLW CWMP oversees the plan implementation with the advice and consent of the individual county, tribal government, Red Lake Watershed District, and SWCD boards under the umbrella of the implementation MOA.