Rainy Headwaters-Vermilion Watershed

One Watershed, One Plan

CLEAN WATER LAND & LEGACY AMENDMENT

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Acronyms

1W1P	One Watershed, One Plan
AC	Advisory Committee
AIS	Aquatic Invasive Species
ATV	All-Terrain Vehicle
BANCS	Bank Assessment of Nonpoint Source Consequences of Sediment
BMP	Best Management Practice
BWCAW	Boundary Waters Canoe Area Wilderness
BWSR	Board of Water and Soil Resources
CPF	Compensation Planning Framework
CRP	Conservation Reserve Program
CSP	Conservation Stewardship Program
CWMP	Comprehensive Watershed Management Plan
DNR	Minnesota Department of Natural Resources
DO	Dissolved Oxygen
DWSMA	Drinking Water Supply Management Area
EAB	Emerald Ash Borer
EPA	Environmental Protection Act
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency
HEI	Houston Engineering, Inc.
HSPF	Hydrologic Simulation Program – Fortran
HUC	Hydrologic Unit Code
IBA	Important Bird Area
LCCMR	Legislative-Citizen Commission on Minnesota Resources
LGU	Local Government Unit
LSOHC	Lessard-Sams Outdoor Heritage Council
LSP	Landscape Stewardship Plan
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MIDS	Minimal Impact Design Standards
MnDOT	Minnesota Department of Transportation
MOA	Memorandum of Agreement
MPCA	Minnesota Pollution Control Agency
MRWA	Minnesota Rural Water Association
NFWF	National Fish and Wildlife Foundation
NLCD	National Land Cover Dataset
NRCS	Natural Resources Conservation Service
PC	Policy Committee
PCB	Polychlorinated Biphenyls
PFAS	Per- and polyfluorinated substances
PFC	Perfluorochemicals

RAQ	Risk Adjacency Quality
RCPP	Regional Conservation Partnership Program
RH-V	Rainy Headwater - Vermilion Watershed
RH-V CWMP	Rainy Headwater - Vermilion Watershed Comprehensive Watershed Management Plan
RIM	Reinvest in Minnesota (Easement Program)
SAM	Scenario Application Manager
SFIA	Sustainable Forest Incentive Act
SSTS	Subsurface Sewage Treatment Systems
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TSS	Total Suspended Solids
U of MN	University of Minnesota
USDA	United States Department of Agriculture
USACE	US Army Corps of Engineers
USEPA	Unites States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VNP	Voyageurs National Park
WBIF	Watershed-Based Implementation Funding
WCA	Wetland Conservation Act
WHAF	Watershed Health Assessment Framework
WMA	Wildlife Management Areas
WPLMN	Watershed Pollutant Load Monitoring Network
WRAPS	Watershed Restoration and Protection Strategy

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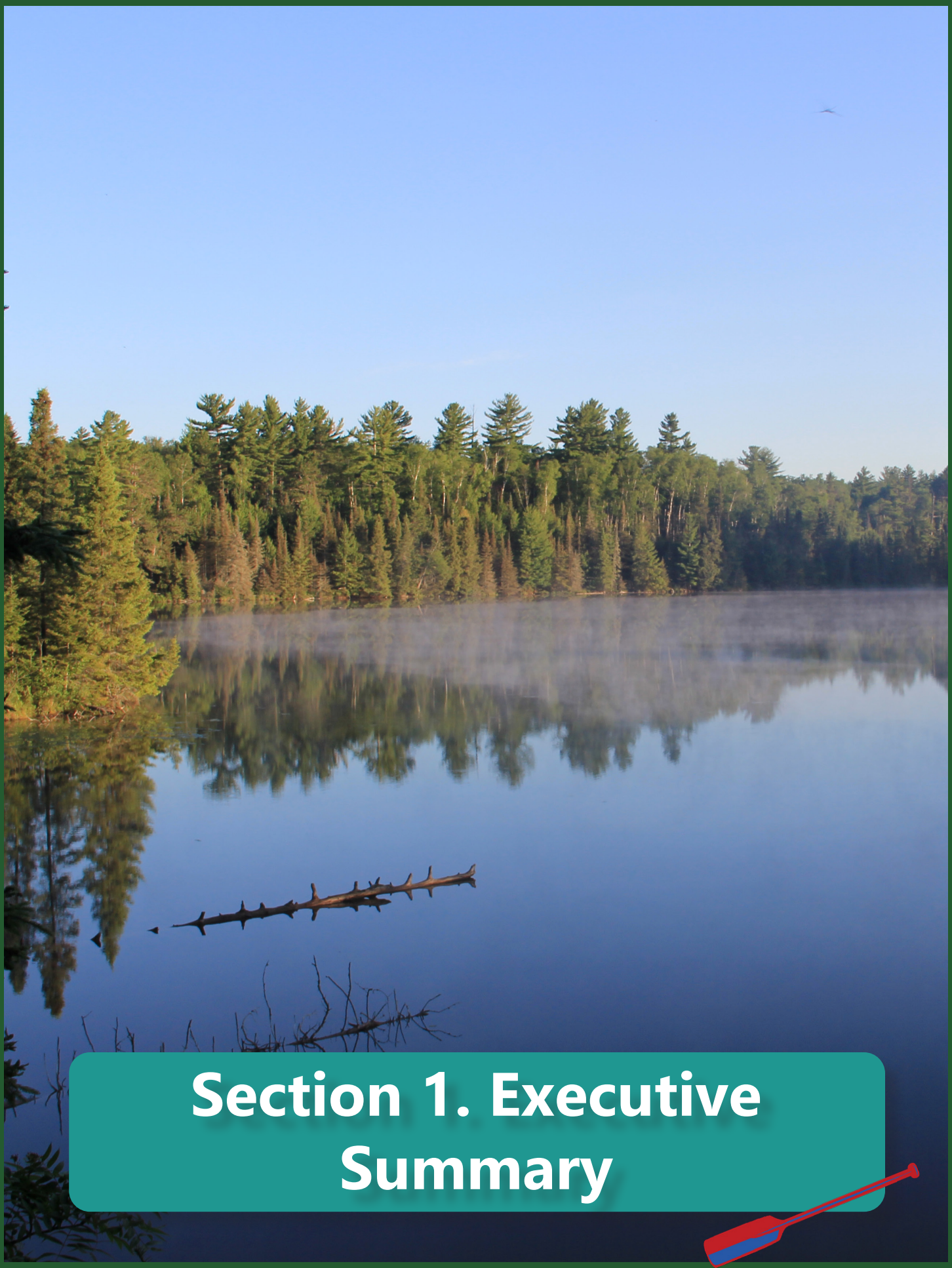


Section 1. Executive Summary

Section 1.
Executive Summary

The northern Minnesota region that contains the Rainy Headwaters – Vermilion Watershed (RH-V) has a special place in the hearts of Minnesotans and others. The Boundary Waters Canoe Area Wilderness, Superior National Forest, Voyageurs National Park, and Bois Forte Band of Ojibwe are all part of this pristine and beautiful area. The history and unique qualities are summarized in the watershed vision statement below.

The Rainy Headwaters – Vermilion Comprehensive Watershed Management Plan (RH-V CWMP) was developed between 2022-2023 through the Minnesota Board of Water and Soil Resources (BWSR) MN Statues §103B.801, the One Watershed, One Plan (1W1P) program. This plan was developed to provide a single set of goals for the RH-V. The following plan sections describe the process by which the planning partners determined priority issues and resources within the watershed, developed measurable goals to improve or protect those resources, and compiled implementation actions to meet those goals over the 10-year implementation period.

The RH-V is comprised of two watersheds (Figure 1.1): the Vermilion River Watershed and the Rainy River - Headwaters Watershed. Both watersheds drain into the Rainy River, flowing west towards Lake of the Woods. Watersheds are grouped by size or Hydrologic Unit Codes (HUC) and this plan addressed the HUC 8 watersheds of the Vermilion River (09030002) and the Rainy River – Headwaters (09030001).

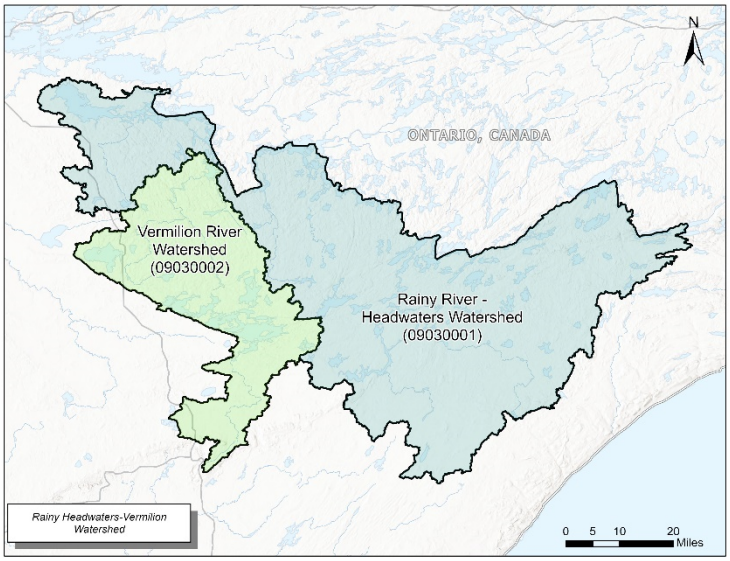


Figure 1.1. HUC 8 boundaries of the RH-V Watershed.

The RH-V is 3,989 square miles (10,331 square km) and includes 1,691 lakes. Of these, 103 lakes are over 500 acres in area. The watershed has over 6,500 miles (10,460 km) of streams. A large majority of the land in the watershed is public land, with only 26.5% being held privately. The federal government is the largest landowner in the RH-V, approximating 54.4% of the watershed.

Roles and Responsibilities

The RH-V CWMP planning effort began with a Memorandum of Agreement (MOA) between Cook County, Cook Soil and Water Conservation District (SWCD), Lake County, Lake SWCD, St. Louis County, and North St. Louis SWCD. A representative from each governmental unit was appointed by each county and SWCD board to serve on the Policy Committee, which is the decision-making body for this plan (Figure 1.2).

The plan content was shaped by the Advisory Committee (AC), which consisted of the counties and SWCDs in the watershed, State Agencies, Federal Agencies, the 1854 Treaty Authority, and other local stakeholders. The Bois Forte Band of Chippewa were invited to participate and hosted one of the AC meetings.

The Steering Committee guided the planning process, produced the plan content, and developed the details for implementation options and best management practices. The

Figure 1.2. Committees involved in the RH-V CWMP.

Steering Committee is the core group responsible for tracking, administrating, and implanting the plan.

Priority Resources

Through the planning process, the planning partners prioritized areas and developed resource categories to target implementation within the planning area. Resource categories were developed to group natural resources concerns and conservation topics while listing potential actions under each (Figure 1.3).

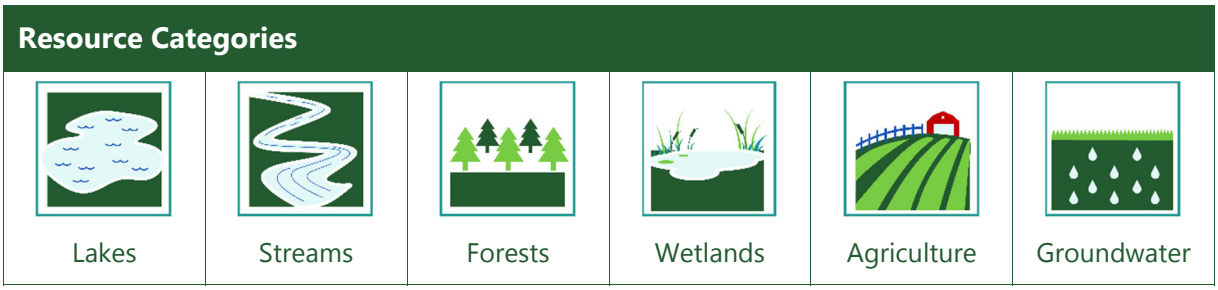


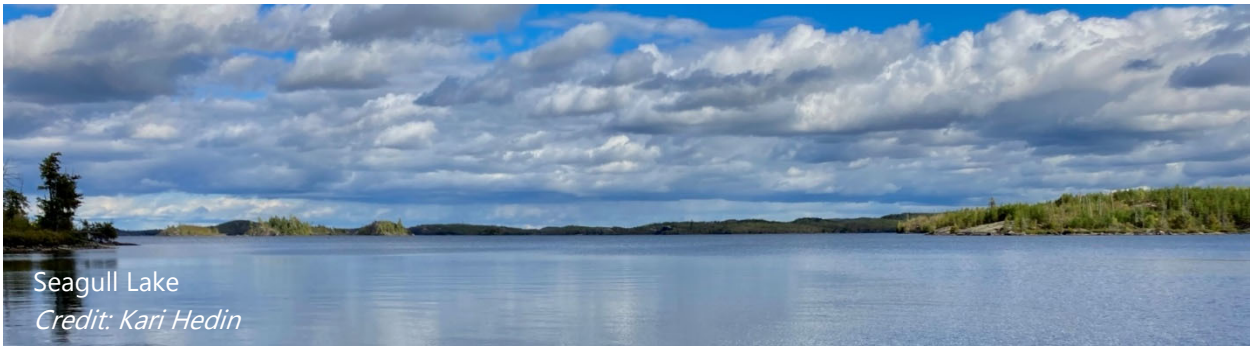
Figure 1.3 Resource categories developed for the RH-V CWMP.

To further the prioritization process, priority lakes and streams were identified within the watershed. Due to the large number of lakes and streams in the watershed, it was essential to identify locations to prioritize conservation resources. Identifying these lakes and streams early in the planning process would best allow for the planning committee to set measurable goals and implementation actions to meet these goals.

Lakes and streams were prioritized using a variety of sources:

- Public input at public kick-off meetings and an online survey
- Issues identified in existing documents, studies, and data sets (e.g. Watershed Restoration and Protection Strategies (WRAPS) reports)
- Planning committees and their professional expertise

Lakes and streams were assigned to one of four categories or management strategies, based on data and their needs: Vigilance, Protect, Enhance, and Restore (Table 1.1). These are commonly used management strategies in watersheds in Northern Minnesota where most of the subwatersheds have a high percentage of protected lands.



Seagull Lake
Credit: Kari Hedin

Table 1.1 Management strategies for resource prioritization.

Management Strategy	Definition
Restore	These resources are impaired (nutrients, *E. coli*, or total suspended solids (TSS)/Turbidity). These streams and lakes require restoration.
Enhance	These resources are at risk, but not impaired. Criteria include degrading water clarity, percentage of lands vulnerable to future land use change, minor watershed protection (<75%), and nearly impaired. Water bodies with <75% permanent protection have been shown to be more vulnerable to water quality degradation. Enhancement projects, nutrient reduction, and land protection are necessary for this category.
Protect	These resources are in good condition. They may have some developmental pressure or risk of land use change impacts. Water bodies have >75% minor watershed permanent protection (public waters, public land, wetlands, conservation easements, Sustainable Forest Incentive Act (SFIA)).
Vigilance	These resources are in excellent condition and have permanent protections in place to maintain their condition. Future risks are low, but maintaining land protection and continued monitoring is important.

A series of criteria were then used to divide the lakes and streams in the RH-V into these management strategies. Those criteria are shown in Table 1.2.

Table 1.2 Criteria for management strategies and the identified lakes and streams in those strategies.

Management Strategy	Lake Criteria	Lakes Identified	Stream Criteria	Streams Identified
Restore	Impaired for nutrients	1	Impaired for *E. coli* and/or TSS/Turbidity	2
Enhance	Declining water quality trend, <75% protected watershed, and/or nearly impaired	8	Vulnerable, <75% protected watershed, and/or nearly impaired	6
Protect	Stable or improving trend and >75% protected	18	>75% protected, exceptional use standard, cold water habitat	10
Vigilance	All lakes in his planning area not in the catagories above.		All streams in his planning area not in the catagories above.	

Maps of priority lakes and streams can be found in Figure 1.4 and Figure 1.5. Lists of priority lakes and streams and those highlighted in Figure 1.4 and Figure 1.5 can be found in Section 4.

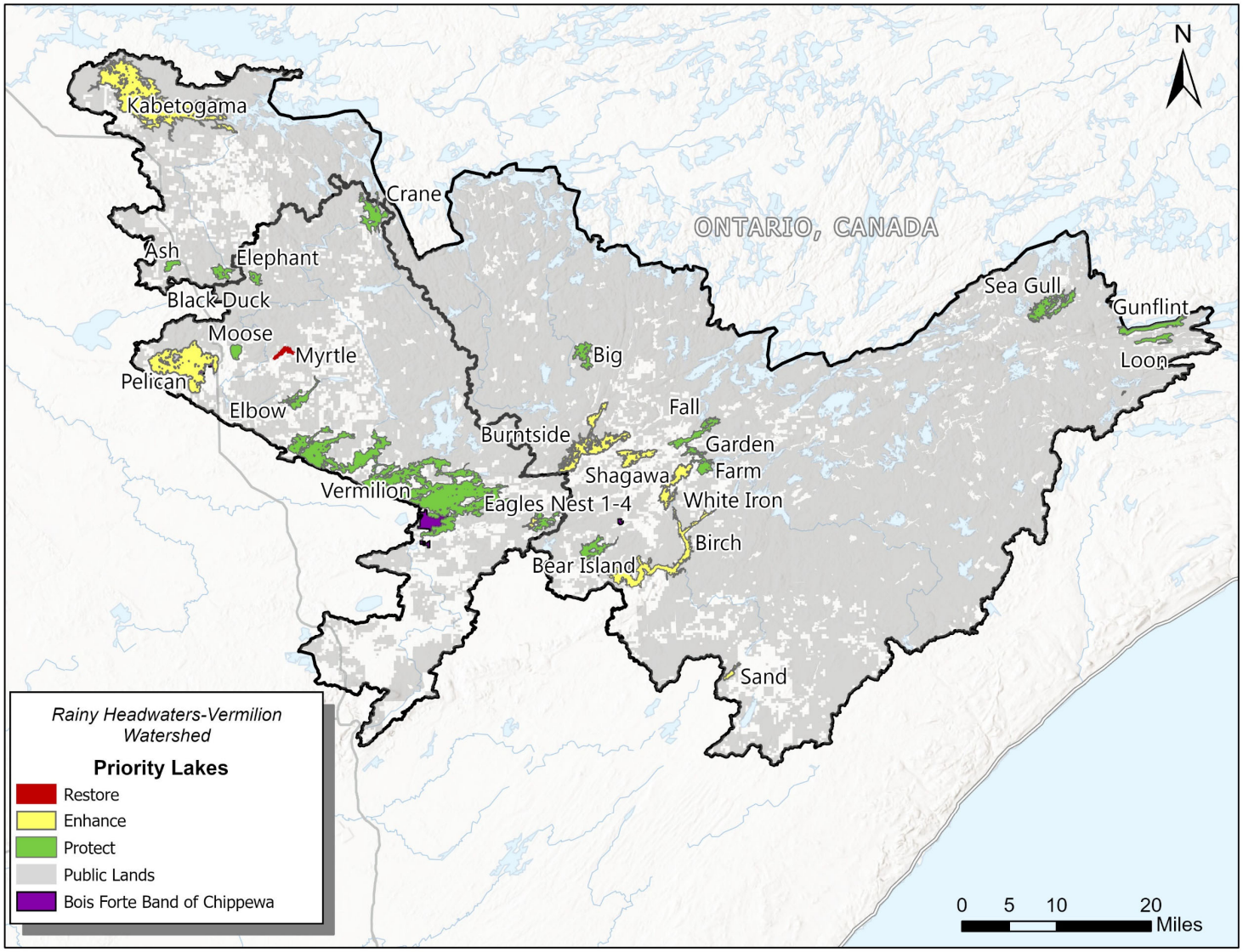


Figure 1.4. Priority lakes by management strategy.

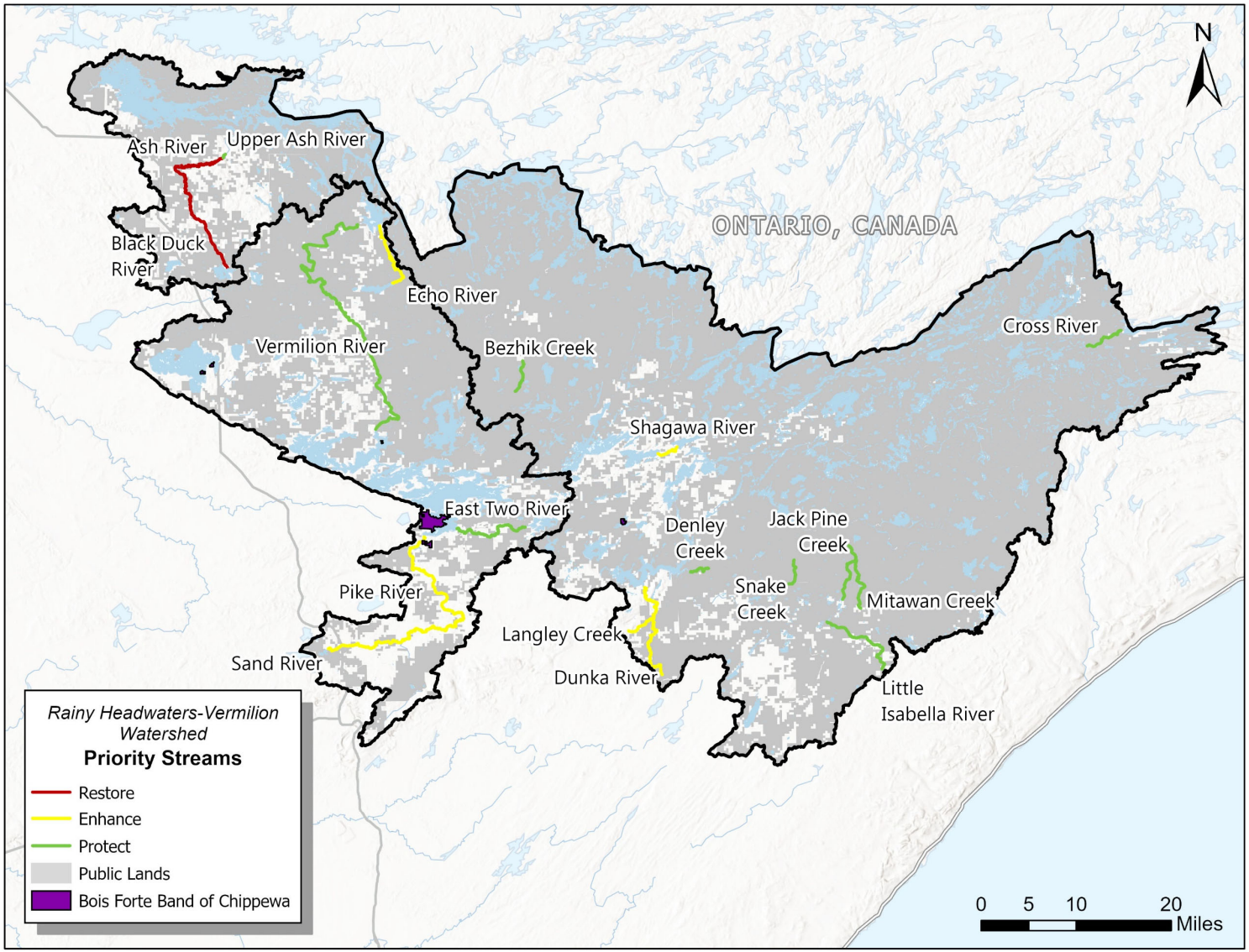
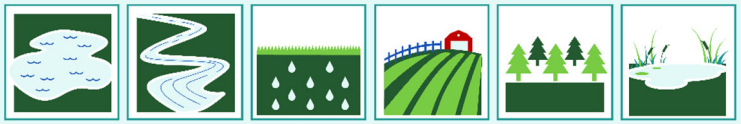


Figure 1.5 Priority streams by management strategy.

Priority Issues

In tandem with priority lakes and streams, priority issues were identified. An initial comprehensive list of issues that impact land and water resources in the watershed were identified from existing documents, studies, data sets, public input, local knowledge, as well as comment letters from state agencies, lake associations, and other local interest groups. This comprehensive set of priority issues was then prioritized to the most pressing issues in the watershed through committee discussions and public input. A full list of the priority issues identified can be found in Table 1.3. The table includes the impacted resource categories and an issue statement (Figure 1.3).

Table 1.3 Issue statements and resource categories impacted by those issues.

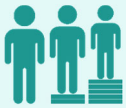
Impacted Resource Category	Issue Statement
	**Pollutants** have the potential to impact water quality, aquatic recreation, aquatic consumption, and aquatic life.
	**Shoreline erosion** caused by increased development and the removal of natural buffers impacts habitat and water quality.
	**Individual waste treatment systems** that are failing contribute pollutants to groundwater and surface water.
	**Stormwater runoff** increases peak flows and contributes pollutants to stream, lakes, and groundwater.
	**Land use change** from development, resource extraction, and outdoor recreational use can impact water quality and habitat.
	**Forest management** is needed to improve forest health and resiliency, as well as protect against terrestrial invasive species.

Impacted Resource Category	Issue Statement
 Streams	**Connectivity barriers** impact biological communities and stream geomorphology.
 Lakes Streams	**Wild Rice** requires mitigation from development, climatic changes, contaminants, and invasive species.
 Groundwater	**Groundwater quality and sustainability** need protection.
 Lakes Streams Wetlands	**Aquatic invasive species** impact recreational activities and may result in reduced biodiversity in lakes and streams.
 Lakes Streams Wetlands	**Altered hydrology** including channelized streams and ditch systems, increase erosion and flow, with the potential to impair water bodies.
 Lakes Streams Wetlands Forests Groundwater	**Sufficient protection** is needed for outstanding resources and sensitive species to maintain water and habitat quality.
 Streams	**Eroding streambanks** contribute to turbidity impairments and reduced habitat quality.

Issue Lenses

During the planning process, issue lenses based on scientific and cultural knowledge in the watershed were developed (Table 1.4). These lenses were directly applied to help prioritize issues, develop goals, and create implementation actions. Using these lenses will allow for stronger plan implementation over the 10-year plan period.

Table 1.4 Issue lenses used throughout the RH-V CWMP.

Issue Lens		Description
	**Climate Variability and Resilience**	Climate change impacts every aspect of watershed management. Variability in the coming decades is likely to affect plan implementation. Because of this, creating goals and actions require extra attention to both mitigate the impacts of variability and build resilience in the watershed.
	**Cultural Resources**	The RH-V is a unique watershed with diverse species, citizens, and waterbodies. Considering the cultural resources in the RH-V is essential to creating and implementing a successful plan. During the planning process, projects that protect or restore cultural resources may receive priority.
	**Equity, Inclusion, and Diversity**	Everyone in the RH-V is impacted by water quality and environmental concerns. Efforts in this planning process were completed using the lens of equity to focus efforts in disadvantaged communities. This also includes facilitating involvement with all groups and considering all voices in the planning and implementation process.
	**Social Capacity**	The RH-V has a unique and diverse group of citizens living with the watershed. Completing the goals laid out in this plan will be dependent on the capacity of individuals, landowners, businesses, and other organizations within the watershed to facilitate and participate in projects and actions that protect the environment and water quality.

Measurable Goals

Measurable goals are one of the most important steps in the planning process. The goals build upon the previous sections' work of identifying priority issues, lakes, and streams. Goals set quantitative, measurable progress that directly address the priority issues of the plan. A summary of the plan goals can be found in Table 1.5 Short-term goals are for the 10-year plan implementation period. Long-term goals are the desired future condition of the watershed. Priority areas are the focus areas for implementation actions.

Table 1.5 Plan goals.

GOAL: LAKE & LAKESHORE MANAGMENT		
Short-term: 2 miles of lakeshore restored to natural vegetation	***Long-term:*** halt the long-term trends of natural shoreline loss	***Priority areas:*** priority lakes
GOAL: RIPARIAN ENHANCEMENT		
Short-term: enhance 1 mile of riparian land; implement 100 acres of agricultural Best Management Practices (BMPs)	***Long-term:*** meet the total maximum daily load (TMDL) goals in the Blackduck and Ash Rivers	***Priority areas:*** Blackduck and Ash Rivers, priority streams
GOAL: LAND PROTECTION		
Short-term: protect 1,570 acres in the watershed (10% of Land Stewardship Plan (LSP) goal)	***Long-term:*** meet the LSP goal of 15,706 acres	***Priority areas:*** areas with high and medium Riparian, Adjacency, and Quality scores identified in the LSP
GOAL: FOREST HEALTH		
Short-term: manage 4,200 acres of private forested land (5% of LSP goal)	***Long-term:*** meet the LSP goal of 83,777 managed acres	***Priority areas:*** priority areas identified by LSP
GOAL: CONNECTIVITY ENHANCEMENT		
Short-term: 10 connectivity barriers removed	***Long-term:*** replace all priority barriers and inventory all connectivity barriers	***Priority areas:*** priority culverts identified by the Minnesota Department of Natural Resources (DNR); Ash and Blackduck Rivers
GOAL: DRINKING WATER PROTECTION		
Short-term: seal 50 unused wells; replace 50 noncompliant septic systems	***Long-term:*** replace all failing septic systems and seal unused wells; create wellhead protection programs	***Priority areas:*** Drinking water supply management areas (DWSMAs); surface water drinking lakes
GOAL: STORMWATER MANAGEMENT		
Short-term: 4 stormwater plans and 4 stormwater projects	***Long-term:*** implement stormwater projects in each city	***Priority areas:*** Each city and large developed areas; golf courses, resorts, intensely developed areas
GOAL: WATER RETENTION		
Short term: 0% change in current watershed discharge and build resiliency	***Long term:*** No net loss of water storage	***Priority areas:*** priority areas identified in WRAPS development and runoff scenarios

Implementation

Funding levels for the RH-V CWMP are shown in Table 1.6. There are three funding levels, all of which contribute to plan implementation:

- **Base:** Current baseline funding. This is funding that the local government units (LGUs) currently receive through state and county allocations and competitive grant applications and spend on conservation implementation in the RH-V.
- **WBIF:** Watershed Based Implementation Funding (WBIF). WBIF is noncompetitive funding available to the partnership after the plan is adopted. It comes from the Minnesota Clean Water Land and Legacy Amendment.
- **Other:** Other funding. This is funding from partners and other funding programs such as Lessard Sams Outdoor Heritage Fund, 319 Funds, and additional federal funds.

Table 1.6 Funding levels for the RH-V CWMP.

Funding Level	Description	Estimated 10-Year Total
Base	**Current Baseline Funding**	**$5,780,000**
WBIF	**Watershed Based Implementation Funding**	**$5,255,600**
Other	**Other Funding (i.e. Lessard Sams, DNR, 319 Funds, USFS)**	**$11,414,500**

In addition, there are defined implementation programs to help guide 10-year implementation period. These programs help sort implementation actions into different programs. Implementation requires balance between planned landscape management ("Manage It"), constructed environmental enhancements ("Fix It"), protected lands maintenance ("Keep It"), and Data Collect and Outreach ("Know It") (Figure 1.6).

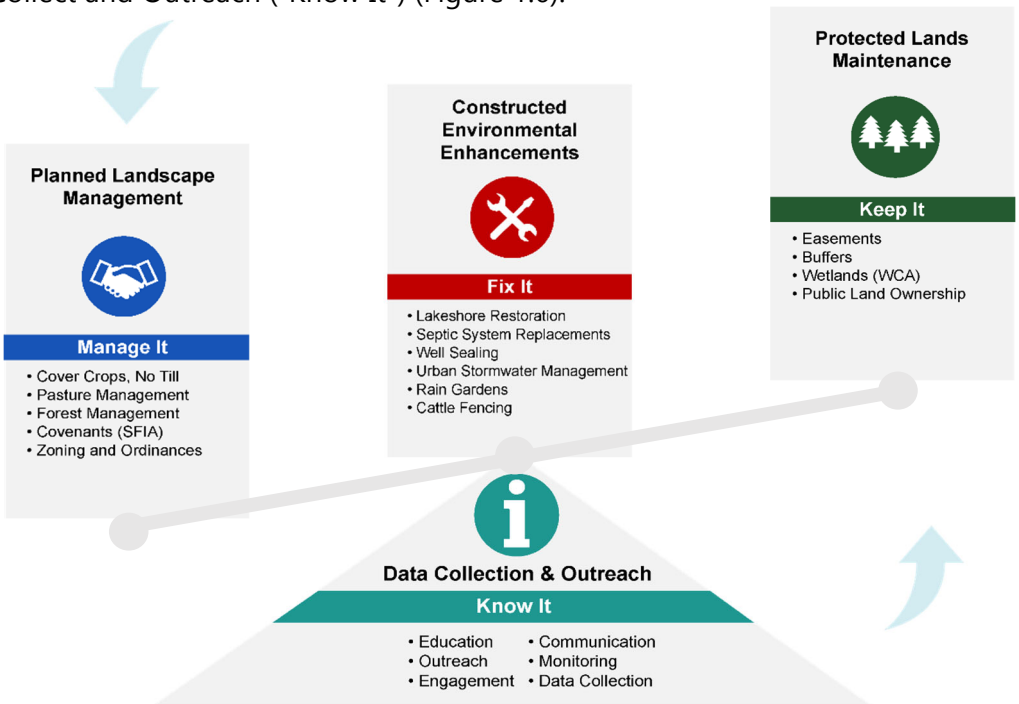


Figure 1.6. Implementation Programs in the RH-V CWMP.

The Rainy Headwaters-Vermilion Partnership is a collaboration of LGUs in St. Louis, Lake, and Cook Counties (Figure 1.7). These entities previously entered into a Memorandum of Agreement (MOA) for planning the 1W1P to form a Policy Committee for RH-V (Appendix F). The LGUs in the MOA include St. Louis County and North St. Louis Soil and Water Conservation District (SWCD), Lake County and SWCD, and Cook County and SWCD. Other local collaborators outside of the formal agreement include Koochiching County and SWCD, as well as the Bois Forte Band of Chippewa (Figure 1.7).

The entities will enter into a new memorandum of agreement to implement the plan. The Policy Committee is advisory to the individual county and SWCD boards under the umbrella of the MOA.

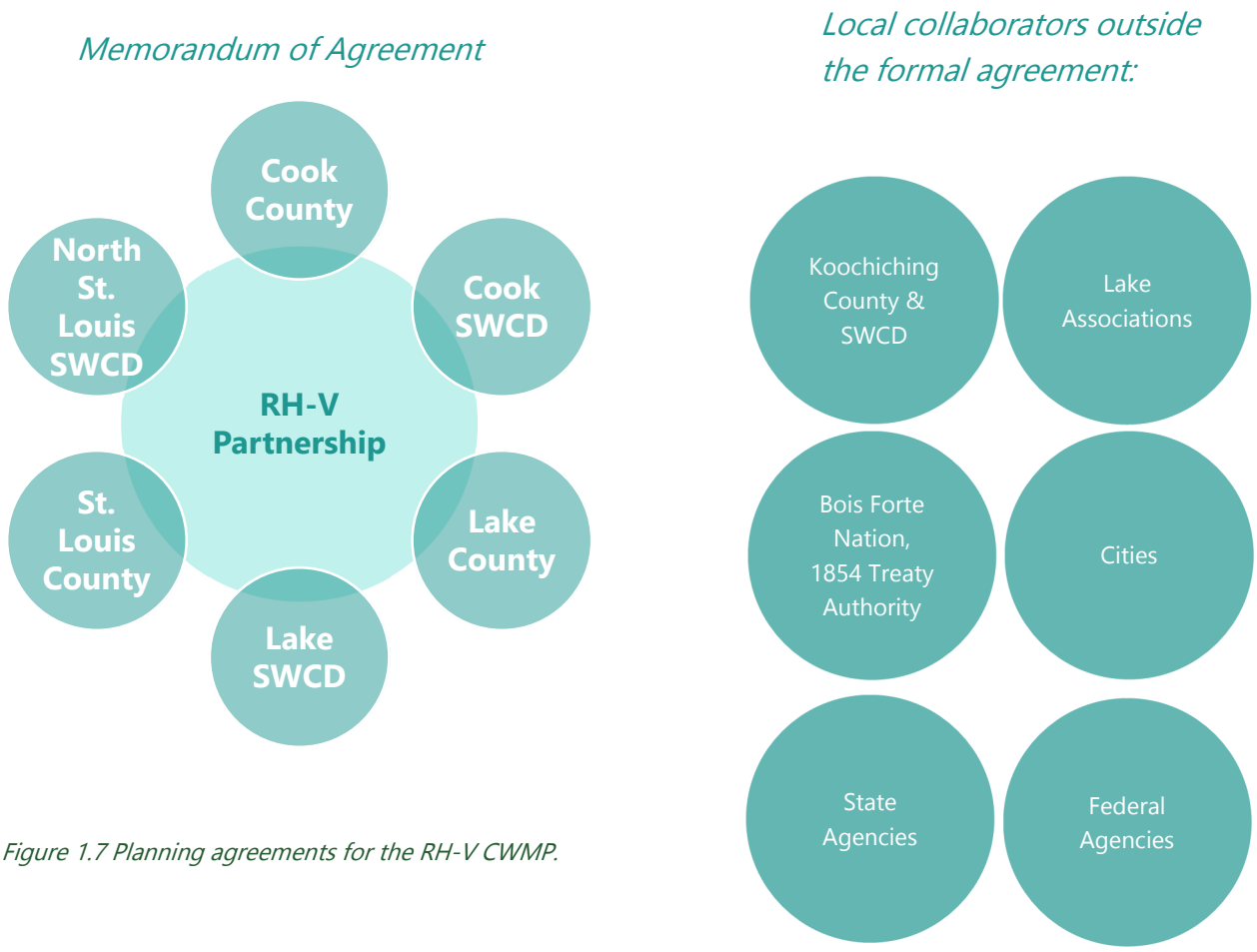
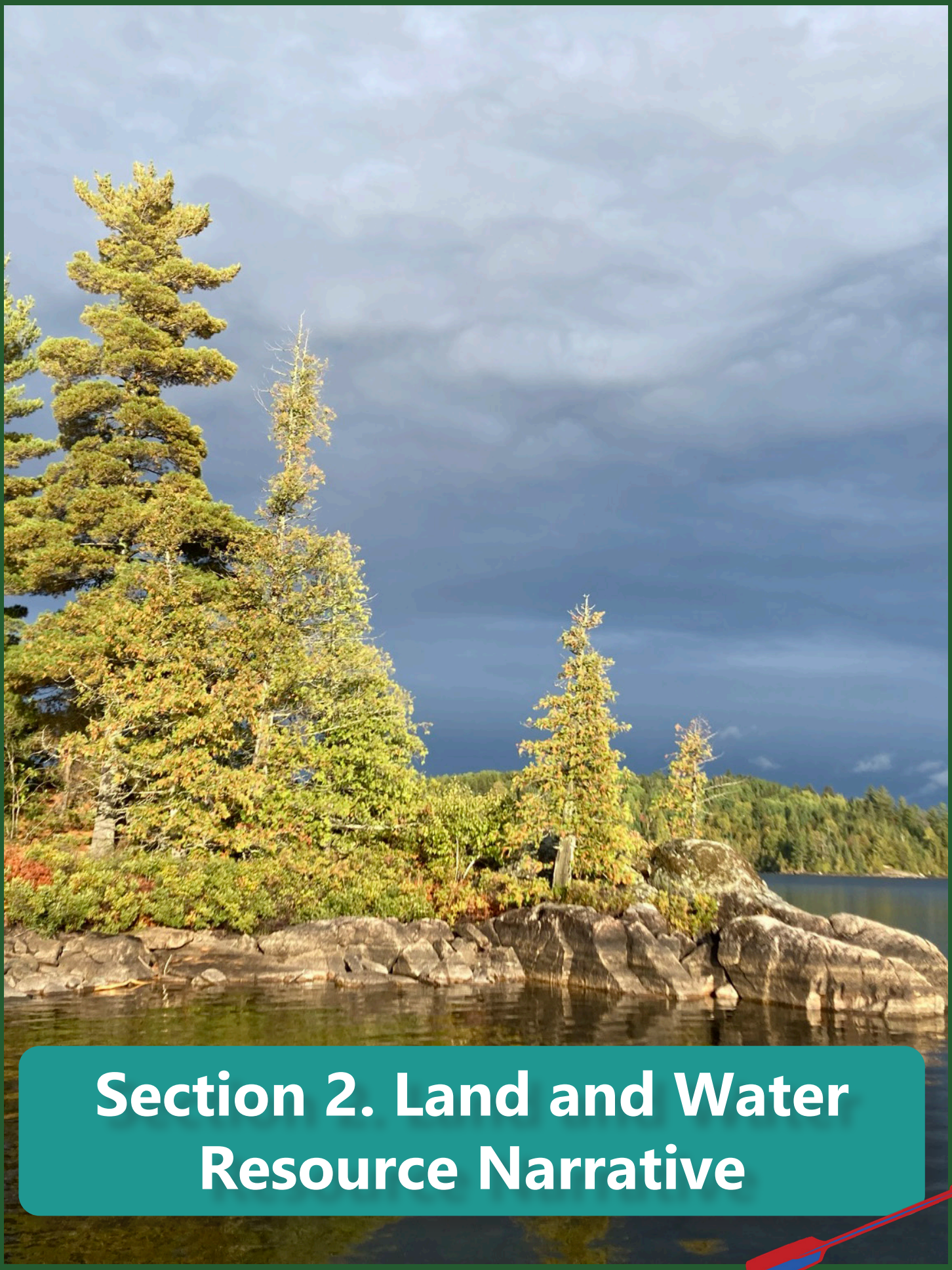


Figure 1.7 Planning agreements for the RH-V CWMP.



Section 2. Land and Water Resource Narrative

Section 2.
Land and Water Resource Narrative

Background

The Watershed

A watershed is an area of land where all the water drains into the same place. Watersheds can be defined at different scales and composed of smaller watersheds. The planning area for the RH-V is comprised of the US portions of Rainy River Headwaters (HUC 09030001), and Vermilion River (09030002) watersheds based on the National Watershed Boundary Dataset created by the U.S. Geological Survey. The full watershed also extends into Canada (Figure 2.1).

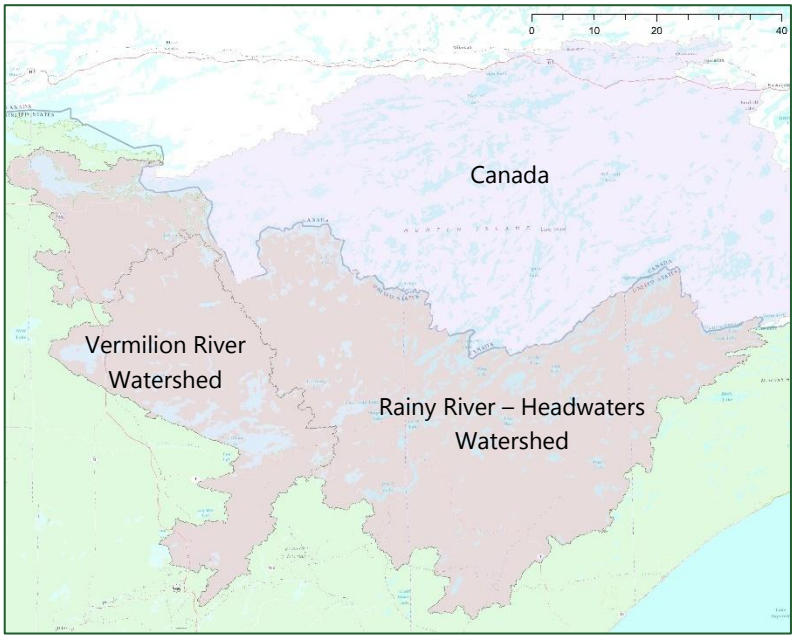


Figure 2.1 Rainy Headwaters basin with the Canadian portion included.

The RH-V Watershed is renowned for its abundant clear waters and glacially scoured lakes surrounded by boreal forest and dark night skies. The watershed is full of wilderness; the Boundary Waters Canoe Area Wilderness (BWCAW) is the largest federal wilderness area east of the Mississippi River; it is flanked by Voyageurs National Park (VNP) to the west and Quetico Provincial Park to the north on the Canadian side. The planning area totals 3,989 square miles (10,331 sq km) and covers four counties (Table 2.1). There are 1,691 lakes including 103 lakes over 500 acres.

Table 2.1 Counties in the RH-V, their acreage in the watershed, and their % of total area of the US portion of the watershed.

County/Country	Acres in Watershed	% Watershed	% Planning Area
Cook County, MN	208,252	4.4%	8.1%
Lake County, MN	863,399	18.4%	33.8%
St. Louis County, MN	1,470,030	31.3%	57.6%
Koochiching County, MN	10,405	0.2%	0.4%
Total USA	2,552,086	54.3%	100%
Canada	2,146,898	45.7%	0%

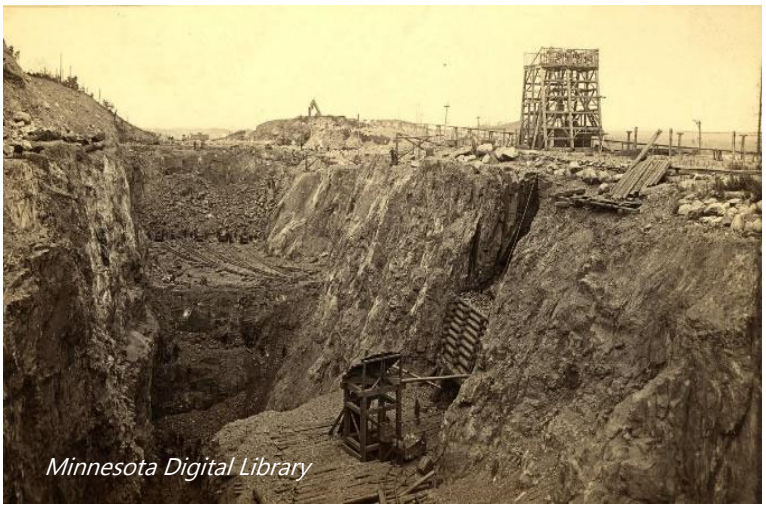
Human History of the Watershed


Photo: Becca Reiss

Many stories can be told about people in the RH-V watershed. Pictographs, stone quarries, projectile points, and shards of pottery: archeological evidence shows people inhabiting the RH-V not long after the last glacier retreated from the region approximately 10,000 years ago. The watershed has historically been home to the Woodland, Lakota, Assiniboine, and Cree people. In the 1600s, the Anishinaabeg (also known as Chippewa), migrating westward in search of a new home, began to inhabit the area. Many place names, including towns and lakes, retain their original Anishinaabe names. By the 1700s, French voyageurs had made alliances with the inhabitants of the region and established trade throughout the area. The border lakes and rivers served as important routes before and after European settlement. In 1783, the watershed was a part of the section of present-day northeastern Minnesota that was granted to the United States at the end of the American Revolutionary War. By the 1840s the demand for fur decreased and European settlement had significantly affected the way of life for the Anishinaabeg living in the area. The United States was increasingly interested in extractive resources to support westward expansion. In the 1854 Treaty of La Pointe, the Chippewa of Lake Superior ceded lands of much of the planning area to the United States. The treaty established reservations around Lake Vermilion, retained indigenous hunting, fishing, and gathering rights, and allowed for non-indigenous settlement across ceded territory.

The Lake Vermilion Reservation was further defined in the Treaty of 1866 to open areas for miners and support a short-lived gold rush that ended in 1867. The Nelson Act of 1889 broke apart reserved lands by mandating that communally held lands be allotted to individual households and band members making unallotted land available for sale and settlement to European American settlers. The Bois Forte band is working towards recuperating treaty-reserved lands lost during the allotment period.

In contrast to gold mining, iron-ore deposits analyzed during this time period precipitated numerous longer-term surface and underground mining operations on the Vermilion Iron Range beginning in 1884 at what is now the Lake Vermilion - Soudan Underground Mine State Park and ending with the last underground operation closing in Ely in 1967.


Minnesota Digital Library

Many present-day cities were originally established as mining towns, such as Ely and Tower, as well as numerous unincorporated communities such as present-day Soudan. The unrealized potential mining opportunities south of Gunflint Lake also drove the extension of the Gunflint Trail into the watershed from the east. Mining continues in the present day, with large active iron mines on or near the borders of the RH-V watershed; the mine near Babbitt, MN crosses the watershed boundary, so some of the water impacted by mining operations flows into the watershed. Multiple copper-nickel mines have also been proposed in the area.

In the 1880's, settlers saw the economic benefits of harvesting timber in areas previously considered inaccessible after Congress allowed the purchase of 160 acres of timber for $2.50 per acre. The region and watershed experienced an intense timber harvest from the 1890s-1920s, changing the landscape significantly. The timber industry also spurred the establishment of the present-day cities of Cook, Orr and Winton. Not long after a hydro-electric dam was constructed near Winton, MN, dams were proposed to be built on lakes across the border region. Resistance from environmentalists led to the Shipstead-Newton-Nolan Act of 1930 that restricted logging near waterways and dam construction without the approval of Congress. Multiple parties participate in a settlement agreement as part of the Federal Energy Regulatory Commission (FERC) licensing for the Winton Dam, which created the Garden Lake Reservoir (including Garden Lake, Farm Lake, South Farm and Friday Lake, plus White Iron Lake) and is managed by Minnesota Power. The agreement reviews compliance with prescribed flows and lake levels in relation to outflows from the Birch Lake dam (Birch Lake is also a reservoir lake), and also manages any erosion issues caused by the dam, as well as ongoing water quality and aquatic invasive species monitoring and management. The agreement in 2023 also includes a wild rice habitat survey on Birch Lake. Any work on reservoir lakes under this plan should recognize the unique nature of these lakes compared to natural lakes; since they are flow-through lakes with regulated water levels, they typically have shorter water residence times and more dynamic lake chemistries than other nearby lakes.

Settlers claimed land for homesteads, though many homesteads were abandoned due to poor farming conditions, or they were fraudulently claimed for timber and mining companies. Starting in 1902, the United States government and state began withdrawing lands in the region from settlement. In 1909, the Superior National Forest was established in an effort to create a national

Photo: Kyle Gill

forest system that supports multiple use principles of public lands including a game refuge in an attempt to protect moose and caribou populations.

Railroads created to transport ore, miners, equipment, and timber soon brought vacationers to the area. With the end of World War I, there was increased interest in relaxation and auto touring. New roads were created into the forested areas to accommodate cars, including the Echo Trail, Fernberg Trail, and the last section of the Gunflint Trail in 1922. In 1926, a roadless area was created to preserve much of the land as a "wilderness." By the 1930s fishing camps and resorts were well established on lakes across the watershed including what is now the Boundary Waters Canoe Area Wilderness (BWCAW) and Voyageurs National Park (VNP). Resorts that were not accessible by road could be reached by paddle, motorboat, or seaplane.

With the end of World War II, there was increasing interest in the border lakes as a recreation destination, and Ely held the title of the largest freshwater seaplane base in the lower 48 states. There was also increasing pressure to preserve undeveloped parts of the county as "wilderness areas'' that would be preserved for the use and enjoyment of the American people, as many of these places were viewed as being loved to death. Federal and state legislation along with executive orders changed rules and regulations of what is now the BWCAW; it was officially created in 1964 with the Wilderness Act and additional issues were addressed in the Boundary Waters Canoe Area Wilderness Act of 1978. The resorts and private properties within the BWCAW were removed or destroyed, with the last removal taking place in 1987.

VNP was established as the only National Park in the State in 1971 with the purpose "to preserve, for the inspiration and enjoyment of present and future generations, the outstanding scenery and geology, biological diversity, and cultural resources, within its vast interconnected waterways that shaped the historic fur trade in North America and constituted a part of the historic route of the voyageurs."

Both the creation of the BWCAW and VNP were divisive. Some saw these new designations as federal overreach limiting access to hunting, fishing, logging, mining, tourism, and recreation in the area. This is an important context to consider for this plan as discussions around water quality and land protection may be viewed through this lens.

Three Anishinaabe or Ojibwe bands, the Grand Portage Band of Lake Superior Chippewa, Bois Forte Band of Chippewa, and Fond du Lac Band of Lake Superior Chippewa, signed the Treaty of

LaPointe with the federal government in 1854, ceding lands in Minnesota's Arrowhead but retaining the right to hunt, fish, gather and harvest natural resources to sustain themselves in perpetuity (Figure 2.2). Through multiple federal court rulings, treaty rights have been upheld. The state of Minnesota signed agreements in 1988 with the Grand Portage and Bois Forte Bands, and in 2017 with the Fond du Lac Band, outlining collaborative efforts to conduct monitoring and research that informs the annual Tribal harvest regulations set by the Bands. Other recent actions include an agreement between the three Bands and the US Forest Service, which outlines how Tribal input will be included in resource management priorities and decisions within the Superior National Forest. In the present day the three bands continue to self-regulate, research and manage treaty harvest activities in the 1854 Ceded Territory. Fond du Lac maintains its own staff and administration to manage off-Reservation treaty rights in 1854 Ceded Territory, while the 1854 Treaty Authority protects and implements treaty rights for the Grand Portage and Bois Forte Bands.

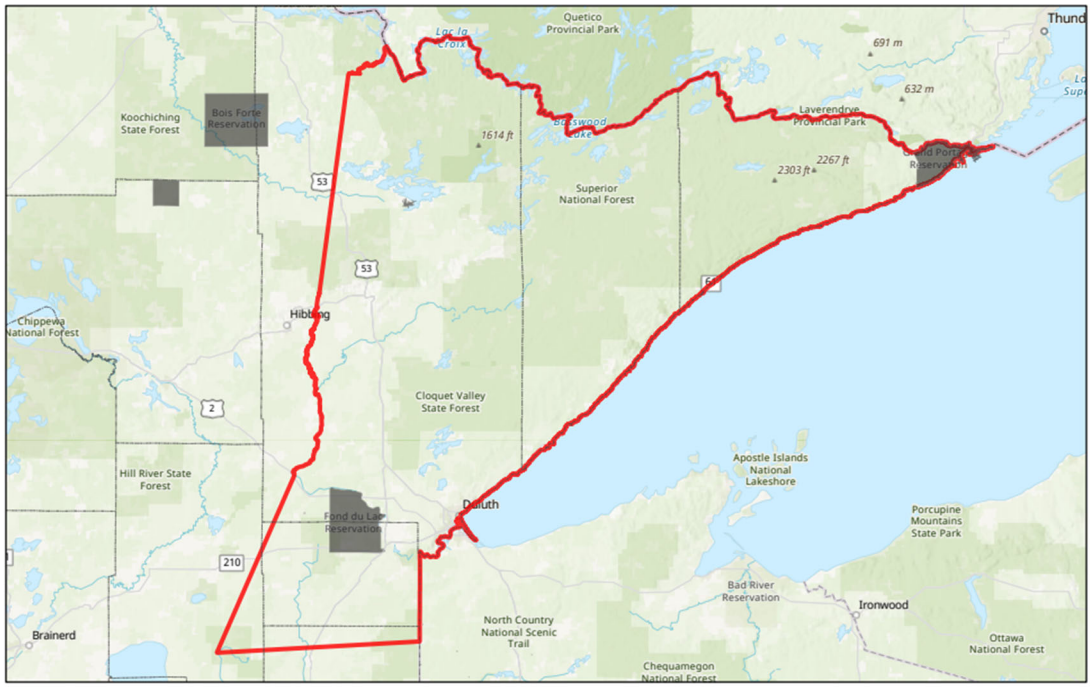


Figure 2.2 1854 Ceded Territory and Fond du Lac Band of Lake Superior Chippewa, Grand Portage Band of Lake Superior Chippewa, and Bois Forte Band of Chippewa Reservation areas (Map credit: 1854 Treaty Authority)

On the Canadian side, the Treaty #3 territory includes 28 First Nations, including the Lac La Croix First Nation near the US-Canada border. The Treaty #3 lands cover 55,000 square miles, which includes most of the Rainy Headwaters watershed and extends well beyond to the north and west. The treaty, which was signed in 1873, includes language on how both the land and its resources would be shared between the Anishinaabe and the British. The Grand Council Treaty #3 is the governing body that protects, preserves and enhances Treaty and Aboriginal rights; they review and comment on business activities that impact natural resources and they inform governments of their treaty obligations.

Present Day

Today, the watershed is still a recreation destination. Overall, the watershed is sparsely populated (approximately 3 people/square mile) due to the nature of the landscape and large percentage of public land. The Vermilion River Watershed population is 5,977 and Rainy River – Headwaters is 6,261. The largest city in the watershed is Ely with a population of 3,254 in the 2020 census. However, there are many people who live in the watershed seasonally as "snowbirds" or occasionally visit property owned in the watershed. The watershed is used as a place to recreate for those who live inside its boundaries as well as neighboring cities and communities such as Virginia and other Mesabi Iron Range cities, Grand Marais, to the Twin Cities, Chicago, and worldwide.

Tourism, timber, and mining are still the major economic drivers of the watershed. There is some limited farming. The Grand Portage, Bois Forte, and Fond du Lac Bands still retain and exercise treaty rights in the watershed portions within the 1854 Ceded Territory. The COVID-19 pandemic resulted in more virtual work options and increased internet connectivity. With that shift, there has been interest in remote workers either increasing the time spent at their vacation properties or relocating to the area. It is possible there will be an increase in population in the future in contrast to the long-term population decline since the peak of mining and logging in the region.

Geology, Soils and Climate

Geology

From outpourings of ancient lava to more recent mile-high ice, the RH-V has been shaped by epic continental forces (Figure 2.3). Geology influences every aspect of life in this region - because of glacial activity, the land supports thin, rocky soils that are unsuitable for farming, so it has retained much of its original undeveloped, forested, and wetland-rich character. Prospectors are drawn to this area for its rugged exposed bedrock and the promise of mineable metals; iron mining historically took place in open pit and underground mines within and around Tower-Soudan, Ely, and even at the end of the Gunflint Trail, and mineral exploration continues to this day. Glaciers influenced the shape of this watershed and the way water flows through it.

The Canadian Shield – ancient volcanic bedrock – is exposed at or near the earth surface of the watershed due to glaciers scouring the overlying layers of rock and sediment. These glaciers, especially the Laurentide Ice Sheet (about 75,000 to 14,000 years ago), formed the rolling landscape seen today, including high-topography features such as eskers, drumlins and moraines, as well as the low-topography features such as outwash plains, peatlands and numerous lakes. The Rainy lobe of the Laurentide Ice Sheet represents the final instance of glaciation in this region of Minnesota. It stalled along the Vermilion moraine, losing its final load of sediment before retreating to the northeast, exposing a landscape shaped by the glaciers over centuries, including lake basins with a distinct east-west orientation. The watershed boundary that abuts Lake Vermilion, running straight on distinctive a northwest axis, is

separated by the Vermilion moraine. The Highland moraine of the Laurentide Ice Sheet's Superior lobe demarcates part of the southeastern boundary of the watershed. These boundaries pose continental significance; the RH-V watershed constitutes the Laurentian Divide, which splits the continental basins of the Atlantic and Arctic Oceans.

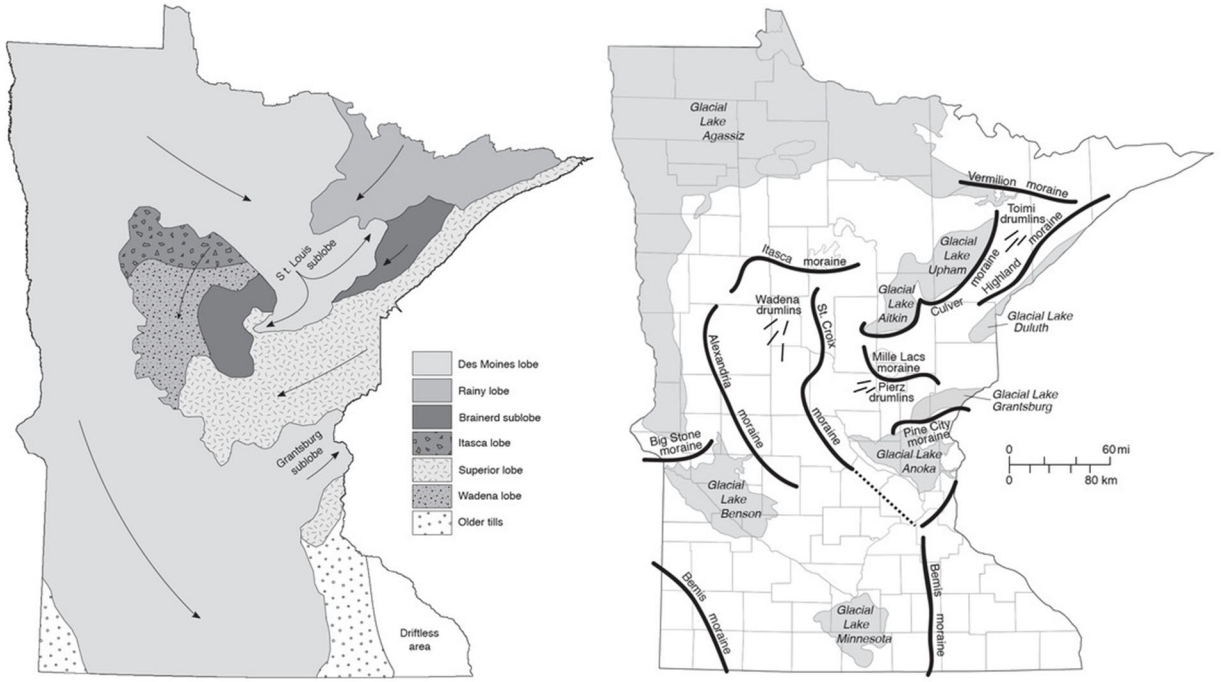


Figure 2.3 Left: Simplified map showing the extent and flow directions of ice lobes that covered Minnesota during the Ice Age. Right: Map showing the major end moraines and glacial lakes during the Wisconsinan episode (not necessarily contemporaneous). From Minnesota at a Glance B.A. Lusardi, 1994; revised May, 2017 by E.L. Deng.

Where glaciers scoured the surface, outcrops of some of the most ancient rock on Earth, greenstone, is visible in this watershed. Sharp crags and expanses of smooth rocky shore are features that draw people to the wilderness areas of this watershed. The ancient rocks of the Canadian Shield formed during the Precambrian Era, a time of active volcanoes and lava flows. Together, the Mesabi Range, the Vermilion Range, and the Gunflint Range once formed a mountain range that extended from southwest to northeast through the present-day watershed. The bedrock in northeastern Minnesota includes deposits of metallic minerals, including iron, copper and nickel, that accumulated in shallow basins during quiet periods between bouts of volcanic activity. The Vermilion Range, formed along the Vermilion Fault (extending from Tower, MN to Saganaga Lake) has been mined for iron in several places and was the site of a long-ago gold rush. Miners Lake in Ely was formed when the last operating underground mine shut down in 1967. The pumps that had been keeping the tunnels from flooding were shut off. Shortly after, the tunnels collapsed, allowing water to fill the void. The Peter Mitchell Pit near Babbit, Minnesota is an active iron mine in the watershed; the pit crosses the Laurentian Divide and water from the pit flows into the RH-V Watershed. There is also an active tailings basin discharging to the watershed near Sandy and Little Sandy Lakes on the outskirts of Virginia, MN.

Soils

When glaciers covered the northern Minnesota landscape, they eroded previous rock formations and deposited layers of glacial till (a parent material formed of an unsorted mixture of clay, silt, sand, gravel and boulders). Distinctive types of glacial till exist in the watershed because the area was covered by separate glacial lobes that originated in far-flung locations and carried different types of source material (Figure 2.3). The Rainy lobe pushed south and west through the present-day watershed, depositing brown till with sand and rock fragments with no lime (calcium carbonate derived from limestone), while the St. Louis sublobe came in from the northwest and carried gray lime-rich loam till. In some places the St. Louis sublobe overrode the Rainy lobe, so those areas contain a mixture of tills. The Superior lobe formed the southeast margin of the watershed, carrying with it a red sandy loam and lime-free till. Because the Precambrian bedrock of northern Minnesota was resistant to glacial erosion, the bedrock is now exposed at the land surface in many areas, and the glacial till layer is relatively sparse.

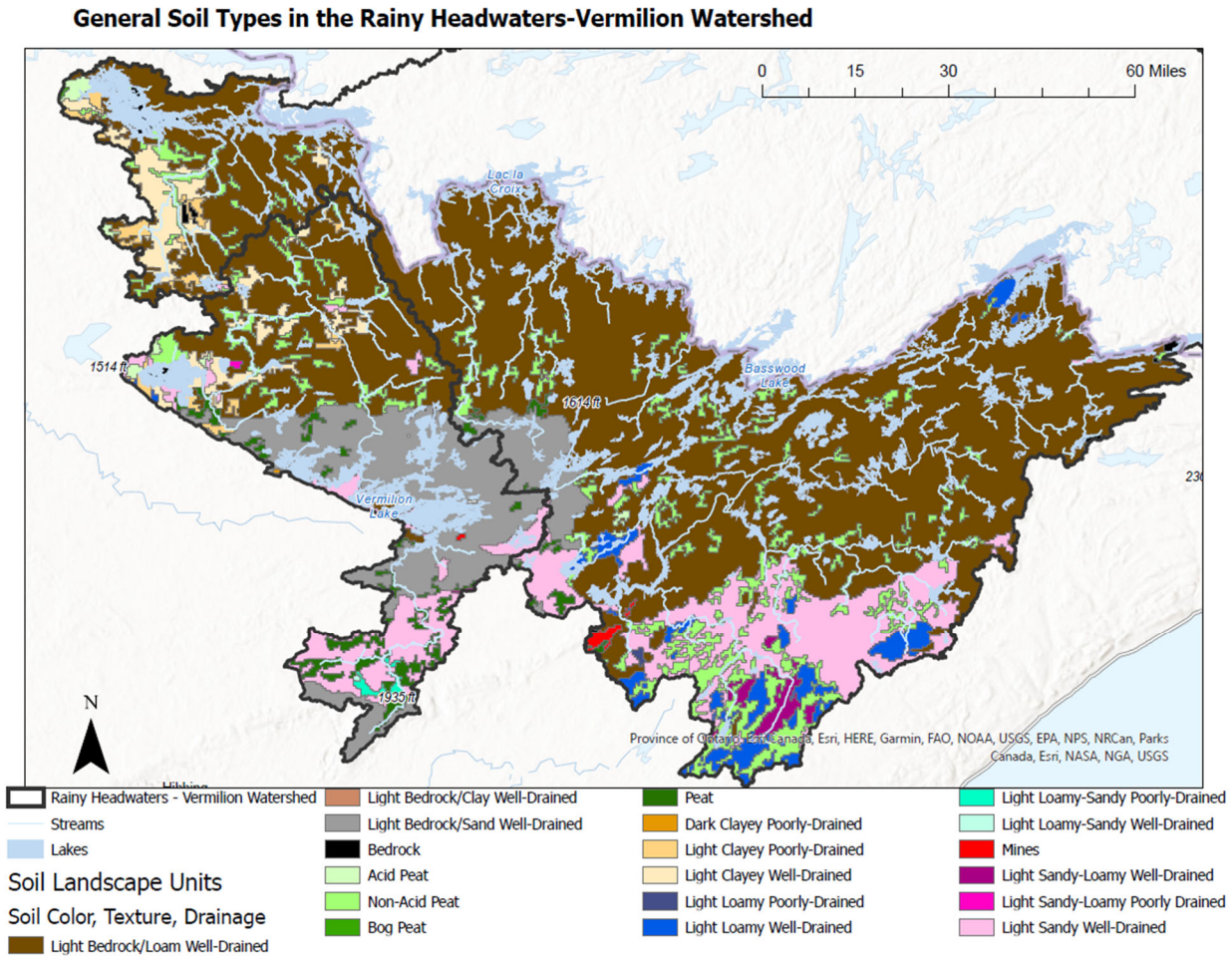


Figure 2.4 Soils of the RH-V.

Most of the watershed's thin, rocky soils are in the Udept suborder, which are light-colored soils interspersed with bedrock that form in mixed conifer-hardwood forests from glacial till parent material. The southern portion of the RH-V Watershed is underlain by Orthents, which occur at the tops of ridges; they are shallow and poorly developed soils that support conifer forests. The entire watershed is interspersed with peatlands, which are underlain by acidic organic soils in the Hemist suborder. These soils are formed in cool, wet, oxygen-deficient depressional areas (often the remnant beds of glacial lakes) where plant decomposition is very slow.


Photo: Kyle Gill

The Ash River subwatershed is unique compared to the rest of the larger watershed because this area was at one time covered by Glacial Lake Agassiz at the end of the last glaciation. Lake Agassiz was a massive ice-dammed lake that formed at the margin of the St. Louis sublobe, extending into the western boundary of the present-day watershed (Figure 2.4). Fine clay particles settle out in lakebeds, and because of this, the Ash and Black Duck rivers now cut through highly erodible silty-clay soils.

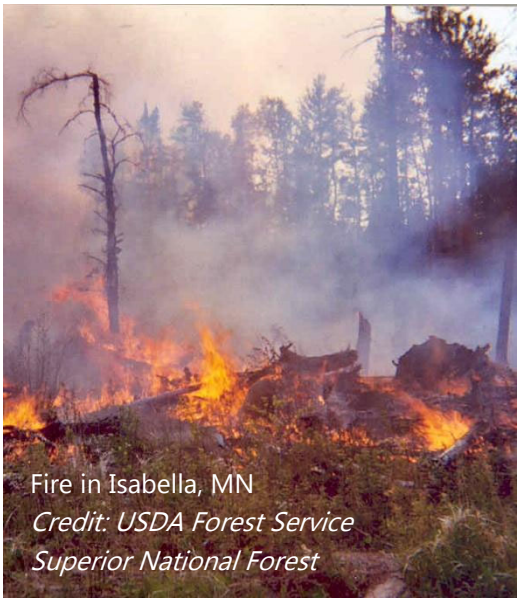
Glacial deposits can be rich in sand and gravel; the southern margins of this watershed are covered by moraines and outwash plains, where water flowing off the ends of glaciers sorted the sediment they carried into sand and gravel deposits, based on the velocity of water flow. The watershed is peppered with gravel (aggregate) mines that serve as an economic driver for the region and an essential source of building material for roads and construction projects. Because the northeastern part of the state has parent material derived from igneous (volcanic) rock, it provides a more durable aggregate when compared to sandstones.

Climate

The RH-V Watershed's climate, much like its geology, is shaped by ice and fire. The watershed has a continental climate characterized by short, warm summers and long, cold winters. The coldest temperature ever recorded in Minnesota was measured on February 2, 1996, south of Tower at -60 degrees Fahrenheit. Plants, animals and humans that live in the watershed have adapted, not only to seasonal extremes, but to the volatility of living in a place so far from the oceans, which regulate extreme temperature swings and sudden storms. For instance, extreme winds caused a massive forest blowdown over nearly 500,000 acres of the BWCAW in 1999.

Since northeastern Minnesota is colder than the rest of the state, approximately 50% of the incoming precipitation that falls in northeastern Minnesota becomes runoff, compared to 10% in western Minnesota, where warmer temperatures lead to higher rates of evaporation. Annual precipitation averages 28 inches and most of the precipitation occurs in the summer months. The watershed receives more of its precipitation as snow than anywhere in the state, has the

longest period of snow cover, and the shortest growing season. On the other extreme, major droughts have occurred 2-3 times per century in the past, and major wildfires usually accompany droughts.



Fire in Isabella, MN
Credit: USDA Forest Service Superior National Forest

Despite the cold winters, Minnesota is warming faster than anywhere else in the continental United States due to climate change. Climate predictions indicate warmer and wetter conditions for Minnesota, with the winter season warming the fastest. This will likely lead to shallower snow depth and fewer days with snow cover. Climate change is already bringing more intense storms with longer periods between storms, leading to more fluctuations between drought and flood (Liess et al., 2022). Since the watershed is at the edge of boreal biome (characterized by conifer forests), there will likely be drastic change in the types of plants and animals that are able to establish in the area with warmer weather, including invasive species and forest pests. Fires could become more frequent, converting forest lands into mosaics of different forest types and open landscapes (Chaffin, 2019).

Water Resources & Water Quality

The rivers and lakes that flow through the RH-V Watersheds are storied for their austere beauty and are sought out by paddlers, anglers, and tourists from all over the country. Remote waterways typically have exceptional water quality and provide habitat for sensitive species such as moose, brook trout, aquatic insects, rare plants, and cisco. In much of the state, nutrient-rich runoff into lakes causes frequent algae blooms and impairments for excess phosphorus; many of the lakes in the RH-V Watersheds are unique in that they are deep, clear, and oligotrophic (naturally low in nutrients).

Minnesota maintains water quality standards that protect good water quality (i.e., antidegradation) and works to devise strategies to address polluted waters (e.g, impaired waters list and total maximum daily loads). One priority for the RH-V Watersheds is protecting healthy lakes and streams, especially in cases where water bodies are classified as exceptional waters. These waters often have sensitive populations of fish and aquatic insects. There are seven streams classified as exceptional waters in the RH-V (Table 2.2) with additional waters possibly classified in future monitoring cycles. However, lakes and streams in these watersheds also face potential degradation from human land uses (forest clearing, agriculture, development), climate change and atmospheric deposition (pollutants that enter that watershed with precipitation, such as mercury).

Table 2.2 Exceptional waters in the RH-V.

Name	Reach Description	HUC 10	Temperature
Little Isabella River	Headwaters to Flat Horn Lake	Isabella River	cold
Snake River	Township 61 Range 9 W Section 7, south line to Township 61 Range 10 W Section 12, north line	Birch Lake	cold
Jack Pine Creek	Headwaters to Mitawan Creek	Isabella River	cold
Mitawan Creek	Kitigan Lake to Township 61 Range 9W Section 13, north line	Isabella River	cold
Denley Creek	Nira Creek to Stony River	Stony River	warm
Cross River	Ham Lake Outlet to Gunflint Lake	Granite River	warm
Bezhik Creek	BWCAW boundary to Moose River	Boulder River	Warm

Impaired Waters in the Rainy Headwaters/Vermilion Watershed

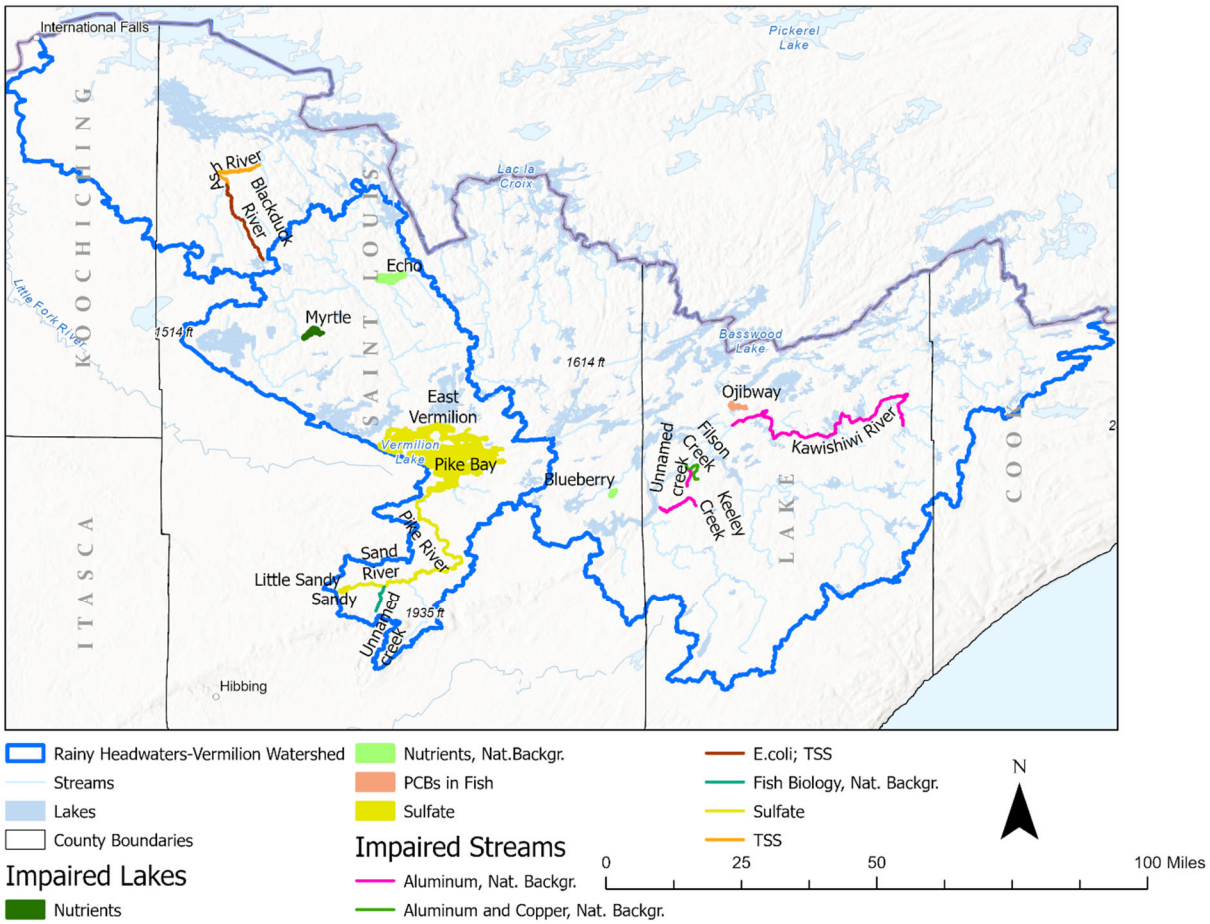


Figure 2.5 Impaired waters in the RH-V.

Almost all water bodies in the watershed are impaired for consumption of aquatic organisms due to excess mercury in fish tissue (full list can be found on the Minnesota Pollution Control Agency's (MPCA's) impaired waters list). Hustler Lake in St. Louis County is also impaired for aquatic consumption due to excess mercury in the water column. Additionally, seven water bodies are listed as impaired due to natural background conditions for naturally occurring levels of copper and aluminum in the water, as well as two lakes (Echo and Blueberry) that have naturally high nutrient levels. The impairments that will be addressed in this plan include the multiple waters in the Vermilion River watershed (Figure 2.5). The RH-V watershed has few impaired waters with TMDLs needed. The Blackduck River is impaired for aquatic life due to total suspended solids (excess sediment) and for aquatic recreation due to *E. coli* (excess bacteria) and the Ash River is impaired for aquatic life due to total suspended solids. Myrtle Lake is impaired for aquatic recreation due to high nutrient levels that can cause algae blooms. Multiple lakes and streams in the Pike River and Vermillion Bay subwatersheds are impaired for wild rice production due to high sulfate levels. In both watersheds, some lakes have water quality that is worsening over time, though they are not yet listed as impaired, and these waters are also important to consider for additional management (Figure 2.6). However, the number of lakes with declining trends is small compared to the vast number of lakes with good or improving water quality in this watershed.

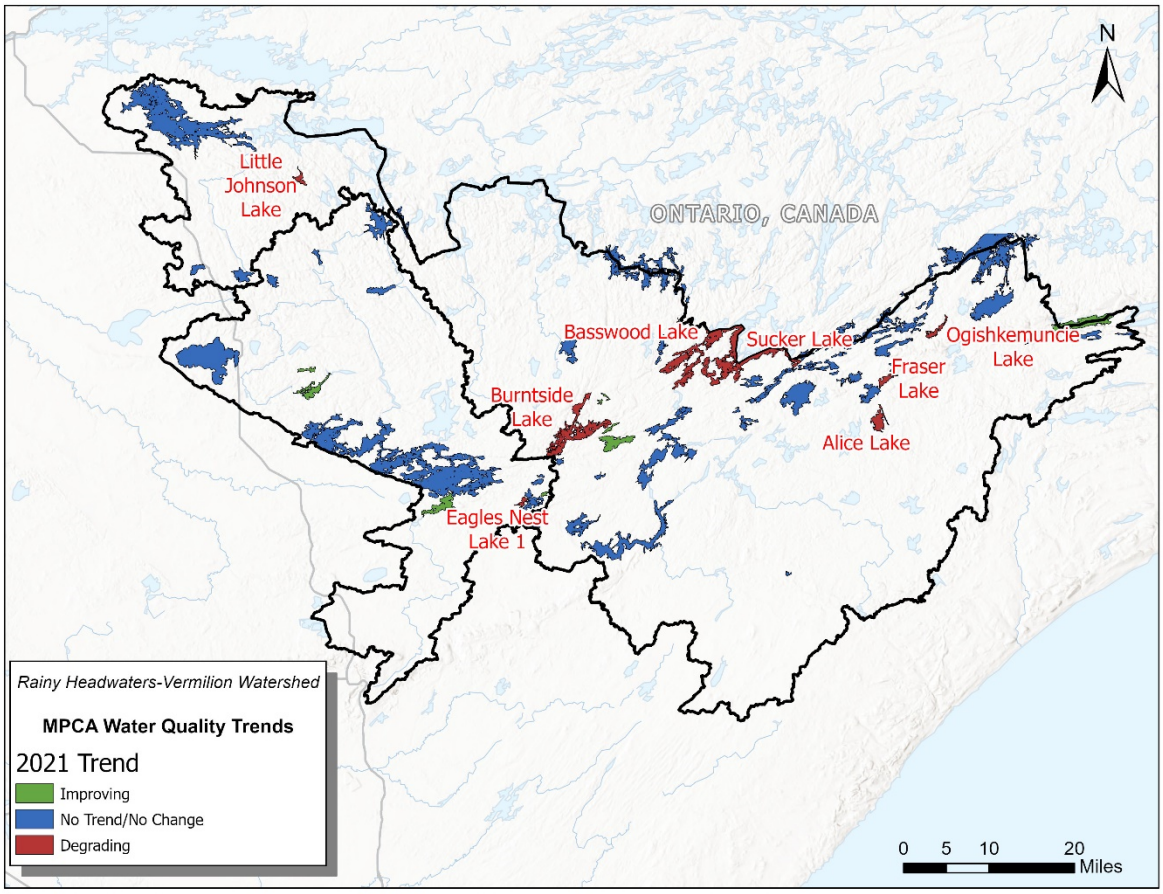


Figure 2.6 Lake water quality trends in the RH-V. Labels are provided for degrading trend. Source: MPCA.

Groundwater Resources & Drinking Water

Most of the watershed is underlain by shallow bedrock, except for the two southern arms of the watershed where the primary surface material is sand. This affects how groundwater moves through the earth and how it interacts with surface water. The impermeable bedrock in this watershed causes groundwater to stay near the earth's surface, except where it can move into a network of bedrock fractures or in places where sandy and clayey glacial drift materials allow groundwater to percolate more deeply. An aquifer is a layer that carries groundwater and can readily transmit water to wells and springs. The abundant surficial aquifers in this watershed likely have direct hydrologic connections to surface water. These aquifers are typically recharged where sand and gravel allow for groundwater infiltration, as well as topographic high spots and along the interface between bedrock and glacial deposits. The Rainy Headwaters Watershed Monitoring and Assessment Report lists the average recharge rate as ranging between 8 and 12 inches per year, while the Vermilion River Watershed recharge rate is estimated at 0.70 to 14.25 inches per year, with an average of 5.7 inches per year. Both watersheds have somewhat higher recharge rates compared to the rest of the state.

Groundwater is an important resource in the watershed since the majority of residents use wells for drinking water, mostly within sand and gravel aquifers, but also within fractured bedrock. Since pollutants such as chemicals, oils or sewage can infiltrate quickly into the shallow groundwater, much of the watershed is classified as having wells within surficial aquifers that have high pollution sensitivity. High groundwater sensitivity impacts how septic systems are sited, inspected and maintained so they don't cause bacterial contamination in surficial aquifers. Since groundwater residence time can be relatively short in shallow aquifers, any contamination that moves into groundwater can also affect connected surface waters.

Several communities, including Ely, Tower-Breitung, Winton and Babbit have Drinking Water Supply Management Areas that include added land protection. It's also important to note that the City of International Falls relies on the Rainy River for its drinking water, so protecting drinking water quality in the Rainy Headwaters-Vermilion Watershed has important downstream implications. The Bois Forte Band of Chippewa also obtains drinking water from both surface and groundwater sources.

Land Cover, Use, & Ownership

Forests dominate the landscape of the Rainy Headwaters-Vermilion Watershed. Forests cover over half (65.61%) of the watershed with upland shrub (20.00%) and open water (9.00%) as the next largest cover types (Figure 2.7). Urban and rural development, grassland, bogs/marshes/fens, and barren lands also cover smaller percentages of the watershed. Prior to European settlement, forests were also the primary land cover type estimated at 78.99% along with open water, bogs/marshes/fens, and grasslands. The RH-V watershed retains over 80% of the wetlands present at the time of statehood.

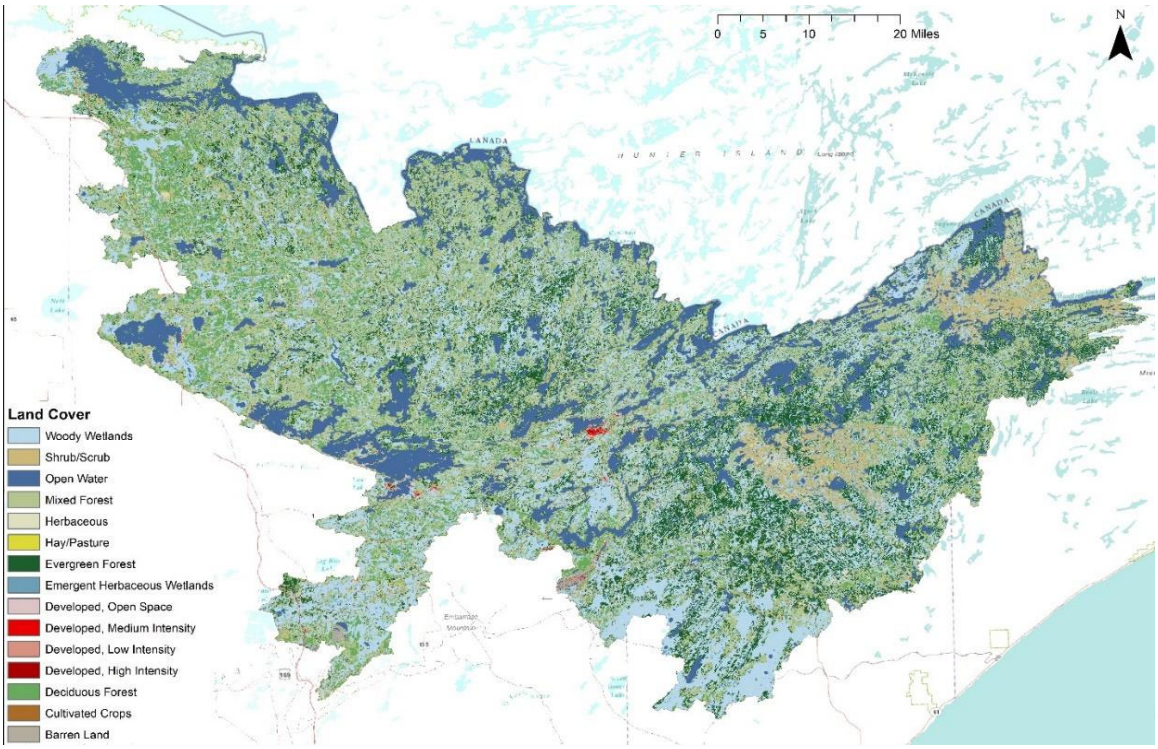


Figure 2.7 Land cover in the RH-V.

Most of the land in the watershed is held in public ownership with only 26.5% held privately (Table 2.3; Figure 2.8). The federal government is the largest landowner in the watershed. The lakes, streams, and forests of this watershed are a draw for recreational tourism from wilderness canoe paddling experiences and fishing trips to the growing all-terrain vehicle (ATV) and mountain biking opportunities. The COVID-19 pandemic saw an increase in resort occupancy and remote working throughout the region. Land use pressure also exists from the timber industry, metallic mining and gravel pit mining. There are also small farming/pasture operations in the watershed. Federal lands within the 1854 Ceded Territory are also used for hunting, fishing, and gathering by the Grand Portage, Bois Forte, and Fond du Lac Bands.

Table 2.3 Land ownership in the RH-V.

Land Ownership	Acreage	Percentage of Watershed
Federal	1,389,352	54.44%
Private	676,168	26.50%
State	459.826	18.02%
County	16,810	0.66%
City/Township	7,073	0.28%
Tribal	2.811	0.11%

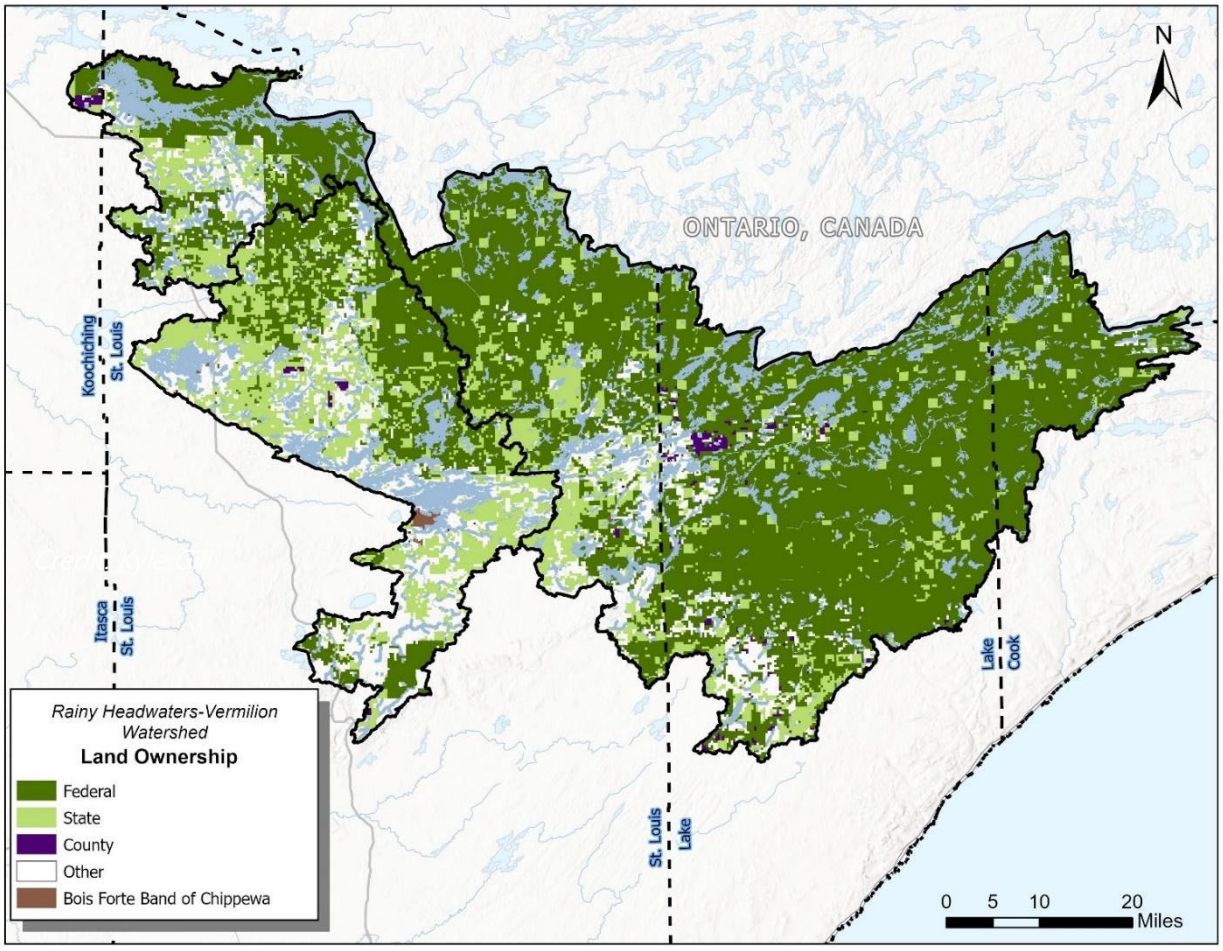


Figure 2.8 Land ownership in the RH-V. "Other" land includes private and municipal.

Habitat & Ecology

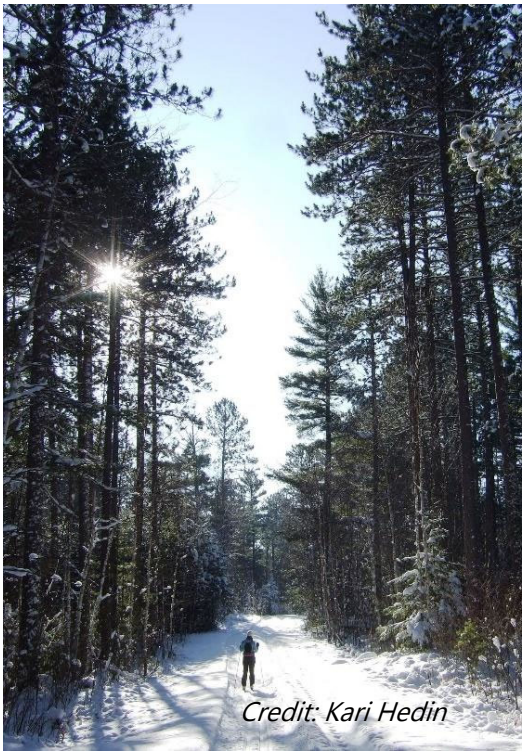
Fire, and the absence of fire, is central to the story of habitat in the RH-V watershed. Because we practice fire suppression to protect the towns and settlements in the forest, those who live in the watershed now have no living memory of frequent fires, both large and small, that shaped the habitat of northern Minnesota. Prior to European settlement, fire was used as a management tool by Native Americans. Fire suppression shapes the forest by allowing the tree canopy to become dense and well-established. Within the watershed, and in the Boundary Waters and Superior National Forests especially, large intact conifer forests persist, providing excellent habitat for species adapted to the boreal biome. The RH-V Watershed provides habitat to unique plant communities, diverse wildlife species, and many aquatic species including coldwater fish. Located within the Laurentian Mixed Forest Province, the watershed contains large areas of conifer forest, mixed hardwood, and conifer bogs and swamps.

The watershed lies mostly in the Northern Superior Uplands Section of the Ecological Classification System used by the DNR and US Fish and Wildlife Service (USFWS). The

vegetation is classified as mostly fire-dependent forests and woodlands where the composition was shaped by Native American use of fire as well as lightning caused fires. Forests with red and white pine were more widespread in the past, mixed with aspen, paper birch, spruce, and balsam fir. Much of the pine was cut in the late 1800s and early 1900s, resulting in changes to forest composition. Fire suppression efforts and the removal of fire as a management tool also changed forest dynamics and composition. Forests today are mostly aspen, black spruce, balsam fir, and paper birch. Jack pine forests are present on droughty ridges and bedrock exposures, as well as on local sandy outwash deposits.

There is one federally endangered species in the watershed – the Northern Long-Eared Bat and one federally threatened species- the Canada Lynx. Both species are listed as of Special Concern for the state. According to the DNR, there are 15 species of moss, lichen, vascular plants, and an insect on the State Endangered Species List. There are 31 species on the State Threatened List including moss, lichen, vascular plants, one bird, one insect, and one reptile. There are an additional 72 species across all taxa on the State Special Concern list.

A large part of the Superior National Forest and Voyageurs Kabetogema Audubon Important Bird Areas (IBA) are within the watershed. Over 163 bird species have been documented in these IBAs.


Credit: Kari Hedin

The potential for catastrophic wildfires has been of increasing concern with large fires in the watershed taking place in recent years including the Cavity Lake Fire of 2006, Pagami Creek Fire of 2011, and the Greenwood Fire of 2021. Decreased occurrence of smaller fires on the landscape along with dead and dying balsam fir from spruce budworm infestation cycles and blowdowns have created large fuel loads in some areas. Large catastrophic wildfires have the potential to negatively affect regeneration, impact water quality, and create invasion points for invasive species in addition to threats to human safety and property.

Forests in the watershed face stress in a changing climate. Some tree and plant species currently exist at the southern end of their range and could become extirpated from the watershed with changing climatic conditions. Species dependent on cold-water resources are also threatened by a warmer climate. However, this part of the state has also been identified as a potential coldwater refuge for some of these at-risk species. The watershed provides habitat to numerous culturally important species that may be at risk to climate change as reported in the Climate Change Vulnerability Assessment and Adaptation Plan for the 1854 Ceded Territory. Species at higher risk include wild rice, Labrador tea, upland and bog berries, ruffed grouse, spruce grouse, loons, swans, cisco,

lynx, marten, snowshoe hare, lake trout, whitefish, moose, brook trout, paper birch, and northern white cedar.

Summary

Most of the land in the Rainy Headwaters-Vermilion Watershed is considered protected and the area is well known for its unique and good quality water resources. This planning area has the potential to be one of the more resilient areas of the state in the face of climate change with the potential to be a refuge for many species that would otherwise be extirpated including cold-water organisms. There is also opportunity for management and collaborations as agencies and stakeholders work together to conduct management informed by research.

Vermilion River
Credit: 1854 Treaty Authority

Section 3. Priority Issues

Section 3.
Priority Issues

The first component of the planning process is to identify the largest and most pressing needs of the natural resources within the watershed. This involves identifying the important natural and cultural resources and the issues that impact these resources. For the purposes of this plan, an issue is a problem, risk, or opportunity identified within the watershed. Prioritization is the process of determining which identified issues require the most immediate resources, particularly what can be addressed in the 10-year lifespan of this plan. The Priority Issues plan section summarizes the process used to identify and prioritize issues that will be addressed throughout the other sections of this plan (Figure 3.1).

Figure 3.1. Process for arriving at priority issues to address in the plan.

Identifying Issues

To develop priority issues, the planning partners needed to first develop a comprehensive list of issues that impact land and water resources in the watershed. Planning partners catalogued issues through a review of existing documents, studies, data sets, and other information available to them. The materials consulted were:

- Existing county water plans:
  - Cook County Comprehensive Local Water Management Plan (2014-2024)
  - Lake County Local Water Management Plan Update (2015-2024)
  - St. Louis County Comprehensive Water Management Plan (2010-2020)
- Rainy Headwaters Watershed reports, including:
  - Watershed Restoration and Protection Strategies (WRAPS) report
  - Total Maximum Daily Load (TMDL) studies and supporting data (Stressor Identification Report and Monitoring and Assessment Reports)
- Vermilion Watershed reports, including:
  - WRAPS report
  - TMDL and supporting data (Stressor Identification Report and Monitoring and Assessment Reports)
- Comment letters and supporting materials from state agencies, lake associations, and other local interest groups
- Local knowledge from partnering entities who manage resources in the watershed, including the Advisory Committee
- Public input collected during three public kickoff meetings in August 2022

After the comprehensive set of issues were developed, "Issue Statements" were written, revised, and finalized by the Steering Committee and can be seen in Table 3.2.

Resource Categories

Natural resource protection and restoration benefits soil and water resources that people care about. Each issue related back to one of these resources. A resource is a feature that provides drinking water, food, or other benefits for humans and wildlife such as habitat, aesthetic views, or recreational opportunities. Issue statements were assigned resource categories to help frame concerns to see the relationship between issues in the RH-V Watershed and these precious resources (Table 3.1).

Table 3.1. Resource categories for the RH-V Watershed.

Resource Categories					
					
Lakes	Streams	Forests	Wetlands	Agriculture	Groundwater

Prioritizing Issues

Public

Three public kick-off meetings were held in August 2022, in Orr, Seagull Lake, and Ely. These locations were chosen to allow for participation from citizens across geographically large watershed. These meetings were held to gather diverse viewpoints from and to capture the values, priorities, and issues concerning those living in the watershed. Those unable to attend were able to complete an online survey, available for one month. In total, 52 people contributed public input.

Attendees of these meetings were asked to complete activities to help identify issues and prioritize them. These activities facilitated citizens sharing information about the following topics:

- Issues, concerns, and opportunities in the watershed (Figure 3.2)
- Desired future conditions in the watershed
- Prioritizing watershed topics
- Sharing additional information

A full report with results from these activities and the online survey can be found in Appendix B. These activities and results were valuable for the planning partners to begin issue prioritization.

Figure 3.2. Word cloud of responses of participants when asked "What is your biggest concern related to your experiences in the RH-V Watershed". The size of the words represents the frequency of that word in responses.

Committees

Considering the public input in Figure 3.2, issue prioritization was discussed at three committee meetings.

In November 2022, the Advisory Committee reviewed the issue statements and identified the lead agency or group to address each issue. In particular, the participants discussed whether local governments such as the SWCD and County would be the lead or a state or federal agency (MPCA, DNR, Minnesota Department of Health (MDH), USFWS, etc) would be the lead. A map of land ownership was used to help guide the discussion (Figure 3.3). The results from this discussion can be found in Appendix C.

In December 2022, the Steering Committee reviewed the results from the November Advisory Committee discussion. It was decided that separating the issues based on local vs non-local leads didn't give the separation the Steering Committee was looking for. They then took an online poll to separate issues into two tiers of priority. This exercise also concluded in keeping all 13 issues on the same tier. It was decided that the goals and the funding allocated to actions will show the priorities in the plan.

In March 2023, the Policy Committee reviewed the issues and approved them as presented.

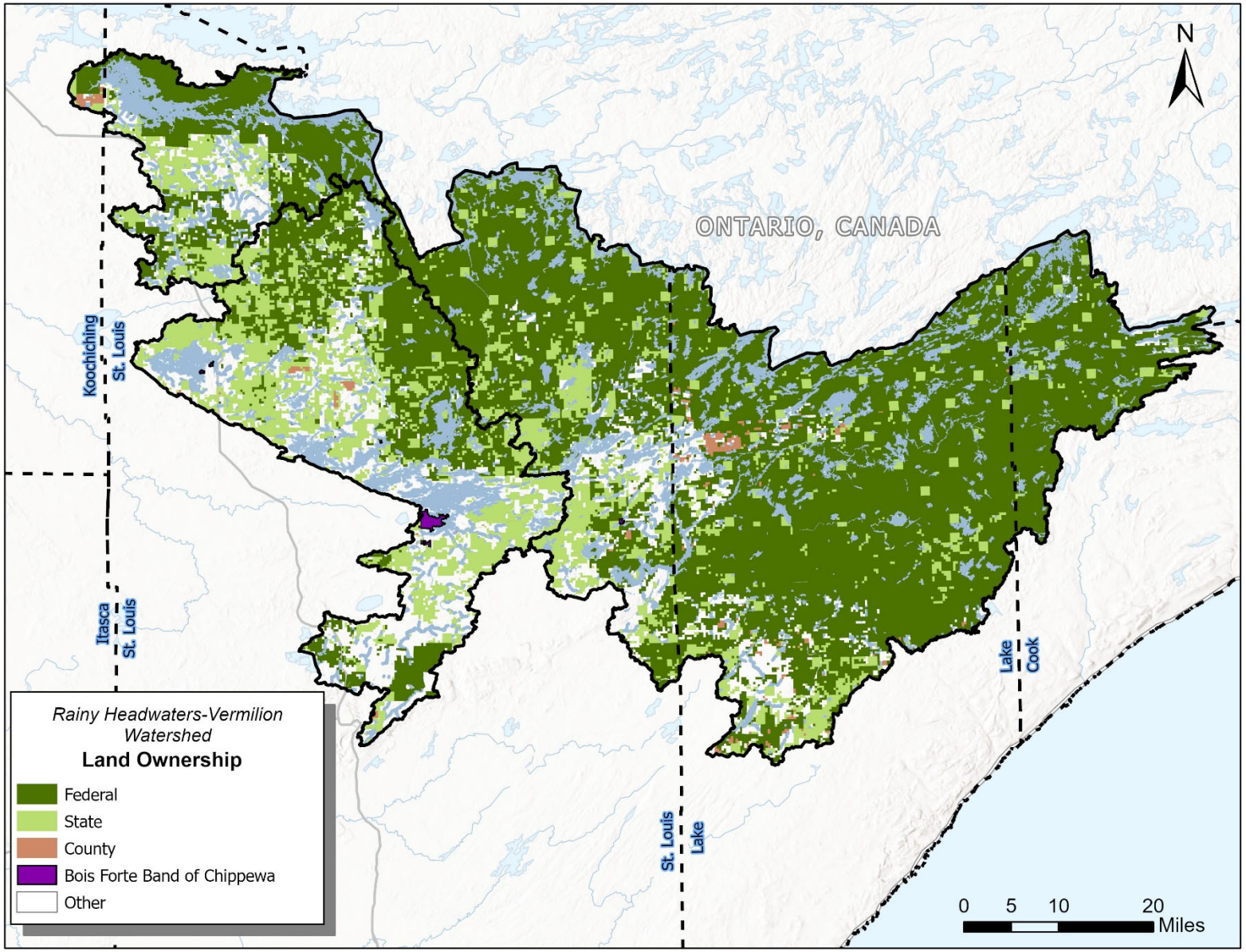
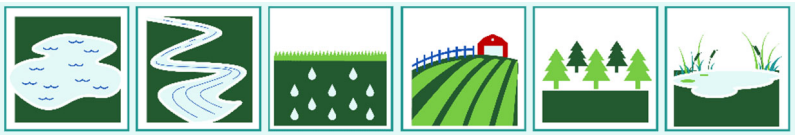


Figure 3.3. Land ownership in the RH-V Watershed.

Priority Issues

The 13 Priority Issues in Table 3.2 will be the focus of plan implementation. The main theme of each issue statement is highlighted in bold. The Resource Categories are represented by icons.

Table 3.2. Priority Issues identified in the RH-V Watershed.

Resource Category	Issue Statement
 Lakes Streams Groundwater	**Pollutants** have the potential to impact water quality, aquatic recreation, aquatic consumption, and aquatic life.
 Lakes	**Shoreline erosion** caused by increased development and the removal of natural buffers impacts habitat and water quality.
 Lakes Streams Groundwater	**Individual waste treatment systems** that are failing contribute pollutants to groundwater and surface water.
 Lakes Streams Groundwater	**Stormwater runoff** increases peak flows and contributes pollutants to stream, lakes, and groundwater.
 Lakes Streams Groundwater Farms Forest Wetlands	**Land use change** from development, resource extraction, and outdoor recreational use can impact water quality and habitat.
 Forest	**Forest management** is needed to improve forest health and resiliency, as well as protect against terrestrial invasive species.

Resource Category	Issue Statement
 Streams	**Connectivity barriers** impact biological communities and stream geomorphology.
 Lakes  Streams	**Wild Rice** requires mitigation and protection from development, climatic changes, contaminants, and invasive species.
 Groundwater	**Groundwater quality and sustainability** need protection.
 Lakes  Streams  Wetlands	**Aquatic invasive species** impact recreational activities and may result in reduced biodiversity in lakes and streams.
 Lakes  Streams  Wetlands	**Altered hydrology** including channelized streams and ditch systems, increase erosion and flow, with the potential to impair water bodies.
 Lakes  Streams  Wetlands  Forests  Groundwater	**Sufficient protection** is needed for outstanding resources and sensitive species to maintain water and habitat quality.
 Streams	**Eroding streambanks** contribute to turbidity impairments and reduced habitat quality.

Issue Lenses

Throughout the identification and prioritization process, lenses were used. These lenses are based in both science and local knowledge and are considerations to help in the issue prioritization process, as well as in the implementation and allocation of resources for the plan. These lenses are not issues in themselves but provide a different perspective to examine the issues in this plan at greater depth. Using these lenses for each of the issues will provide greater ability to implement the plan in the context of the next 10 years. They will be applied to the goals of the plan as well.

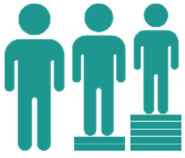
Climate Variability and Resilience

Climate change will likely make plan implementation more difficult, as rising temperatures and precipitation will have impacts on many of the resource categories identified in this section. Climate change impacts every aspect of water quality, including seasonal cycles in chemistry, nutrients, sediment, ice cover, and snow melt. All these changes in turn impact the quality and quantity of habitat for sensitive and cold-water species. With less-predictable climatic and weather patterns, as well as the increased probability of new issues to emerge within the watershed, climate change is a necessary lens when planning for all issues in this plan. Another possible consideration is the potential of rising population in the watershed with climate change fueled migration, causing increased development pressure around lakes and water supplies. Creating climate resiliency as a part of implementation will be essential for implementation success. Additionally, during the 5-year review, the planning partners should reassess if climate change impacts requires more allocation of resources.

Cultural Resources

The RH-V Watershed is a unique watershed with diverse species, citizens, and waterbodies. Considering the cultural resources in the RH-V Watershed is essential to creating and implementing a successful plan. During the planning process, projects that protect or restore cultural resources may receive priority. Culturally significant species include cold water fish, wild game, and wild rice, among others. The RH-V Watershed could be a climate refuge for these coldwater species and increases the importance of protection. Additionally, treaty rights on public lands must be considered when projects could impact treaty resources or access.

Equity, Inclusion, and Diversity



Everyone in the RH-V Watershed is impacted by water quality and environmental concerns. These concerns can cause climate anxiety, impact mental health, and cause trauma in the case of extreme weather events. In many areas of the world, the benefits of improved water quality and the negative impacts of reduced water quality are not equitable. Because of this, efforts in this planning process were completed using the lens of equity to focus efforts in disadvantaged communities. Further, traditional

inequities were considered and efforts to generate more equity in the watershed are written into this plan. This includes facilitating involvement with all groups and considering all voices in the planning and implementation process. Due to the uniqueness of the watershed, there is a need to balance resource protection with human access. In this, there is a need to protect from future impaired waters, which can have negative economic and health implications for citizens in the watershed, as water quality supports the local economy.

Social Capacity

The RH-V has a unique and diverse group of citizens living within the watershed. Completing the goals laid out in this plan will be dependent on the capacity of individuals, landowners, businesses, and other organizations within the watershed to facilitate and participate in projects and actions that protect the environment and water quality. To ensure that this is possible, participants require skills, education, knowledge, resources, and connections. Creating this capacity across all groups will be required to successfully implement this plan.

Local Concerns

Local concerns are issues or topics of interest in the watershed that are also outside the scope of the plan but are important considerations to water and land management. While not fully addressed in the plan, associative resource categories and goals can address components of these concerns since they are of importance in the watershed.

Wildfires

Forests in the RH-V Watershed are fire-dependent, and long-term fire suppression on the landscape increases the risk of major wildfire. Thoughtful forest management can reduce wildfire risk while supporting a mosaic of different forest types and ages for economic and recreational benefit. In some years, dry conditions are creating increased risks of wildfires. Wildfires can be beneficial to fire dependent species and have significant cultural heritage in Northeast Minnesota. However, these fires also pose potential risks to the resources of the watershed, human structures, and human safety. As such, a natural conflict exists between fire avoidance and fire promotion for management in the watershed.

Wildfire in the BWCAW

Parcelization and Future Development

The division of woodlands (parcelization) may increase in the RH-V Watershed in the coming decades with increased development. Parcelization has the potential to harm forest health, water quality, and economic prospects in Minnesota (Block-Torgerson et al., 2010). While parcelization is occurring at highest rates in Central Minnesota, there are areas of high parcelization in the RH-V Watershed. Plan partners should assist LGUs and landowners with resources and consultation to counteract natural resource strains and stressors.

School Trust Lands

State School Trust Lands are mandated to be managed for maximum long-term economic return with sound natural resource conservation and management principles, providing funding for Minnesota schools. The State of Minnesota, Superior National Forest and The Conservation Fund have collaborated to develop a proposed land swap that could increase the amount of school trust land outside the BWCAW in these watersheds. This would allow the consolidation of land ownership within the BWCAW to the Forest Service to better protect the wilderness resource while increasing revenue generation activities on lands outside the BWCAW to support public education. There is a potential increase in State School Trust land in the Dunka River watershed, a proposed Class 2A coldwater stream. Currently this stream reach is afforded protections from the surrounding forestland. Management of this area should consider the possible impacts to the hydrology and biological suitability for coldwater communities in the Dunka River (MPCA 2022).

Forests in the Watershed
Credit: Kyle Gill

Mining


Soudan Mine, closed in 1962

The northeast region of Minnesota has a long history of mining dating back into the late 19th century. It is an economically important industry in the RH-V Watershed, which contributes over 10,000 jobs and adds approximately $4 billion to the state's economy (UMD, 2020). There are several potential impacts from mining activity, including altered hydrology, runoff and groundwater seepage from tailings management areas, soil disturbance, loss of or conversion of wetlands, sulfate impairments, and changes to flow and water quality. Mining activities have already impacted water quality and hydrology in the watershed, leading to impairments for sulfate and causing wetland loss from mine pit construction. Mine expansion and closure can also impact flow, temperature, and water quality (MPCA, 2022). In 2023, the federal government established a 20-year moratorium for mining on federal land by withdrawing 225,504 acres of National Forest System land from disposition under US mineral leasing laws in the Rainy River Watershed (BLM's Public Land Order 7917). Continued monitoring for the potential impacts of mining, as well as water quality and quantity management in the watershed will be important moving forward.

Lead in Tackle and Ammunition

Lead is toxic for birds, mammals, and fish and lead tackle is commonly used in fishing tackle and ammunition. In Minnesota, lead is a poison commonly ingested by wildlife. This can impact the food chain as eagles and other predators or scavengers can eat lead contaminated meat and carcasses. The MPCA's *Get the Lead Out* is a program to counter this problem by providing resources to fisherfolk on locations and retailers where they can buy lead-free tackle. More information can be found on the MPCA's website: https://www.pca.state.mn.us/air-water-land-climate/getting-lead-out-of-fishing-tackle. Also of concern is lead shot and bullets, which have been known to be ingested by bald eagles. DNR efforts for lead-free ammunition on public lands are not currently in-place.

Fish Consumption Advisories

Fish is a healthy food that contains many important nutrients. However, fish can contain contaminants from the environment. Mercury is found in fish in RH-V Watershed (Weiner et al.,

2006), and fish in northeastern Minnesota have higher mercury levels compared to the rest of the state. Minnesota has developed statewide safe-eating guidelines based on mercury, perfluorooctane sulfonic acid (PFOS) and polychlorinated biphenyls (PCBs) levels measured in fish throughout lakes in the State, as well as mercury levels sold in commercial fish. Many of the waters in the RH-V are included in the statewide mercury TMDL. However, there are many waters in the planning area that are not covered under this TMDL because they don't meet the criteria and will need to have site-specific TMDL developed. More information can be found here: https://www.health.state.mn.us/communities/environment/fish/index.html.

Ice Fishing Waste

Ice fishing is a common recreational activity in Northern Minnesota. However, waste from ice fishing is a water quality concern, as litter and waste are often left on the frozen lakes during ice fishing season. This waste can harm fish, birds, and other wildlife both during the winter and following spring thawing. Waste left on the ice enters the water bodies and commonly washes up on shorelines. Support of programs aimed at reducing waste from ice fishing should be considered. Increased development is also likely to increase recreational activities and traffic on waterbodies for both winter and summer activities.

Ice fishing waste on the Rainy River

Sulfate Impairments

Elevated sulfate levels are particularly important to monitor and mitigate in the RH-V due to sulfate's impact on wild rice ecosystems. The current standard (adopted in 1973) is 10 mg/L for waters used for production of wild rice (WUFPOWR). In recent years, the MPCA has begun working with wastewater permittees and tribal nations to discuss implementation methods to protect wild rice. Additionally, the MPCA is working towards implementation of a permitting process that can help better monitor and evaluate waterbodies to protect waters from impairments. These permits will set limits and create monitoring requirements for sites upstream that are known or suspected to contribute sulfate. The Clean Water Act and Minnesota Rules allow flexibility to develop site specific standards where unique circumstances change the impact a pollutant has on the use if the applicant can demonstrate that the waterbody has and will maintain a wild rice population that is self-sustaining and productive. Site specific standards also need to go through public notice and EPA approval. For more information, visit: https://www.pca.state.mn.us/air-water-land-climate/protecting-wild-rice-waters

There are several waters in the watershed that are impaired for sulfate: Pike and Sand Rivers, Lake Vermilion, and Sand and Little Sandy Lakes. The Dunka River and Birch Lake have been included in the MPCA's draft 2024 impaired waters list. In Section 4 of this plan, lakes that have sulfate risks have also been identified.

It is important to note that this plan does not seek to address sulfate impairments directly. It is outside the scope of the plan and will be addressed through state and federal processes.

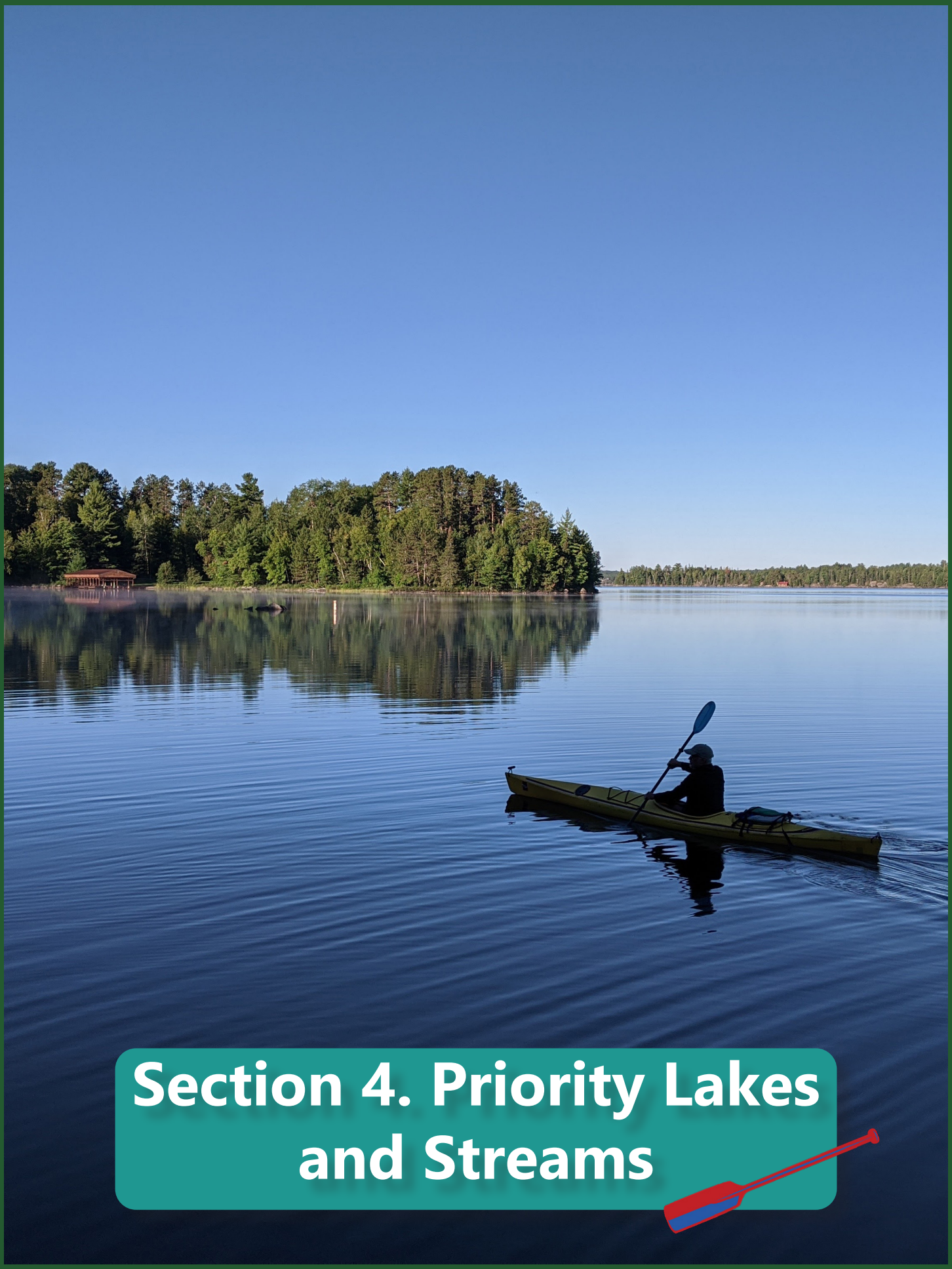
Wild Rice in the Vermilion River
Credit: 1854 Treaty Authority
August 17, 2023

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.

Contaminants of Emerging Concern

There are several contaminants of emerging concern that have been of concern for decades, but have lacked sufficient information to include and address in local water planning. 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. The MPCA regulates and monitors many of these contaminants. More information can be found here: https://www.pca.state.mn.us/air-water-land-climate/understanding-emerging-contaminants. The MPCA has recently upped their efforts in addressing PFAS in wastewater, stormwater, and solid waste facilities. More information can be found here: https://www.pca.state.mn.us/pollutants-and-contaminants/pfas.



Section 4. Priority Lakes and Streams

Section 4.
Priority Lakes and Streams

In Section 3. Priority Issues, resource categories were defined and their importance in the RH-V Watershed were examined. Important resources within the watershed include lakes, rivers, streams, drinking water sources, wetlands, soils, as well as terrestrial and aquatic habitat. These resources were utilized to frame issues and concerns.

Because there are over 1,691 lakes and thousands of miles of streams in the watershed, these surface water resources needed a further step of prioritization to focus funding and staff in the next decade. References such as the WRAPS, the Landscape Stewardship Plan (LSP), and local knowledge and priorities were used to determine which lakes and streams required greater focus. These priority lakes and streams will be targeted for outreach and project development, as well as provide a roadmap for implementation efforts.

During this process, it was important to prioritize lakes and streams in a quantitative way (Figure 4.1). To do this, the planners used simple and clear criteria (e.g. percent protected lands), so that these priorities could be clearly communicated with residents and stakeholders in the RH-V Watershed.

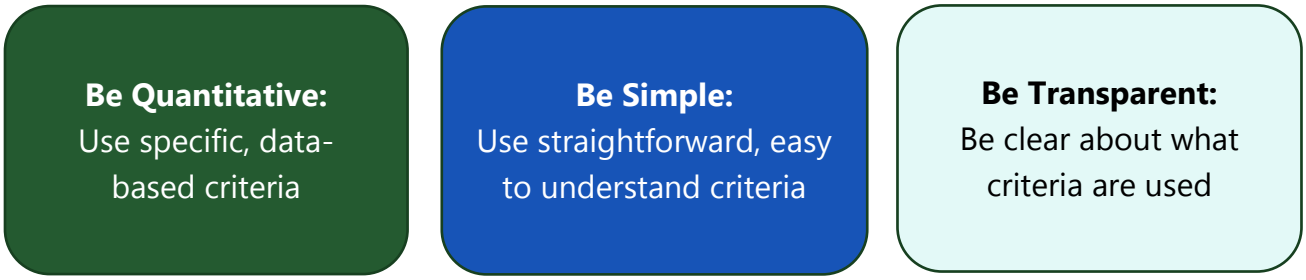


Figure 4.1. Criteria for developing priority resources.

Management Strategies

BWSR's Nonpoint Priority Funding Plan for Clean Water Implementation Funding and Minnesota's Clean Water Roadmap outlines priorities for resources:

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

However almost no resources in the RH-V Watershed are impaired (or nearly/barely impaired) for aquatic life and recreation. Additionally, a majority of the watershed has over 75% permanently protected lands (public lands, public waters, wetlands, conservation easements, SFIA; Figure 4.2). Because of the high level of permanently protected lands, the focus of this plan instead can be on enhancing and protecting these resources.

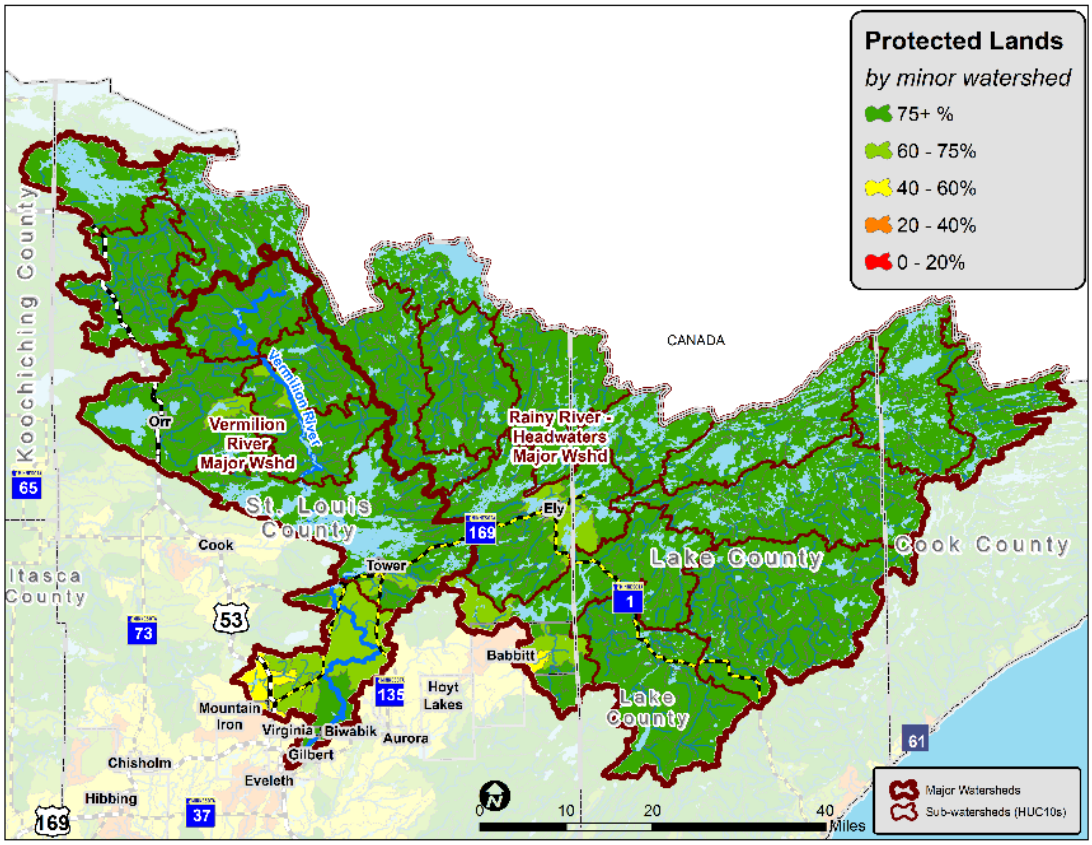


Figure 4.2. Permanently protected lands in the RH-V Watershed.

Four management strategies were identified for priority resources in the RH-V Watershed: Vigilance, Protect, Enhance, and Restore (Table 4.1). These are commonly used management strategies in watersheds with a focus on maintaining the already well-protected resources in Northern Minnesota.

Table 4.1. Management strategies for priority lakes and streams.

Management Strategy	Definition
Restore	These resources are impaired (nutrients, E. Coli, or TSS/Turbidity). These streams and lakes require restoration.
Enhance	These resources are at risk, but not impaired. Criteria include degrading water clarity, <75% minor watershed permanent protection, and nearly impaired. These lands may be vulnerable to future land use change. Enhancement projects, nutrient reduction, and land protection are necessary for this category.
Protect	These resources are in good condition. They may have some developmental pressure or potential risk for land use change. Water bodies have >75% minor watershed permanent protection (public waters, public land, wetlands, conservation easements, SFIA).
Vigilance	This resource is in excellent condition and has permanent protections in place to maintain its condition. Future risks are low, but maintaining land protection and continued monitoring is important.

Priority Lakes

There are approximately 1,691 lakes in the RH-V Watershed. Creating management focuses for staffing and funding to complete work in the watershed is essential to make measurable change. These categories can help direct these resources to create measurable and important change in the watershed. Figure 4.3 below describes and outlines the decision-making process for categorizing lakes in this plan, as well as implementation focus. Table 4.2 provides more information on the lakes selected.

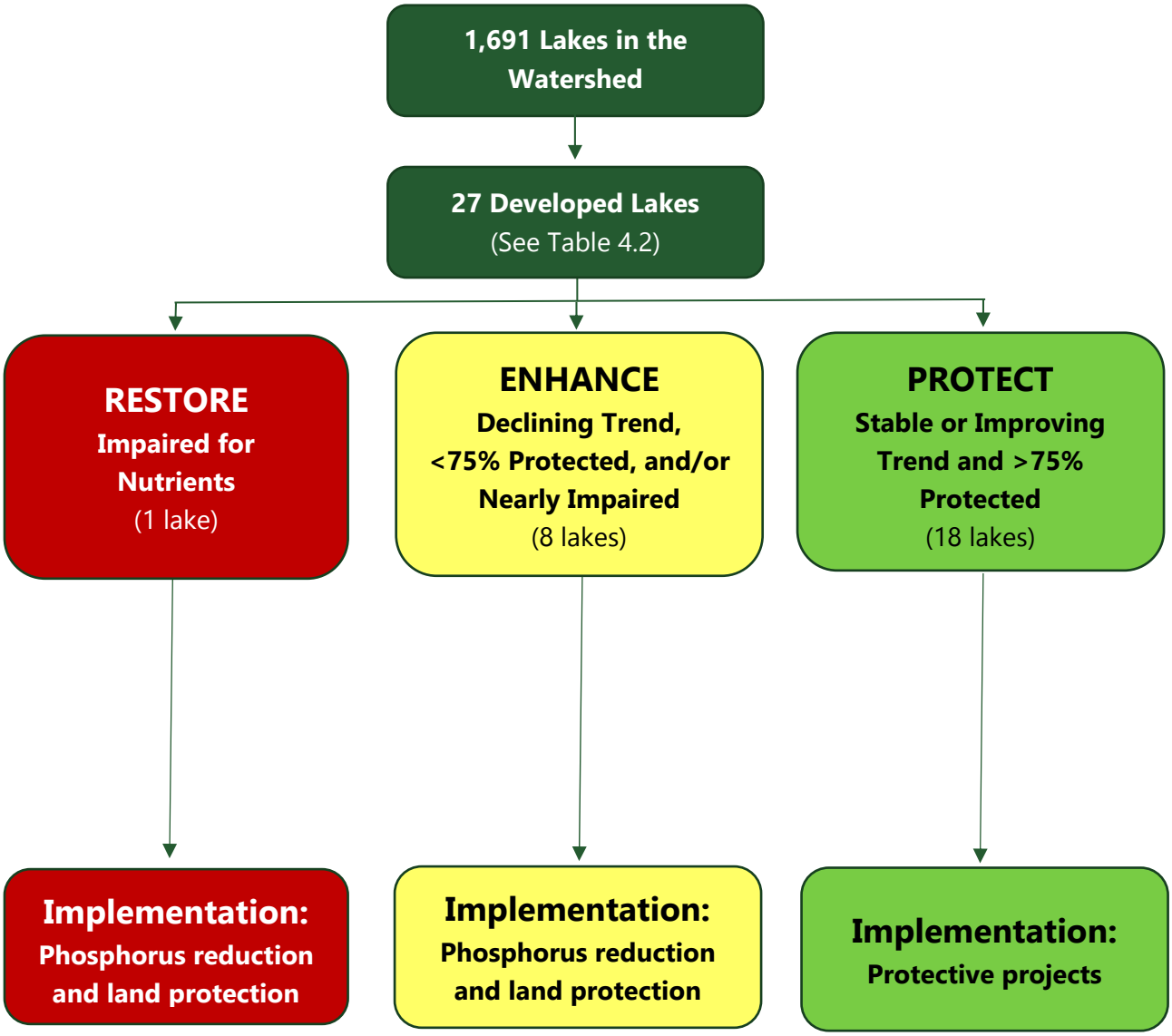


Figure 4.3. Decision tree for priority lakes.

Table 4.2. Priority lakes from the WRAPS and management strategies (Definitions for column headers provided on the next page).

Major Watershed	Lake Name	Lake ID	Water Clarity Declining Trend	Nearly Impaired	<75% Minor Watershed Protected	Management Strategy	Phosphorus Sensitivity	Lakes Benefit Cost Ratio	Biological Significance	Notes added from Advisory Committee
Vermilion	Myrtle	69-0749-00			x	RESTORE	Impaired	High	N/A	
Rainy H.	Burntside	69-0118-00	x			ENHANCE	Highest	Highest	Outstanding	Drinking water source for Ely
Rainy H.	Sand	38-0735-00		x	x	ENHANCE	Higher	High	Outstanding	
Rainy H.	Shagawa	69-0069-00			x	ENHANCE	High	High	High	
Rainy H.	White Iron	69-0004-00			x	ENHANCE	High	High	High	
Rainy H.	Kabetogama	69-0845-00		x		ENHANCE	High	High	Outstanding	Moderate to severe algal blooms
Rainy H.	Birch	69-0003-00	x			ENHANCE	High	High	Outstanding	Mine discharge, sulfate risks
Vermilion	Eagles Nest 2	69-0285-02	x			ENHANCE	Highest	Higher	Moderate	
Vermilion	Pelican	69-0841-00		x		ENHANCE	Higher	Highest	Outstanding	Section 319 Plan*
Rainy H.	Bear Island	69-0115-00				PROTECT	High	Higher	Moderate	
Rainy H.	Big	69-0190-00				PROTECT	Highest	Highest	High	
Rainy H.	Blackduck	69-0842-00				PROTECT	Higher	Higher	High	
Rainy H.	Ash	69-0864-00				PROTECT	Higher	High	N/A	
Rainy H.	Fall	38-0811-00				PROTECT	High	High	High	
Rainy H.	Farm	38-0779-00				PROTECT	High	High	Outstanding	
Rainy H.	Garden	38-0782-00				PROTECT	High	High	Outstanding	
Rainy H.	Gunflint	16-0356-00				PROTECT	Highest	Highest	Lake Trout	
Rainy H.	Loon	16-0448-00				PROTECT	Highest	Higher	Outstanding	
Rainy H.	Sea Gull	16-0629-00				PROTECT	High	High	Outstanding	
Vermilion	Crane	69-0616-00				PROTECT	High	High	Outstanding	
Vermilion	Eagles Nest 1	69-0285-01				PROTECT	Highest	Higher	N/A	
Vermilion	Eagles Nest 3	69-0285-03				PROTECT	Highest	Highest	High	
Vermilion	Eagles Nest 4	69-0218-00				PROTECT	Highest	Higher	High	
Vermilion	Elbow	69-0744-00				PROTECT	Higher	Higher	N/A	
Vermilion	Elephant	69-0810-00				PROTECT	Higher	Higher	High	
Vermilion	Moose	69-080-600				PROTECT			Outstanding	
Vermilion	Vermilion	69-0378-01				PROTECT	Higher	Highest	Outstanding	Sulfate Impairment

**North St. Louis SWCD was awarded Section 319 funding for improvement projects for Pelican Lake because it was identified as nearly impaired in the 2022 WRAPS.*

Definitions:

Water Clarity Declining Trend: The lake has a declining trend in transparency as documented in the 2022 WRAPS.

Phosphorous Sensitivity: Phosphorus sensitivity was estimated for each lake by the DNR by predicting how much water clarity would be reduced with additional phosphorus loading to the lake. The lake is identified on the Lakes of Phosphorus Sensitivity Significance (DNR) study as the "Highest" level of sensitivity.

Lakes Benefit Cost Ratio: Lakes where improvements give the most return on investment.

Biological Significance: DNR Lakes of Biological Significance – Outstanding, means that they have high aquatic plant richness, wild rice, exceptional fishery, endangered or threatened lake bird species.

What does Protection mean?

Protection literally means to keep something or someone safe or to shield from harm. Protecting lakes and streams means to shield them from degradation. This can be done through protective projects such as stabilizing an eroding shoreline or by keeping protective land covers such as forests and wetlands around the lake or stream (protecting forests from conversion to other land uses). Land protection can be accomplished with tax incentives, conservation easements, or public land acquisition. These lands, such as forests, can be managed for water quality and forest health.

Bear Island State Forest
Credit: Kari Hedin

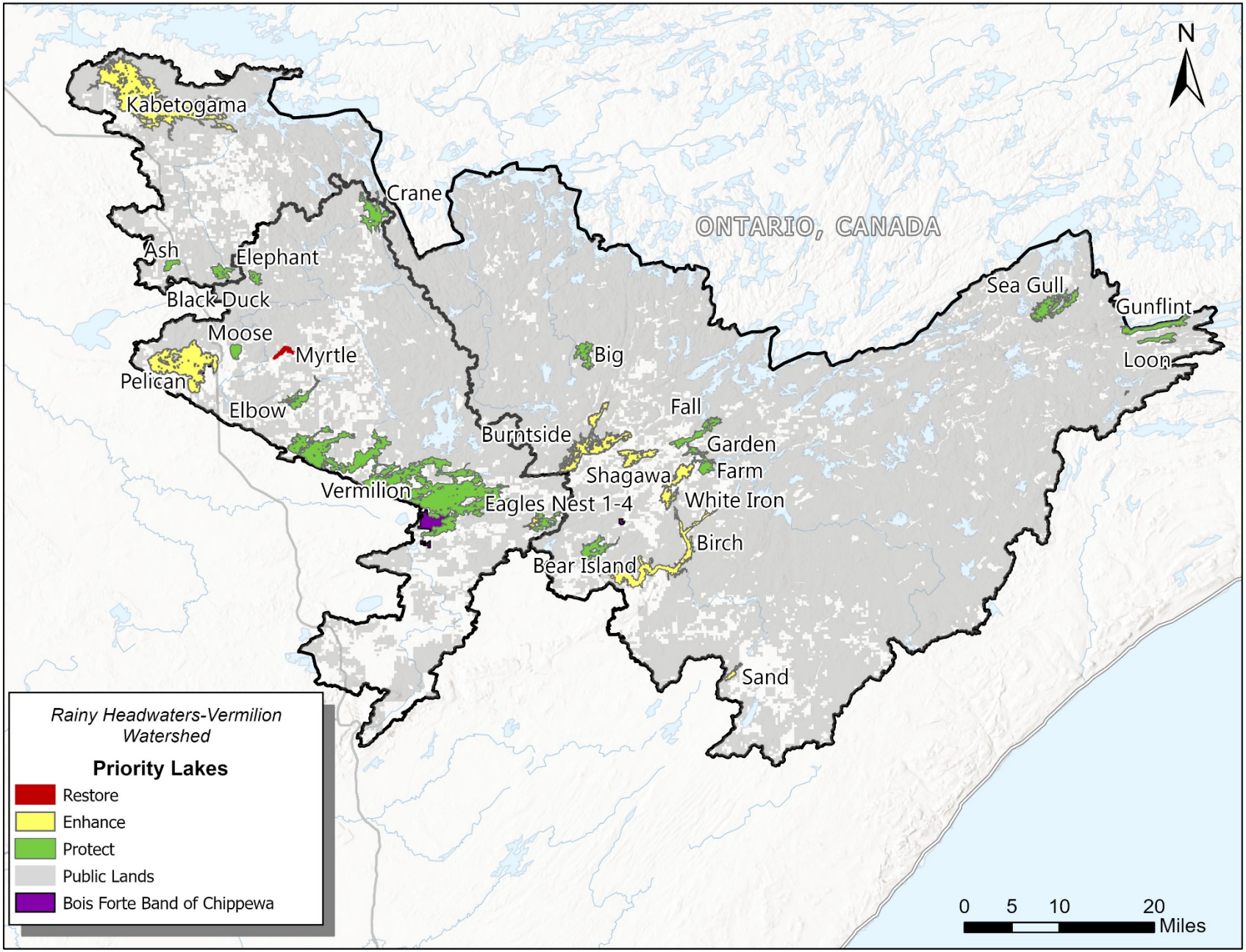


Figure 4.4. Priority lakes in the RH-V Watershed.

Discussion on Criteria

Water Quality Data

As shown in Figure 4.3, other criteria were considered for categorization for lakes. Impaired lakes were placed into the "restore" strategy (Myrtle). Lakes that are nearly impaired (Sand, Pelican, and Kabetogama), have <75% minor watershed protection (Sand, Shagawa, and White Iron), or have declining water clarity trends (Burntside, Eagles Nest 2, and Birch) were placed into the "enhance" strategy. Other water quality considerations were discussed during Advisory Committee meetings, such as sulfate impairments (Sand and Vermilion) and algal blooms (Kabetogama). In Kabetogama, most (internal) loading is likely from nutrient rich soils left by Glacial Lake Agassiz, and cyanotoxins have been documented during some algal blooms (MPCA, 2022). Other characteristics such as phosphorus sensitivity, lakes benefit to cost ratio, and their biological significance were considered, but were not determining factors in categorization.

Birch Lake is a particularly important lake due to its hydrology and position within the watershed. It is impounded with many bays and has varying water quality across its length. In addition, there are two mining facilities that discharge into its tributaries, which give the potential for sulfate impairments. For more information about sulfate, see page 40 in Section 3.

Although they were not included as priority lakes, there are lakes in the watershed impacted by recent wildfire. For example, the 2021 Greenwood Fire in Lake County caused loss of mature forest canopy cover. These lakes include MacDougal Lakes, Pitcha, Stony, and Wampus. This is also applicable to streams, such as Stony Rivers and Coyote Creek. Forest management actions in these areas could help improve water quality.

Seagull Lake
Credit: Kari Hedin

Development Pressure

The sensitive resources in the RH-V Watershed will continue to be vulnerable to developmental pressure. In determining management categories, developmental pressure around lakes was analyzed. Two main surrogates were used to understand development pressure, new wells in the watershed and parcel size around lakeshores.

New Wells

Data on new wells installed from 2017-2022 were summarized (MDH). The lakes in Table 4.3 below match closely with the selected lakes for management shown in Table 4.2. Note that not all drinking water comes from groundwater sources in the watershed, therefore other methods of determining developmental pressure were also used.

Table 4.3. New wells installed in the RH-V Watershed from 2017-2022.

Lake Name	New Wells (2017-2022)
East Vermilion	56
West Vermilion	20
Farm	13
Crane	10
Birch	9
Fall	9
Bear Island	8
White Iron	8
Burntside	7
Pelican	7
Shagawa	6
Kabetogama	5
Pike Bay	5
Eagles Nest #2	4
Garden	3
Little Long	2
Eagles Nest #3	1

Parcel Sizes

Examining parcel size can help identify trends in development. By evaluating the number of each type of parcel size, concentrated development around lakes can be identified (parcels <1 acre), as well as areas with the potential for future parcelization. Figure 4.5 breaks down parcel sizes within 1,000 feet of priority lakes in this plan. Vermilion was graphed on its own because it has so many more parcels than the other lakes.

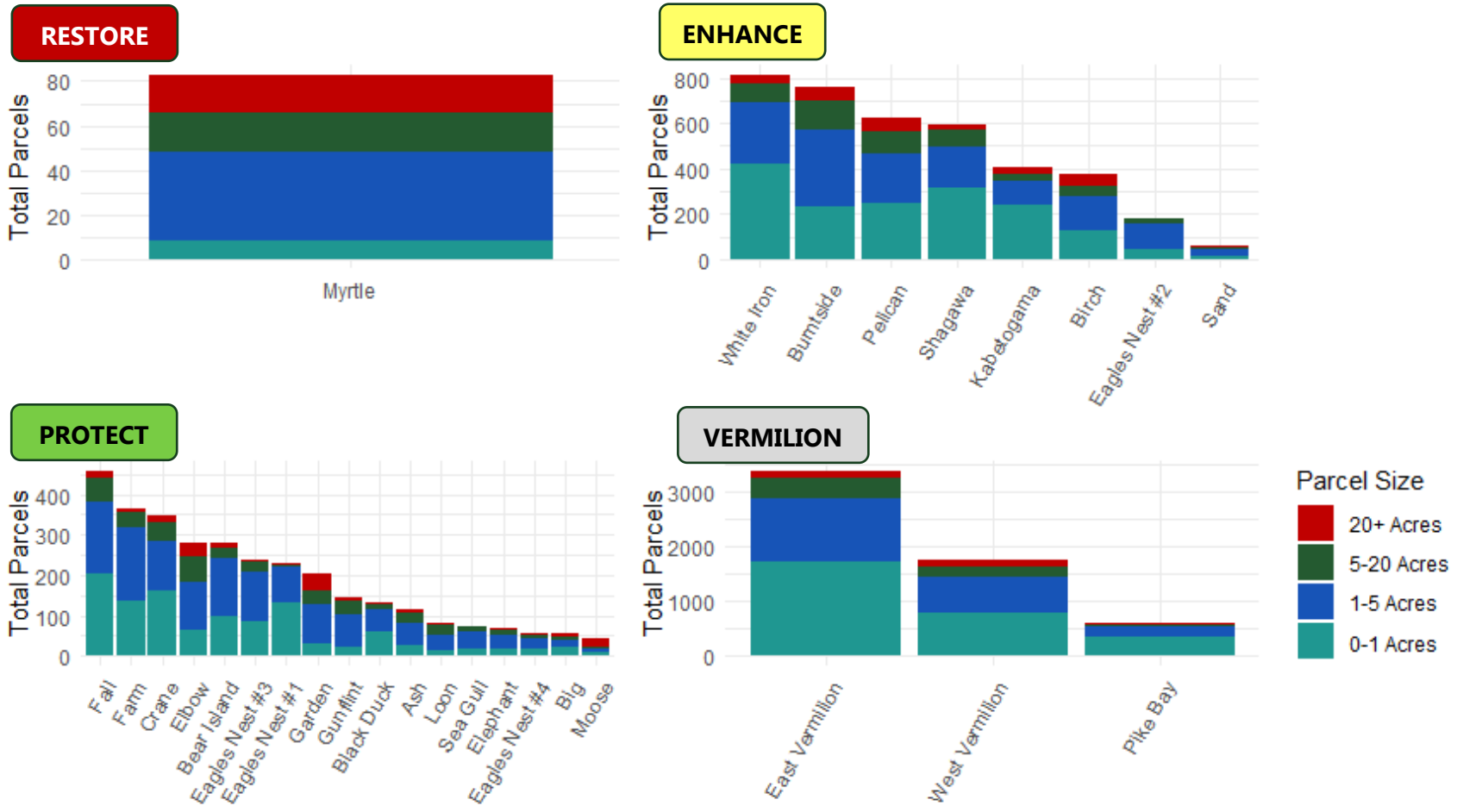


Figure 4.5. Parcel analysis for management catagories and Lake Vermilion.

Priority Streams

There are thousands of stream miles in the RH-V Watershed, and selecting the management focus for resources in the watershed will be essential for implementing this plan. Figure 4.6 shows a flow chart for determining management focus for streams in the watershed, as well as the implementation associated with that focus. Table 4.4 provides more information on the streams selected and categorized into each focus (Figure 4.7).

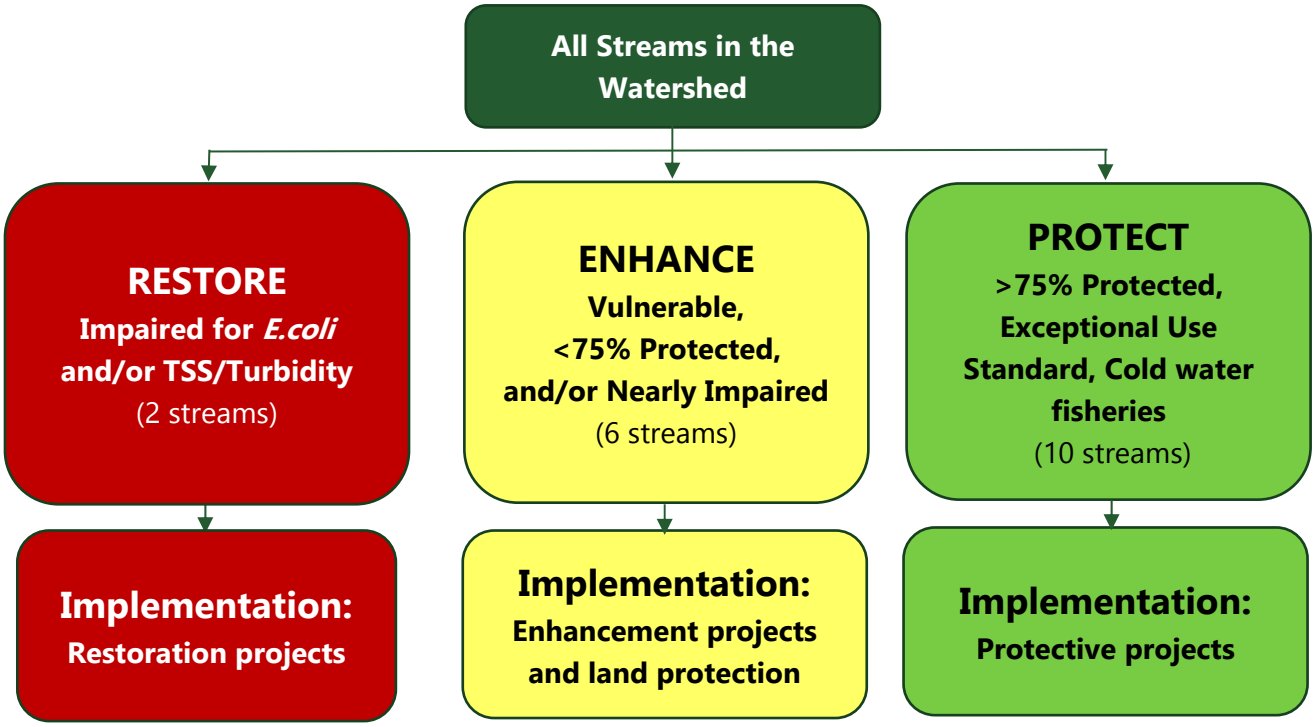


Figure 4.6. Decision tree for priority stream.


Ash River, Orr, MN

Table 4.4. Priority streams and management focus.

Major Watershed	Name	Water Body ID	Management Focus	Impairment Parameters	<75% Protected	Nearly Impaired	Exceptional Use Standard	WRAPS Notes
Rainy H.	Ash River	09030001-818	**RESTORE**	TSS				Restoration efforts in Blackduck River will support the Ash River
Rainy H.	Blackduck River	09030001-820	**RESTORE**	TSS, *E. coli*				Restoration efforts focused here
Rainy H.	Dunka River	09030001-987	**ENHANCE**		x			Mine closures in the distant future have the potential to increase flows; trout stream
Vermilion	Sand River	09030002-501	**ENHANCE**	Sulfate	x			Ditching issues and altered hydrology
Vermilion	Pike River	09030002-503	**ENHANCE**	Sulfate	x	TSS		
Vermilion	Echo River	09030002-532	**ENHANCE**			Bacteria		
Rainy H.	Shagawa River	09030001-535	**ENHANCE**					
Rainy H.	Langley Creek	09030001-603	**ENHANCE**					Mine closures in the distant future have the potential to increase flows
Rainy H.	Upper Ash River	09030001-819 09030001-821	**PROTECT**					Protecting Upper Ash helps improve the Ash River
Rainy H.	East Two River	09030002-504 09030002-647	**PROTECT**					Contributes drinking water supply to Tower/Soudan
Rainy H.	Bezhik Creek	09030001-975	**PROTECT**				x	
Rainy H.	Cross River	09030001-966	**PROTECT**				x	
Rainy H.	Denley Creek	09030001-627	**PROTECT**				x	
Rainy H.	Jack Pine Creek	09030001-564	**PROTECT**				x	
Rainy H.	Little Isabella River	09030001-530	**PROTECT**				x	
Rainy H.	Mitawan Creek	09030001-568	**PROTECT**				x	
Rainy H.	Snake River	09030001-542	**PROTECT**				x	
Vermilion	Vermilion River	09030002-529	**PROTECT**					State Water Trail

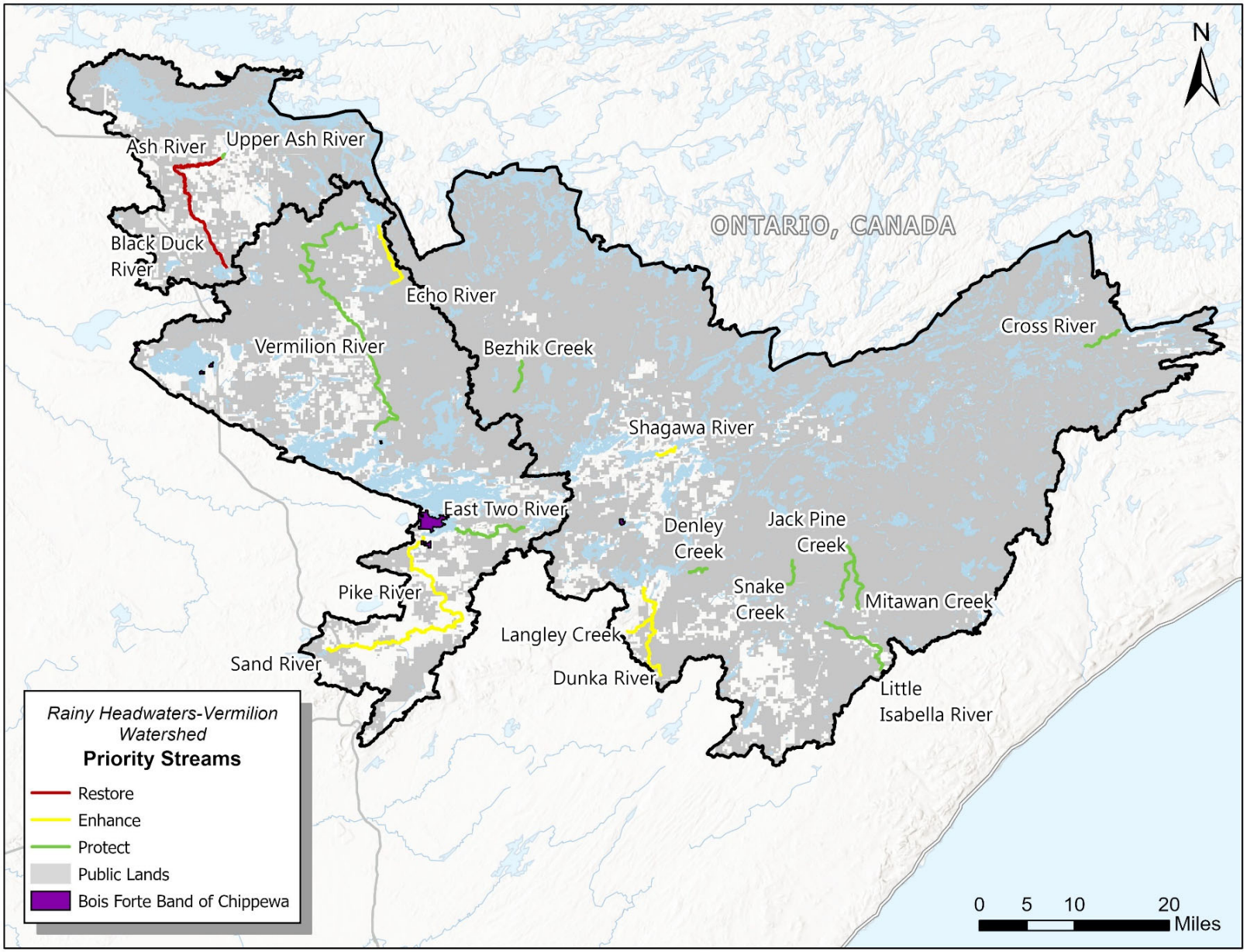


Figure 4.7.Priority streams in the RH-V Watershed.

Discussion on Criteria

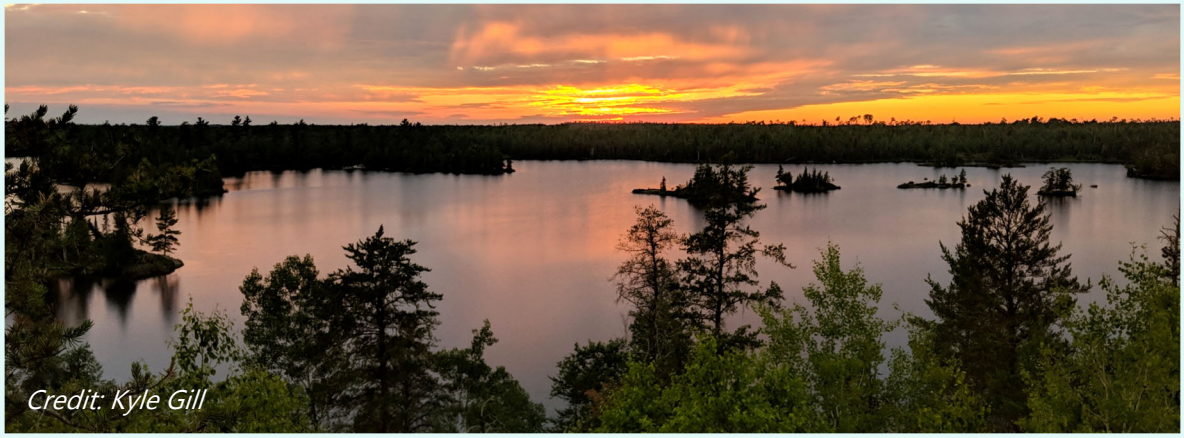
As shown in Figure 4.6, criteria were used to divide the streams in the RH-V Watershed into management focus categories. Streams with *E.coli* (Blackduck) or TSS/Turbidity (Blackduck and Ash) impairments were placed into the "restore" strategy. Streams were placed into the "enhance" strategy if they were considered vulnerable (Shagawa and Langley due to potential distant future mine closures) had <75% minor watershed protection (Dunka, Sand, and Pike), or were nearly impaired (Pike and Echo). Sand and Pike Rivers also have sulfate impairments. Other streams with other considerations were placed into the "protect" strategy, including exceptional use standard (Bezhik, Cross, Denley, Jack Pine, Little Isabella, Mitawan, and Snake). Vermilion River is a state water trail. Additionally East Two River is an important drinking water supply tributary, and Upper Ash is important for the improvement of the Ash Rivers.

Other Lakes and Streams

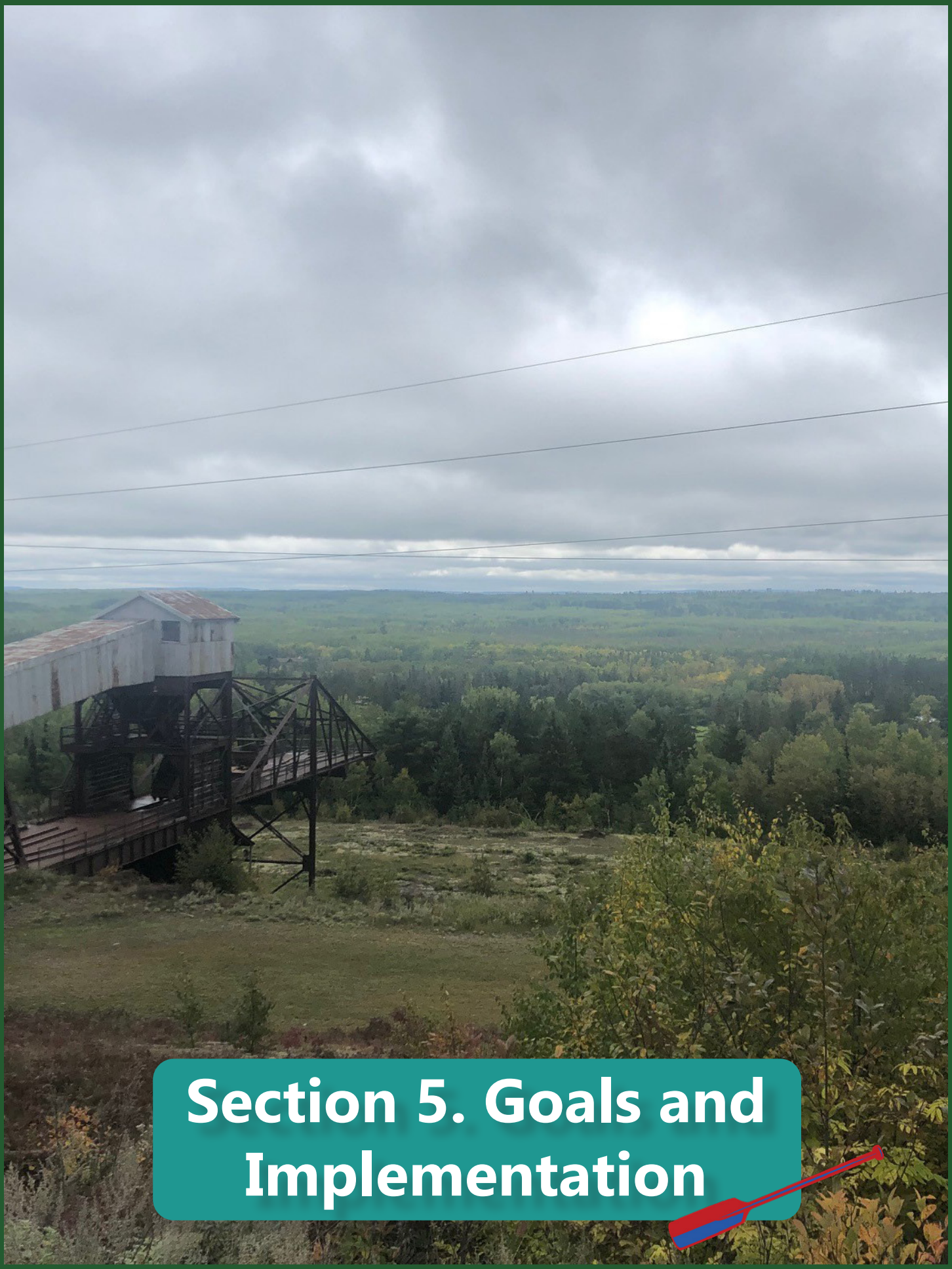
What about the lakes and streams that aren't a focus in this plan?

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

- Continue volunteer water quality monitoring to track trends;
- SWCDs and Counties continue to provide technical and financial assistance for projects;
- Lake, Homeowner, Property, and Road Associations could participate in Lake Management Planning; and
- Resources will be re-assessed by MPCA in the next 10-year cycle and could be a focus in the future.



Credit: Kyle Gill



Section 5. Goals and Implementation

Section 5.
Goals and Implementation

Creating goals and implementation actions are one of the most important steps in the planning process, which builds upon the previous sections' work of identifying priority issues, lakes, and streams in the watershed. This section will establish concrete goals for the implementation of this plan and identify the actions that can help achieve those goals. In this plan, goals are laid out with their actions in the following format:

- Measurable goal fact sheets with quantitative goals, plan issues addressed, plan outcomes, and lenses addressed
- Watershed-wide maps identifying priority areas for implementation
- Targeted implementation tables which include actions, timelines of implementation, lead agencies, costs, and funding structures

Measurable Goals

Measurable goals identify how progress is measured over the course of the 10-year implementation plan for this project. These goals were developed to directly address priority issues. However, these goals do not match directly to priority issues, as many goals address more than one priority issue or resource. These quantitative goals were developed based on models, as well as the capacities of the staff within the watershed to achieve them over the 10-year period. These goals were developed by the Steering and Advisory Committees and approved by the Policy Committee.

Each goal sheet includes the following components:

- **Short-term Goal:** goal for the 10-year implementation period
- **Desired Future Condition:** long-term goal for the watershed without a timeframe
- **Description:** background information on the goal
- **Issues Addressed:** which priority issues are addressed by the goal
- **Plan Outcomes:** what the goal will achieve for the watershed
- **Lenses:** the goal's impact on the lenses developed in Section 3. Priority Issues
- **Priority Resource:** which priority resources (streams, forests, etc.)

Credit: Becca Reiss

Targeted Implementation

The targeted implementation tables outline actions that will be taken during the 10-year implementation period. They outline specific actions that help to achieve each goal and include the following comments:

- **Program Type:** Fix it, know it, keep it, or manage it (Figure 5.1)
- **10-year Outcome:** Outcome from the action
- **Priority Areas:** Areas for implementation
- **Lead/Supporting Entities:** Who is leading (in bold) and who is supporting the action
- **Timeline for Implementation:** What years will the action be occurring
- **Tracking Output:** Does the action provide direct or indirect progress towards plan goals (see below)
- **Funding Level:** Which level of funding will provide resources for this action. Funding levels for the RH-V Watershed are summarized in Table 5.1
- **Total Costs:** 10-year cost for implementing the action

The implementation of this plan will require coordinating between watershed partners and multiple funding sources. Implementation requires balance between planned landscape management ("Manage It"), constructed environmental enhancements ("Fix It"), protected lands maintenance ("Keep It"), and Data Collect and Outreach ("Know It"). Each action in the tables below is associated with one of the implementation programs in Figure 5.1.

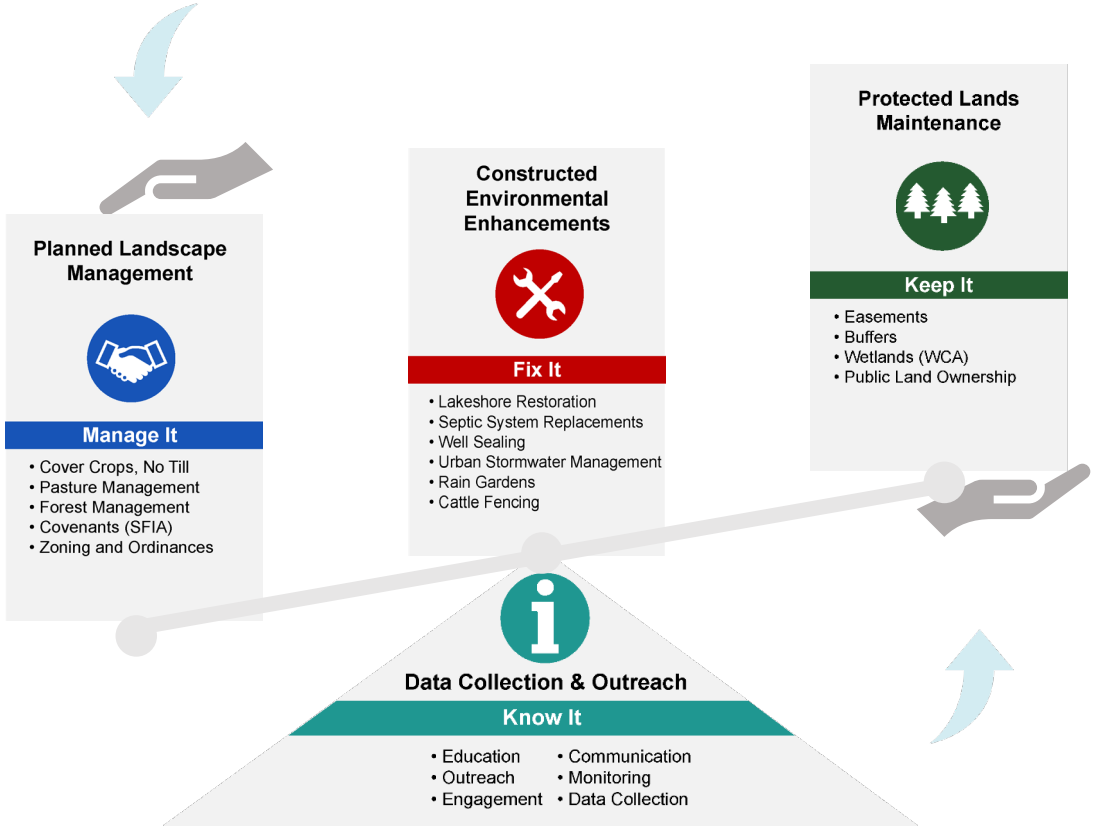


Figure 5.1. Implementation programs in the RH-V Watershed.

Each action in the Targeted Implementation Schedule has a funding level associated with it. 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 (Table 5.1).

Table 5.1 Funding levels for the RH-V Watershed.

Funding Level	Description	10-Year Total
Base	**Current Baseline Funding**	**$5,780,000**
WBIF	**Watershed Based Implementation Funding**	**$5,255,600**
Other	**Other Funding (i.e. Lessard Sams, DNR, 319 Funds, USFS)**	**$11,414,500**

Each action in the action tables contains a 10-year output. Some of these actions make direct progress towards the goal, while others are actions which address the goal but do not make direct progress at the quantitative goal. These goals are marked as either direct or indirect, as shown by the toggle below. For example, in the Drinking Water Protection goal, the action of replacing failing Subsurface Sewage Treatment Systems (SSTS) is an action that directly generates progress towards the goal of replacing 50 failing septic systems. Another action, SSTS ordinance enforcement, provides indirect progress towards achieving the goal.

Direct progress towards achieving plan goals

Indirect progress towards achieving plan goals

The costs and locations indicated in the action tables represent a best-case scenario. The actions require voluntary participation, field verification, and adequate funding, therefore prioritized projects may not be possible or feasible. In that case, the next highest priority projects should be targeted. Additionally, it is possible that projects may emerge that are not identified in the action tables. These projects should be pursued if the benefits are comparable to those identified during the planning process.

Several factors will determine if an implementation project occurs, which includes the following factors (but is not limited to these factors):

- Funding available for implementation
- Readiness of practices and projects for implementation
- Emerging data on resource conditions
- Emerging practices
- Field verification of a certain practice type and location
- Participation by landowners and residents
- Effectiveness of outreach and education events, as well as research initiatives

Where To Target Work

Another component of targeted implementation is deciding where actions should occur. For each goal, there is a priority area and accompanying map highlighting these areas. Overall, actions for this plan will be targeted to private land, particularly adjacent to priority streams and lakes. Figure 5.2 highlights these areas.

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

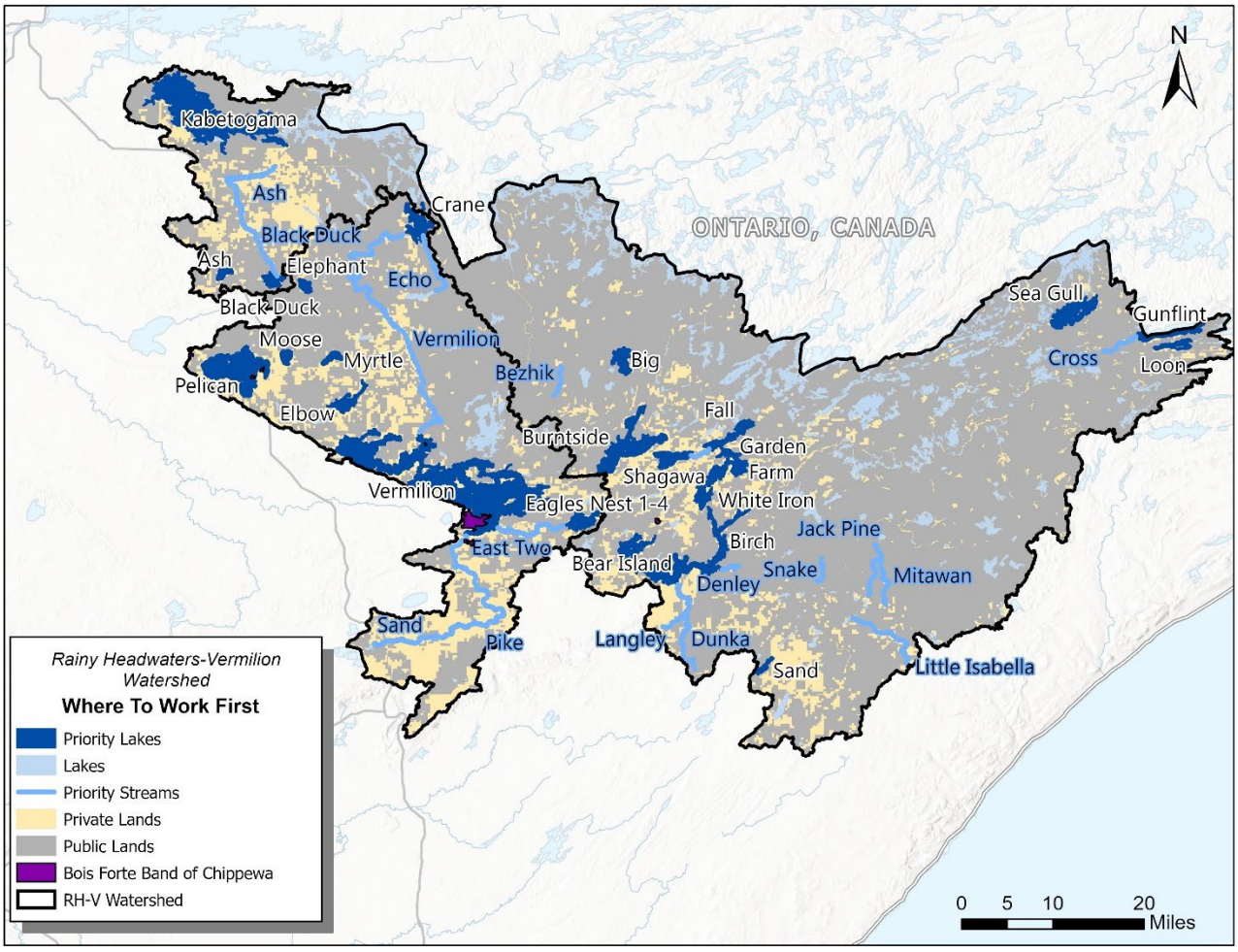


Figure 5.2 Private land, priority lakes, and priority streams in the RH-V Watershed. These indicate areas to begin implementing actions.

The next pages walk through each goal and its priority areas and actions.

GOAL: LAKE & LAKESHORE MANAGEMENT

Short-term Goal

Return **2 miles** of lakeshore to natural vegetation (10 projects per year of 100 feet each for 10 years).

Desired Future Condition

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

Issues Addressed

- Shoreland Erosion
- Land Use Change

Plan Outcomes

- Increased natural vegetation on lakeshores
- Improved wildlife habitats
- Decreased shoreland loss
- Reduced nutrients entering lakes

Lenses

Reducing the impacts of variable precipitation patterns.

Improving lake water quality, including for those who rely on surface water for drinking water.

Protecting habitats for important wildlife and resources such as wild rice.

Human activities such as shoreline development and the removal of native vegetation speed up shoreland erosion. These changes also increase nutrient loading into lakes, as they remove natural buffers surrounding waterbodies.

There are 494 miles of privately owned shoreline on the priority lakes identified in this plan. The DNR projects that 1-2% of natural buffers on shoreline will be lost per decade in Minnesota from 2003 baseline measurements. This means that in the 10-year implementation-program in this plan, between 5-10 miles of shoreline could be lost on these priority lakes. Halting this loss and reversing these trends by returning lakeshore to natural vegetation provides water quality, habitat, and erosion benefits for the lakes.

Figure 5.3 shows priority lakes in the watershed which were developed in Section 4. Priority Streams and Lakes. These lakes are ideal for increased lakeshore management due to their locations within the watershed, developmental pressure, or nutrient loads. To see a zoomed in map of each lake targeting work, see Appendix D.

Priority Map

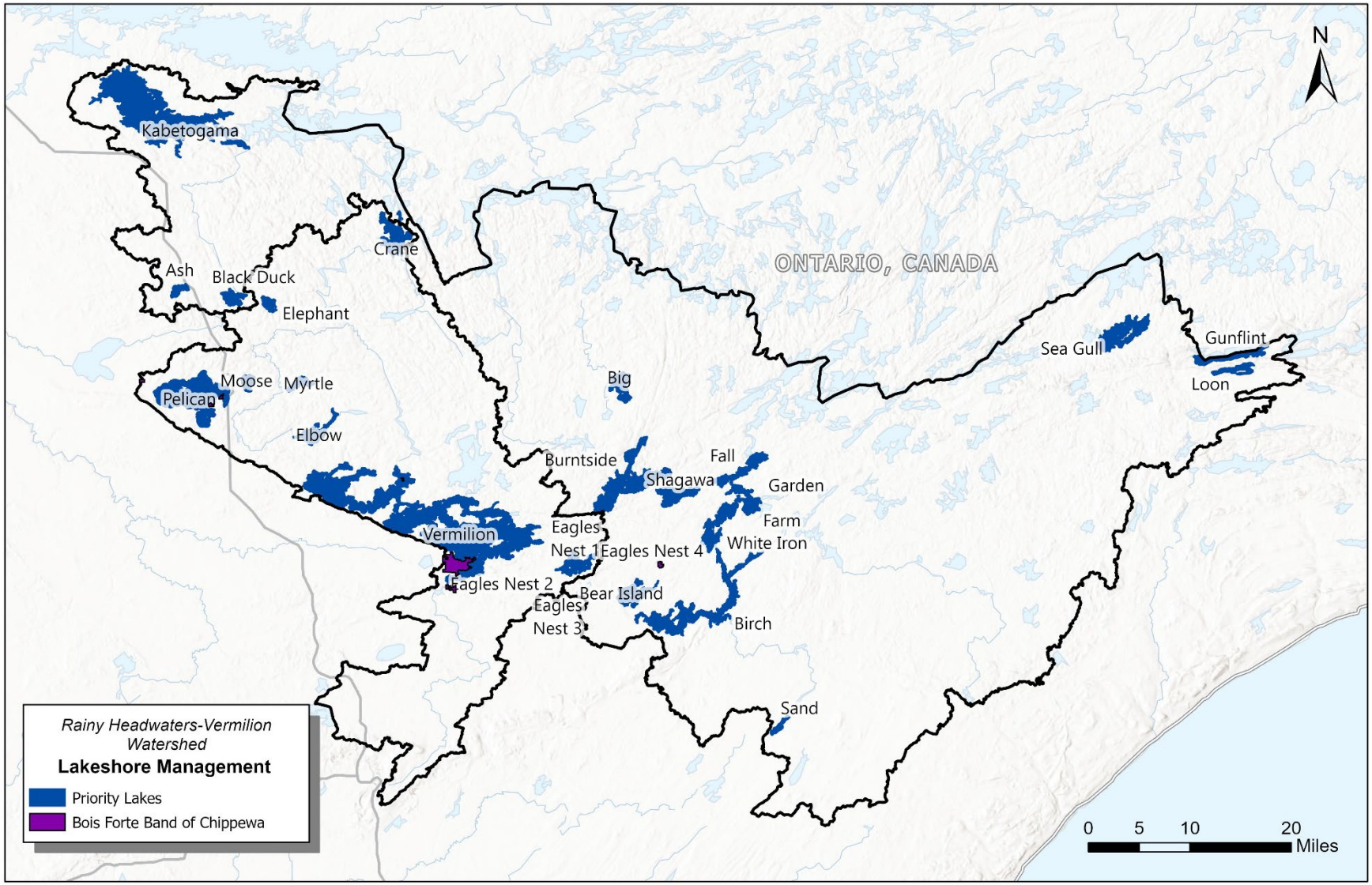


Figure 5.3. Priority lakes for the lakeshore management goal. Priority lakes were identified in Section 4. Priority Lakes and Streams.

Goal: Lake and Lakeshore Management

Return **2 miles** of lakeshore to natural vegetation.

Primary Metric: Length restored
Secondary Metrics: Phosphorus and sediment reductions

What			Where	Who	When					Tracking	Cost	
Action	**Program**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Lakeshore Management *cost share and technical assistance for buffers, native vegetation, coir logs, coarse woody habitat, shoreline BMPS, aquatic vegetation, county boat landings*		2 Miles Restored	Focus Lakes	**SWCDs, Cities, Counties, DNR, Lake Associations**	↑	↑	↑	↑	↑	✓	**WBIF** **Other**	**$1,404,500**
In-Lake Management *studies to manage in-lake phosphorus loading, lake modeling*		Complete 2 Studies	Focus Lakes	**SWCD, MPCA,** Counties, BWSR, Lake Associations			↑	↑	↑	X	**WBIF** **Other**	**$200,000**
Outreach Program *workshops and materials, give away native seeds, shoreline guides, contractors, realtors, DNR Fisheries Management Plans, help lakeshore users, understand water quality data, outreach about building on bluffs, webinars, school outreach*		One Workshop Per Year in Each County, Educational Materials	Watershed-Wide	**SWCDs, U of MN Extension,** Lake Associations, Counties, Landowners, WICOLA, DNR	↑	↑	↑	↑	↑	X	**Base, WBIF**	**$71,500**
Data Collection *use new LiDAR to measure shoreline changes, shoreline inventory and score your shore to target projects, better understanding building on bluffs, EPA Bloomwatch, mercury and wildlife study*		Data Set to Target Shoreline Management	Focus Lakes	**SWCDs, Counties,** DNR			↑	↑	↑	X	**WBIF**	**$50,000**
Shoreline Ordinance *continue to implement ordinances and increase funding; update ordinances as needed, see detailed comparison between counties in Table 6.1.*		County and City Ordinances	Watershed-Wide	**Counties**, **Cities**, SWCDs, Townships, Associations	↑	↑	↑	↑	↑	X	**Base, WBIF**	**$625,000**

What			Where	Who	When					Tracking	Cost	
Action	Program	10-year Outcome	Priority Areas	Lead/ Supporting Entities	2024-2025	2026-2027	2028-2029	2030-2031	2032-2033	Output for goal tracking	Primary Funding	Total 10-year Cost
Shoreline Incentives *explore development of a shoreland management incentives program and implement it*		Incentives Plan	Focus Lakes	**SWCDs, Counties,** DNR, Lake Associations		▲	▲	▲	▲	X	**WBIF**	**$10,000**
AIS Prevention & Management *Monitoring, inspection, treatment of AIS, outreach*		Implement AIS Plans	Watershed-Wide	**Counties, SWCDs, DNR, 1854 Treaty Authority, Tribes, VNP**	▲	▲	▲	▲	▲	X	**Base, Other**	**$1,600,000**
											Total BASE and WBIF Funding	**$2,361,000**
											Total OTHER Funding	**$1,694,500**

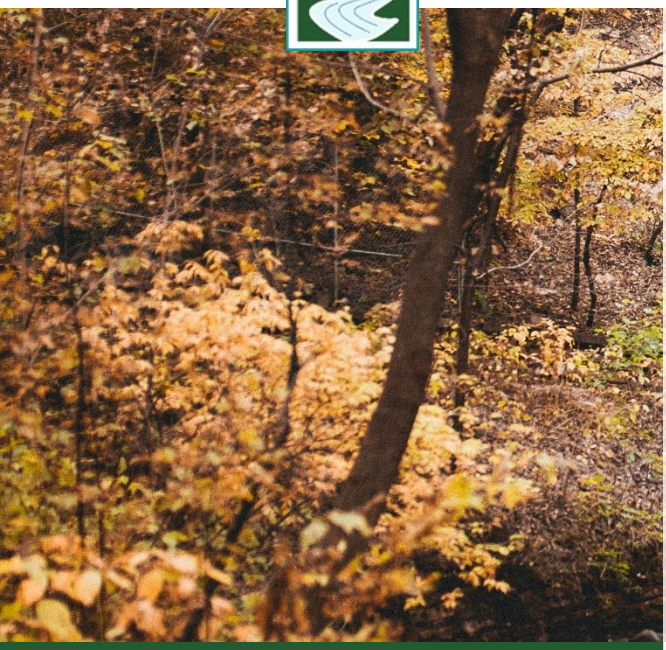
**SSTS inventory and replacement of failing septic systems are included under the drinking water protection goal (page 77) but will also contribute to protecting and improving lake water quality for recreation.*

Aquatic Invasive Species

Each county in Minnesota receives state funding for aquatic invasive species (AIS) prevention and management. These programs will continue throughout the 10-year implementation period of this plan. AIS can impact water quality in RH-V lakes and streams through plant population changes which can fuel algal growth, decrease fish growth, and alter nutrient cycling. See Appendix F for more about the affect of invasive species on water quality. Links to each county's AIS prevention and management program can be found below.

- Lake County: https://www.lakecountyais.org/
- Cook County: https://www.co.cook.mn.us/government/departments/soil_and_water/invasive_species.php
- St. Louis County: https://www.nslswcd.org/programs-services/waters/aquatic-invasive-species-ais/

GOAL: RIPARIAN ENHANCEMENT



Short-term Goal

Enhance **1 mile** of riparian land.

Implement **100 acres** of agricultural Best Management Practices (BMPs; ~10% of agricultural lands).

Desired Future Condition

Meet the TMDL goals published in the 2022 TMDL report for the Blackduck and Ash Rivers.

Issues Addressed

- Eroding Streambanks
- Altered Hydrology

Plan Outcomes

- Decrease bank erosion
- Improved wildlife habitats
- Improved stream water quality

Lenses

Improving riparian areas can cool streams and mitigate the impacts of rising temperatures.

Maintaining streams are important for recreation.

Protecting habitats for cold water fish.

Similar to the shorelines discussed in the riparian enhancement goal, human activity has also reduced bank stability along streams through development and the removal of native species. Unstable streambanks cause sediment loading into streams, which can impact wildlife habitat and increase phosphorous loads in streams.

Priority streams for the RH-V were identified in Section 4. Priority Lakes and Streams. These streams are good locations for riparian enhancement. Stream crossing stabilization, upland agricultural BMPs such as pasture management and cover crops, riparian easements, and riparian planting are also actions that can help meet this goal.

Figure 5.4. identifies the Ash River Subwatershed as a priority. In this subwatershed, there are areas of high erosion, particularly on the Ash and Blackduck Rivers, which are both impaired for Total Suspended Solids. The Blackduck River is also impaired for *E.coli.* Erosion rates, barriers (features such as culverts, roads, or other impediments that prevent natural waterflow, which negatively affects stream dynamics and passage), and acreage for potential BMPs are identified in Figure 5.5.

Priority Map

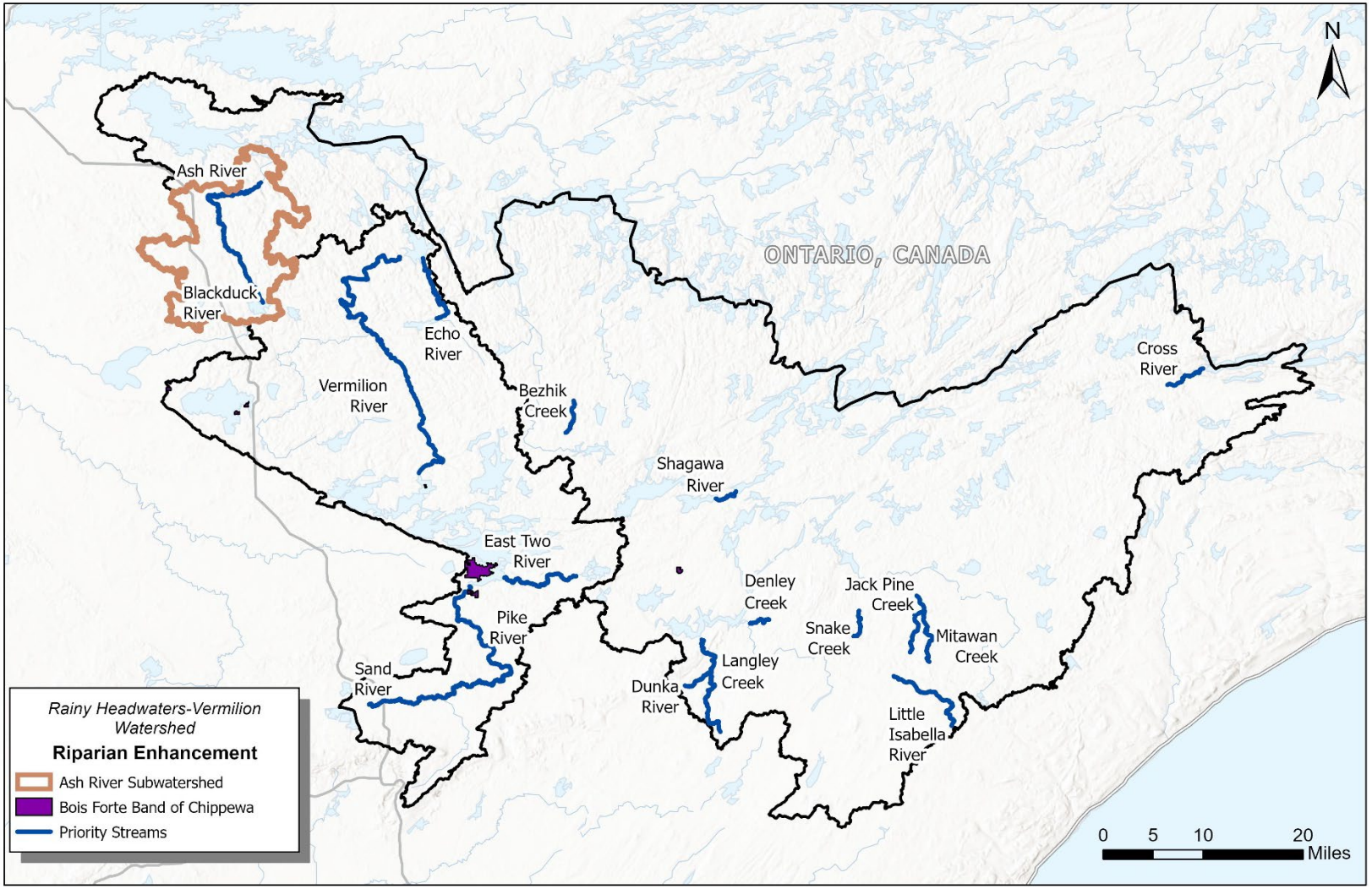


Figure 5.4. Priority areas for the riparian management goal. Priority streams were identified in Section 4. Priority Lakes and Streams. Ash River Subwatershed is highlighted, and an additional map of the Subwatershed can be found in Figure 5.5.

Priority Map 2

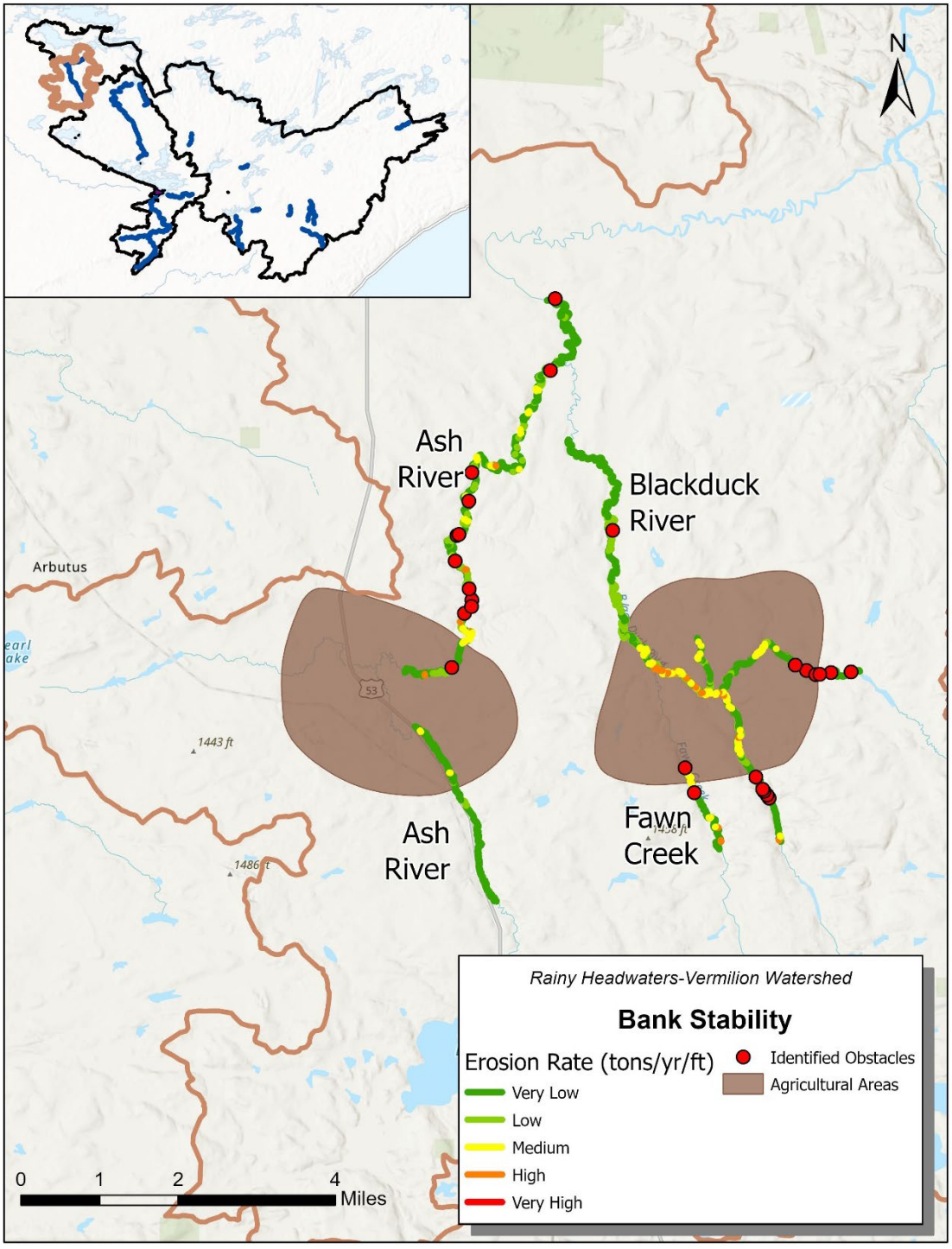


Figure 5.5. Zoom-in on the Ash River sub-watershed. Erosion rates of streams are shown, with identified obstacles (erosion rate below obstacles ranges from very low to high) shown with red dots. Additionally, pasture and cultivated crops are highlighted. Data from DNR, which conducted Bank Assessment of Nonpoint Source Consequences of Sediment (BANSCS) data in summer 2017.

Goal: Riparian Enhancement

Enhance **1 mile** of riparian land. Implement **100 acres** of agricultural BMPs.

Primary Metric: Miles enhanced, Acres of BMPs
Secondary Metrics: Phosphorus and sediment reductions

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Riparian Enhancement *cost share and technical assistance to stabilize gullies, natural vegetation, in-channel stabilization, tree planting including considerations for Emerald Ash Borer (EAB), riparian shading, bank and ditch stabilization, grade control*		1 Mile of Enhancement	Focus Streams, Ash River Subwatershed, Exceptional Use Streams, Priority Streams	**SWCDs, Counties, NRCS,** DNR, U of MN Extension		✓	✓	✓	✓	✓	**Base, WBIF**	$100,000
Cattle Fencing *cost share and technical assistance to fence cattle away from stream and provide alternate water source, cattle crossing*		Included in 1 Mile Total Above	Focus Streams, Ash River Subwatershed	**SWCDs, Counties, NRCS,** U of MN Extension	✓	✓	✓	✓	✓	✓	**WBIF** **Other**	$100,000 $100,000
Data Collection *ground-truthing and survey of areas for stream and ditch stabilization and channel restoration in the Blackduck River*		Ground-truth 10 Miles in the Watershed (~ 1 mile/year)	Focus Streams, Ash River Subwatershed	**SWCDs, Counties,** DNR, MPCA			✓	✓	✓	X	**WBIF**	$50,000
Agricultural Land Management Practices *cost share and technical assistance for cover crops, pasture management, perennial agriculture, filter strips, and tillage management*		100 Acres of Agricultural BMPs	Ash River Subwatershed	**SWCDs, NRCS, U of MN Extension**		✓	✓	✓	✓	✓	**WBIF**	$30,000
Soil Loss & Buffer Law (103F) *perennial vegetative buffers of up to 50 feet along lakes, rivers, and streams and buffers of 16.5 feet along public ditches*		100% Compliance	Watershed-wide	**Counties, SWCDs,** BWSR	✓	✓	✓	✓	✓	X	**Base, WBIF**	$625,000

Total BASE and WBIF Funding	$905,000
Total OTHER Funding	$100,000

GOAL: FOREST HEALTH

Short-term Goal

Manage **4,200 acres** (~420 acres/year) of privately owned forested land in the watershed (5% progress towards LSP goal).

Complete **37 plans** for private forested lands (~4 plans/year).

Desired Future Condition

Meet the LSP goal of 83,777 managed acres of forested land, as well as complete 367 plans for forested lands.

Issues Addressed

- Forest Health

Plan Outcomes

- Improve forest health and resilience to invasive specifies and climate variability
- Improve water quality
- Protect carbon storage in trees
- Protect and improve habitat for wildlife

Lenses

Improving resiliency to climate variability.

Protecting forests for recreation.

Increase participation in forest protection activities including easements.

Protecting forests which are a

Forested land is an important economical and recreational resource in the RH-V. Additionally, forests provide habitat and store carbon. Because of this, creating resiliency and maintaining healthy forests in the face of challenges, such as wildfires, invasive species, and climate change is essential. Preparing forest stewardship plans, conservation planning, forest stand improvements, climate assisted migration, and invasive species management will all help in maintaining forest health. Urban and community forests also help manage urban heat, stream water temperature, stormwater management, and maintain ecological services in low-income neighborhoods.

In Figure 5.6, priority areas from the LSP are identified for forest management and plans. These have been identified based on forest type and land type. Only parcels over 20 acres in size qualify for a Forest Stewardship Plan. The LGUs in the watershed will explore options for managing forest parcels smaller than 20 acres.

Wildfires can pose a threat to people, water quality, and infrastructures. However, controlled fire is an important tool for maintaining a healthy forest. Lack of thinning and long term fire suppression practices will lead to potentially more destructive wildfires. Additionally, fire dependent species, such as the Jack Pine populate the RH-V. Forest management that includes practices such as prescribed burning help reduce the risks of major wildfires to maintain this important cultural resource.

Priority Map

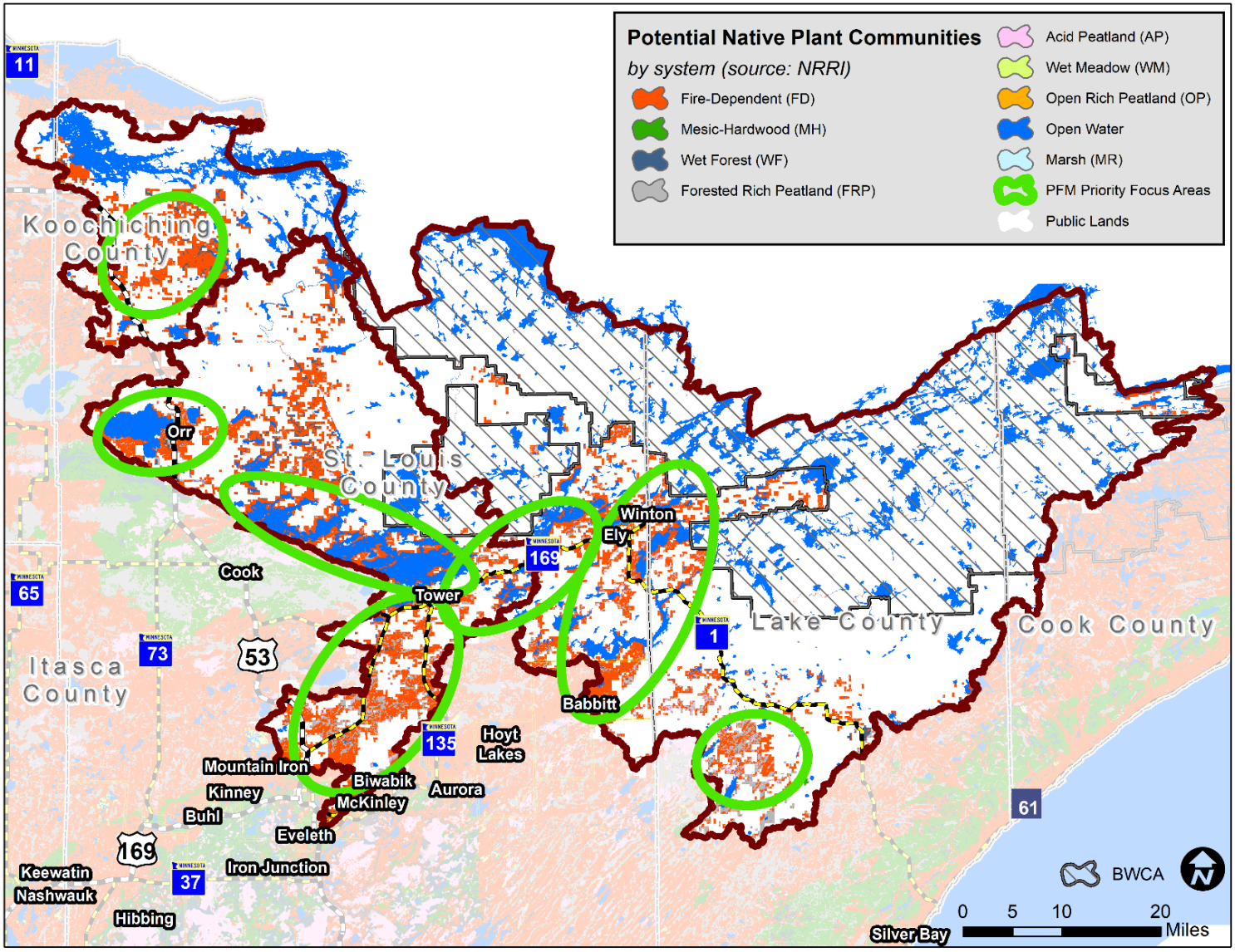


Figure 5.6. Priority areas for the forest health goal. More details of this prioritization can be found in the Rainy Headwaters-Vermilion LSP.

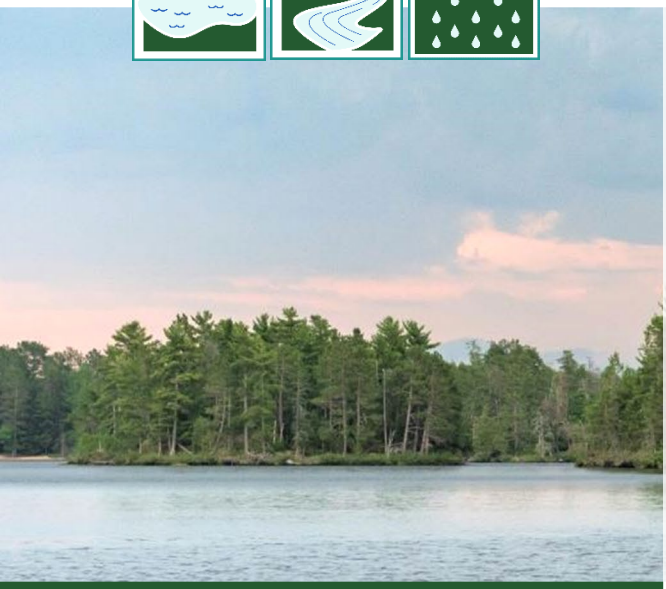
Goal: Forest Health

Primary Metric: Acres managed

Manage **4,200 acres** of private forested land in the watershed. Complete **37 plans** for private forested lands.

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Forest Health Management *cost share and technical assistance for practices such as Forest Stand Improvement, tree planting, Climate Assisted Migration, prescribed burning, erosion control, forest pest response, EAB risk planning and mitigation, post wildfire response, urban and community forests*		4,200 Acres Managed	LSP Identified Areas, (Figure 5.6) Pelican Lake Subwatershed	**NRCS, USFS, DNR, SWCDs, 1854 Treaty Authority**							**WBIF** **Other**	$1,099,400 $1,099,400
Noxious Weeds & Terrestrial Invasive Species Management *coordinate invasive species management activities on private land, Noxious Weed Program, evaluate benefits of herbicide application vs the risk to water quality*		Maintain Current Programs	Watershed-Wide	**SWCDs, DNR, Counties,** NRCS							**WBIF** **Other**	$50,000 $50,000
Forest Stewardship Plans *management plans on private parcels over 20 acres in size*		37 Plans Written	LSP Identified Areas, Figure 5.6.	**SWCDs. DNR, Consultants,** BWSR							**WBIF**	$64,800
Small Parcel Management *explore options for developing a local program for parcels smaller than 20 acres*		Develop program, manage 200 acres	Watershed-Wide	**SWCDs. DNR, Consultants,** Counties, BWSR							**WBIF**	$50,000
Outreach Program *networking, local foresters, workshops, tourism, promote Fire Adapted Communities and the Firewise program, BWSR HELP program*		One Outreach Event Per Year in each region	Watershed-Wide	**SWCDs, DNR**, NRCS, BWSR, Counties							**Base, WBIF**	$71,500
											Total BASE and WBIF Funding	$1,335,700
											Total OTHER Funding	$1,149,400

GOAL: LAND PROTECTION



Short-term Goal

Protect **1,570 acres** (~157 acres/year) of privately owned land in the watershed (10% progress towards LSP goal).

Desired Future Condition

Protect lands through SFIA and easements to achieve the Landscape Stewardship Plan (LSP) goal of 15,706 acres.

Issues Addressed

- Wild Rice
- Sufficient Protection
- Land Use Change

Plan Outcomes

- Protect and improve habitat for fish and wildlife
- Improve forest health and resilience to invasive species

Lenses

Land protection will improve resilience to changing temperature and precipitation and store carbon.

Land protection can help protect resources such as cold water fish and wild rice.

Protecting land is an important way to improve both groundwater and surface water quality. The RH-V already has a high percentage of lands that are protected, with most subwatersheds above the 75% threshold that is commonly used as a goal in other Minnesota watershed plans. However, increased protection will continue to help reach many water quality goals. By prioritizing lands that will provide the greatest return on investment for these goals, this plan can protect the most important lands in the watershed to sustain its resources. These lands are highlighted in Figure 5.7.

Many property owners do not control the mineral rights under their property, with most mineral rights controlled by the State of Minnesota. This may disqualify the lands from easements, but SFIA is possible. In addition, Lake County has a policy of no net gain in public lands, so any potential public land acquisitions in Lake County would need to be considered by the county board.

Increased development poses large risks in the watershed. Houston Engineering (2020a) modeled phosphorus loading rates to lakes based on development scenarios within the watershed. The model predicts that Ely-area lakes are particularly vulnerable and will experience an increase in phosphorus loading between 54% and 274%.

Priority Map

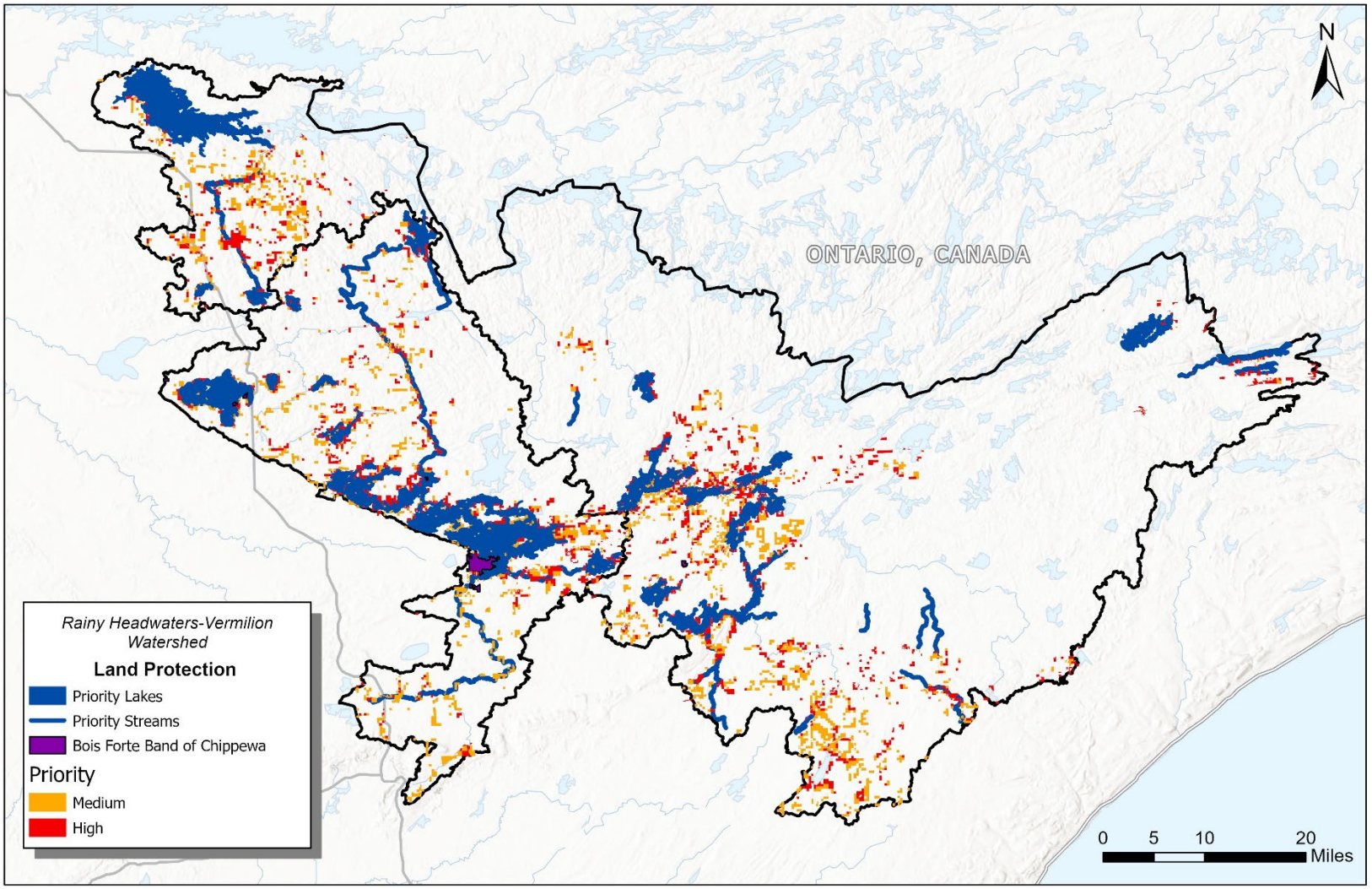


Figure 5.7. Priority areas for the land protection goal. High and medium Riparian, Adjacency, and Quality (RAQ) scores are shown. These locations are priorities for land protection. More details of this prioritization can be found in the Rainy Headwaters-Vermilion LSP.

Goal: Land Protection

Protect **1,570 acres** in the watershed with SFIA or easements.

Primary Metric: Acres protected

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Forest and Land Protection *SFIA, conservation easements, Reinvest in Minnesota (RIM) easements on priority private uplands, riparian, and shorelands, wild rice protection*		1,570 Acres Protected	LSP Identified areas, Figure 5.7.	**SWCDs,** USFS, BWSR, DNR, Minnesota Land Trust, Tribes, The Nature Conservancy							**Other**	$1,522,100
Outreach Program *networking, local foresters, workshops, outreach materials and tools*		One Workshop Per Year in Each County	Watershed-Wide	**SWCDs,** Counties, UMN Extension							**Base, WBIF**	$71,500
Data Collection *identification of sensitive shoreland communities for protection (i.e. white cedar, tamarack, black spruce, wild rice)*		Complete Datasets	LSP Identified areas, Figure 5.7.	**SWCDs,** DNR, Counties, Tribes							**WBIF**	$50,000
											Total BASE and WBIF Funding	$121,500
											Total OTHER Funding	$1,522,100

Stacked Benefits (not tracked in implementation)

- The 1,274,900 acres of forest in the watershed stores 140 million tons of carbon
- The 1,073,800 acres of public forest in the watershed stores 117 million tons of carbon
- Adding 1,570 acres of protected forest protects an additional 171,600 tons of carbon

GOAL: CONNECTIVITY ENHANCMENT

Short-term Goal

10 barriers removed (1 barrier/year).

Desired Future Condition

Replace all priority barriers in the watershed to increase connectivity, maintain fish passage, and improve climate resiliency throughout the watershed. Inventory all connectivity barriers in the watershed.

Issues Addressed

- Connectivity Barriers
- Altered Hydrology

Plan Outcomes

- Improved wildlife habitat
- Improved fish habitat
- Improved water quality

Lenses

Making streams more resilient to increasingly common high rainfall events.

Maintaining streams for recreational activities.

Protecting habitats for cold water fish.

Culverts that are improperly sized or placed can block fish passage in streams. This limits connectivity and fish movement, impacting habitat and fish populations. While a culvert inventory has begun in the Rainy River-Headwaters Subwatershed, inventory in the Vermilion Watershed has not occurred. Completing the Rainy River-Headwaters inventory and beginning a Vermilion inventory is important to identify priority culverts to replace for increased connectivity. Figure 5.8 shows priority culverts identified for Brook Trout, while Figure 5.9 displays assessed culverts in the Ash River Subwatershed.

Additionally, roads can be obstacles for free wildlife passage. Identifying areas that potentially block wildlife passage is important to maintain habitat. Figure 5.8 shows road construction plans in the watershed for the next five years.

Increased connectivity can also help improve water quality as well as improve floodplain connectivity through correct culvert sizing and the addition of floodplain culverts. Sediment reduction from stormwater management along roads can help meet TMDLs for TSS.

Priority Map

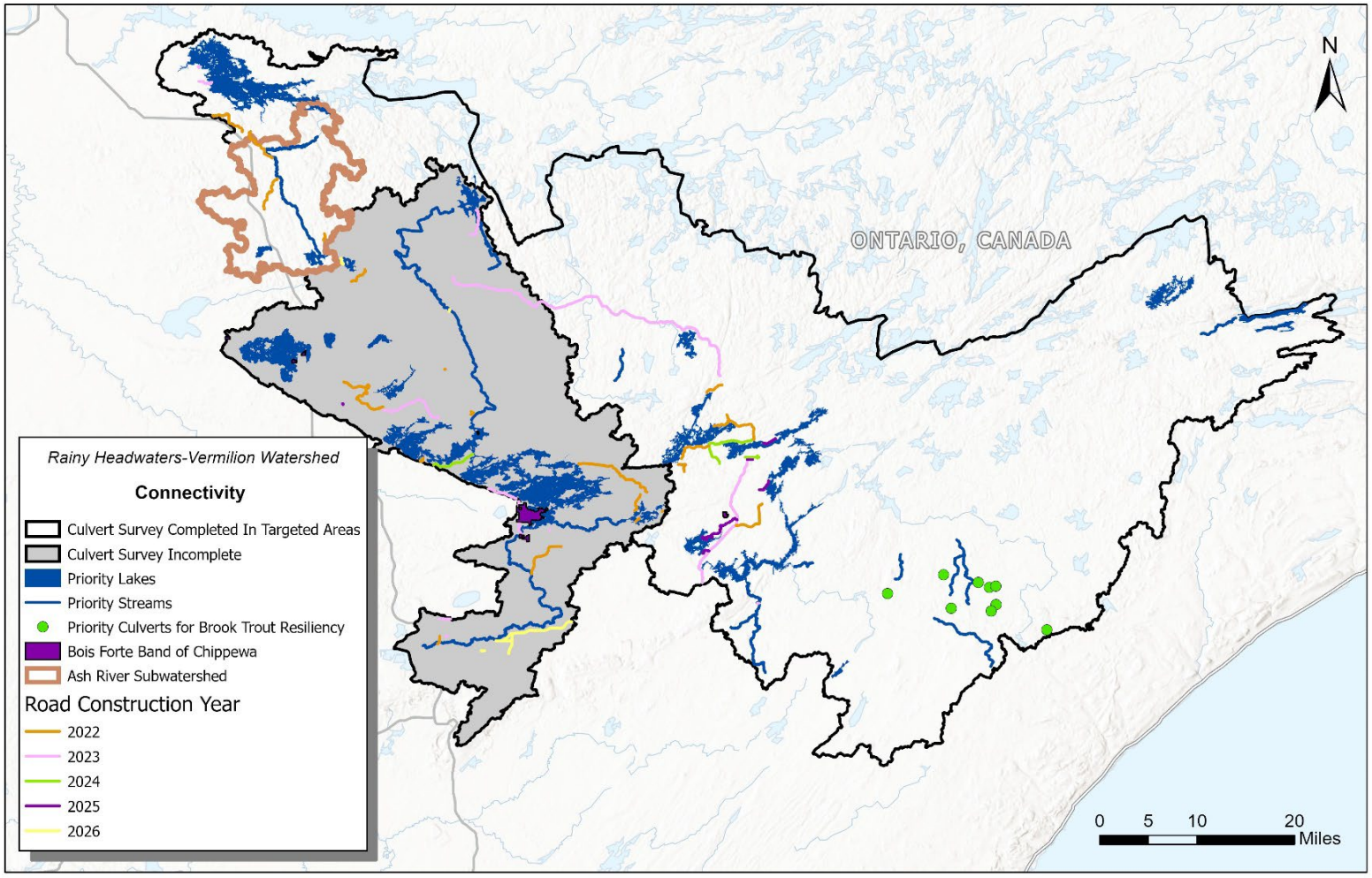


Figure 5.8. Priority areas for the connectivity enhancement goal. Shaded areas show where the culvert survey is incomplete in the Vermilion Watershed. Non-shaded areas have completed culvert survey in priority areas, but not in the entire watershed. Priority culverts were identified by DNR fisheries. Road project maps show year that road construction projects begin in St. Louis County. Efforts were targeted in certain areas based on a specific need (i.e. aquatic life or impairments) and other areas could still use survey data from the DNR's Culvert Inventory.

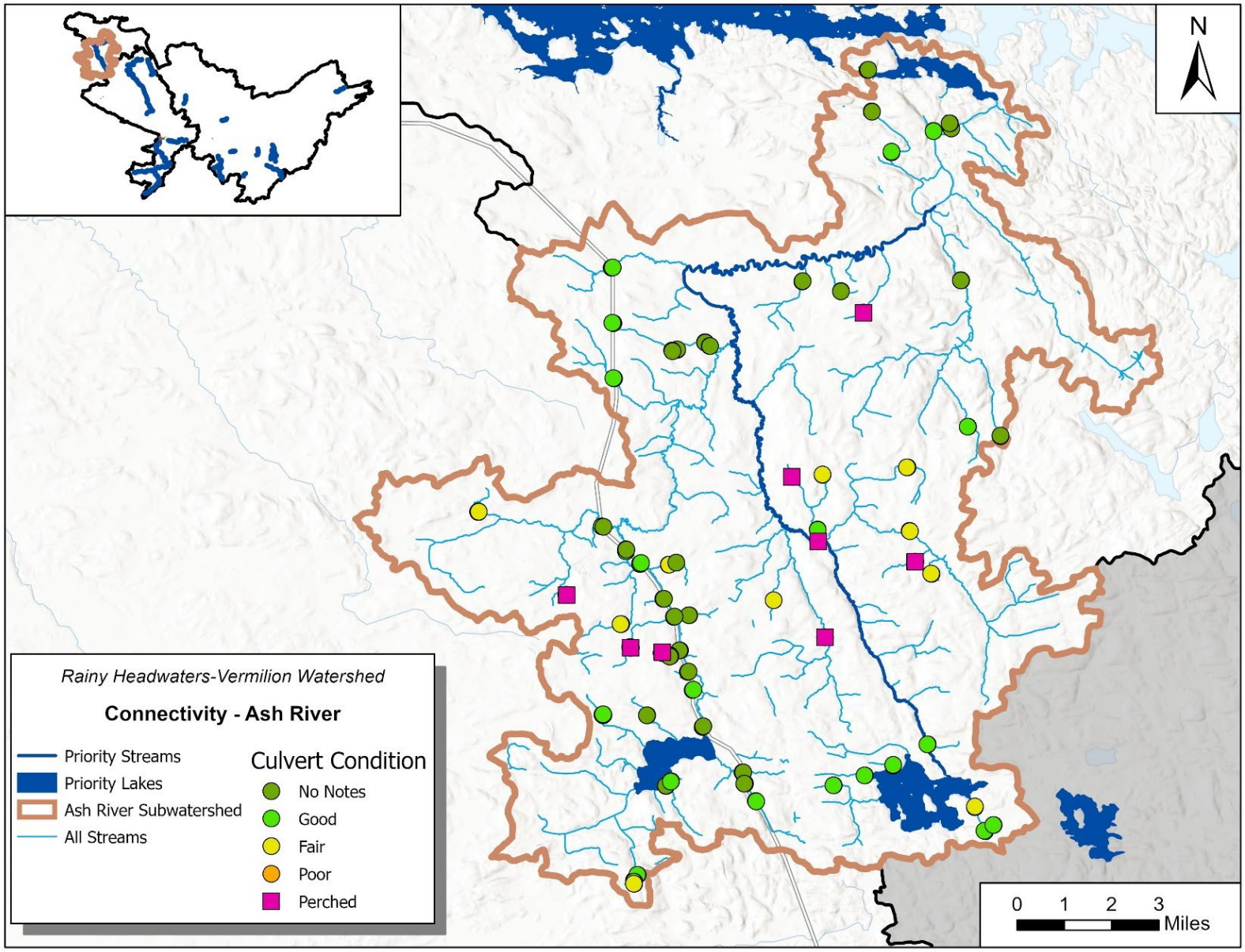


Figure 5.9. Map of the Ash River Subwatershed with all assessed culverts (DNR culvert inventory data). A recent survey of this watershed found that of the 66 culverts surveyed, 74% were potential fish barriers, 65% were undersized, 26% had visible erosion, 18% were improperly aligned, and 18% were perched (MPCA, 2019).

Goal: Connectivity Enhancement

10 barriers removed.

Primary Metric: Barriers removed
Secondary Metrics: Sediment and phosphorus reduction

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Enhance Stream Connectivity *Coordinate with the DNR and county on culvert repair and replacement to reduce sediment transport (see riparian enhancement), maintain fish passage, compensate for climate change impacts by building climate resiliency, stream crossing stabilization, wetland connectivity, trail crossing improvements, bridges*		Remove 10 Barriers	Priority Streams, Ash River Subwatershed, top DNR Culverts	**Counties, DNR,** MNDOT, SWCDs, Townships		▲	▲	▲	▲	✓	WBIF Other	$500,000 $5,000,000
Water Quality Monitoring *TSS, transparency, fish, water quality, macroinvertebrates in streams, modeling*		Water Quality Inventory	Priority Streams, Ash River Subwatershed	**SWCDs, MPCA,** DNR		▲	▲	▲	▲	X	Other	$52,500
Culverts and Crossings Inventory *complete and update culvert inventory for entire watershed, use new LiDAR data, GIS data anylsis, modeling*		Complete or Update Inventory for Entire Watershed	Vermilion River Watershed and incomplete areas of Rainy Headwaters	**DNR, SWCDs,** Counties			▲	▲	▲	X	WBIF	$50,000
Coordinate with Road Authorities *coordination and training with road authorities to incorporate water quality and habitat connectivity into road projects.*		Biennial Training	Watershed-Wide	**DNR, SWCDs, Counties, Townships**		▲		▲		X	WBIF Other	$5,000
											Total BASE and WBIF Funding	$550,000
											Total OTHER Funding	$5,052,500

GOAL: DRINKING WATER PROTECTION

Short-term Goal

Seal **50 unused wells** (5 wells/year).

Replace **50** failing **septic systems** (5 systems/year).

Desired Future Condition

Replace failing septic systems and unused wells to protect drinking water sources in the watershed. Create wellhead protection plans with landowners.

Issues Addressed

- Pollutants
- Individual Waste Treatment
- Stormwater Runoff
- Groundwater Quality and Sustainability

Plan Outcomes

- Safe drinking water
- Reduce contaminants from drinking water sources
- Replace infrastructure

Lenses

Protecting drinking water in low-income areas.

Education and outreach will build social capacity for best groundwater protection.

Drinking water is one of the most important resources in any watershed. A majority of RH-V residents utilize private wells or obtain their drinking water from groundwater sources. Additionally, many residents rely on septic systems, which may be aging or failing. By sealing unused wells and replacing failing septic systems, a significant risk for drinking water contamination can be mitigated. Education, incentives, and wellhead protection plans will be important to reach private landowners in the watershed.

The RH-V also has eighteen lakes that are used as non-community surface drinking water sources, shown in Figure 5.10. These lakes require extra consideration. Individual maps of source water protection areas for these lakes can be found in Appendix E.

Private landowners also utilize and drink from other lakes, outside of those outlined in Figure 5.10. In addition, many of the groundwater drinking water sources are under the direct influence of surface water. Because of this, protecting both surface and groundwater sources of water are important for maintaining drinking waters quality.

Priority Map

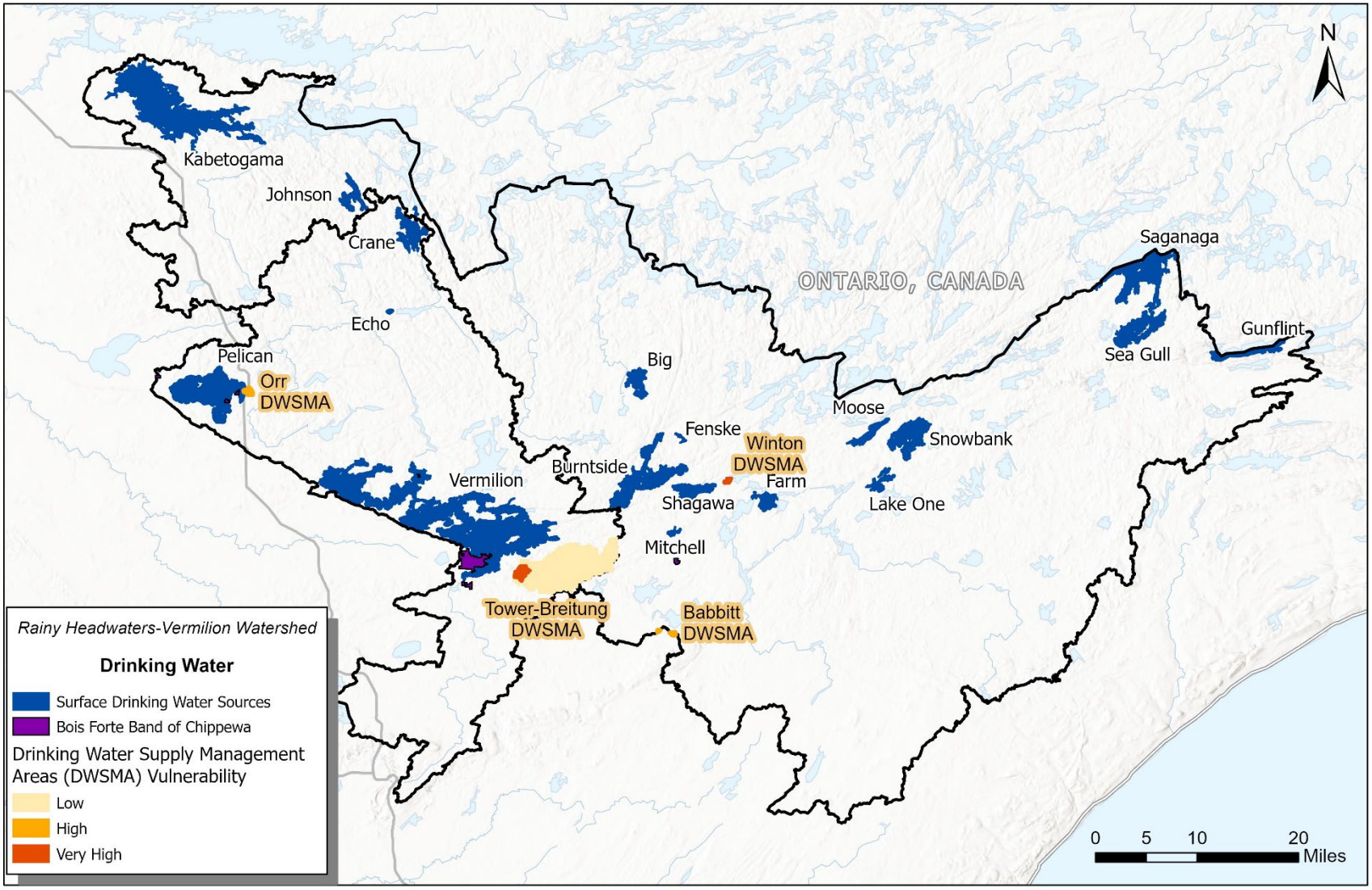


Figure 5.10. Priority areas for the drinking water protection goal. Lakes shown on map are lakes that are non-community drinking water sources such as resorts (MDH). Drinking water supply management areas (DWSMA) and their vulnerability are also coded. See Appendix E for source water protection areas for surface drinking water sources. MDH is currently developing source water protection areas for lakes as drinking water sources as well as source water intake protection plans for sources.

Goal: Drinking Water Protection

Seal **50 unused wells**. Replace **50 failing septic systems**.

Primary Metric: Wells sealed and septic systems replaced
Secondary Metrics: Nitrogen and phosphorous reductions

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Seal Abandoned Wells *through existing cost share programs and outreach to increase participation*		Seal 50 Unused Wells	Watershed-Wide	**MDH, SWCDs, Counties,** NRCS							**WBIF**	**$60,000**
Subsurface Sewage Treatment Systems (SSTS)* *cost share and low interest loans to replace noncomplying systems, grey water systems, training, RV dumping stations* **SSTS improvements also improve water quality for recreation.*		Replace 50 Septic Systems	Watershed-Wide, Focus Lakes and Streams	**Counties, SWCDs, MDH, MPCA**							**WBIF** **Other**	**$250,000** **$1,000,000**
Sanitary Sewer Projects *Complete planned Sanitary Sewer projects.*		Complete Ash River and Island View projects	Ash River, Island View	**St. Louis Co, Koochiching Co, Joint Powers Board, VNP,** MPCA, DNR							**Other**	**NA**
SSTS Ordinance *enforce SSTS ordinances for greater compliance*		Implement Cook, Lake, & St. Louis County Ordinances	Watershed-Wide	**Counties, MPCA,** SWCDs							**Base, WBIF**	**$625,000**
Emergency Response Plans *develop and implement Emergency Response Plans for hazardous spills along highway, pipeline, and railroad corridors, fire suppressants, wildlife impacts*		Implement Cook, Lake, & St. Louis County Emergency Response Plans	DWSMAs and Source Water Protection Areas	**Counties, MDH, MPCA**							**Base, WBIF**	**$625,000**

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Gravel Pit BMPs and Reclamation Plans *implement BMPs at gravel pits and develop reclamation plans, requirements for new gravel pits*		2 BMPs, 2 Reclamation Plans	Gravel Pits	**Counties, MPCA, SWCDs, MDH**		▲	▲	▲	▲	X	**Base, WBIF**	**$25,000**
Screen Private Wells for Contaminants *testing clinics for nitrate, bacteria, arsenic, manganese, chloride, conductivity; trend analysis on wells in focus areas (3 tests in 10 years)*		One Well Testing Clinic Per Year Per County, Testing Kits from SWCDs	Watershed-Wide	**SWCDs, MDH**	▲	▲	▲	▲	▲	X	**Base, WBIF**	**$71,500**
Drinking Water Protection Plans *complete for all communities*		MDH Protection Plans	Communities	**MDH, Cities**	▲	▲	▲			X	**Other**	**NA**
Outreach Program *septic system maintenance, wellhead protection, household hazardous waste, outreach on lake drinking water safety, septic system maintenance in relation to wells*		One Workshop Per Year in Each County	Watershed-Wide	**Counties, SWCDs, MDH**	▲	▲	▲	▲	▲	X	**Base, WBIF**	**$71,500**
Data Collection *lakewide SSTS inventories, gather data about groundwater/surface water connection at gravel pits, complete geologic atlas for each county, survey how many properties use lake water for drinking water*		Complete for Each Focus Lake	Focus Lakes	**Counties, MPCA, SWCDs**	▲	▲	▲	▲	▲	X	**WBIF**	**$50,000**
											Total BASE and WBIF Funding	**$1,778,000**
											Total OTHER Funding	**$1,000,000**

GOAL: STORMWATER MANAGEMENT

Short-term Goal

Complete **4 stormwater plans and 4 stormwater projects** in Ely, Tower, Orr, and Winton or other developed areas.

Desired Future Condition

Implement stormwater projects in each city.

Issues Addressed

- Stormwater Runoff
- Pollutants

Plan Outcomes

- Stormwater Management
- Stormwater Plants
- Groundwater Recharge

Lenses

Stormwater management will help deal with increased precipitation events.

Protect cold water fish habitat.

Cities, resorts, golf courses, and other unorganized communities create impervious surfaces which increase runoff into waterways. Stormwater management and BMPs could benefit the four cities in the RH-V shown in Figure 5.11: Orr, Tower, Ely, and Winton. Each has impervious surfaces such as pavement and roofs, which increase the amount of stormwater runoff into nearby priority streams and lakes. Urban runoff often carries pollutants such as fertilizers and chloride from roads. Stormwater runoff also increases water temperatures. It is important to actively manage stormwater runoff with road authorities to reduce the volume of runoff entering waterbodies from both public and private roads.

Stormwater management can also impact drinking water. By reducing runoff, BMPs can instead increase recharge and infiltration, building groundwater reserves.

Reducing stormwater runoff can be achieved through many different practices, including stormwater treatment ponds, rain gardens, and permeable pavement.

Priority Map

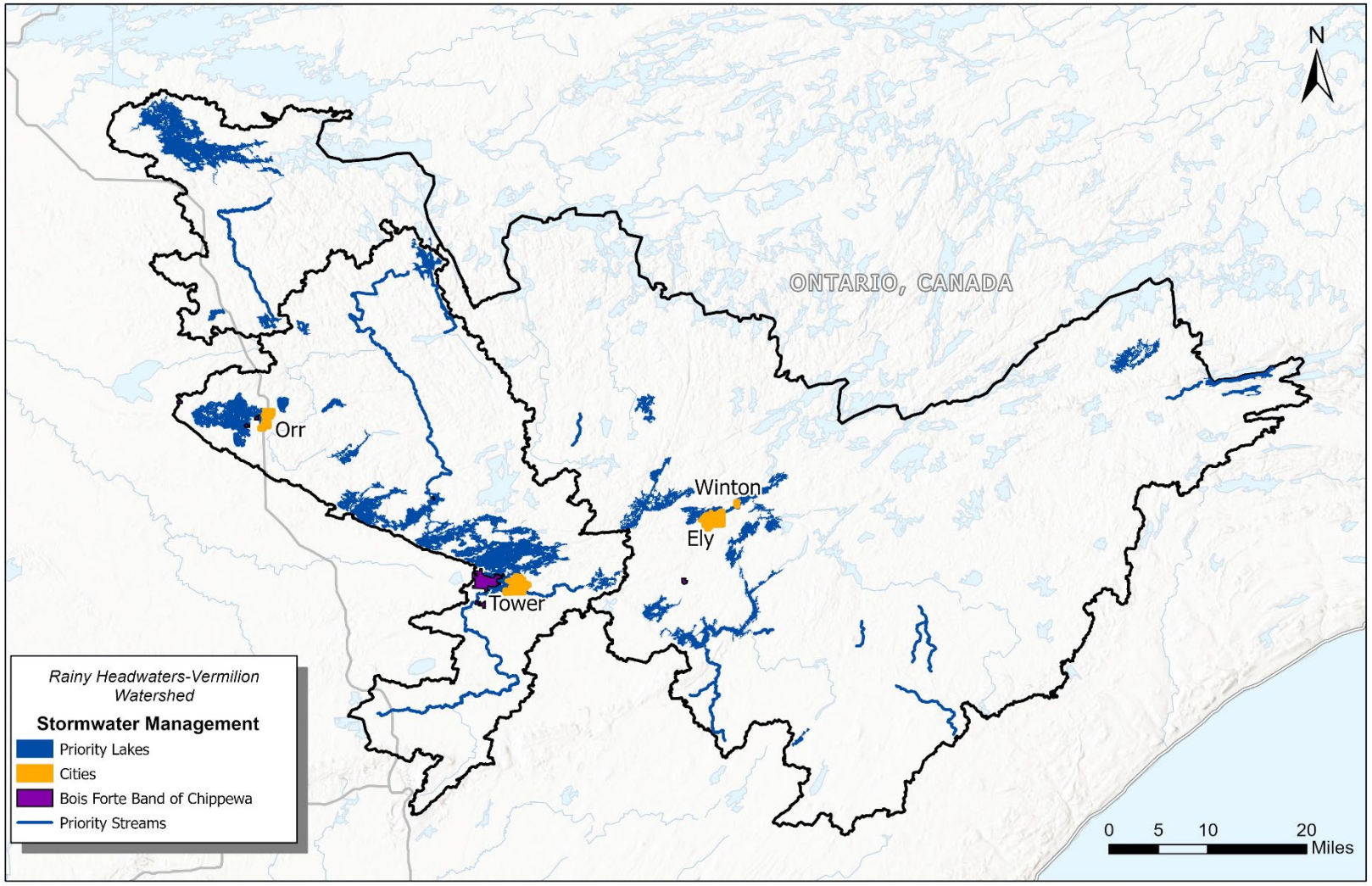


Figure 5.11. Priority areas for the stormwater management goal. Shown in orange are the locations of cities in the RH-V that could benefit from stormwater management.

Goal: Stormwater Management

Complete **4 stormwater plans** and **4 stormwater projects**.

Primary Metric: Stormwater plans and projects
Secondary Metrics: Sediment and phosphorus reductions

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Stormwater Plans *Stormwater management plans for cities and other concentrated development such as resorts, campgrounds, and golf courses, Minimal Impact Design Standards (MIDS)*		4 Stormwater Plans	Orr, Tower, Ely, Winton, Resorts, Golf Courses, Campgrounds	**Cities, Counties, SWCDs, Tribes,** Townships		▲	▲	▲	▲	✓	**WBIF**	**$400,000**
Stormwater Projects *Implement projects identified in the stormwater plans: stormwater treatment facilities, stormwater retention basins, biofiltration, road projects that incorporate storage, street sweeping in cities*		4 Projects	Orr, Tower, Ely, Winton, Resorts, Golf Courses	**Cities, Counties, SWCDs, Golf Courses, Resorts**				▲	▲	✓	**WBIF** **Other**	**$800,000**
Near-shore Stormwater BMPs *cost share and technical assistance for green infrastructure on lakeshore (rain gardens, rain barrels, etc.)*		10 projects (~1/year)	Cities, Priority Lakes and Streams	**Cities, Counties, SWCDs**	▲	▲	▲	▲	▲	✓	**Base,** **WBIF**	**$500,000**
Incorporate Stormwater Management into Road Projects *coordinate with road authorities to ensure proper stormwater treatment for new road improvements, stormwater green infrastructure*		10 Projects (~1/year)	County Road Projects, Figure 5.8.	**Cities, Counties, Townships, MNDOT,** SWCDs, DNR	▲	▲	▲	▲	▲	✓	**WBIF** **Other**	**$204,000** **$996,000**
Chloride Management *road salt/dust suppressant ordinances, smart salting equipment, salt storage facility BMPs, demonstrations for equipment operators, explore alternatives for water softeners, etc.*		Support cities and townships with plans and cost share for salt use	Cities	**Cities, Counties,** SWCDs		▲	▲	▲	▲	✗	**WBIF**	**$200,000**

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Outreach Program *storm drain stenciling, rain barrels, smart salting, workshops, beach monitoring, etc.*		One Workshop Per Year	Watershed-Wide, Cities	**Cities, SWCDs, Counties,** U of M Extension						X	**Base, WBIF**	**$71,500**
											Total BASE and WBIF Funding	**$2,175,500**
											Total OTHER Funding	**$996,000**

GOAL: WATER RETENTION

Short-term Goal

0% change in the current average watershed discharge while building resiliency to future precipitation trends.

Desired Future Condition

Unlike many regions in Minnesota, the RH-V has not experienced significant water storage loss over the past century. Because of this, no net loss of water storage is achievable while building resilience to future precipitation trends. In addition, we would like to achieve a better understanding by the public on what water storage means.

Issues Addressed

- Altered Hydrology

Plan Outcomes

- Maintain current level of water storage
- Store increasing future precipitation

Lenses

Store excess precipitation from large precipitation events.

Human alteration to the landscape has caused an increase in runoff in the past few centuries in Northern Minnesota. These activities include draining wetlands, channelizing streams, and removing forests. Increased water retention on the landscape can help reduce peak flows, decreasing bank erosion, which in turn helps improve habitat and water quality.

Storing water in aquifers and the soil can also help mitigate potential droughts and reduce the impacts of floods. With irregular precipitation patterns expected to occur in the coming decades, water storage will become increasingly important.

In the RH-V, the impacts of human alteration have been minimal compared to other regions of Minnesota. Because of this, setting a goal to maintain current levels of water storage will help mitigate potential risks. Areas with the highest risk of increased runoff from future development are highlighted in Figure 5.12. Changes in the Dunka River are explained in an MPCA study found here:
https://www.pca.state.mn.us/sites/default/files/wq-ws10-08.pdf

Priority Map

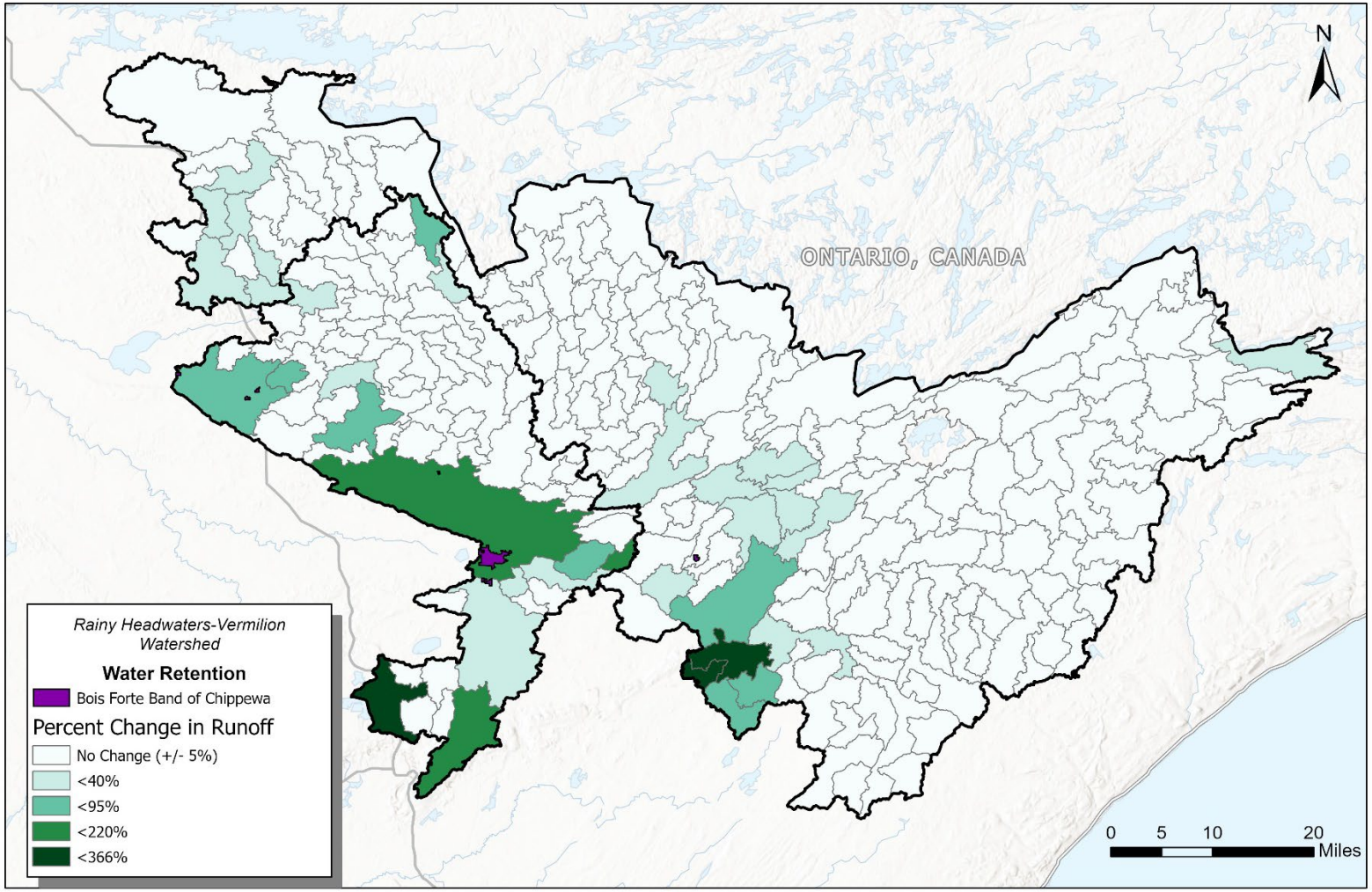


Figure 5.12. Priority areas for the water retention goal. Results are from Hydrological Simulation Program-Fortran (HSPF) models in the WRAPS. Highlighted areas have the highest increases in runoff under specific development scenarios: a 10% increase watershed wide in development, development within 500 feet of key identified lakes on private lands, and further development of all cities in the watershed (HEI, 2020a; HEI, 2020b).

Goal: Water Retention

Primary Metric: Acre-feet of water storage

0% change in the current average watershed discharge while building resiliency to future precipitation trends.

What			Where	Who	When					Tracking	Cost	
Action	**Pro-gram**	**10-year Outcome**	**Priority Areas**	**Lead/** Supporting Entities	**2024-2025**	**2026-2027**	**2028-2029**	**2030-2031**	**2032-2033**	**Output for goal tracking**	**Primary Funding**	**Total 10-year Cost**
Wetland Conservation Act (WCA)		Implement Program	Wetlands	**BWSR, SWCDs, Counties, Municipalities,** DNR							**Base, WBIF**	**$625,000**
Actions From Other Goals *stormwater management, lakeshore enhancement, riparian enhancement, land protection, connectivity enhancement*		Build Resiliency Through Acre-Feet of Water Retention	See other goals	See other goals							**WBIF** **Other**	**See other goals**
Data Collection *consider working with the DNR to complete an ELOHA study for streams in this watershed (Ecological Limits of Hydrologic Alteration)*		Discussion with DNR to Gage Feasibility of Completing ELOHA Study	Focus streams	**DNR, SWCDs, Counties**							**WBIF** **Other**	**$0**
Outreach Program *education on wetlands, wetland banking, what water storage means*		One Outreach Event Per Year Per County	Watershed-Wide	**SWCDs, Counties**							**Base, WBIF**	**$71,500**
											Total BASE and WBIF Funding	**$696,500**
											Total OTHER Funding	**Level 3 can be used for anything above as well**

Section 6. Plan Programs

Section 6.
Implementation Programs

The Implementation Program section of the plan describes the programs that will be used for implementing this plan. There are four main categories: Planned Landscape Management ("Manage It"), Constructed Environmental Enhancements ("Fix It"), Protected Lands Maintenance ("Keep It"), and Data Collection and Outreach ("Know It"). These programs balance differently in different watersheds. For this watershed, the "Keep It" program is lighter because of the higher percentage of public land. The "Manage It" and "Fix It" have more of the focus (Figure 6.1). All programs are balanced on "Know It", which is collecting and distributing information.

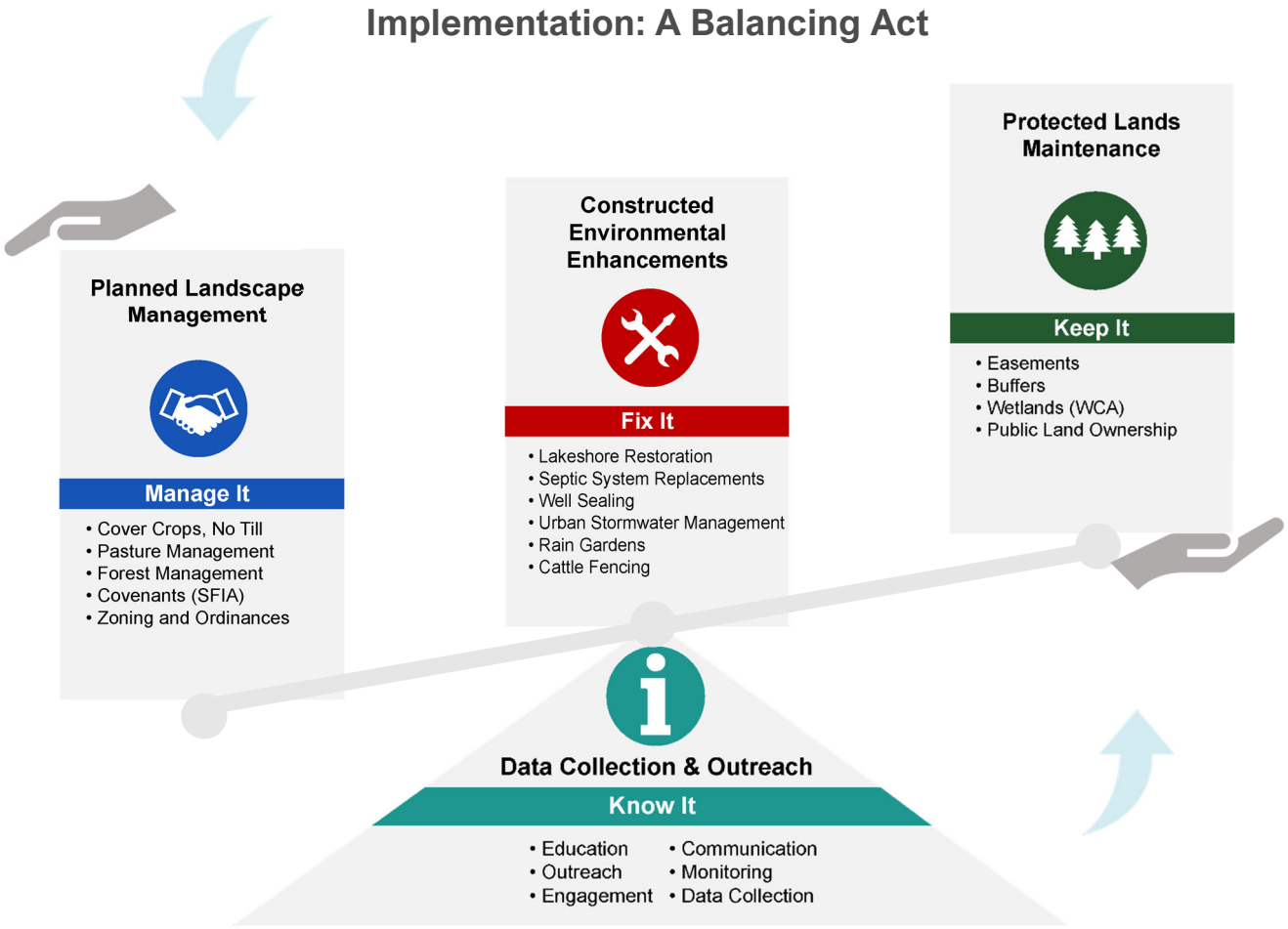


Figure 6.1. Implementation Programs for the RH-V Watershed.

In Section 3. Priority Issues, several lenses were described. These lenses are extra considerations that have helped shape the prioritization, goal setting, and implementation process throughout the plan. These lenses provide the plan writers with different perspectives to consider when planning and adopting measures to improve water quality in the RH-V.

Equity, Inclusion, and Diversity

Water is a requirement for life. It belongs to everyone and therefore everyone is responsible for its stewardship. As outlined earlier in the plan, everyone in the RH-V Watershed is impacted by water quality. Some, however, are impacted more than others. Creating equity takes work. As outlined in Section 5. Measurable Goals, there are specific ways that many of the goals in this plan attempt to address equity issues.

Environmental Justice and Health Equity

Environmental justice is the effort to ensure that the effects of pollution and climate change do not disproportionally impact one group more than others. All people, regardless of race, socioeconomic status, gender, or any other characterization, have equal amounts of environmental protection and are included in decisions and actions that may impact their environment. Equity is particularly important today because of the increasing issues arising from climate variability. It is not enough to simply implement actions across the entire watershed. Instead, this requires actions that specifically address equity and seek out action in areas where environmental justice is needed.

Figure 6.2 highlights areas to focus on environmental justice in the RH-V. These highlighted areas are locations within the watershed where a quarter of more of the population have incomes 185% below the poverty line. These areas are important to target for implementation programs, as they require greater focus to ensure equity in the watershed. The MPCA and MDH have additional information available at the links below.
https://www.pca.state.mn.us/about-mpca/environmental-justice
https://www.health.state.mn.us/communities/equity

Pelican Lake
Credit: Kari Hedin

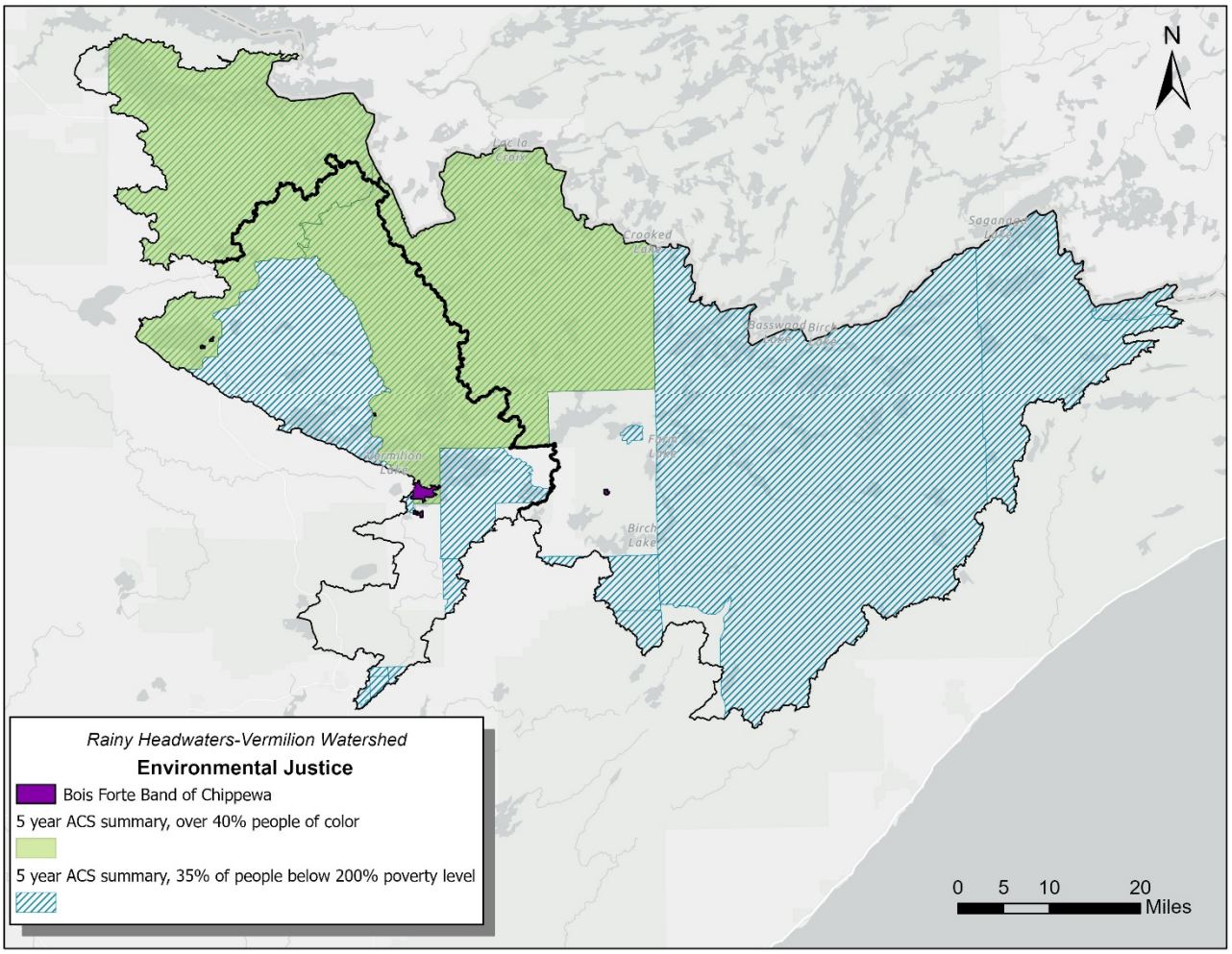


Figure 6.2. Environmental Justice Areas of Concern in RH-V. Highlighted areas in green are census tracts where over 40% of the population are people of color and in hatched blue are census tracts where 35% of the population are 200% below poverty level.

Climate Variability and Resilience

Resilience is the ability to experience change but mitigate the impacts of that change. In this plan, the writers viewed issues and goals through the lens of climate variability expected to impact the RH-V in the coming decades. To do this, the plan writers build in actions that build both social and ecological resilience. Social resilience can come from organization and regulation. For example, Lake Associations or Lake Improvement Districts build social framework to implement lake projects. Ecological resilience includes forest protection, water retention, and BMPs. For example, protecting forests at the watershed and landscape scale provides resilience to increasing precipitation trends. This plan includes actions and programs that build both social and ecological resilience.

Cultural Resources

Cultural resources are very important in the RH-V Watershed. The Watershed contains waters, species, and people that are unlike any others throughout the State, including the large presence of tribal groups. Because of this, throughout the plan goals have identified specific methods for preserving important cultural resources. For implementation, cultural resources as well as the context of the 1854 Treaty of La Pointe, will be directly considered for actions. By doing this, the resources will remain protected in the Watershed.

Social Capacity

Plan implementation requires careful planning, coordination, and a desire to integrate programs that can positively impact the watershed. In this plan, dozens of important actions are laid out that will require citizens from across the watershed to come together and coordinate. From LGU staff to individuals on the ground, capacity is essential for implementation.

Throughout this plan section, opportunities to include issue lenses are highlighted in these call out boxes.

Credit: Kyle Gill

Manage It

"Manage It" programs involve continual management of the landscape. In the RH-V, this means forest lands, agricultural and pasture lands, as well as zoning and ordinances. Examples of this are shoreline ordinances, Ag BMPS, forest health management, and SSTS Ordinances.

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

Management of the following programs, plans, and ordinances deals with the relationship between people and land. This will be done by planning partners with a focus on equitable management, building resilience for climate variability, building social capacity, and protecting cultural resources.

Cost-Share and Incentive Programs

Cost-share programs are those in which the cost of implementing or installing a project is shared with the landowner. Incentive programs provide payment to encourage landowners to implement practices. Implementing agricultural land best management practices, forest management, or SSTS replacement are applicable examples that meet plan goals.

Private Forest Management

Forest Stewardship Plans

Forest owners can manage their lands through Woodland Stewardship Plans through coordination with the DNR's Forest Stewardship Program. Forest goals can be developed in coordination with foresters to create wildlife habitat, increase natural beauty, enhance environmental benefits, or harvest timber. Use of voluntary site level guidelines is encouraged. Plans will be prepared by a DNR-approved plan writer, which may include SWCD staff and private foresters. Additionally, the LGUs will explore options for managing forest parcels smaller than 20 acres.

Forest 2C Designation

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

Cost-share for woodland owners

The DNR operates a cost-share program that provides financial assistance to owners of private woodlands for several forest management practices. Typical projects are between 3 to 20 acres and can help achieve many goals, such as maintain habitat, promote biodiversity, or prevent wildfires.

US Department of Agriculture Programs

The Farm Service Agency (FSA) of the United States Department of Agriculture (USDA) oversees several voluntary conservation programs. These programs include the Conservation Reserve Program, Conservation Reserve Enhancement Program, Emergency Conservation Program, Emergency Forest Restoration Program, Farmable Wetlands Program, Grassland Reserve Program, and the Source Water Protection Program.

Regulatory Programs

Watershed partners will explore ways to integrate this plan into other county comprehensive land use plans. Counties and cities will meet once a year to discuss ordinances and counties will notify each other of any proposed ordinance amendments. Activities will be tracked by the individual counties. An effort will be made to compile the information watershed-wide.

The plan's intention is not to place undue regulatory burden on Tribal government or Band members, but to enter into cooperative working relationships and agreements so that plan goals can be achieved on Tribal lands and waters only if they serve Tribal goals as well and meet Tribal regulations.

Historically, regulatory action has furthered disparities. Planning partners reviewing or enforcing ordinances will utilize the MPCA environmental justice regions in mind (Figure 6.2) to work towards improving equity through regulatory programs.

Aggregate Management

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

- Regulations: Minnesota Statutes 298.75, 394.25

Bluffland Protection

Blufflands are managed under several state programs, including programs for shoreland management and Wild and Scenic Rivers. Minimum structure setbacks from bluffs and related development standards apply to land in shoreland for this watershed. The Statewide shoreland program includes land within 1,000 feet of any public water body, 300 feet of any public water river or stream, or the landward extent of their floodplains. St. Louis County administers bluffland standards in their zoning ordinance.

Construction Soil Erosion

Temporary construction erosion control is the practice of preventing or reducing the movement of sediment from a site during construction. All construction projects should follow construction

BMPs, but projects disturbing one acre or more of land will require a National Pollutant Discharge Elimination System (NPDES) Permit and Stormwater Pollution Prevention Permit from the MPCA. The individual counties do not have ordinances for construction soil erosion. Regulations: Minnesota Rules, chapter 7090

Groundwater Use

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

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

Hazard Management

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

- Regulations: Minnesota Statute, chapter 12

Invasive Species

Aquatic and terrestrial invasive species can cause ecological and economic damage to water resources, forests, and human health. The DNR has regulatory authority over aquatic plants and animals as well as terrestrial animals. For aquatic species, permits are required by the public for transporting lake water and invasive species and for treating invasive species. St. Louis, Cook, and Lake Counties administer AIS programs. Counties partner with SWCDs for AIS programs.

- Regulations: Minnesota Statute 84D

Noxious Weed Law

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

- Regulations: Minnesota Statutes 18.75-18.91

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

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

- Regulations: Minnesota Statute 103E

Public Waters

Public waters include lakes, watercourses, and wetlands over which DNR has regulatory jurisdiction. Minnesota Statute 103G.005, Subd. 15 defines a public water. The DNR maintains the Public Waters Inventory, which is a map that can viewed to see if a water is public. If a watercourse is a public water, no work may be done on it without a permit.

- Regulations: Minnesota Statute 103G

Shoreland Management

Minnesota has shoreland management rules that are administered by the DNR. LGUs are required to have land use controls that protect shorelands along lakes and rivers, and they can adopt stricter ordinances than the state's requirements, if desired. All counties in the RH-V have shoreland ordinances (Table 6.1). The city of Ely has zoning districts that apply within 1,000 feet of Shagawa and within 300 feet of Miners Lake. The city of Tower has a zoning ordinance that follows the same guidelines in Table 6.1 as St. Louis County. DNR published an Innovative Shoreland Standards Showcase website that may be helpful to local governments as they implement this plan: https://www.dnr.state.mn.us/waters/watermgmt_section/shoreland/innovative-standards.html.

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

Table 6.1. Comparison of Shoreline Ordinances in St. Louis, Cook, and Lake counties.

	General Development	Recreational Development	Natural Environment
Definition (DNR)	Generally large, deep lakes with high levels and mixes of existing development. These lakes often are extensively used for recreation and are heavily developed around the shore.	Generally medium-sized lakes characterized by moderate levels of recreational use and existing development. Development consists mainly of seasonal and year-round residences and recreationally oriented commercial uses.	Generally small, shallow lakes. They often have adjacent lands with substantial constraints for development such as wetlands and unsuitable soils. These lakes usually do not have much existing development or recreational use.
Minimum Water Frontage and Lot Width	*Cook:* 150 feet *Lake:* 200 feet *St. Louis:* 100 feet	*Cook:* 150 feet *Lake:* 200 feet *St. Louis:* 150 feet	*Cook:* 250 feet *Lake:* 200 feet *St. Louis:* 200 feet
Minimum Lot Area (single home)	*Cook:* 1 Acre *Lake:* 1 Acre *St. Louis:* 0.5 Acres	*Cook:* 1 Acre *Lake:* 1 Acres *St. Louis:* 1 Acre	*Cook:* 2 Acres *Lake:* 1.84 Acres *St. Louis:* 2.5 Acres
Minimum Setback from Ordinary High-Water Level	*Cook:* 75 feet *Lake:* 75 feet *St. Louis:* 75 feet	*Cook:* 100 feet *Lake:* 100 feet *St. Louis:* 100 feet	*Cook:* 150 feet *Lake:* 150 feet *St. Louis:* 150 feet

Minimum Lot Sizes and Dwelling Density

Minimum lot sizes and dwelling densities for subdividing parcels also varies per county (Figure 6.3 and Figure 6.4). Larger tracts of land (20-40 acres) could be protected by forest stewardship, while smaller lot sizes (1 acre or less) have the potential for future subdivision for development. Figure 6.4 shows that there is potential for 2nd tier development around White Iron and Shagawa Lakes.

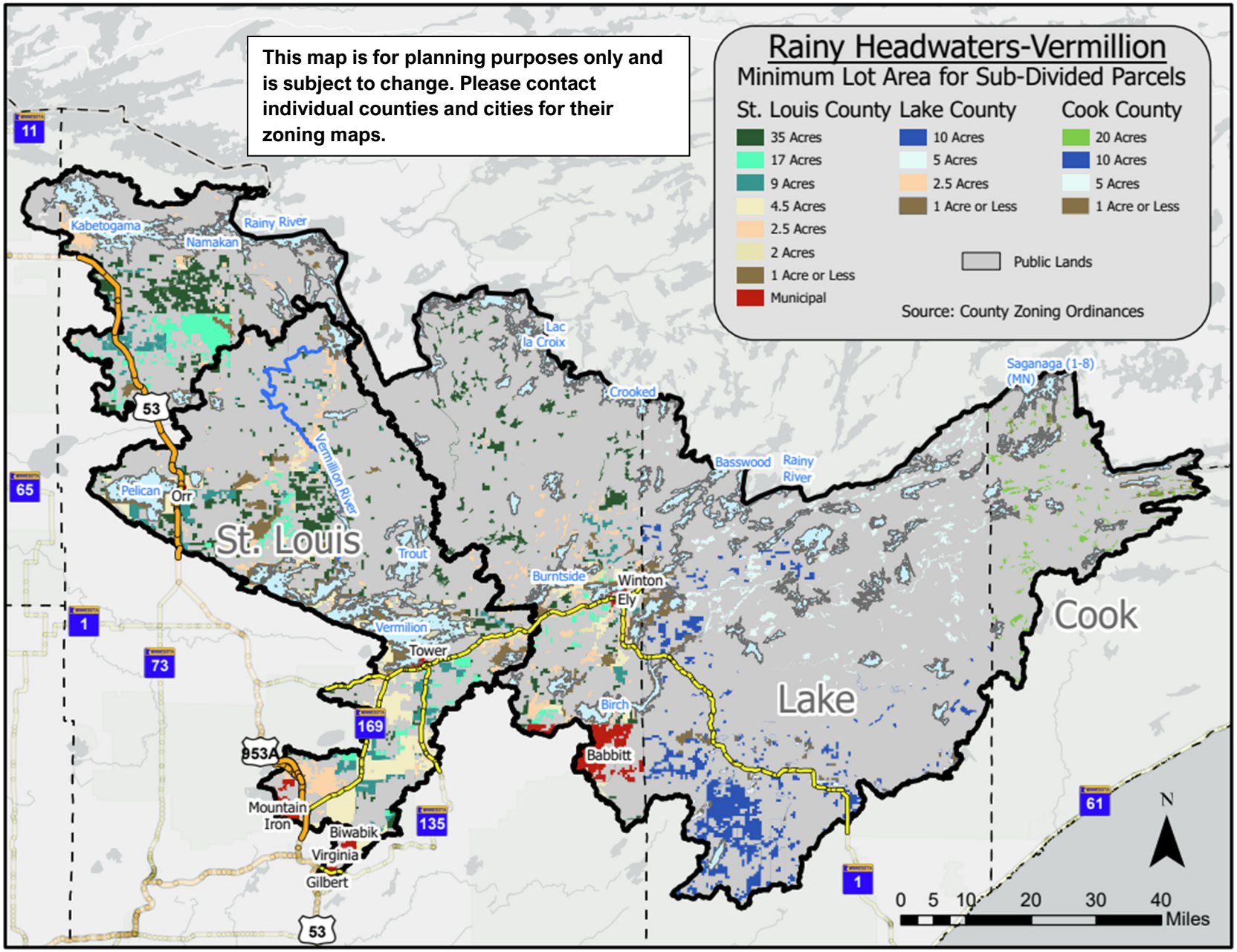


Figure 6.3. Minimum lot size comparisons between counties in the RH-V.

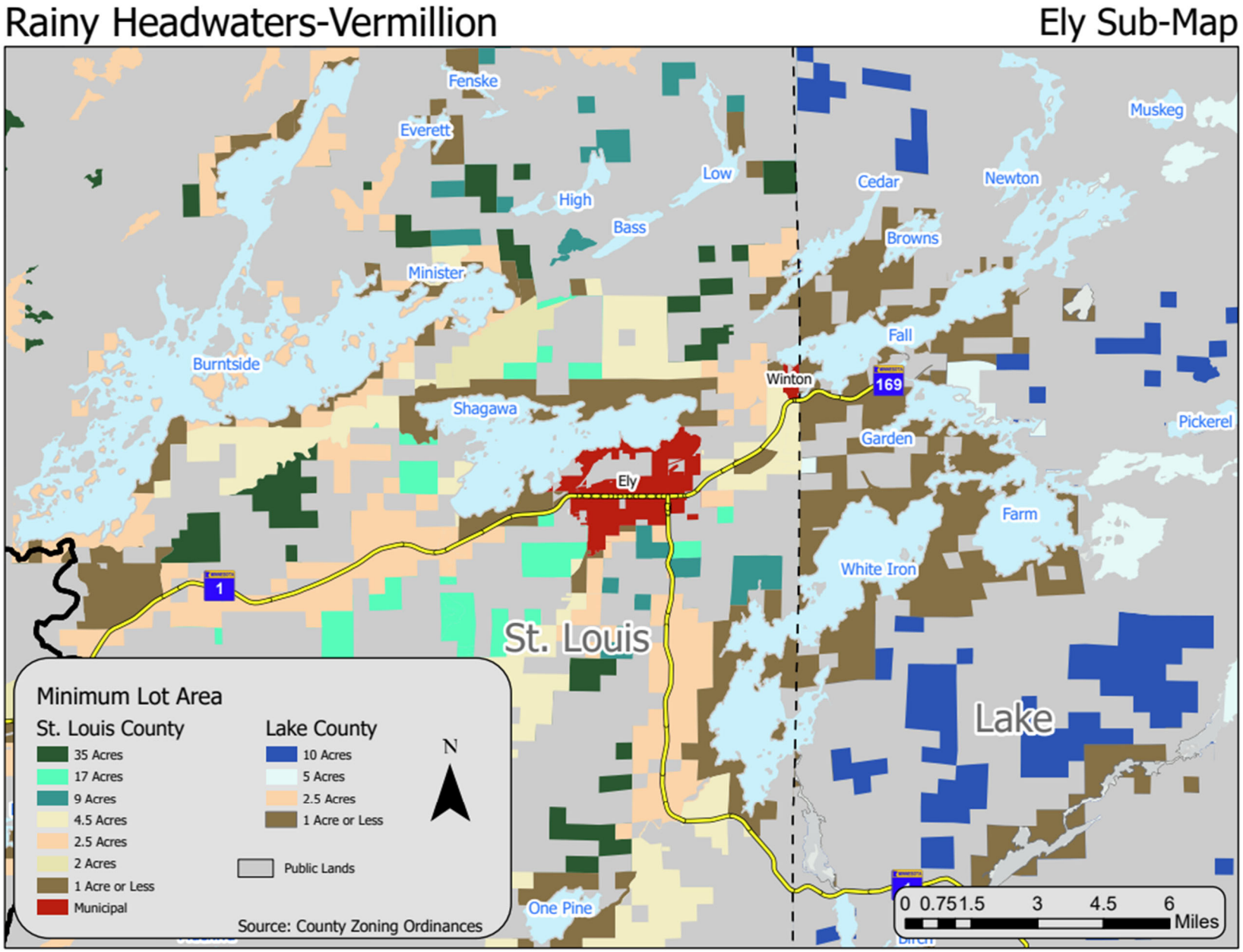


Figure 6.4. Ely minimum lot area.

Subsurface Sewage Treatment Systems

The SSTS Programs are required by Minnesota State Statute to protect public health and environment. Counties are required to have an ordinance that regulates SSTS enforced at the county level. Cities and townships may administer their own programs but must be as strict as their county's ordinance. Low-interest loans and low-income grants are available through the SWCD, or county. St. Louis, Lake, and Cook counties all have a SSTS Ordinance.

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

Waste Management

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

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

Wellhead Protection

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

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

Well Construction Standards

Well construction standards are an MDH Program.

- Regulations: Minnesota Well Code/ Minnesota Rules Chapter 4725

Wetland Conservation Act

Wetlands are protected by the Minnesota Wetland Conservation Act (WCA). Because this is considered permanent protection, WCA is included in the "Keep It" Program, page 100. Cook, Lake, and St. Louis counties administer WCA in the RH-V. Federal wetland regulations also apply where applicable. Placing wetland restoration or preservation projects in the most effective locations provides better watershed health. To determine the most effective locations, known as prioritized catchments, BWSR developed a watershed-based prioritization plan, known as a Compensation Planning Framework (CPF). The CPF is a GIS based evaluation that documents baseline conditions

and scores selected prioritization criteria to identify catchments in the watershed where wetland restoration or preservation would be most effective. Landowners looking to perform wetland restoration or preservation projects, either for developing wetland credits or for other conservation programs, can reference the CPF and the maps contained within to determine if their project is within a prioritized catchment. The CPF can be accessed at this web site https://bwsr.state.mn.us/lieu-feemitigation-program.

- Regulations: Minnesota Rules, part 8420.0105

Operations and Maintenance

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

Comprehensive Plans

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

Current Water Plans in the RH-V Watershed

- Cook County Comprehensive Local Water Management Plan (2014)
- Lake County Local Water Management Plan Update (2005)
- St. Louis County Comprehensive Water Management Plan (Amended 2015)
- City of Ely Local Water Supply Plan (2020)
- Pelican Lake Section 319 Plan (2023)

Current Comprehensive Land Use Plans in the RH-V Watershed

- Cook County Land Use Guide Plan (2016)
- Lake County Comprehensive Plan and Land Use Ordinance (2017)
- St. Louis County Comprehensive Land Use Plan (2018)
- City of Ely Land Use and Comprehensive Plan (2016)

Keep It

"Keep It" programs involve permanent landscape protection, such as Sustainable Forest Incentive Act lands (SFIA), conservation easements, aquatic management areas, and other easements.

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

Protected lands will help with climate resilience and help protect culturally important species and lands.

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. Reinvest in Minnesota (RIM) has many options for easements including habitat, forestry, and grasslands. The easements are individually tailored agreements with organizations such as BWSR, DNR, Minnesota Land Trust, or The Nature Conservancy (TNC).

Sustainable Forest Incentive Act

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

Wetlands

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

- Regulations: Minnesota Rules, part 8420.0105

Buffers

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

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

Land Acquisition

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

Fix It

"Fix It" programs are constructed environmental enhancements. These programs include long-term fixes, enhancements, and installations on the landscape such as septic system upgrades, riparian enhancement, culvert removal, and well sealings.

These programs will build necessary infrastructure to help mitigate climate variability. Additionally, they will maintain habitats for culturally important species, and create equity through targeting areas for water quality improvements through enhancements.

Low-Interest Loans

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

Cost-Share Programs

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

Capital Improvements

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

Operations and Maintenance

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

Know It

"Know It" programs are the backbone of the plan and instrumental for achieving the plan's goals. These programs include inventories, educational events, and monitoring, all of which are essential for understanding the watershed.

Data Collection and Analysis

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

Current Data Collection and Monitoring Efforts

Currently, a wide variety of monitoring is carried out on multiple government and local organization levels (Table 6.2, Figure 6.5, 6.6). Additionally, lakes and streams in the watershed are monitored by the National Lakes Inventory, 1854 Treaty Authority, tribal nations, and the United States Geological Survey.

These existing data helped determine the current conditions of surface water, groundwater, and habitat in this plan and developed a starting point for measuring goals moving forward. Because these are already established projects, they don't cost additional funds for this plan.

Table 6.2. Summary of ongoing water quality and quantity monitoring programs. RS = rivers and streams, L = lakes, W = wetlands, and GW = groundwater.

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

BWCAW
Credit: USDA Forest Service
Superior National Forest

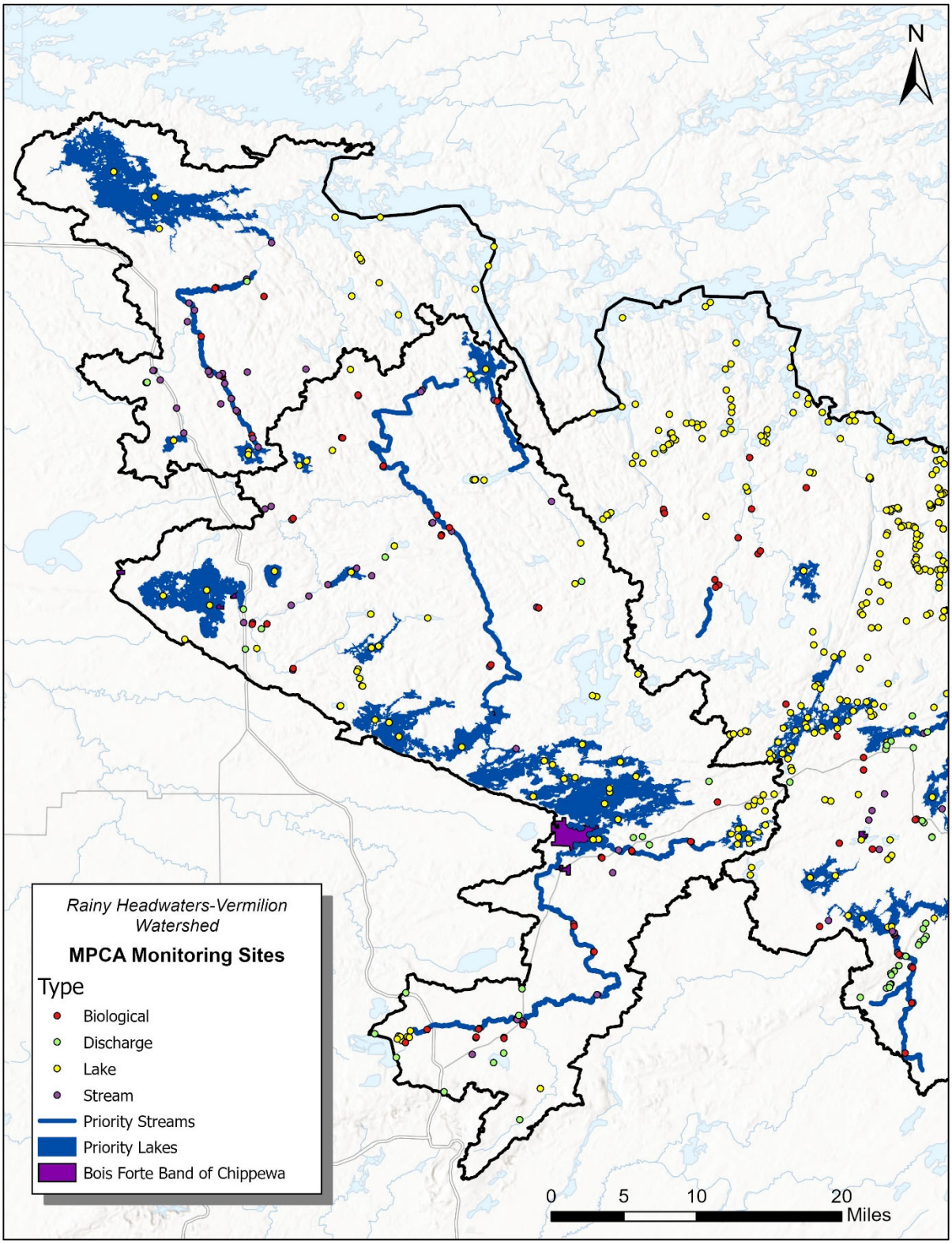


Figure 6.5. MPCA monitoring sites on the RH-V western portion that have collected water quality data in that last 10 years. Not all sites are continually monitored.

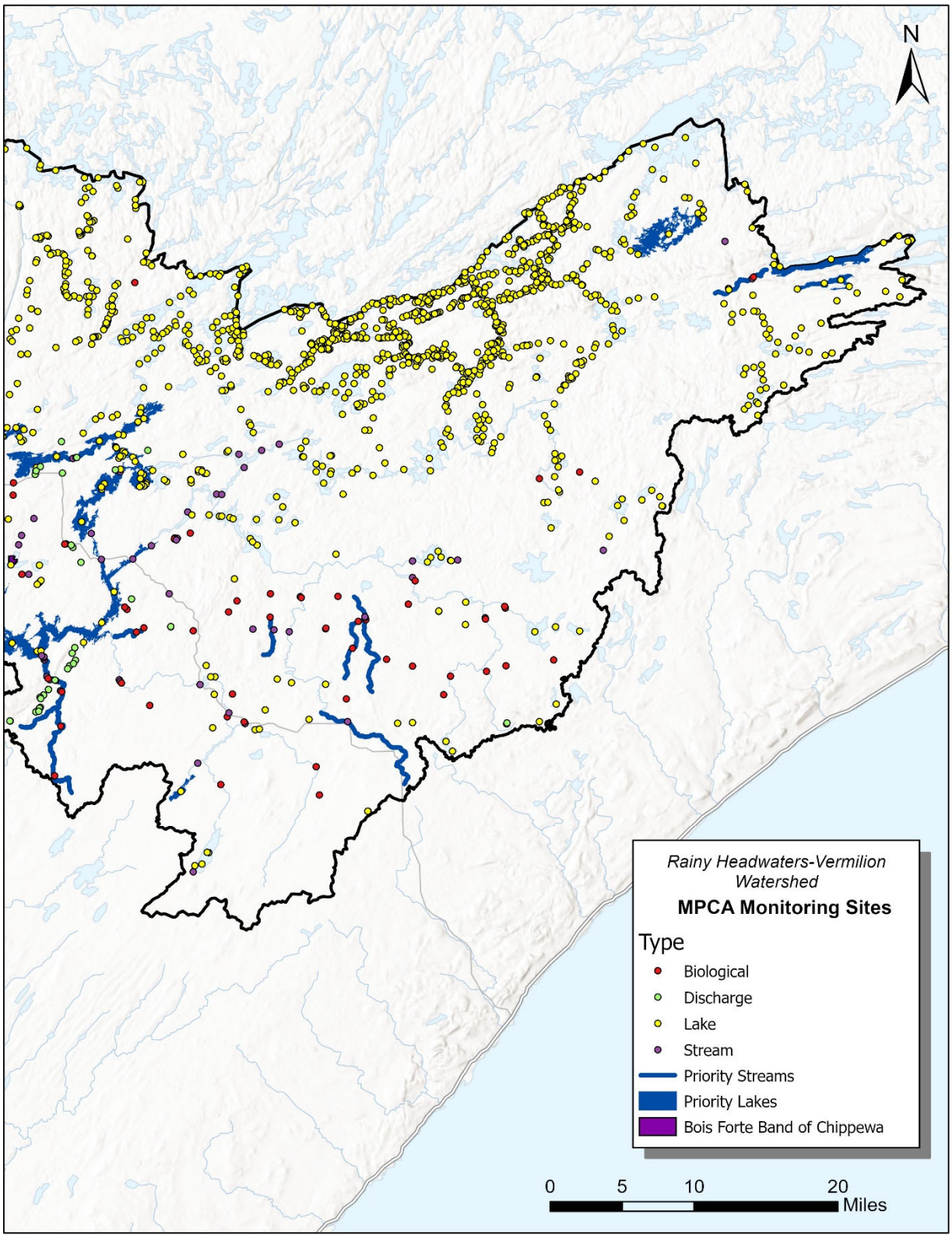


Figure 6.6. MPCA monitoring sites on the RH-V eastern portion that have collected water quality data in the last ten years. Not all sites are continually monitored.

Resource Category	Monitoring
 **Rivers**	• As part of the Intensive Watershed Approach, the MPCA conducts stream intensive stream monitoring in each major watershed on a 10-year cycle. Water chemistry and biological parameters are collected, and results are assessed against water quality standards. The RH-V is scheduled for monitoring in 2025-2026. • The MPCA Watershed Pollutant Load Monitoring Network (WPLMN) provides funding to local partners to assist with intensive water quality monitoring at long-term sites. Monitoring at these sites can be used to track progress towards reduction of phosphorus, sediment, nitrogen, and water outflow during plan implementation (Figure 8.5, 8.6). • During the MPCA's intensive monitoring cycle, the rivers in the watershed are tested for biological parameters. The DNR monitors fish and MPCA monitors macroinvertebrates (Figure 8.5, 8.6). Any biological impairments are assigned a stressor that is likely causing the reduction in diversity. Stressors include loss of habitat, loss of connectivity, sediment, dissolved oxygen, and altered hydrology. • *To track pollutant reductions from plan implementation actions (Section 5) and point source improvements, it would be beneficial to continue monitoring sites in focus streams. Monitoring could include water chemistry, littoral zone studies that assess habitat quality, and more.*
 **Lakes**	• As part of the Watershed Approach, the MPCA conducts intensive lake monitoring in each major watershed on a 10-year cycle. Water chemistry is collected and results are assessed against water quality standards. The RH-V is scheduled for monitoring in 2025-2026. • Lake Associations conduct general condition monitoring annually, including total phosphorus, chlorophyll-a, and transparency parameters (Figure 8.5, 8.6). This data is crucial for tracking trends in lake water quality. • White Iron Lake, Echo, Elephant, and Bear Head are Sentinel Lakes in RH-V. The Sentinel Lake Program is a long-term monitoring program created to detect and understand the physical, chemical and biological changes to Minnesota Lakes. https://www.dnr.state.mn.us/fisheries/slice/index.html • VNP conducts wide monitoring of lakes. • *To track pollutant reductions from plan implementation actions (Section 6) and point source improvements, it would be beneficial to continue monitoring sites in focus lakes.*
 **Groundwater**	• The DNR monitors groundwater availability and ecological impacts through the Cooperative Groundwater Monitoring network. • The MDA monitors groundwater for agricultural chemicals and fertilizer contamination. • The MDH monitors wells and drinking water supplies for public health, including bacteria, nitrates, and arsenic.
 **Forests**	• Forest habitat is described in the forthcoming RH-V LSP. Areas for enhancement and recommended species assemblages are outlined in the plan. • The USDA Forest Service manages the Superior National Forest in the watershed.
 **Wetlands**	• Wetlands in the watershed are protected by the WCA. The counties and SWCDs monitor and enforce WCA. • Federal wetland regulations apply where applicable.

Filling Data Gaps

This planning process has identified data gaps to be filled through implementation of this plan or further into the future (Table 6.3). The following inventory and study activities were developed by the Technical Advisory Committee and the associated Plan Goal (Section 5) is noted.

Table 6.3. Data gaps identified in the RH-V.

GOAL: LAKE & LAKESHORE MANAGEMENT
Use new LiDAR to measure shoreline changes, shoreline inventory and score your shore to target projects, better understanding building on bluffs, Environmental Protection Act (EPA) Bloomwatch, beach monitoring
GOAL: RIPARIAN ENHANCEMENT
Ground-truthing and survey of areas that need stream and ditch stabilization.
GOAL: LAND PROTECTION
Identification of sensitive shoreland communities for protection (i.e. white cedar, tamarack, black spruce, wild rice, black ash, fens).
GOAL: FOREST HEALTH
Gather data on wildland firefighting (especially aerial drops by planes) and groundwater pollution sensitivity.
GOAL: CONNECTIVITY ENHANCEMENT
Complete and update culvert inventory for entire watershed, use new LiDAR data.
GOAL: DRINKING WATER PROTECTION
Lakewide SSTS inventories, gather data about groundwater/surface water connection at gravel pits, complete geologic atlas for each county, survey how many properties use lake water for drinking water.
GOAL: STORMWATER MANAGEMENT
When completing stormwater plans, gather data about storm sewer networks and outlets.
GOAL: WATER RETENTION
Consider working with the DNR to complete an Ecological Limits of Hydrologic Alteration (ELOHA) study for streams in this watershed (Ecological Limits of Hydrologic Alteration).

Outreach and Project Development

Public participation and engagement are essential for successfully implementing this plan. The implementation of actions in this plan is voluntary and requires willing landowner participation. Landowners have varying levels of understanding of conservation practices, programs, and funding opportunities available. Many times, the first step towards adopting conservation practices is outreach. Outreach can be conducted in a variety of ways, including mailings, workshops, and social media. It can be targeted to landowners in priority areas to help target conservation practices in those areas to reach plan goals. *Outreach can also be identifying and educating decision-makers who support implementation work, such as commissions, state officials, or other local government officials.*

The second step is knowledge exchange, including site visits, technical assistance, peer-to-peer networks, and demonstration plots. Sometimes the outreach and knowledge exchange can take years before landowners adopt the practices. Once the landowner is interested in adopting practices, incentives and cost-share programs can help them get started (Figure 6.).

Outreach will be focused on environmental justice as well as building capacity for plan implementation.

Figure 6.7. Steps towards conservation.

Outreach

Watershed partners already implement numerous outreach strategies. Existing and new strategies are detailed in Section 5. A summary of the outreach actions is provided in Table 6.4. Outreach strategies will be targeted to priority resources and areas in the plan. An additional consideration is tourism and the ecosystem services linked to water quality which draw tourists (and locals) into the region.

Table 6.4. Outreach actions in the RH-V.

GOAL: LAKESHORE MANAGEMENT
Workshops and materials, give away native seeds, shoreline guides, contractors, realtors, DNR Fisheries Management Plans, help lakeshore users, understand water quality data, outreach about building on bluffs, webinars, school outreach.
GOAL: RIPARIAN ENHANCEMENT
Site visits with landowners, workshops.
GOAL: LAND PROTECTION
Networking, local foresters, workshops, outreach materials and tools.
GOAL: FOREST HEALTH
Networking, local foresters, workshops, tourism, promote the Firewise program, BWSR Habitat Enhancement Landscape Pilot (HELP) program. DNR community forest funding.
GOAL: CONNECTIVITY ENHANCEMENT
Coordinate with Road Authorities to incorporate water quality and habitat connectivity into road projects.
GOAL: DRINKING WATER PROTECTION
Septic system maintenance, wellhead protection, household hazardous waste, outreach on lake drinking water safety, smart salting.
GOAL: STORMWATER MANAGEMENT
Storm drain stenciling, rain barrels, workshops, smart salting, landowner incentives, etc.
GOAL: WATER RETENTION
Education on wetlands, wetland banking, water storage.
Estimated 10-Year costs for Outreach Implementation: $500,000
• Outreach Effectiveness can be tracked by: • Number of participants at each event • Number of events and meetings • Number of people reached • Hours spent on Outreach

Project Development

The second step is project development; including site visits, technical assistance, peer-to-peer networks, and demonstration plots. Site visits to landowners who have previously adopted a practice is a key measure to increase adoption. Sometimes the outreach and project development can take years before landowners adopt the practices. Once the landowner is interested in adopting practices, incentives and cost-share programs can help them get started (Figure 6.7).

Example: incentives for farmers to adopt cover crops from the SWCD or the EQIP program can help them implement the practice for a few years to ensure profitability. See a description of the program on Page 92.

Example: incentives for private landowners to develop a forest stewardship plan makes them eligible for enrollment in the SFIA, which provides payments to landowner to keep forests forested. See a description of the program on Page 102.

Project Development can be tracked by:

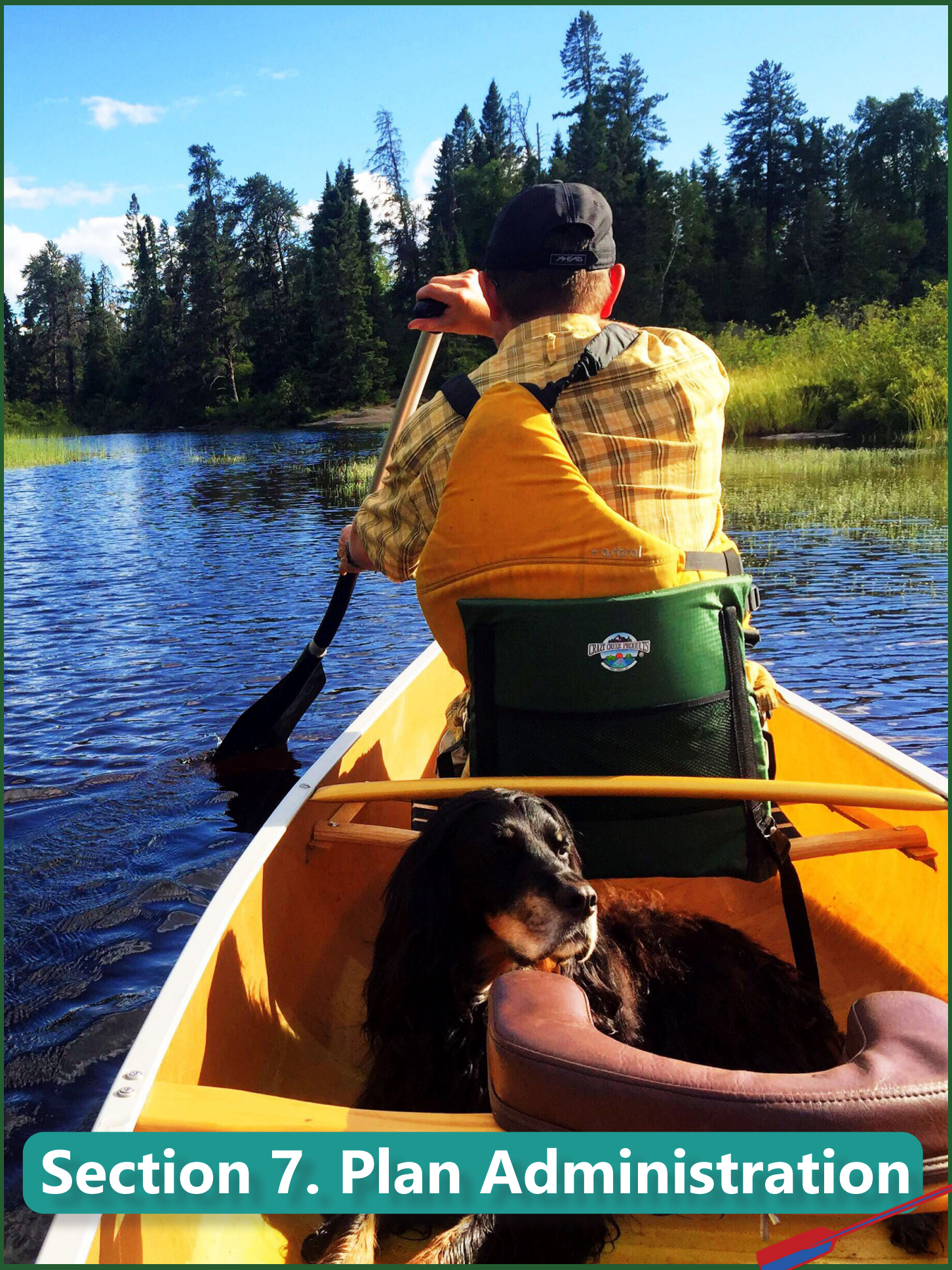
- Number of projects implemented
- Number of people reached
- Number of people that adopted practices
- Number of people that adopted practices by word of mouth (neighbors, newspaper, social media, etc.)

Achieving Plan Goals

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

There will be different levels of measuring progress for this plan. Projects will be tracked during implementation with the system chosen by the watershed. This will include:

- **Tracking**: gathering and compiling data on practices, miles, and other quantitative goals.
- **Reflecting**: comparing work activities completed to those in the plan.
- **Evaluation**: comparing the results to the stated goals in the plan.
- **Sharing**: maintain support through communication about local implementation geared towards stakeholders and the citizens of the watershed.



Section 7. Plan Administration

Section 7.
Plan Administration

The Plan Administration Section describes the process for plan implementation, how plan partners collaborate, how funding will move between partners, and which partners will execute administrative processes.

Formal Agreements

The Rainy Headwaters-Vermilion Partnership is a collaboration of LGUs in St. Louis, Lake, and Cook Counties (Figure 7.1). These entities previously entered into a MOA for planning and formed a Policy Committee for RH-V (Appendix G). The LGUs in the MOA include St. Louis County and North St. Louis SWCD, Lake County and SWCD, and Cook County and SWCD. The entities will enter into a new memorandum of agreement to implement this plan. The Policy Committee is advisory to the individual county and SWCD boards under the MOA.

Koochiching County and SWCD declined to participate due to their small number of acres in the watershed, with much of it being state-owned. The Bois Forte Band of Chippewa declined to participate. The plan's intention is not to place undue burden on Tribal government or Band members, but to enter into cooperative working relationships and agreements so plan goals can be achieved on Tribal lands and waters only if they serve and meet Tribal goals and regulations. The Fond du Lac Band of Lake Superior Chippewa can also be implementation partners.

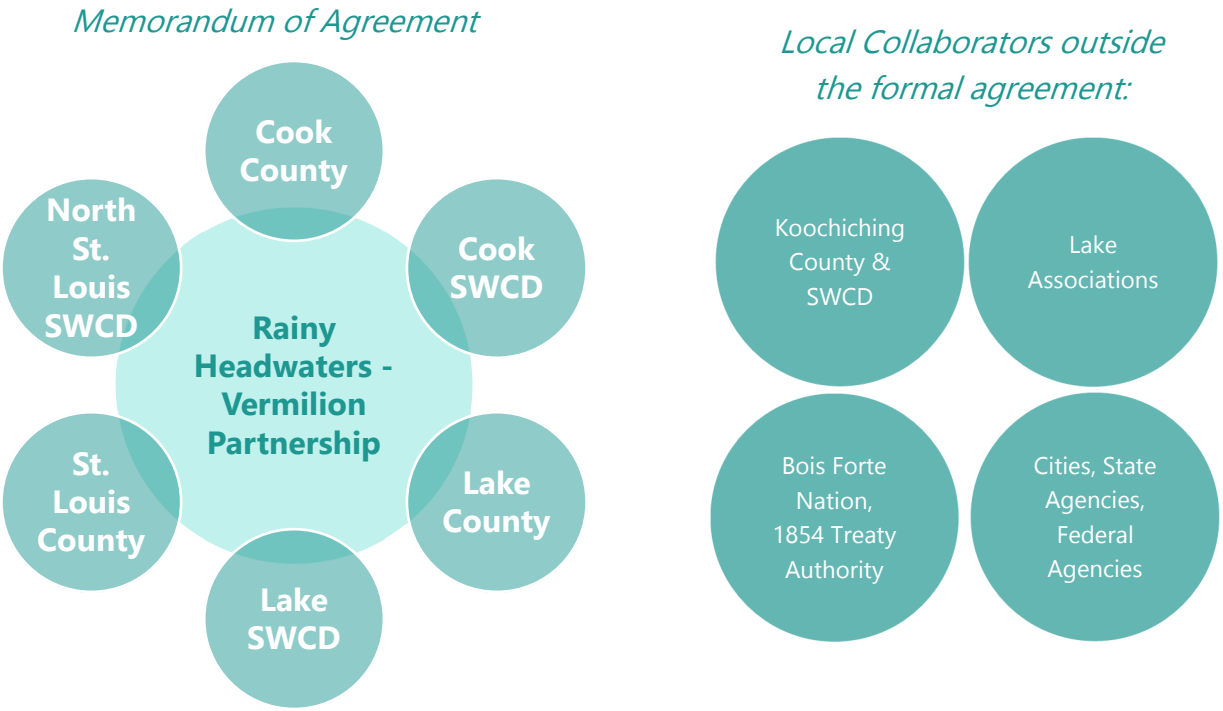


Figure 7.1. Implementation Agreements for the RH-V.

Decision-making and Staffing

Plan implementation in the RH-V will require increased capacity of plan partners, including increased staffing, funding, and coordination from current levels. Successful implementation will require generating active interest and increasing partnerships within the watershed.

The decision-making and staffing for implementing the RH-V CWMP will be conducted based on the concepts outlined in this section of the plan. The probable roles and functions related to plan implementation are outlined in Table 7.1. Expectations are that the roles of each committee will shift and change during implementation to best meet the needs of the RH-V Partnership. Fiscal and administrative duties for plan implementation will be assigned to an LGU through a Policy Committee decision as outlined in the formal agreement. Responsibilities for work planning and serving as the central fiscal agent will be revisited by the Policy Committee on a biennial basis.

Table 7.1. Roles for RH-V Implementation. The LGUs will be collectively referred to as the RH-V Partnership.

Committee Name	Description	Primary Implementation Role and Functions
Policy Committee	One board member from each MOA entity.	▪ Meet twice a year and as needed ▪ Review and confirmation of Steering and Advisory Committee recommendations, annually ▪ Oversee implementation funds from plan participants ▪ Provided direction to Steering Committee on addressing issues ▪ Recommend approval of the biennial work plan by the individual boards of the MOA members
Local Fiscal Agent and Coordinator	One entity in the MOA as determined by the Policy Committee	▪ Coordinate and facilitate committee meetings ▪ Prepare the work plans ▪ Prepare, coordinate, and submit grant applications or other funding requests ▪ Research opportunities for other collaborative grants ▪ Generate report on fund use ▪ Compile results for annual assessment
Steering Committee	Staff members from each MOA entity and local BWSR Board Conservationist.	▪ Meet monthly and as needed ▪ Assist in work plan preparation ▪ Review status of available implementation funds from plan participants ▪ Review collaborative grants opportunities ▪ Review annual fiscal reports ▪ Review annual reports submitted to BWSR ▪ Biennial review of priority issues ▪ Recommend response to emerging issues ▪ Prepare plan amendments ▪ Implement the targeted implementation schedule

Committee Name	Description	Primary Implementation Role and Functions
Advisory Committee	State Agencies and local stakeholders appointed by the Policy Committee.	▪ Meet once a year and as needed ▪ Review and provide input for the annual work plan ▪ Identify and review collaborative funding opportunities ▪ Assist Steering Committee with execution of the targeted implementation schedule ▪ Provide input for the biennial work plan ▪ Provide local support for the plan and implementation

Collaboration

Collaboration between Planning Partners

The RH-V Partnership acknowledges the need for planning partners to collaborate to successfully implement the plan. Successful collaboration will generate consistent implementation of actions watershed-wide, increased chances of project funding, as well as resource efficiencies gained.

Collaboration already exists between the LGUs in the RH-V Watershed and the RH-V Partnership. The Counties, SWCDs, and Lake Associations collaborate on implementing the Aquatic Invasive Species Program, including monitoring, inspections, and outreach. Moving forward, the Partnership will continue to pursue opportunities between LGUs to gain the benefits described above- resources efficiencies, increased funding opportunities, technical assistance, and streamlined implementation. The RH-V Partnership will also review similarities and differences in local regulatory administration to identify local successes and identify changes needed in the future to make progress towards goals outlined in this plan.

Collaboration with Other Units of Government

The RH-V Partnership will continue to coordinate and cooperate with other governmental units at all levels. Coordination with state agencies will continue as their cooperation is essential for plan implementation and many have been participants in the planning process on the Advisory Committee (and will continue to do so on the implementation timeline). Additionally, coordination with tribal governments will be essential for successful plan implementation.

Inter-agency cooperation will also be essential with other LGUs, cities, and Counties, particularly as many programs are best implemented through collaborative methods. Examples of collaborative programs in the watershed include the Environmental Quality Incentives Program (EQIP) (NRCS), Wellhead Protection for Community Water Supply DWSMAs (Minnesota Rural Water Association (MRWA) and MDH), and Minnesota Forest Resource Council and WRAPS (MPCA). The US Forest Service works with counties on forest management (good neighbor authority). The Voyageurs National Park Clean Water Joint Powers Board is a collaboration between Koochiching and St. Louis Counties and was established to address the need for improved wastewater treatment in the area, as well as for AIS prevention. There is collaboration

with Canadian entities under the umbrella of the Rainy-Lake of the Woods Watershed Board | International Joint Commission.

Collaboration with Others

Support from local groups and citizens as well as partnerships will be a primary driver of success for the final outcomes of the plan. Many of the plan's actions focus on voluntary land stewardship practices and engaging with landowners, therefore collaborations with landowners in the watershed is essential for successful plan implementation. Many actions in the plan require working directly with landowners and providing cost share as well as technical assistance for implementing these land stewardship practices. Many of the existing partnerships in the RH-V Watershed have been integral to plan development and are committed to furthering promotion of these collaborations. Potential partners for collaboration include (but are not limited to) Ducks Unlimited, Sportsman's Clubs, lake homeowner's associations, White Iron Chain of Lakes Association, civic groups (e.g. Northeastern Regional ATV Joint Power Board), private businesses, individuals, and foundations.

Funding

The RH-V Partnership will pursue funding opportunities to implement the actions described in the targeted implementation (Section 5). Current county and SWCD programs make up baseline funding and will not be enough to implement the actions described in this plan. Successful plan implementation will require reliable non-competitive watershed-based funding in addition to competitive state, federal, and private grants. The RH-V Partnership acknowledges that additional staffing may be necessary to complete plan goals and implementation schedules. LGUs in the RH-V will be responsible for hiring additional staff.

Base funding (Table 7.2) is based on the annual revenue and expenditures of Lake, St. Louis, and Cook counties, as well as Lake, North St. Louis, and Cook SWCDs. The current level of funding by each LGU is expected to remain consistent during the 10-year implementation schedule for this plan. It includes local funds such as county allocations for SWCDs, state funds such as conservation delivery grounds, and other grants.

Table 7.2. Base funding for the R-H-V.

Funding Level	Annual Local Estimate	Annual State Estimate	Annual Federal Estimate	Annual Total Estimate
Base	$490,000	$88,000	$0	$578,000

Upon completion of this plan, the RH-V Partnership is eligible for Watershed-Based Implementation Funding (WBIF). This is non-competitive funding from Minnesota's Clean Water Fund (Clean Water Land and Legacy Amendment). The current estimate for WBIF in this watershed is $1 million per biennium, or $500,000 per year (Table 7.3). The total estimated that is administered by the RH-V Partnership to implement this plan is Base+WBIF = $15,578,000 over the 10-year life of the plan

(Table 7.3). Administration costs are assumed to be at 10% of the Watershed-Based Funding Grant biennially (~$100,000).

Other funding consists of funding that is administered outside of the RH-V Partnership, including projects implemented by NRCS and other state agencies. There is likely to be more project funding occurring in the watershed above these totals, as it is difficult to document projects by all entities, including private landowners.

Table 7.3. Estimated implementation funding for the plan.

Funding Level	Description	Estimated Annual Average	Estimated Plan Total (10 years)
Base	**Current Baseline Funding**	$578,000	**$5,780,000**
WBIF	**Watershed Based Implementation Funding**	$500,000	**$5,000,000**
Other	**Other Funding (i.e. Lessard Sams, DNR, USFS, 319 Funds)**	$1,141,450	**$11,414,500**

Total funding can also be summarized by implementation program type (Figure 7.2). The majority of the funding is going towards "Fix It" and "Manage It" programs, but in this watershed these fixes are mainly for protection since there are very few impairments. Nearly 100% of the total funding is going towards nondegredation practices. The "Keep It" program is smaller because 92% of the watershed is already permanently protected. Overall, 94% of the plan funding is being used for implementing conservation and 6% for outreach, monitoring, feasibility studies, and data collection ("Know It" program).

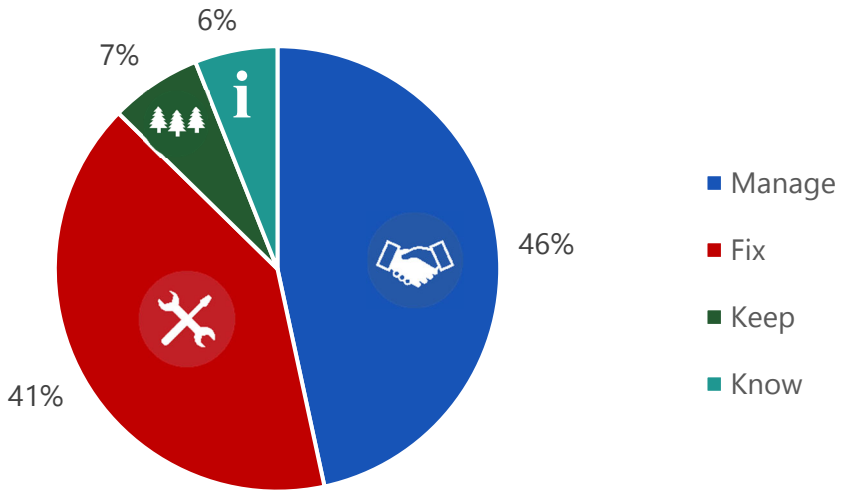


Figure 7.2. Funding spent per program (Base+WBIF) for the 10-year plan.

Table 7.4 lists popular programs and grants for executing implementation programs described by this plan and used within the targeted implementation tables. The funding grants and programs are cross-referenced to plan implementation programs, showing potential sources of revenue for implementation. Programs will be coordinated uniformly throughout the watershed when possible.

Table 7.4. Funding sources available for plan implementation.

Source	Agency	Program/Fund Name	Type of Assistance	Form of Assistance				
STATE FUNDING	BWSR	Clean Water Fund	Financial	Grant				
	BWSR	Natural Resources Block Grant	Financial	Grant				
	BWSR	SWCD Local Capacity Service Grants	Financial	Grant				
	BWSR	Erosion Control & Management Program	Financial	Grant				
	BWSR	Lawns to Legumes						
	BWSR	HELP						
	DNR	Conservation Partners Legacy	Financial	Grant				
	DNR	Aquatic Invasive Species Control	Financial/ Technical	Grant				
	DNR	Forest Stewardship Program	Technical	Cost Share				
	DNR	Aquatic Management Area, Wildlife Management Area	Financial	Fee Title Acquisition				
	DNR	ReLeaf Community Forestry						
	DNR	Prioritize Stream Restoration Projects Scoring Worksheet						
	DNR/Revenue	Sustainable Forest Incentive Act	Financial	Incentive payment				
	MPCA	Clean Water Partnership and Section 319 Grant Program	Financial	Grant				
	MPCA	State-Revolving Fund	Financial	Grant				
	MPCA	Climate Resilience Stormwater						
	MPCA	Surface Water Assessment Grant	Financial	Grant				
	MDH	Source Water Protection Grant	Financial	Grant				
	MDA	Nitrate Testing	Technical	Monitoring				

Source	Agency	Program/Fund Name	Type of Assistance	Form of Assistance				
	MDA	Agricultural BMP Loan Program	Financial	Loan				
	LSOHC	Outdoor Heritage Funds	Financial	Grant				
	LCCMR	Environmental Trust Fund	Financial	Grant				
	Legislature	Bonding	Financial	Bond				
FEDERAL FUNDING	FSA	Conservation Reserve Program	Financial	Cost Share				
	NRCS	Conservation Innovation Grant	Financial	Grant				
	NRCS	EQIP	Financial	Cost Share				
	USGS	Stream Gaging Network	Technical	Monitoring				
	USACE	Planning Assistance	Technical	Planning				
	EPA	State Revolving Fund	Financial	Loan				
	EPA	319						
	USFWS	Fish Passage Grants						
	NFWF	General grants						
OTHER FUNDING	Ducks Unlimited		Financial/ Technical	Easement/Cost Share				
	Whitetails		Financial/ Technical	Easement/Cost Share				
	The Nature Conservancy		Financial	Easement				
	Minnesota Land Trust		Financial	Easement				

Local Funding

Funding from local property tax or in-kind services of any personnel funding from the local tax base is considered local funding. This excludes general operating funds from BWSR, fees for operating services and grants, or partnerships agreements with other conservation organizations or the federal government.

Local funds will be used for programs focused on local issues where opportunities for federal or state funds are lacking due to misalignment of a program's outcomes with federal or state objectives. These funds will also be used for grant matching where statutory authority already exists. Some examples include:

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

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

Road Authorities:

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

State Funding

The Nonpoint Priority Funding Plan was created by leaders at the state agencies that work to protect and restore Minnesota's important water resources. This Plan set high-level state priorities that align programs and actions that reduce nonpoint source pollution across the state. The high-level priority criteria include:

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

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

Collaborative Grants

The fiscal agent will apply for collaborative grants on behalf of the RH-V Partnership, which may be competitive or non-competitive. This assumes that future base support for implementation will be provided to the Partnership as one or more non-competitive implementation watershed-based funding allocations. Where the purpose of an initiative aligns with the objectives of various state, local, non-profit, or private programs, these dollars will be used to help fund the implementation programs described by this plan. Funding sources that are currently available at the time of developing this plan are listed in Table 7.4.

Federal Funding

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

Federal agencies will be engaged following the approval of this plan and prior to implementation, to access federal resources for implementation. Opportunities 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.

Other Funding Sources

Foundations, nonprofit organizations, and private contributions (including landowners and corporate entities) will be sought for plan implementation activities. Local foundations may fund education, civic engagement, and other local priority efforts. There are conservation organizations active in the watershed, such as Ducks Unlimited, Whitetails, Lake Owner Associations, and Sportsman's Clubs. These organizations acquire funding of their own and may have project dollars and technical assistance that can be leveraged. Major cooperators and funding sources are private landowners who typically contribute 25% of project costs and many donate land, services, or equipment for projects or programs.

Work Planning

This plan envisions collaborative implementation. Biennial work planning will be completed to align with the priority issues addressed, the availability of funds, and the roles and responsibilities for implementation. There will also be an annual review of the biennial work plan. This review will be comprehensive, including both WBIF reporting in eLINK and Other funding (additional funding including SFIA, Section 319, USFS, etc.).

Local Work Plan

The RH-V Partnership will be responsible for completing a biennial work plan based on the targeted implementation schedule. The process for approval of work plans will be explained in the MOA between the partners and adopted bylaws. These biennial work plans will help to obtain BWSR watershed-based implementation funding, maintain collaborative progress towards completing the targeted implementation schedule, and reach the outcomes prescribed in the plan.

Funding Request

The RH-V Partnership will collaboratively develop, review, and submit a watershed-based funding request from this biennial work plan. The partnership will approve of this request as per their MOA and bylaws prior to submittal to BWSR. The watershed-based funding request will be developed based on the 2024-2025 priority projects outlined in the targeted implementation schedule and any adjustments made through self-assessments.

Assessment, Evaluation, and Reporting

Accomplishment Assessment

The Steering Committee will provide the Policy Committee with an annual update on the progress of the plan's implementation. A tracking system will be used to measure progress based on measurable goals and will serve as a platform for plan constituents and the public. Tracking these metrics will also make them available for supporting future work plan development, progress evaluation, and reporting.

Partnership Assessment

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

Mid-Point Evaluation

Beginning in 2024, this plan will be in effect for 10 years. Over the course of the plan's life cycle, progress toward reaching goals and completing the implementation schedule may vary. New issues may emerge as the plan progresses, and/or new monitoring data, models, or research may become available. Additionally, the next intensive watershed monitoring cycle beings in 2025 (and the next MPCA WRAPS will be released after). Therefore, in 2029-2030, a mid-point evaluation will be undertaken. This plan will determine if the current course of actions is sufficient to reach the goals of the plan, or if a change in actions is necessary.

Reporting

LGUs have several annual reporting requirements. Some of these reporting requirements will remain a responsibility of the LGUs. Reporting related to grants and programs developed collaboratively and administered under this plan will be reported by the plan's fiscal agent (Table 7.1). In addition to annual reporting, the Steering Committee will also develop a biennial Watershed Report to present to the Policy Committee and the RH-V Partnership. This report will document progress toward reaching goals and completing the targeted implementation schedule and will describe any new emerging issues of priorities. The information needed to biennially update the Watershed Report will be developed through the annual evaluation process.

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

Plan Amendments

The plan is effective through 2034 per the BWSR Order approving it. Activities described in this plan are voluntary, not prescriptive, and will allow for flexibility in implementation. An amendment will not be required for addition, substitution, or deletion of any of the actions, initiatives, and projects if those changes will still produce outcomes that are consistent with the plan priority issues and goals.

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 from sources, significant changes to the projects, programs, or funding in the plan; or the potential impact of emerging concerns and issues may require activities to be added to the plan.

If revisions are required or requested, the Policy Committee will initiate a plan amendment process consistent with Minnesota Statute 103B.314, Subd. 6.

For more information, refer to the BWSR *One Watershed, One Plan* policies on their website https://bwsr.state.mn.us/one-watershed-one-plan-policies.