

# *Rainy River-Rainy Lake*

ONE WATERSHED ONE PLAN

## **Rainy River-Rainy Lake Comprehensive Watershed Management Plan**

### **Plan Appendix**



The image features a serene landscape with a calm lake in the center, framed by several tall, dark pine trees in the foreground. The water reflects the sky and the surrounding greenery. In the distance, a small island with more trees is visible. A semi-transparent blue graphic overlay in the top right corner contains white diagonal lines and teardrop shapes, suggesting rain or water. The text 'A. Planning Memorandum of Agreement' is overlaid in the lower-left quadrant in a large, white, sans-serif font.

# A. Planning Memorandum of Agreement

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## MEMORANDUM OF AGREEMENT

This agreement (Agreement) is made and entered into by and between:

Koochiching County, by and through their respective County Board of Commissioners, and  
Koochiching Soil and Water Conservation District, by and through their respective Soil and Water  
Conservation District Board of Supervisors, and  
City of International Falls, by and through their respective City Council, and  
City of Ranier, by and through their respective City Council,  
Collectively referred to as the "Parties."

**WHEREAS**, the Counties of this Agreement are political subdivisions of the State of Minnesota, with authority to carry out environmental programs and land use controls, pursuant to Minnesota Statutes Chapter 375 and as otherwise provided by law; and

**WHEREAS**, the Soil and Water Conservation Districts (SWCDs) of this Agreement are political subdivisions of the State of Minnesota, with statutory authority to carry out erosion control and other soil and water conservation programs, pursuant to Minnesota Statutes Chapter 103C and as otherwise provided by law; and

**WHEREAS**, the Cities of this Agreement are local governments with the authority to serve the broad-based needs of their residents, pursuant to Minnesota Statutes Chapter 415; and

**WHEREAS**, the parties to this Agreement have a common interest and statutory authority to prepare, adopt, and assure implementation of a comprehensive watershed management plan in the Rainy River – Rainy Lake Watershed to conserve soil and water resources through the implementation of practices, programs, and regulatory controls that effectively control or prevent erosion, sedimentation, siltation and related pollution in order to preserve natural resources, ensure continued soil productivity, protect water quality, reduce damages caused by floods, preserve wildlife, protect the tax base, and protect public lands and waters; and

**WHEREAS**, with matters that relate to coordination of water management authorities pursuant to Minnesota Statutes Chapters 103B, 103C, and 103D with public drainage systems pursuant to Minnesota Statutes Chapter 103E, this Agreement does not change the rights or obligations of the public drainage system authorities.

**WHEREAS**, the Parties have formed this Agreement for the specific goal of developing a plan pursuant to Minnesota Statutes § 103B.801, Comprehensive Watershed Management Planning, also known as *One Watershed, One Plan*.

**NOW, THEREFORE**, the Parties hereto agree as follows:

1. **Purpose:** The Parties to this Agreement recognize the importance of partnerships to plan and implement protection and restoration efforts for the Rainy River – Rainy Lake Watershed (**Attachment A**). The purpose of this Agreement is to collectively develop and adopt, as local government units, a coordinated

watershed management plan for implementation per the provisions of the Plan. Parties signing this agreement will be collectively referred to as the Rainy River – Rainy Lake Planning Group.

2. **Term:** This Agreement is effective upon signature of all Parties in consideration of the Board of Water and Soil Resources (BWSR) Operating Procedures for One Watershed, One Plan; and will remain in effect until adoption of the plan by all parties or the end date of the BWSR Grant Agreement, unless canceled according to the provisions of this Agreement or earlier terminated by law.
3. **Adding Additional Parties:** A qualifying party desiring to become a member of this Agreement shall indicate its intent in writing to the Policy Committee in the form of an official board resolution for consideration and approval. The party agrees to abide by the terms and conditions of the Agreement including but not limited to the bylaws, policies and procedures adopted by the Policy Committee.
4. **Withdrawal of Parties:** A party desiring to leave the membership of this Agreement shall indicate its intent in writing to the Policy Committee in the form of an official board resolution. Notice must be made at least 30 days in advance of leaving the Agreement.
5. **General Provisions:**
  - a. **Compliance with Laws/Standards:** The Parties agree to abide by all federal, state, and local laws; statutes, ordinances, rules and regulations now in effect or hereafter adopted pertaining to this Agreement or to the facilities, programs, and staff for which the Agreement is responsible.
  - b. **Indemnification:** Each party to this Agreement shall be liable for the acts of its officers, employees or agents and the results thereof to the extent authorized or limited by law and shall not be responsible for the acts of any other party, its officers, employees or agents. The provisions of the Municipal Tort Claims Act, Minnesota Statute Chapter 466 and other applicable laws govern liability of the Parties. To the full extent permitted by law, actions by the Parties, their respective officers, employees, and agents pursuant to this Agreement are intended to be and shall be construed as a “cooperative activity.” It is the intent of the Parties that they shall be deemed a “single governmental unit” for the purpose of liability, as set forth in Minnesota Statutes § 471.59, Subd. 1a(b). For purposes of Minnesota Statutes § 471.59, subd. 1a(b) it is the intent of each party that this Agreement does not create any liability or exposure of one party for the acts or omissions of any other party.
  - c. **Records Retention and Data Practices:** The Parties agree that records created pursuant to the terms of this Agreement will be retained in a manner that meets their respective entity’s records retention schedules that have been reviewed and approved by the State in accordance with Minnesota Statutes § 138.17. The Parties further agree that records prepared or maintained in furtherance of the agreement shall be subject to the Minnesota Government Data Practices Act. At the time this agreement expires, all copies of pertinent documents will be held by the fiscal agent for continued retention.

- d. **Timeliness:** The Parties agree to perform obligations under this Agreement in a timely manner and keep each other informed about any delays that may occur.
- e. **Extension:** The Parties may extend the termination date of this Agreement upon agreement by all Parties.

6. **Administration:**

- a. **Establishment of Committees for Development of the Plan.** The Parties agree to designate one representative, who must be an elected or appointed member of the governing board, to a Policy Committee for development of the watershed-based plan and may appoint one or more technical representatives to an Advisory Committee for development of the plan in consideration of the BWSR Operating Procedures for One Watershed, One Plan.
    - i. The Policy Committee will meet as needed to decide on the content of the plan, serve as a liaison to their respective boards, and act on behalf of their Board. Each representative shall have one vote.
    - ii. Each governing board may choose one alternate to serve on the Policy Committee as needed in the absence of the designated member.
    - iii. The Policy Committee will establish bylaws by **April 7, 2023** to describe the functions and operations of the committee(s).
    - iv. The Advisory Committee will meet monthly or as needed to assist and provide technical support and make recommendations to the Policy Committee on the development and content of the plan. Members of the Advisory Committee may not be a current board member of any of the Parties.
  - b. **Submittal of the Plan.** The Policy Committee will recommend the plan to the Parties of this agreement. The Policy Committee will be responsible for initiating a formal review process for the watershed-based plan conforming to Minnesota Statutes Chapters 103B and 103D, including public hearings. Upon completion of local review and comment, and approval of the plan for submittal by each party, the Policy Committee will submit the watershed-based plan jointly to BWSR for review and approval.
  - c. **Adoption of the Plan.** The Parties agree to adopt and begin implementation of the plan within 120 days of receiving notice of state approval, and provide notice of plan adoption pursuant to Minnesota Statutes Chapters 103B and 103D.
7. **Fiscal Agent:** Koochiching SWCD will act as the fiscal agent for the purposes of this Agreement and agrees to:

- a. Accept all responsibilities associated with the implementation of the BWSR grant agreement for developing a watershed-based plan.
  - b. Perform financial transactions as part of grant agreement and contract implementation.
  - c. Annually provide a full and complete audit report.
  - d. Provide the Policy Committee with the records necessary to describe the financial condition of the BWSR grant agreement.
  - e. Retain fiscal records consistent with the Koochiching SWCD's records retention schedule.
8. **Grant Administration:** Koochiching SWCD will act as the grant administrator for the purposes of this Agreement and agrees to provide the following services:
- a. Accept all day-to-day responsibilities associated with the implementation of the BWSR grant agreement for developing a watershed-based plan, including being the primary BWSR contact for the *One Watershed, One Plan Grant Agreement* and being responsible for BWSR reporting requirements associated with the grant agreement.
  - b. Provide the Policy Committee with the records necessary to describe the planning condition of the BWSR grant agreement.
9. The Koochiching SWCD agrees to provide the following services to the Parties:

The Koochiching SWCD's Scope of Services: The services set forth in **Attachment B** are a general scope of services provided by the Koochiching SWCD to the Parties.

10. **Authorized Representatives:** The following persons will be the primary contacts for all matters concerning this Agreement:

Koochiching County  
 Matthew Gouin or successor  
 Environmental Services Director  
 715 4<sup>th</sup> Street  
 International Falls, MN 56649  
 Telephone: 218-283-1156

Koochiching SWCD  
 Pam Tomevi or successor  
 District Administrator  
 501 3<sup>rd</sup> Street, Suite 100  
 International Falls, MN 56649  
 Telephone: 218-283-1174

City of International Falls  
 Betty Bergstrom or successor  
 City Administrator  
 600 Fourth Street  
 International Falls, MN 56649  
 Telephone: 218-283-7983

City of Ranier  
 Sherril Gautreaux or successor  
 City Administrator  
 PO Box 186  
 Ranier, MN 56668  
 Telephone: 218-286-3311

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

**PARTNER: Koochiching County**

APPROVED:

BY:  03/21/2023  
Board Chair Date

BY:  3/21/2023  
Environmental Services Director Date

**APPROVED AS TO FORM**

BY:  3/27/23  
County Attorney Date

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

**PARTNER: Koochiching Soil & Water Conservation District**

**APPROVED:**

BY: Ralph Lewis 3-6-2023  
Board Chair Date

BY: Samuel Jones 3-6-2023  
District Administrator Date



IN TESTIMONY WHEREOF the Parties have duly executed this agreement by their duly authorized officers.

PARTNER: **City of International Falls**

APPROVED: *Monday, March 20, 2023*

BY: *[Signature]* *3-22-23*  
Mayor Date

BY: *Betty Berstrom* *03.22.2023*  
City Administrator Date

**IN TESTIMONY WHEREOF** the Parties have duly executed this agreement by their duly authorized officers.

**PARTNER: City of Ranier**

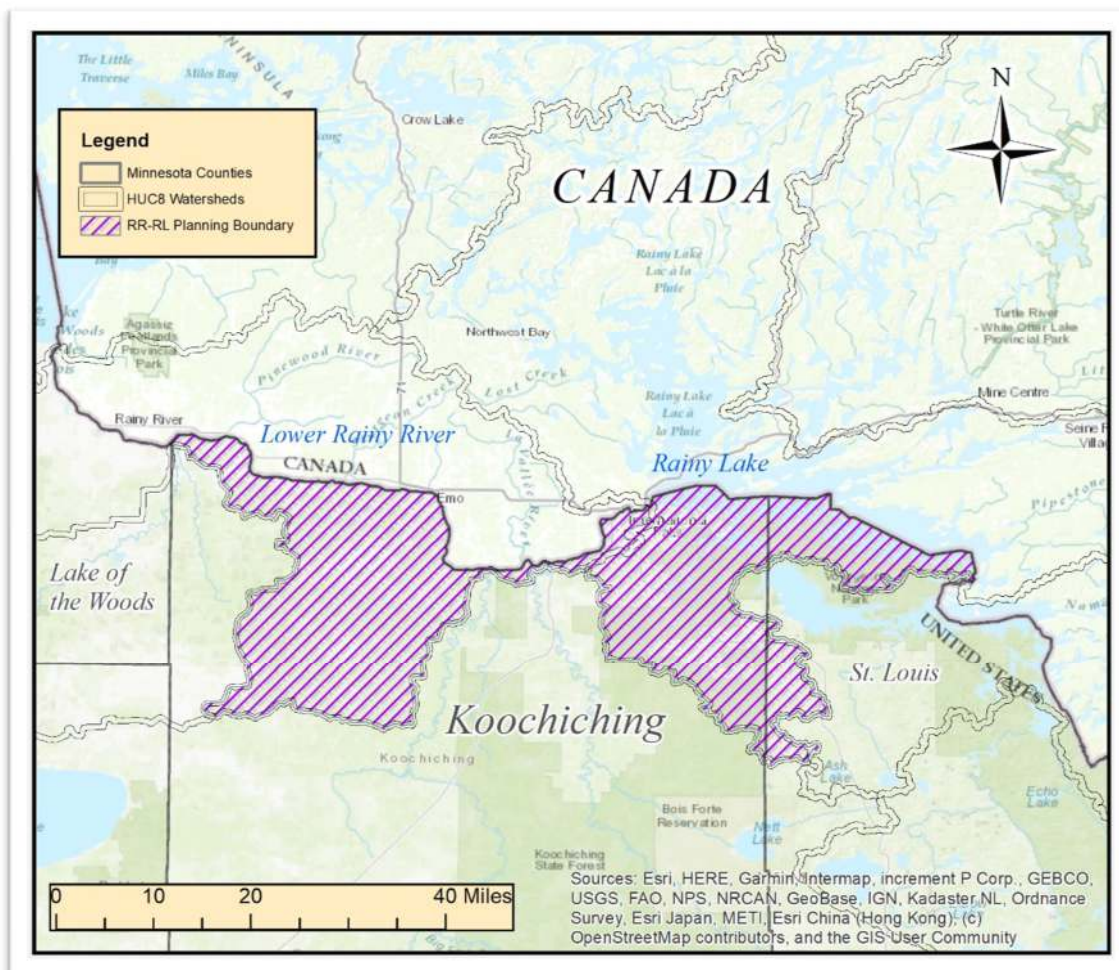
**APPROVED:**

BY:  3-21-23  
Mayor Date

BY:  3/21/23  
City Administrator Date

Attachment A

**Rainy River – Rainy Lake Watershed (RR-RLW)  
One Watershed One Plan Planning Boundary**



**Boundary change from BWSR Suggested Boundary Map:**

All proposed boundary changes were discussed early in the application process with the affected planning partners and were supported by all parties.

All boundary revisions proposed have been approved by the Board of Water and Soil Resources (BWSR).

## Attachment B

### Scope of Services Provided by:

#### Koochiching Soil & Water Conservation District (SWCD)

The Koochiching SWCD will have the following duties:

1. Assist with data compilation, meeting facilitation, and plan writing.
2. Coordination of Policy Committee meetings, including:
  - a) Provide advance notice of meetings;
  - b) Prepare and distribute the Agenda and related materials;
  - c) Prepare and distribute Policy Committee Minutes;
  - d) Maintain all records and documentation of the Policy Committee;
  - e) Provide public notices to the counties and watershed district for publication; and
  - f) Gather public comments from public hearing and prepare for submittal.
3. Coordination of Advisory Committee meetings including:
  - a) Provide advance notice of meetings;
  - b) Prepare and Distribute the Agenda and related materials;
  - c) Prepare and Distribute Minutes; and
  - d) Maintain all records and documentation of the committees.
4. Administration of the grant with BWSR for the purposes of developing a watershed-based plan, including:
  - a) Submit this Agreement, work plan, and other documents as required;
  - b) Execute the grant agreement;
  - c) Account for grant funds and prompt payment of bills incurred;
  - d) Complete annual eLINK reporting;
  - e) Present an annual audit of grant funds and their usage; and
  - f) Maintain all financial records and accounting.
5. Contracting for Services with the chosen consultant for plan preparation and writing of the watershed- based plan, including:
  - a) Execute the Contract for Services agreement;
  - b) Oversee expenditures incurred by the consultant;
  - c) Provide prompt payment for services rendered; and
  - d) Serve as primary contact person with the consultant.



# **B. Public Kickoff Summary**

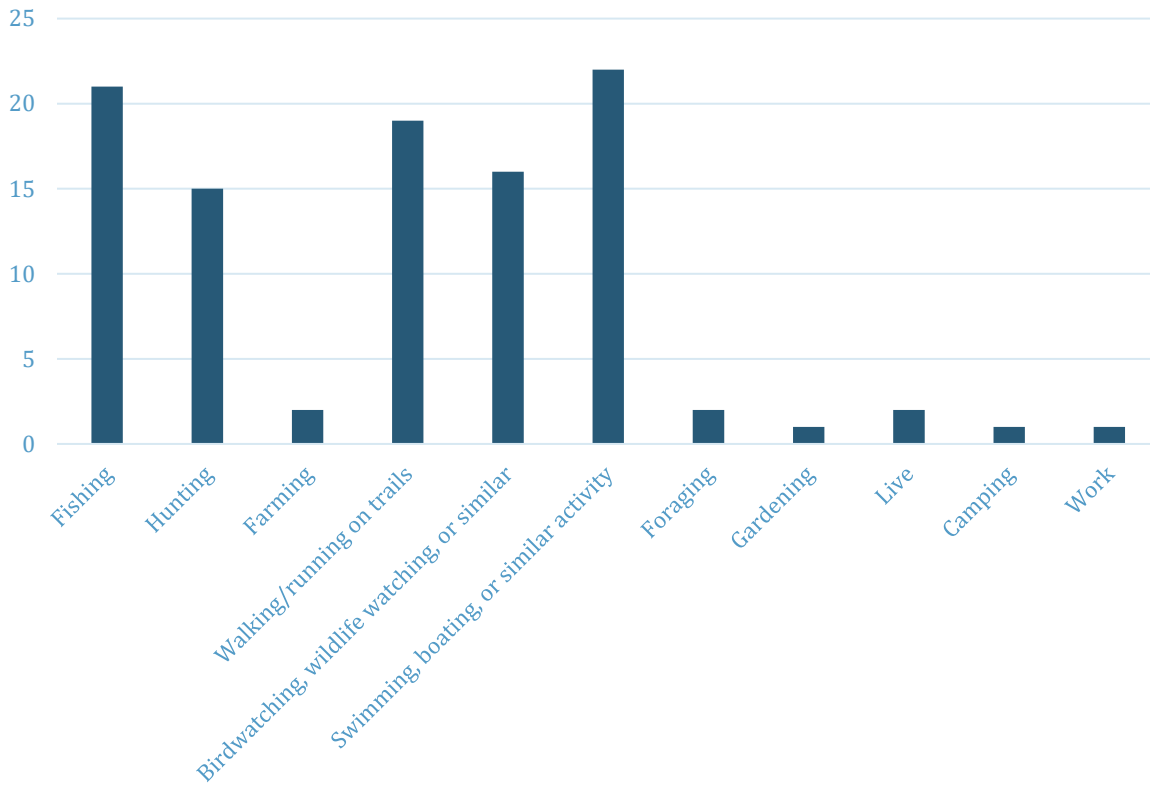
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# PUBLIC KICKOFF SURVEY SUMMARY

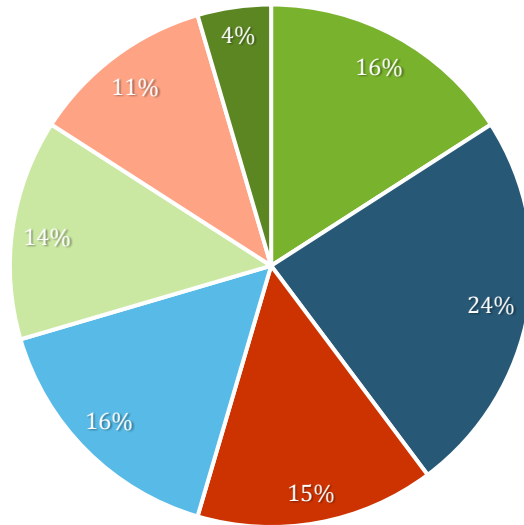
The Rainy River Rainy Lake One Watershed One Plan Partnership issued a public survey to understand the issues most important to the watershed’s residents. The survey was available at the public kickoff meeting in Ranier, MN on September 7, 2023. It was also made available online on the plan’s website.

A total of 27 responses were received. A summary of the responses is provided below.

## Which of the following activities do you do within the watershed? (Check all that apply)

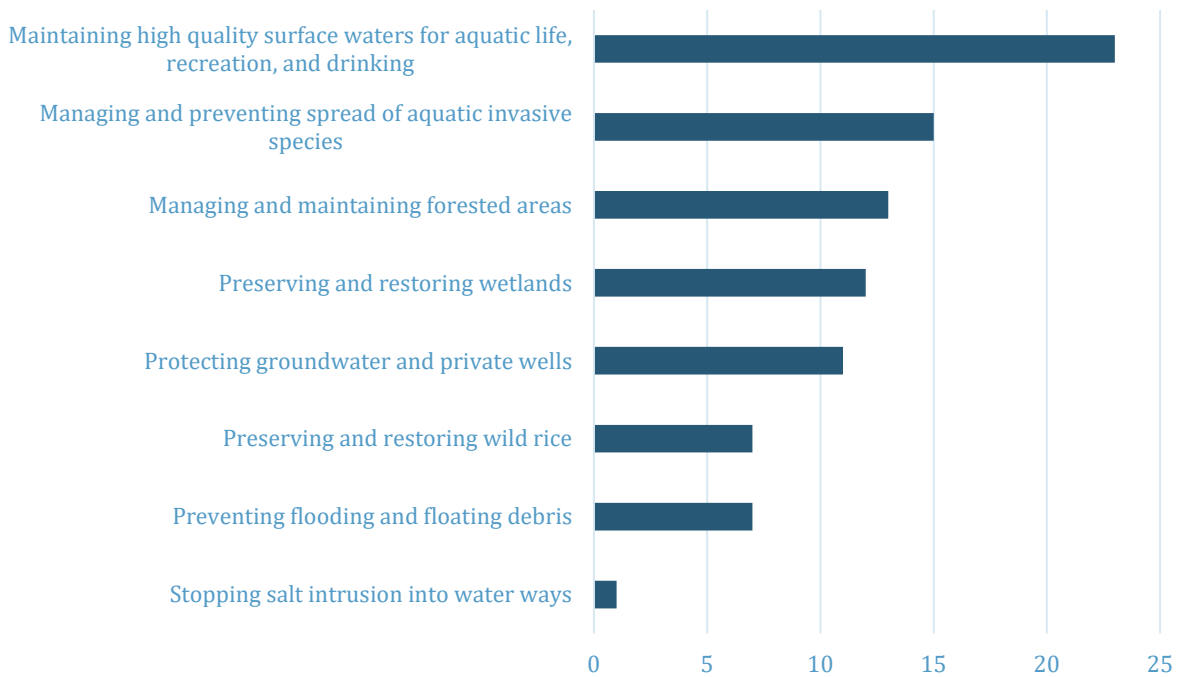


### What's the most important natural resource in your area?



- Groundwater
- Wetland/peatlands
- Farmland
- Rainy Lake
- Forest
- Rainy River
- Hunting/Recreational land

### What do you see as the most important issues facing natural resources in the area?



Using 4-5 words, when you think of the Rainy River-Rainy Lake Watershed, what comes to mind?





Are there any specific waterbodies or natural areas you are most concerned about?

**Response Themes**

Rainy Lake  
All  
Rainy River  
No  
Black River  
Wetland/peatlands  
Voyageurs National Park  
Lake of the Woods  
Little Fork River  
Ash River

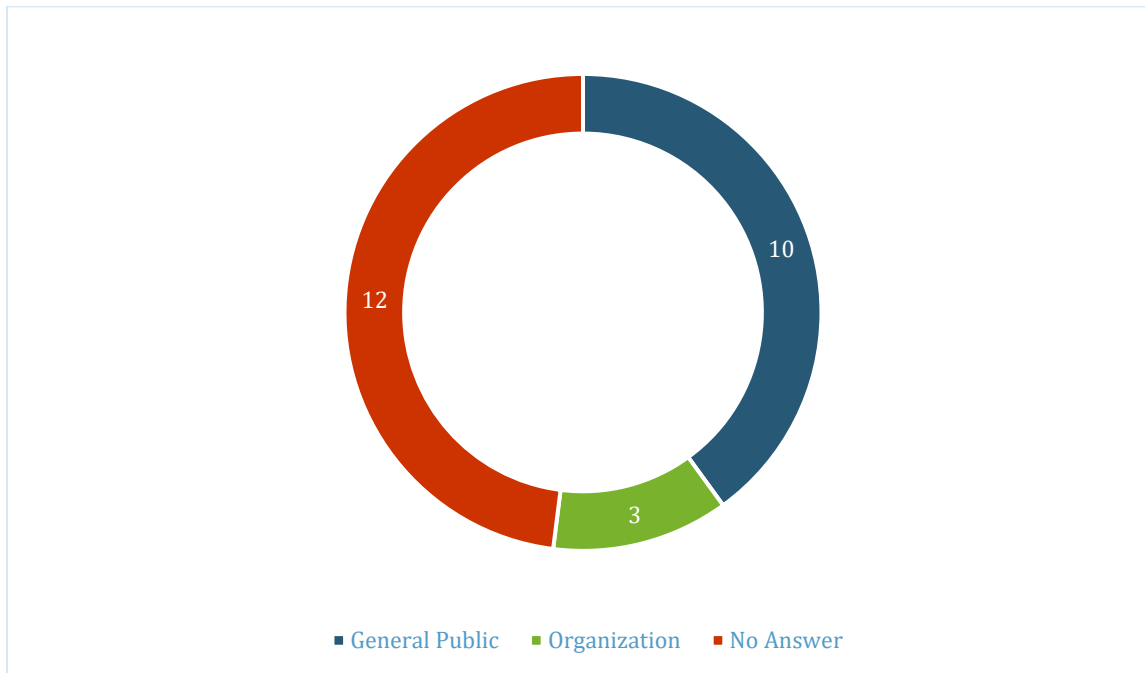
Are there any topics, resources, problems, or opportunities we didn't cover in this survey you'd like to comment on?

**Response Themes**

Climate Change  
Salt Contamination  
Mining  
Dam repairs  
Lakeshore protection  
Private property rights  
Local control of Rainy Lake  
Railroad Bridges  
Zoning variances/setback requirements on lakes  
Natural resource enforcement  
Park ideology for preservation  
Fisheries  
Human behavior effects on resources



Are you representing an organization or citizens / general public? If you are representing an organization, please provide the name of the organization.



Organizations represented:

- LOW SWCD
- County Commissioner
- Koochiching SWCD





# C. Topic Meeting Summary Reports

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# WATER QUALITY TOPIC MEETING REPORT

## Introduction

The Rainy River-Rainy Lake/Lower Rainy River (RR-RL) Watershed, situated along Minnesota’s northern border with Canada, is a healthy watershed containing natural resources that draw visitors from across the region. The watershed drains approximately 630,000 acres across Koochiching County (84% of the watershed), as well as St. Louis and Lake of the Woods Counties. The International Falls-Ranier urban area is the most densely populated region in the watershed, with much of the watershed covered by sparsely populated lands filled with wetlands (cover 70% of watershed), forests, rivers, and lakes. Major surface waters include the Rainy, Rat Root, and Black Rivers as well as Rainy and Rat Root Lakes.

The Rainy River-Rainy Lake One Watershed, One Plan (1W1P) is a planning partnership between Koochiching County, Koochiching SWCD, the City of International Falls, and the City of Ranier. This partnership aims to maintain the high quality of its natural resources and restore (when appropriate) valuable resources in the RR-RL. Through this process, the planning partners, with guidance from local experts and stakeholders, will develop a comprehensive watershed management plan that contains measurable goals and implementation actions to help achieve those goals.

The 1W1P process is outlined in Figure 1 below. For the first steps of this process (gathering issues, prioritizing issues, and targeting resources), a series of topic meetings will be held to cover the main resource concerns in the watershed. These resource concerns include water quality, water quantity and hydrology, groundwater, and habitat and forests. This meeting packet report is for the water quality topic meeting. For this meeting, topic experts for water quality were invited to attend. This included staff members from local SWCD offices, state agencies, and county staff who provided their unique expertise to the planning process for water quality.

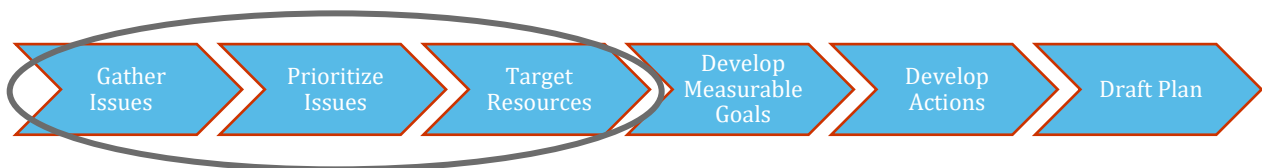


Figure 1. The 1W1P planning process and steps.

The planning process for the Rainy River-Rainy Lake 1W1P is driven by local units of government, guided by an Advisory Committee containing local stakeholders, experts, and members of state and federal agencies. The Policy Committee (the decision making group for the plan) contains elected officials from Koochiching County and SWCD, City of Ranier, and City of International Falls.



## Rainy River – Rainy Lake Water Quality Overview

Water quality in the RR-RL Watershed is generally good with few pollutants. There are two impaired streams in the watershed: the West Fork Black River, between the headwaters to the Black River, as well as the Black River, between Unnamed Creek to West Fork Black River. Both are impaired for bacteria (MPCA, 2022b). There are other streams with elevated TSS and low DO at times throughout the year (MPCA 2022b, 2022a).

In the watershed, there are thirteen lakes that have mercury impairments: Boot, Brown, Fishmouth, Locator, Loiten, Moose, Oslo, Pearly, Quill, Rainy, Shoepack, War Club, and an Unnamed Lake.

Of the eight streams assessed for water clarity trends, only the downstream reach of Moonlight Creek had an improving transparency trend, while the other streams had no trend (MPCA, 2022a, 2022b). Only Rainy Lake was assessed for water clarity trends and had no trend. Between 2010 and 2019, Rainy River had increasing trends in inorganic nitrogen and total suspended solids (MPCA, 2022b).



Aquatic invasive species are an emerging threat in RR-RL. In 2021, the DNR identified zebra mussels in Rainy Lake (MPCA, 2022b). Additionally, wild parsnip (terrestrial) and spiny waterflea have also been found in Koochiching County aquatic ecosystems (Koochiching Soil and Water Conservation District, 2018).

Throughout the RR-RL, both nonpoint and point sources of pollution contribute nutrients to waterways. Models and investigations have shown that point sources have and do contribute to P, N, and sediment loading. MPCA and local partners are currently conducting research to better understand these inputs and their impacts upon algae blooms in the lake (MPCA, 2022a). There are 10 permitted point sources in the watershed, mostly wastewater, industrial, or commercial industries (MPCA, 2022a, 2022b). Nonpoint sources which make up 42, 50, and 97% of loads for phosphorus, nitrogen, and sediment,



come mainly from watershed runoff, wetland export, altered hydrology, streambank erosion, the fine silty clay soils, and industry, including legacy impacts from timber harvesting (MPCA, 2022a, 2022b).

Algal blooms are also of concern in the watershed. Black Bay has recently been experiencing annual algal blooms, which flow into the adjacent Voyageurs National Park. Additionally, Lake of the Woods, downstream of the RR-RL has been experiencing algal blooms from nutrient loading upstream. An important resource in the RR-RL is wild rice, known as manoomin to many Indigenous groups. Manoomin is an important resource due to its cultural significance and economic value for Indigenous groups. It is traditionally harvested in lakes and streams in the watershed. Threats to water quality in those lakes can potentially damage or erase this cultural resource. In the RR-RL, Rainy Lake and Rat Root Lake are both traditional wild rice lakes.

On the next pages, there are maps that display various water quality metrics. These include impairments (page 8), lakes of biological significance (page 9), outstanding resources (page 10), water quality trends (page 11), and phosphorous sensitivity (page 12). Please note that for some of these maps, exceptional water quality already present in the RR-RL Watershed may display itself as having little data.

## Water Quality Issues

To gather the diverse viewpoints about water quality of stakeholders and experts in the watershed, we began the meeting by asking each member of the Advisory Committee to describe the water quality in the Rainy River-Rainy Lake Watershed. Their responses are shown below in a word cloud.

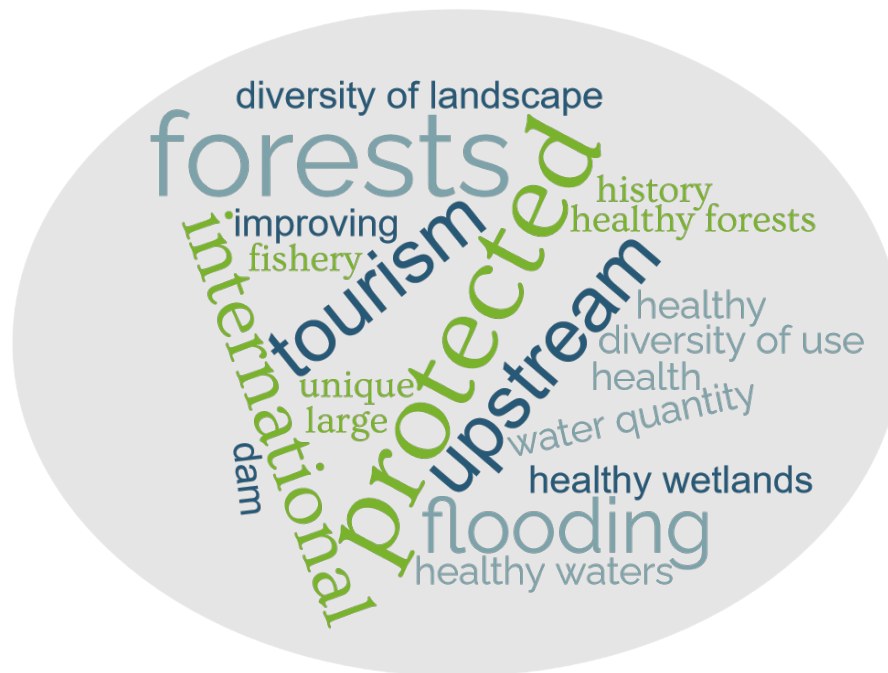


Figure 2 Word cloud about water quality in the Rainy River-Rainy Lake Watershed.



Prior to the meeting, previous plans, reports, state agency comment letters, and public input were reviewed and gathered to better understand the issues and opportunities in the watershed (Figure 3). These were compiled into common themes, which were then used at the water quality topic meeting for facilitation.

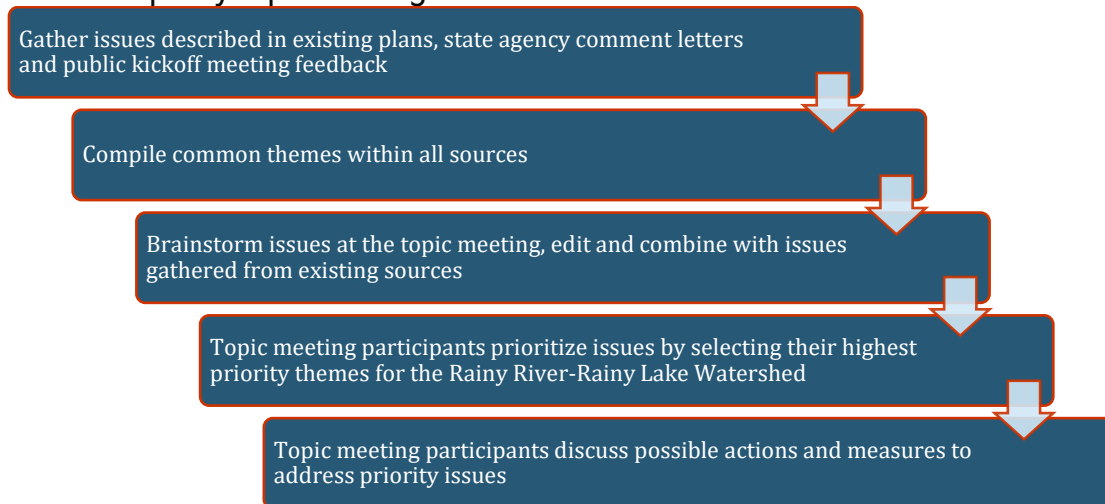


Figure 3 Issue statement development for the Rainy River-Rainy Lake 1W1P.

At the meeting, attendees were asked to write issues and opportunities related to water quality on sticky notes. These notes were then clustered into themes to determine if the Advisory Committee priorities align with the themes gathered from the plans, reports comment letters, and public input. Themes were then adjusted, regrouped, or new themes were created based on feedback and advice from the committee (Jamboard provided as reference at the end of Topic Meeting Report). The group then finalized a list of 4 themes related to water quality (Table 1). Themes that fit under other categories (e.g., water quantity and hydrology) were tabled until the appropriate upcoming meeting. Additionally, themes that were not selected as issues were identified as local concerns (i.e. international watershed) or planning lenses (i.e. climate change).

Table 1 Draft issue statements related to water quality.

Draft Issue Statement	Draft Issues Statement
<b>Water Quality Contaminants</b>	Nutrient, bacteria, mercury, sediment, and chloride runoff or loading has the potential to decrease water quality and impact aquatic recreation and aquatic life.
<b>Point Source Contaminants</b>	Point sources of contamination from septics, gray water discharge, and other sources impact water quality conditions.
<b>Erosion and Shoreland Management</b>	Streambank, ditch, and shoreline erosion increases sediment loading and reduces water and habitat quality.
<b>Aquatic Invasive Species</b>	Aquatic invasive species can degrade lake, stream, and wild rice habitat, impact aquatic recreation, and cause shift in aquatic ecosystems.



Each participant was also asked to vote for their top two issues for water quality using sticky dots. The priorities overall were:

- Erosion and Shoreland Management (10 votes- highest priority)
- Water Quality Contaminants (7 votes- medium priority)
- Point Source Contaminants (7 votes- medium priority)
- Aquatic Invasive Species (2 votes- lowest priority)

## Water Quality Actions

### Water Quality Contaminants

- Stormwater practices
- Salt use in the cities (and all communities)
- Stormwater planning (I-Falls and Ranier)
- Peatland restoration and protection (may be politically challenging)
- Peatland restoration in areas on state land or other public land on ditches that are not serving a purpose or are ineffective for drainage.

### Point Source Contaminants

- Information and outreach for graywater (education and outreach also applies elsewhere)
- Replacement of failing systems
- Stormwater permits (helping people get through them- use funding to help bring systems into compliance)
- Landfills – lining? (likely falls into groundwater)

### Erosion and Shoreland Management

- Livestock fencing
- Livestock management practices
- Culvert replacement and addressing undersized culverts
- Shoreline stabilization (resiliency from high water events)
- Shoreline management
- Bridge south of Highway 217 – trail bridge
- Enhancing ditches to better function like a natural channel
- Review shoreland ordinances and set backs; more resources
- Water levels and rule curves

### Aquatic Invasive Species

- Education and outreach
- Hybrid cattails (coordination)ss
- AIS regulations and enforcement
- Identify strategies for preventing introduction AIS during high threat times (i.e. early spring on the Rainy River)





## Water Quality Resources

In addition to actions, a framework was proposed for categorizing efforts related to water quality. Four categories were proposed (Figure 4), including vigilance, protect, enhance, and restore. Figure 4 provides definitions and categorization criteria. Additional discussion of the “protect” category will be addressed at future meetings, as attendees determined a better, synonymous word should be used. Figure 5 uses these categories to map surface water resources in the watershed.

VIGILANCE	PROTECT	ENHANCE	RESTORE
<b>&gt;75% Protected; Keep Protected</b>  <i>“Protected” defined as: public land, public water, easements, SFIA, wetlands</i>	<b>Good quality but want to increase protection</b>  <i>&lt;25% Disturbance &lt;75% Protected</i>	<b>Where we want to focus fixing things even if they are not impaired</b>  <i>Nearly impaired or algae blooms, declining trend, and/or &gt;25% disturbance (or past disturbance)</i>	<b>Where we want to fix things</b>  <i>Impaired</i>
Any lakes / streams in VNP, SNAs, public land, etc.	Any Lakes of Biological Significance, Wild Rice Lakes but that are <75% protected	Rainy River downstream of International Falls (past disturbance)	Black River ( <i>E.coli</i> )  West Fork Black River ( <i>E.coli</i> )



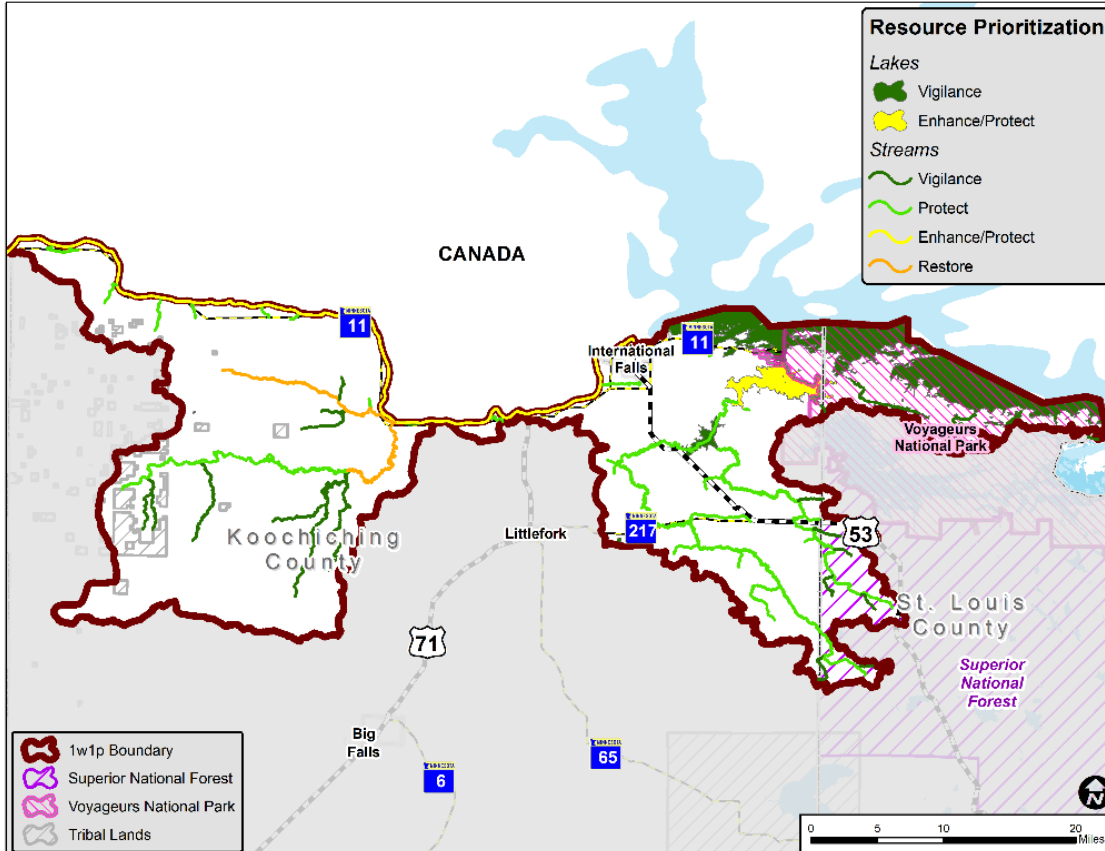
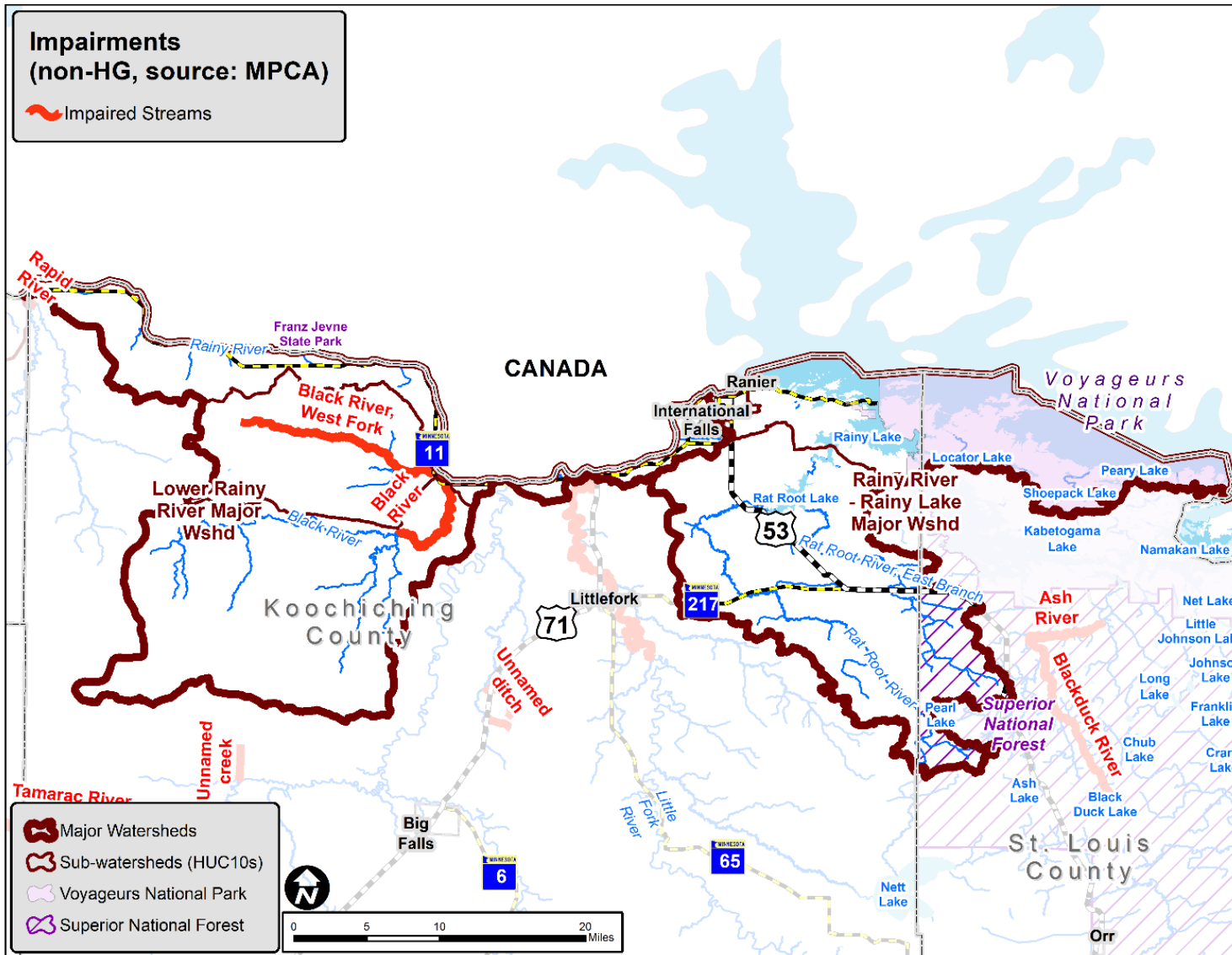


Figure 5 Resource prioritization in the watershed.

## Meeting Attendees

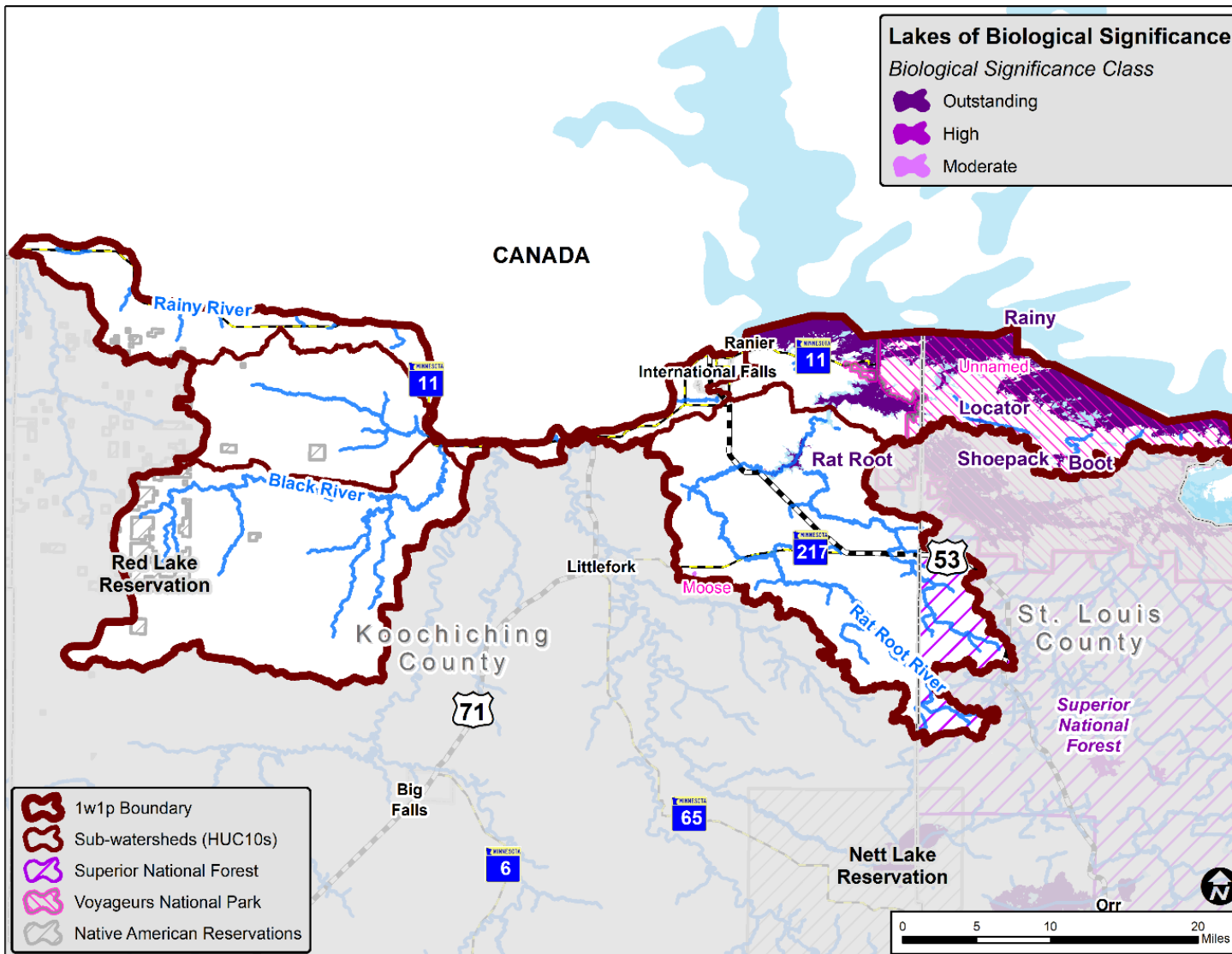
- Pam Tomevi, Koochiching SWCD
- Amy Mustonen, MPCA
- Will Lee, NRCS
- Jeff Hrubes, BWSR
- Phil Talmage, DNR Fisheries
- Nathan Heibel, Koochiching Land and Forest
- Phil Norvitch, N. St. Louis SWCD
- Sam Soderman, Koochiching SWCD
- Matthew Gouin, Koochiching Environmental Services
- Chad Severts, BWSR
- Jolen Simon, Koochiching SWCD
- Kayla Bowe, Red Lake DNR
- Mitch Brinks, Crow Wing County
- Dain Erickson, Red Canoe Cre8tive
- Rachel Olm, Houston Engineering Inc.
- Aaron Frankl, Houston Engineering Inc.





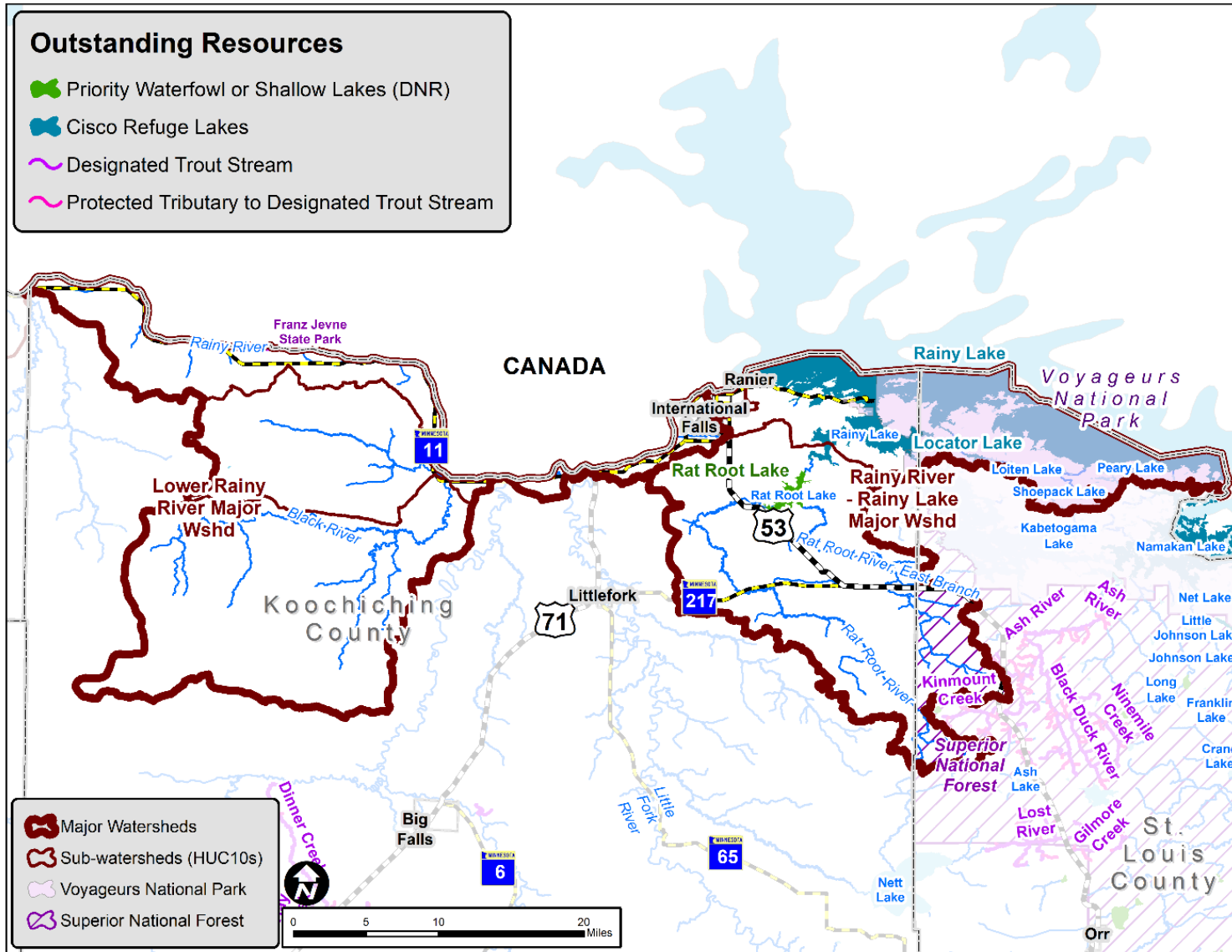
Impaired streams in RR-RL Watershed. Mercury impairments are not included.





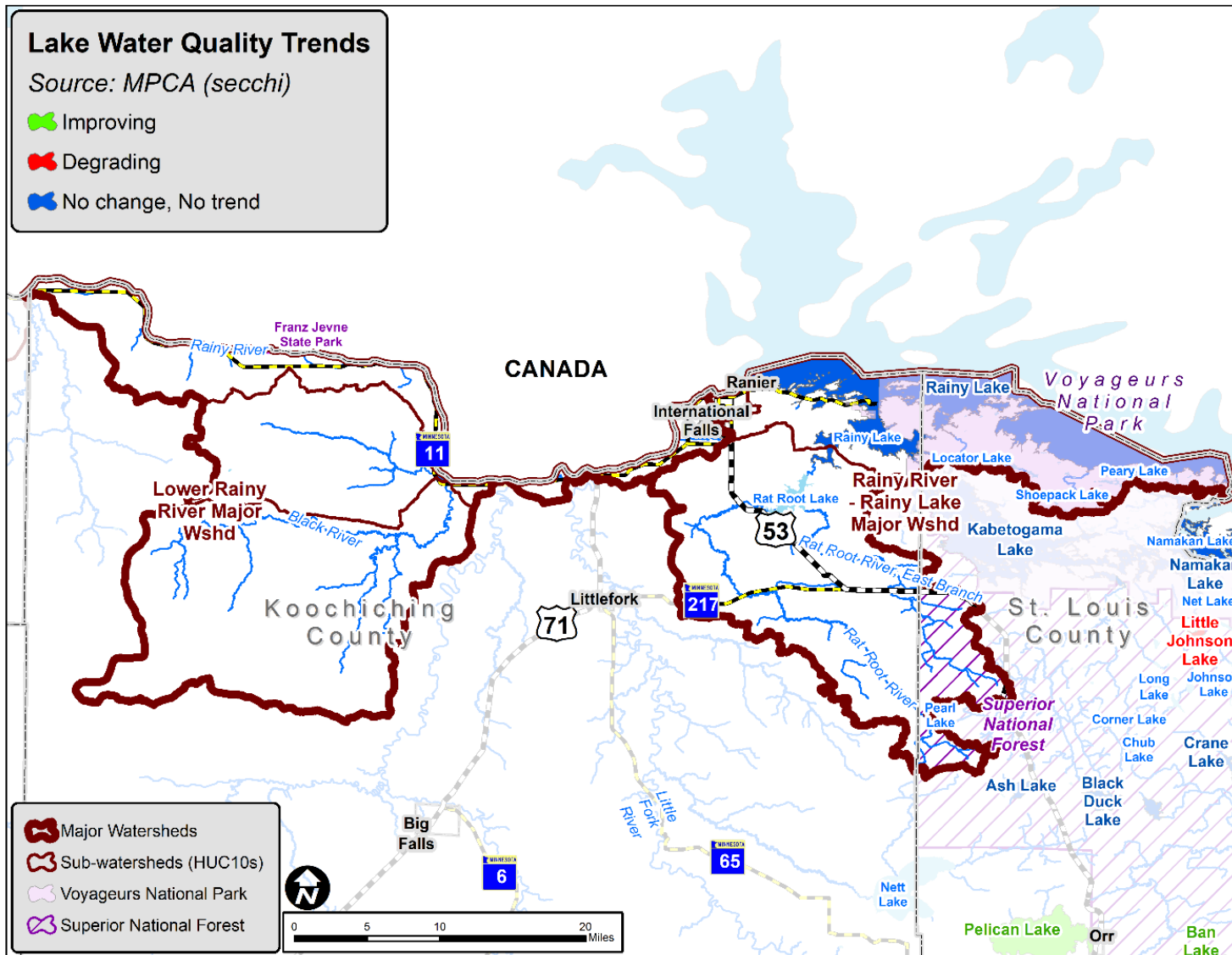
*Lakes of biological significance in the RR-RL Watershed.*





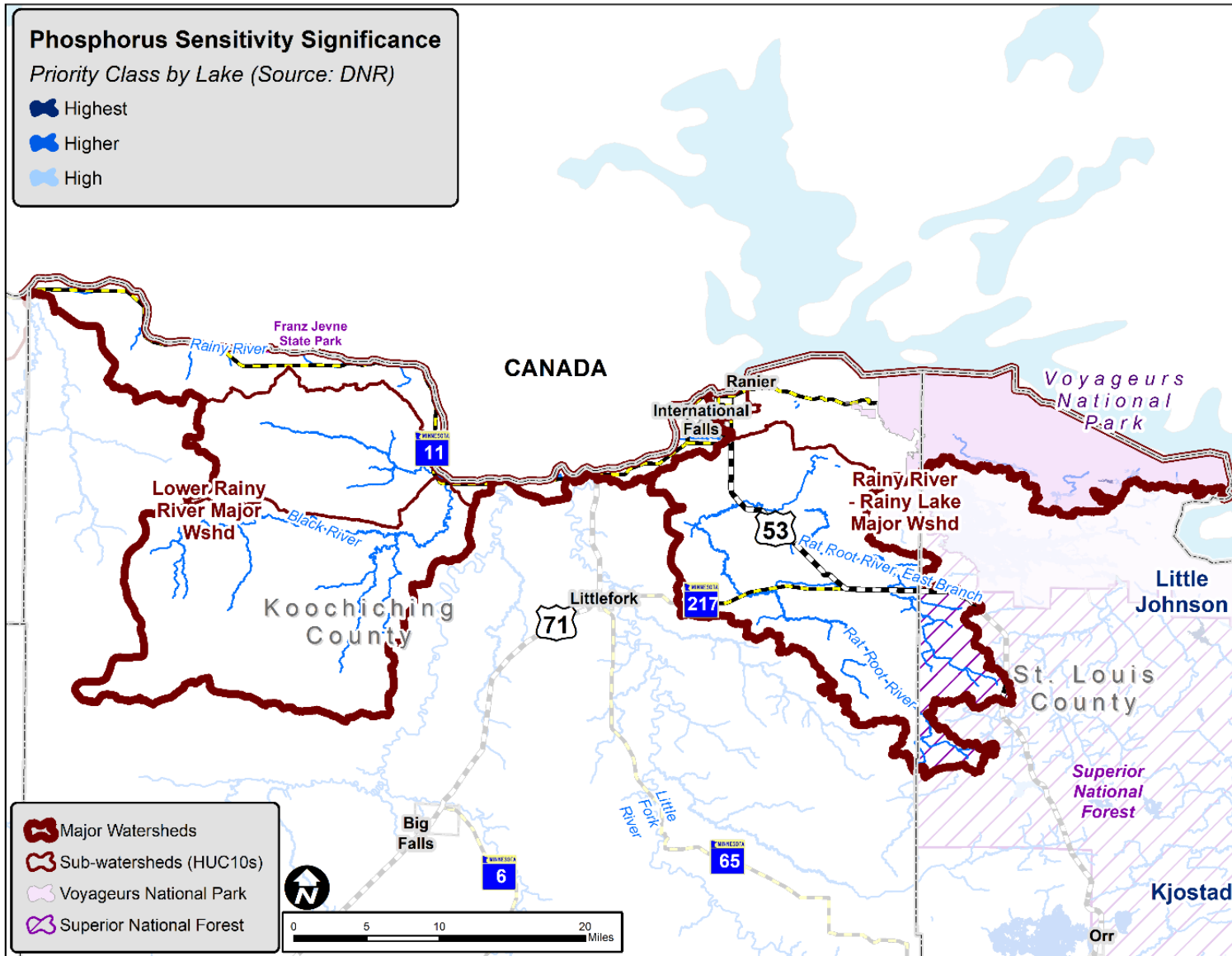
Lakes and streams which are identified as outstanding resources in the RR-RL Watershed.





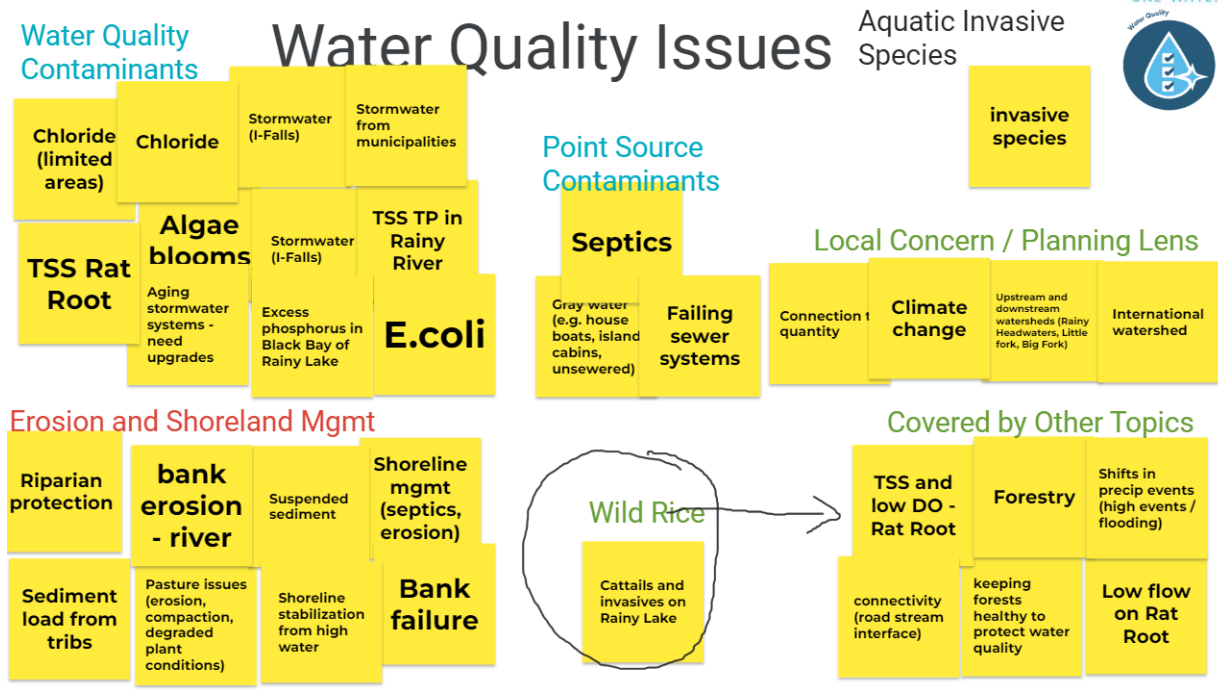
Water quality trends in the RR-RL. This has only completed for Rainy Lake.





*There are no lakes with phosphorous sensitivity in the watershed.*





## CITATIONS

EPA, 2023. Available at: <https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products>

International Joint Commission, 1909. Available at: <https://ijc.org/en/what/water-quality>

Koelmans et al., 2019. Available at: [Microplastics in freshwaters and drinking water: Critical review and assessment of data quality - PMC \(nih.gov\)](#)

Koochiching Soil and Water Conservation District, 2018. Koochiching County Comprehensive Local Water Management Plan, 2018-2028.

MPCA, 2022a. Lower Rainy River Watershed Restoration and Protection Strategy. Minnesota Pollution Control Agency.

MPCA, 2022b. Rainy River- Rainy Lake Watershed Restoration and Protection Strategy. Minnesota Pollution Control Agency.





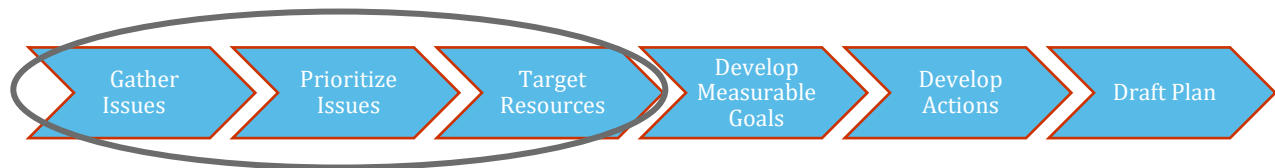
# WATER QUANTITY AND HYDROLOGY TOPIC MEETING REPORT

## Introduction

The Rainy River-Rainy Lake/Lower Rainy River (RR-RL) Watershed, situated along Minnesota's northern border with Canada, is a healthy watershed containing natural resources that draw visitors from across the region. The watershed drains approximately 630,000 acres across Koochiching County (84% of the watershed), as well as St. Louis and Lake of the Woods Counties. The International Falls-Ranier urban area is the most densely populated region in the watershed, while much of the watershed sparsely populated lands with wetlands (70% of watershed), forests, rivers, and lakes. Major surface waters include the Rainy, Rat Root, and Black Rivers as well as Rainy and Rat Root Lakes.

The Rainy River-Rainy Lake One Watershed, One Plan (1W1P) is a planning partnership between Koochiching County, Koochiching SWCD, the City of International Falls, and the City of Ranier. This partnership aims to maintain the high quality of its natural resources and restore valuable resources in the RR-RL. Through this process, the planning partners, with guidance from local experts and stakeholders, will develop a comprehensive watershed management plan that contains measurable goals and implementation actions to help achieve those goals.

The 1W1P process is outlined in Figure 1 below. For the first steps of this process (gathering issues, prioritizing issues, and targeting resources), a series of topic meetings will be held to cover the main resource concerns in the watershed. These resource concerns include **water quality**, **water quantity and hydrology**, **groundwater**, and **habitat and forests**. This meeting packet report is for the water quantity and hydrology topic meeting. For this meeting, topic experts for water quantity and hydrology were invited to attend. This included staff members from local SWCD offices, state agencies, and county staff who provided their unique expertise to the planning process for water quantity and hydrology.



*Figure 1. The 1W1P planning process and steps.*

The planning process for the Rainy River-Rainy Lake 1W1P is driven by local units of government, guided by an Advisory Committee containing local stakeholders, experts, and members of state and federal agencies. The Policy Committee (the decision-making group for the plan) contains elected officials from Koochiching County and SWCD, City of Ranier, and City of International Falls.



## Rainy River – Rainy Lake Water Quantity and Hydrology Overview

Water quantity and hydrology are an important resource concern in the RR-RL. Water quantity and hydrology impact each of the other resource concerns and require careful consideration throughout the unique watershed.

The RR-RL has several water bodies that are impacted by either low flow or flooding. The Rat Root River, located in the eastern portion of the watershed, has low flow conditions. This causes seasonal impacts on the stream, including elevated TSS and low dissolved oxygen.

Flooding is also a common concern due to a lack of topographic variation across the watershed (page 8). Flooding is especially common around the International Falls urban area near Rainy Lake. The Rat Root River system is also prone to flooding. These issues may become exacerbated in the coming decades: climate change is expected to cause higher intensity precipitation events, which will require climate resiliency to limit the economic and ecological harm from potential flooding.

The RR-RL also has seen extensive ditching to allow for the draining of lands and agricultural activity (page 9). Many of the streams in the RR-RL have been ditched, although this varies by region. In the Lower Rainy River Watershed, 45% of total stream length has been altered, whereas only 12% has been altered in the Rainy River – Lower Rainy Lake Watershed. In the early 20th century, settlers attempted to drain wetlands and peatlands, building ditches, and permanently altering the landscape (much of this ditching effort failed due to the difficulties found in peatlands). Today, the landscape remains largely altered, and should be considered in planning (page 10).

Water quantity also impacts other resources in the watershed, such as wild rice. Wild rice, also known as Manoomin, is an important resource due to its cultural significance and economic value to Indigenous groups. It is traditionally harvested in lakes and streams, including Rainy Lake and Rat Root Lake in the RR-RL. Wild rice growth can be particularly impacted by high water at the wrong times, specifically high water levels in early spring through the floating-leaf stage.

Another potential issue in the RR-RL is natural and anthropogenic barriers, such as culverts and dams, which impact fish passage, water levels, and connectivity. The dam at the Fort Frances-International Falls Bridge impacts both fish passage and water levels. Floating



debris and logs are also of concern in the watershed and should be considered for planning purposes.

## Water Quantity and Hydrology Issues

To gather the diverse viewpoints about water quantity and hydrology of stakeholders and experts in the watershed, the meeting began by asking each member of the Advisory Committee to use one word to describe water quantity and hydrology in the Rainy River-Rainy Lake Watershed. Their responses are shown below in a word cloud.



*Figure 2 Word cloud about water quantity and hydrology in the Rainy River-Rainy Lake Watershed.*

Prior to the meeting, previous plans, reports, state agency comment letters, and public input were reviewed and gathered to better understand the issues and opportunities in the watershed (Figure 3). These were compiled into common themes, which were then used at the water quantity topic meeting for facilitation.



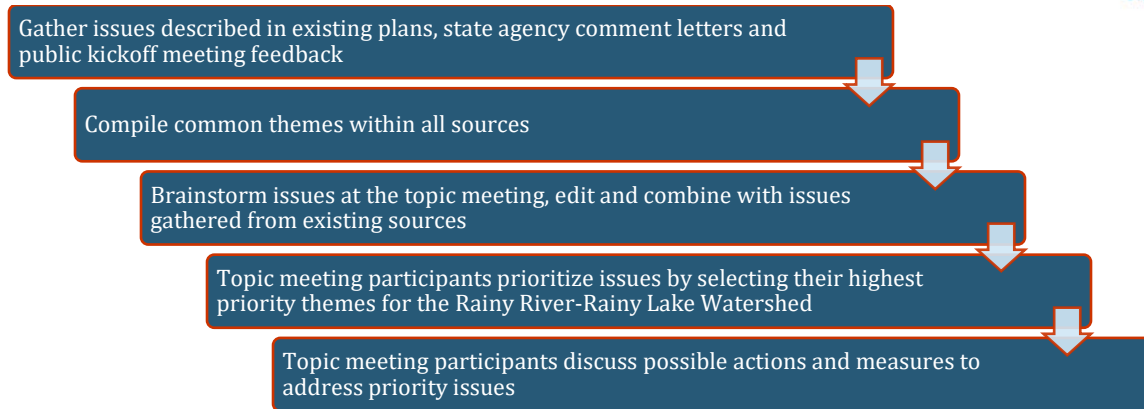


Figure 3 Issue statement development for the Rainy River-Rainy Lake 1W1P.

At the meeting, attendees were asked to write issues and opportunities related to water quantity and hydrology on sticky notes. These notes were then clustered into themes to determine if the Advisory Committee priorities align with the themes gathered from the plans, reports comment letters, and public input. Themes were then adjusted, regrouped, or new themes were created based on feedback and advice from the committee (Jamboard provided as reference at the end of Topic Meeting Report). The group then finalized a list of 4 themes related to water quantity and hydrology (Table 1). Themes that fit under other categories (e.g., habitat and forest) were tabled until the appropriate upcoming meeting, or added to previous meeting notes. Additionally, themes that were not selected as issues were identified as local concerns (e.g. high influx of water entering the watershed) or planning lenses (e.g. environmental justice).

Table 1 Draft issue statements related to water quantity and hydrology.

Draft Issue Statement	Draft Issues Statement
<b>Altered Hydrology</b>	Historical ditching, damming, and stream straightening altered the natural flow of surface water and groundwater, increasing periods of low flow, backwater effects, flashiness and erosion, and degrading habitat.
<b>Wild Rice</b>	Wild rice plants and beds are impacted by fluctuating water levels and other human activities
<b>Connectivity</b>	Natural and human made barriers impact fish passage, water levels, sediment transport, and connectivity
<b>Wetlands and Peatlands</b>	Historically altered or drained wetlands and peatlands contribute to the loss of water storage, water quality (e.g. mercury), and biological diversity on the landscape

Each participant was also asked to vote for their top two issues for water quantity and hydrology using sticky dots. The priorities overall were:

- Altered Hydrology (13 votes - highest priority)
- Connectivity (9 votes - medium priority)
- Wetland and Peatlands (4 votes - medium priority)
- Wild Rice (2 votes - lowest priority)



## Water Quantity and Hydrology Actions

Actions for each of the issue statements were also brainstormed. They are listed below. A Google Document was also created to continue building the list of actions started during the Topic Meeting. It is provided [here](#)

### Altered Hydrology

- Lake Sturgeon protection; other species impacted by hydrology in the Lower Rainy River to encourage dam operators for better hydrologic controls downstream (ecological concerns)
- Replacement of culverts to create better flow (e.g. islands that block the natural flow of water)
- Inventory of small streams that feed into the Rainy River- “death by a thousand paper cuts” – TSS and bugs may tip Rainy River into Impairments

### Wild Rice

- Better understanding of timing and flows needed to improve wild rice habitat conditions
- Reduce hybrid cattails that have created a monoculture (currently within VNP)

### Connectivity

- Assist (financial) with improvements to culverts and stormwater improvement projects
  - Technical assistance as well for design of projects
- Culverts
  - County-wide inventory of culverts, inclusive of all entities needs
  - Information to right-size culverts / pipes
  - Coordinate with road authorities to efficiently replace problem culverts
  - Railroads and culverts
- Stormwater
  - Inventory of flow for stormwater systems
  - Stormwater management plans, inventory of outfalls (some of which is done, but not all)→ specific to the City of I Falls
    - Prioritized list of projects to do in the city?
  - Stormwater permit assistance (technical and financial) to assist with compliance
  - Actions from I Falls MS4 program (also applicable for water quality and groundwater / drinking water):
    - Culvert inlet/outlet stabilization
    - Stormwater sewer outlet stabilization
    - Storm sewer mainline reconstruction
    - Storm sewer outlet abandonment/consolidation
    - Storm sewer inlet improvements
    - Stormwater retention / detention basin construction
    - Property acquisitions for stormwater / water quality improvements
    - Rain garden construction
    - Rain barrel program



- Water quality / quantity educational outreach
- Analysis impacts of new infrastructure projects (i.e. new railbridge in Ranier)
- Beaver management- pond levelers and population management
  - Gilmore Creek- recognizing benefit of beavers at times
  - Public and private lands impacted

### Wetland and Peatlands

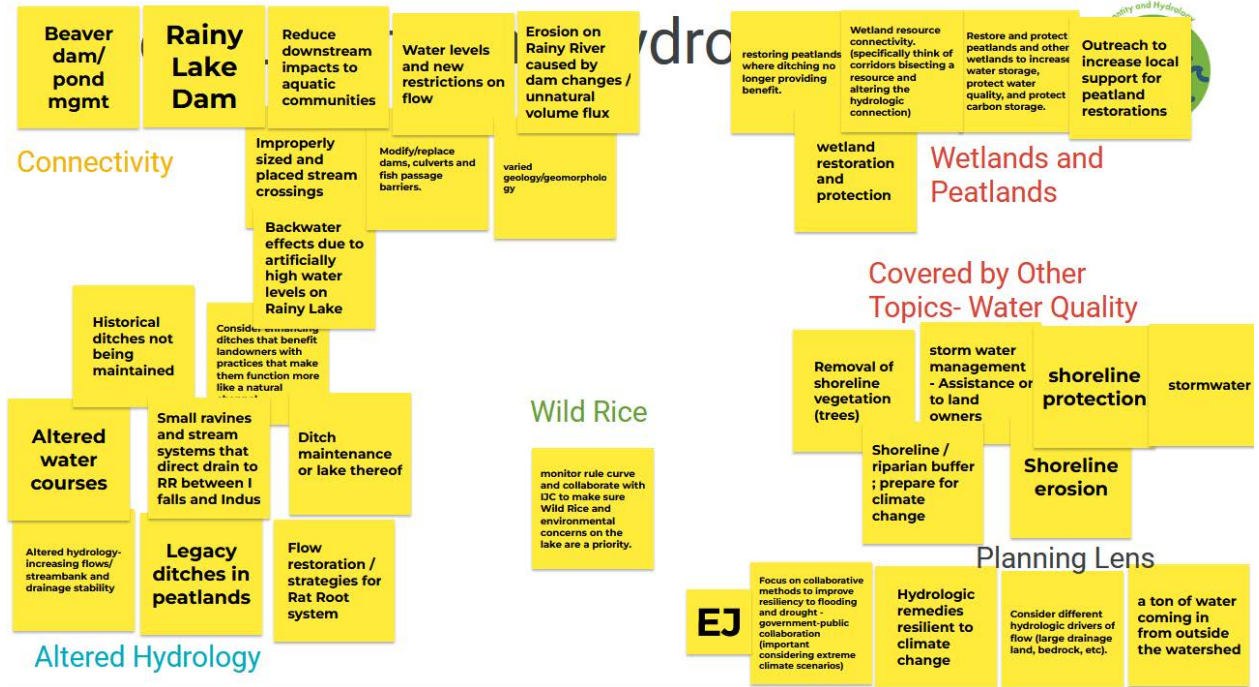
- To be completed at future date

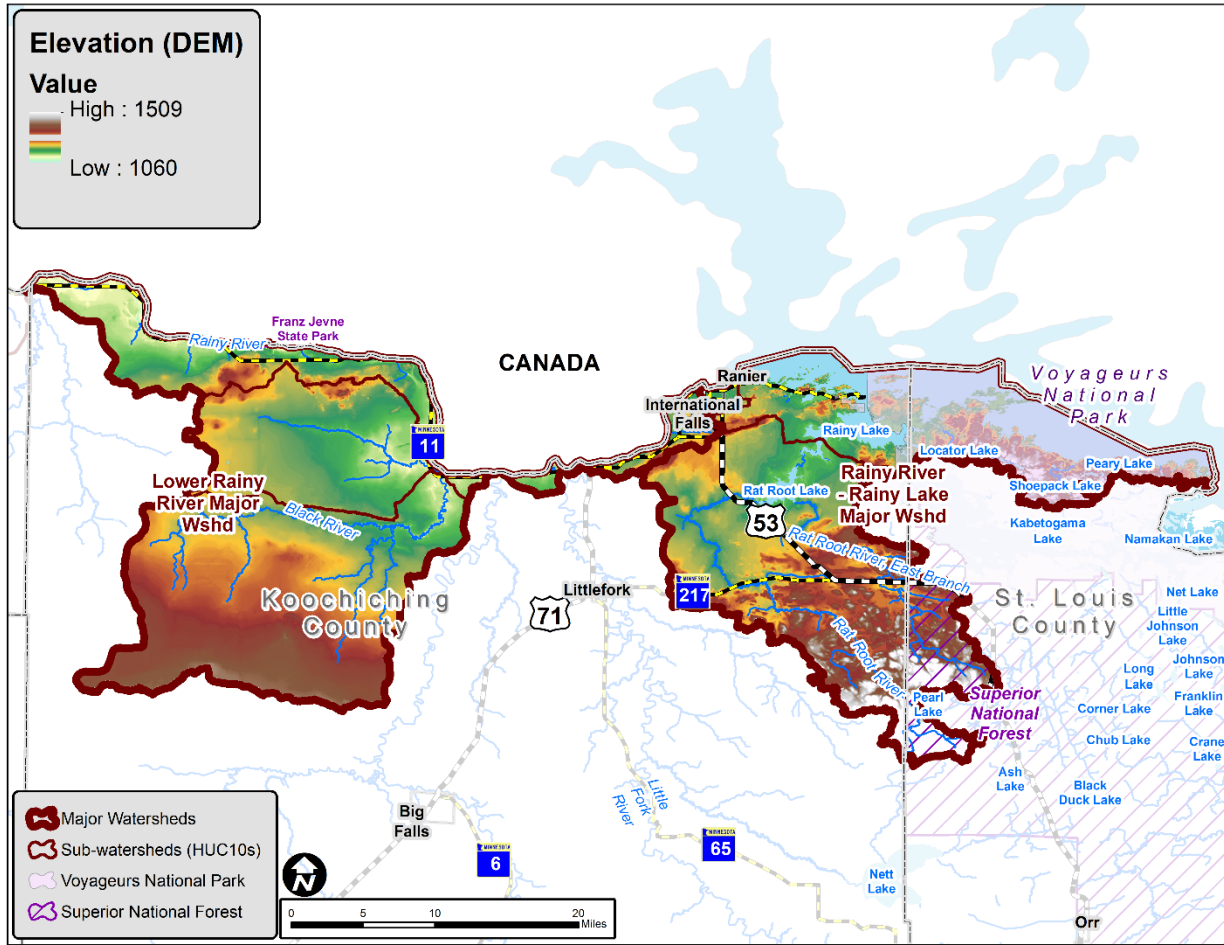
## Meeting Attendees

- Pam Tomevi, Koochiching SWCD
- Amy Mustonen, MPCA
- Jeff Hrubes, BWSR
- Phil Talmage, DNR Fisheries
- Nathan Heibel, Koochiching Land and Forest
- Phil Norvitch, N. St. Louis SWCD
- Sam Soderman, Koochiching SWCD
- Matt Gouin, Koochiching Environmental Services
- Mike Kennedy, MPCA
- Chad Severts, BWSR
- Jolen Simon, Koochiching SWCD
- Jason Fisher, International Falls City Engineer, Bolton & Menk
- Ryan Maki, Voyageurs National Park
- Mitch Brinks, Crow Wing County
- Rachel Olm, Houston Engineering Inc.
- Aaron Frankl, Houston Engineering Inc.



# Jamboard for Issue Brainstorm

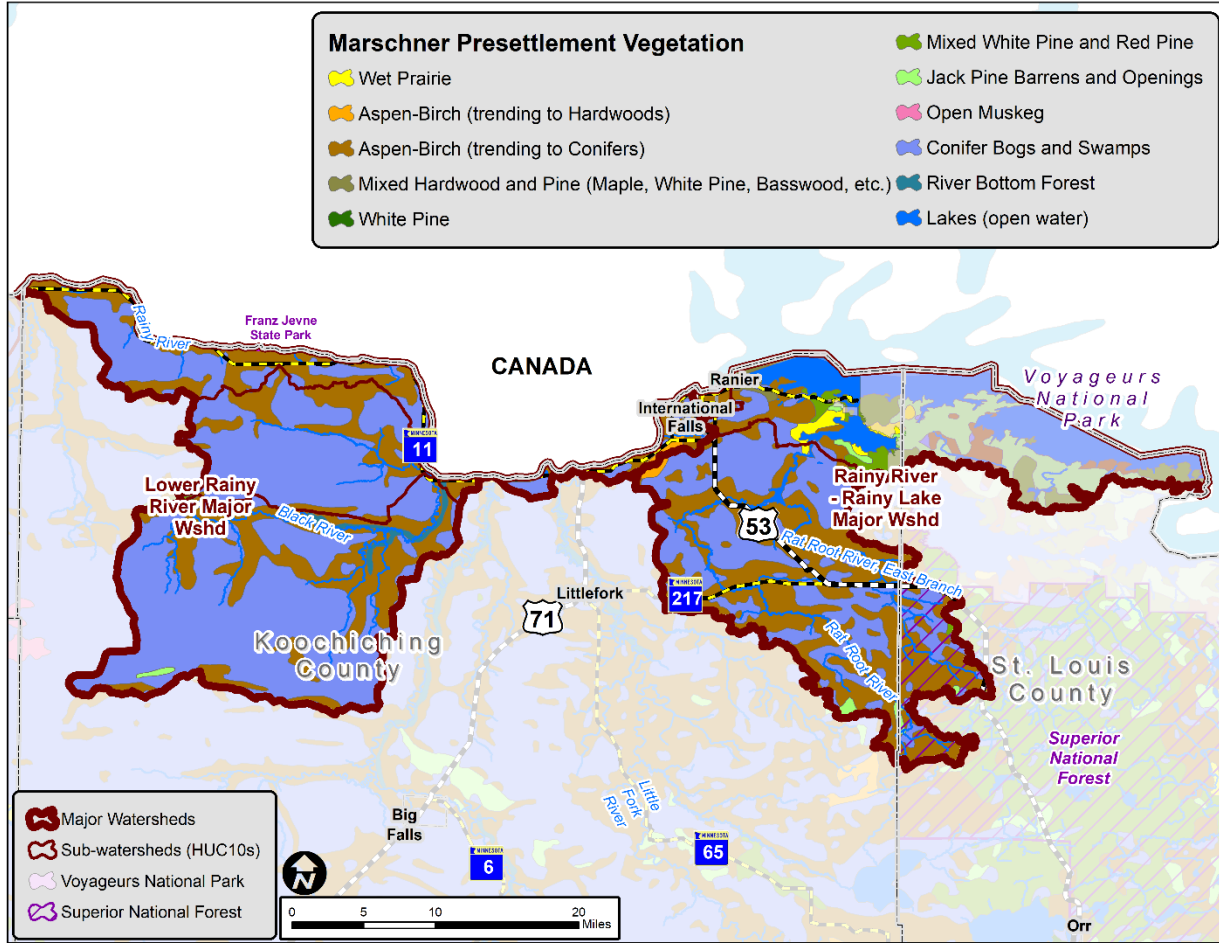




Elevation map of the RR-RL Watershed.

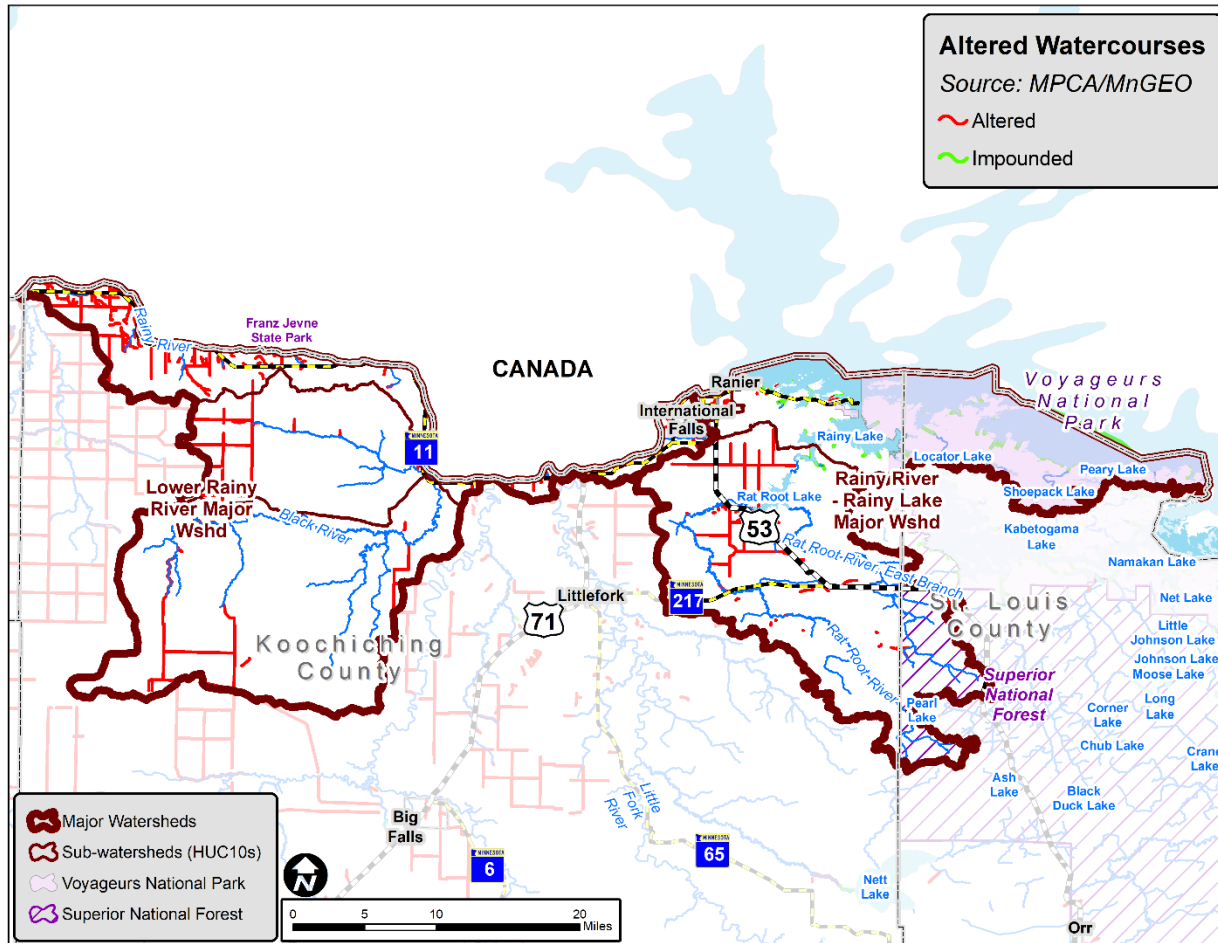






Pre-settlement vegetation in the RR-RL Watershed.





*Altered watercourses in the RR-RL Watershed.*

## CITATIONS

DNR, 2017a. Watershed Context Report: Rainy River-Manitou. Minnesota Department of Natural Resources.

DNR, 2017b. Watershed Context Report: Rainy River-Rainy Lake. Minnesota Department of Natural Resources.



# GROUNDWATER AND DRINKING WATER TOPIC MEETING REPORT

## Introduction

The Rainy River-Rainy Lake/Lower Rainy River (RR-RL) Watershed, situated along Minnesota's northern border with Canada, is a healthy watershed containing natural resources that draw visitors from across the region. The watershed drains approximately 630,000 acres across Koochiching County (84% of the watershed is in Koochiching County), as well as St. Louis and Lake of the Woods Counties. The International Falls-Ranier urban area is the most densely populated region in the watershed, with much of the watershed covered by sparsely populated lands filled with wetlands (covers 70% of watershed), forests, rivers, and lakes. Major surface waters include the Rainy, Rat Root, and Black Rivers as well as Rainy and Rat Root Lakes.

The Rainy River-Rainy Lake One Watershed, One Plan (1W1P) is a planning partnership between Koochiching County, Koochiching SWCD, the City of International Falls, and the City of Ranier. This partnership aims to maintain the high quality of its natural resources and restore (when appropriate) valuable resources in the RR-RL. Through this process, the planning partners, with guidance from local experts and stakeholders, will develop a comprehensive watershed management plan that contains measurable goals and implementation actions to help achieve those goals.

The 1W1P process is outlined in Figure 1 below. For the first steps of this process (gathering issues, prioritizing issues, and targeting resources), a series of topic meetings will be held to cover the main resource concerns in the watershed. These resource concerns include **water quality**, **water quantity and hydrology**, **groundwater and drinking water**, and **habitat and forests**. This meeting packet report is for the groundwater meeting.

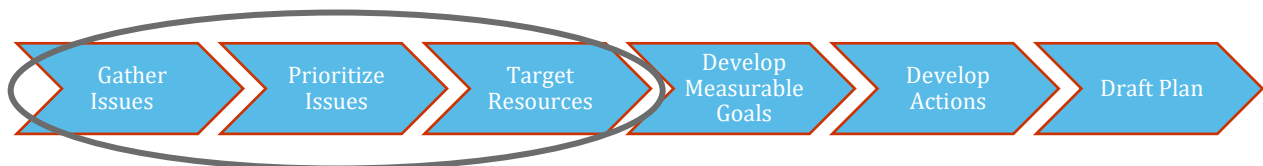


Figure 1. The 1W1P planning process and steps.

## Groundwater and Drinking Water Overview

Residents of the RR-RL Watershed rely on a mix of groundwater and surface water drinking sources based on their location within the watershed and their proximity to water supplies. International Falls (that also serves Ranier) has a public water supply (PWS) and relies on surface water sources, while many other areas throughout the watershed rely on private wells (there are 257 total historical wells in the watershed, with 142 being active and unsealed). There are six noncommunity public water suppliers that use either surface or

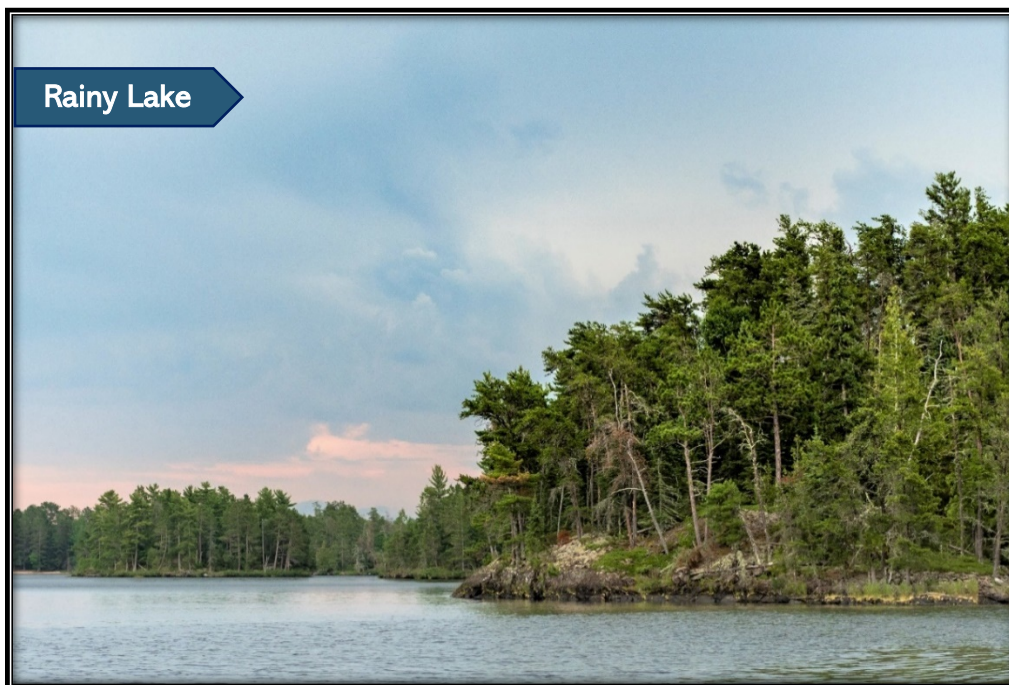


groundwater (MPCA, 2022a; 2022b). Rainy Lake and Rainy River are surface drinking water sources for many in the watershed (MPCA, 2022b). There are no Drinking Water Supply Management Areas (DWSMAs) in the watershed.

Because of the large number of private wells within the watershed, sealing of unused, unsealed wells is important to protect groundwater from potential contaminants that can be carried into the aquifer (Koochiching SWCD, 2018).

There are six groundwater provinces in Minnesota based on bedrock and glacial geology. Most of the RR-RL Watershed is in the Arrowhead Province Groundwater Province (69%, western and northern portion) and partially in the Western Province (31%, southwest portion; DNR 2017a, 2017b).

Subsurface sewage treatment systems (SSTS) are a threat to public health and can contribute *E. coli* to surface and groundwater. Koochiching County has an estimated 1,200 to 2,220 SSTSs (the exact number within the RR-RL is not known), with the MPCA estimating that 40% are failing to protect groundwater (MPCA, 2022c). While Koochiching County maintains an SSTS ordinance, additional actions may be required to help protect groundwater.



Pollution sensitivity of near surface materials varies throughout the watershed: in the eastern portion of the watershed, bedrock is near or at the surface, limiting infiltration of water, but increasing the risk that contaminants may flow over the surface into lakes and streams (DNR, 2017b). In the eastern portion of the watershed, pollution sensitivity is either very low, low, or moderate (moderate in the northwest corner of the watershed; DNR, 2017a). These risks should be considered during the planning process.

Relevant maps are included in the next pages: depth to water table (page 7), pollution sensitivity (page 8), geomorphology (page 9), Minnesota Department of Health (MDH) arsenic results (page 10), and MDH nitrate results (page 11).



## Groundwater and Drinking Water Issues

To gather the diverse viewpoints about groundwater and drinking water of stakeholders and experts in the watershed, the meeting began by asking each member of the Advisory Committee to use one word to describe groundwater in the Rainy River-Rainy Lake Watershed. Their responses are shown below in a word cloud. Note that this word cloud represents only groundwater and does not address surface water drinking water sources.

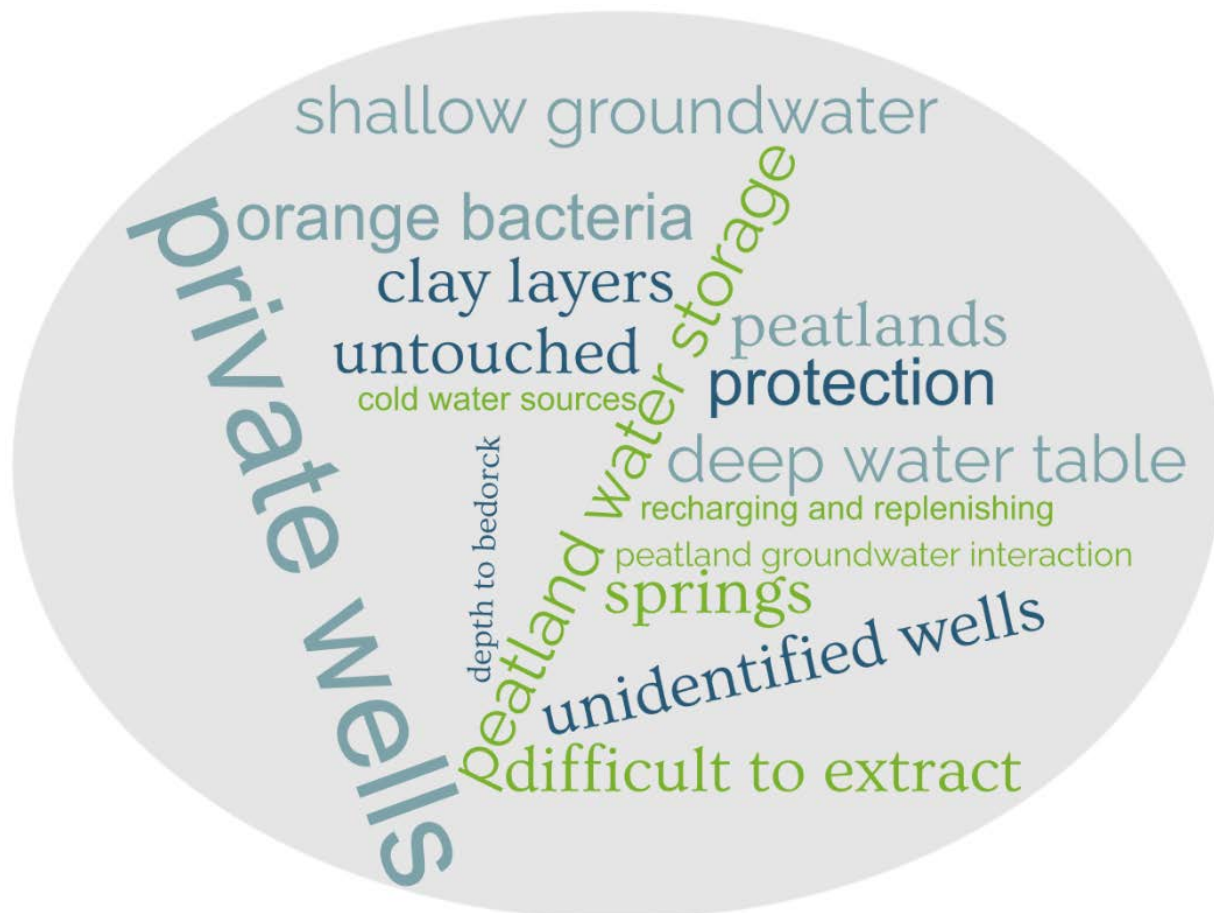


Figure 2 Word cloud about groundwater in the Rainy River-Rainy Lake Watershed.

Following this exercise, it was suggested to broaden the topic of the meeting to include all drinking water sources, as much of the watershed utilizes surface water drinking sources. The rest of this report includes discussion of all drinking water sources (both surface and groundwater).

Prior to the meeting, previous plans, reports, state agency comment letters, and public input were reviewed and gathered to better understand the issues and opportunities in the watershed (Figure 3). These were compiled into common themes, which were then used at the groundwater and drinking water topic meeting for facilitation.



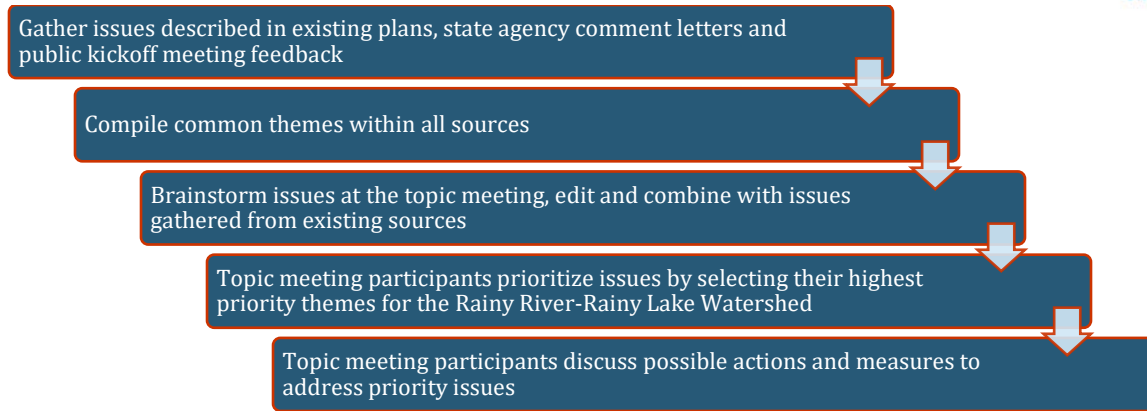


Figure 3 Issue statement development for the Rainy River-Rainy Lake 1W1P.

At the meeting, attendees were asked to write issues and opportunities related to groundwater and drinking water on sticky notes. These notes were then clustered into themes to determine if the Advisory Committee priorities align with the themes gathered from the plans, reports comment letters, and public input. Themes were then adjusted, regrouped, or new themes were created based on feedback and advice from the committee (Jamboard provided as reference at the end of Topic Meeting Report). The group decided to create only one issue statement for drinking water protection. Many other sticky notes were decided to be covered by other topics, including septic systems (covered in water quality), peatlands (covered in water quantity and hydrology), and baseflow / forestry (covered in next topic meeting, habitat and forests). Other sticky notes were noted as actions and compiled in the draft actions, below.

Table 1 Draft issue statements related to groundwater and drinking water.

Draft Issue Statement	Draft Issues Statement
<b>Drinking Water Protection</b>	Protection of groundwater and surface drinking water sources from contamination.

Unlike other meetings, there was no prioritization of issues, as only one draft issue statement was developed during this meeting.



## Groundwater and Drinking Water Actions

Actions for addressing the drinking water protection issue statement were brainstormed at the meeting. They are listed below in no particular order.

### Drinking Water Protection

- Agricultural Best Management Practices (BMPs)
  - Cover cropping and no till (soil health practices)
  - Feedlot management
  - Riparian buffers
  - Pasturelands, erosive waterways and sheet, rill erosion
- Encourage coordination with Canadian partners on agricultural BMPs
- Well sealing
  - Mapping of existing wells / undocumented wells
- Funding
- Inventory septic systems
  - Upgrade failing systems / noncompliant systems
  - Not much appetite for regular septic system inspections- will investigate if receive feedback on systems
- Public education
  - Who to reach out to for septic concerns- knowledge transfer on available programs
  - Developing outreach materials that spell out issues and program availability/ who to contact for assistance
  - Different outreach methods (radio, newspaper, online) – *don't create action item that paints you into a corner*
- Well testing
  - Local water testing and programs
  - Groundwater observation wells
- Reforestation of marginal / cleared land
- Surface water / stormwater mgmt.
  - Assist private owners with stormwater permits (financial and technical)
  - Individual wellhead protection planning
    - Septics, raingardens, erosion
    - Source water protection planning (individual)
  - Stormwater management and systems to comply with City of International Falls MS4, including (details available for each- also applicable for water quality and water quantity and hydrology):
    - Culvert Inlet/Outlet Stabilization
    - Storm Sewer Outlet Stabilization
    - Storm Sewer Mainline Reconstruction
    - Storm Sewer Outlet Abandonment/Consolidation
    - Storm Sewer Inlet Improvements
    - Stormwater Retention/Detention Basin Construction
    - Property Acquisitions for Stormwater/Water Quality Improvements



- Rain Garden Construction
- Rain Barrel Program
- Water Quality/Quantity Educational Outreach

Other:

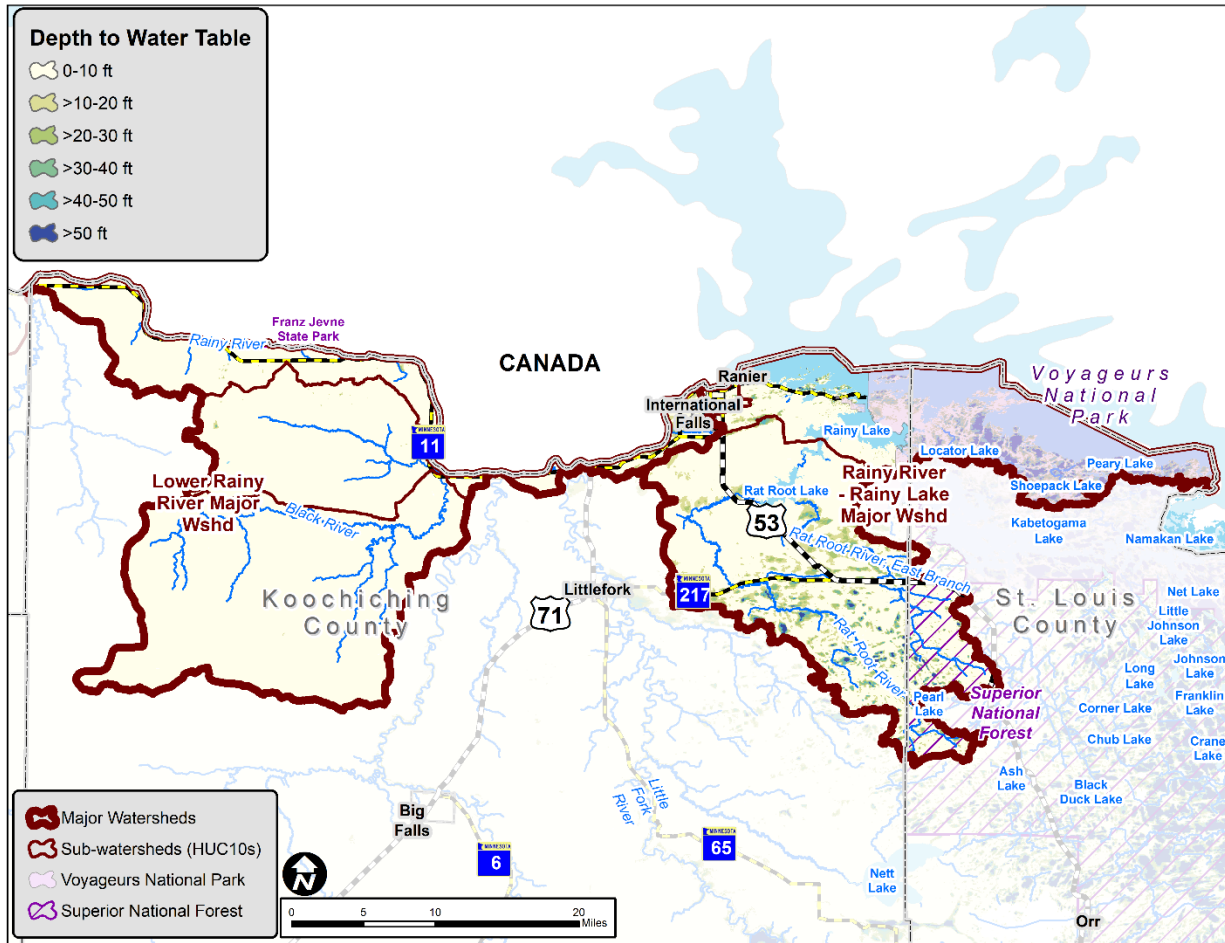
- Include statement in plan that efforts will occur on both sides, but focus of this plan is on the MN side of the border. We will **continue to** engage / work with/ support / collaborate / sharing of knowledge....

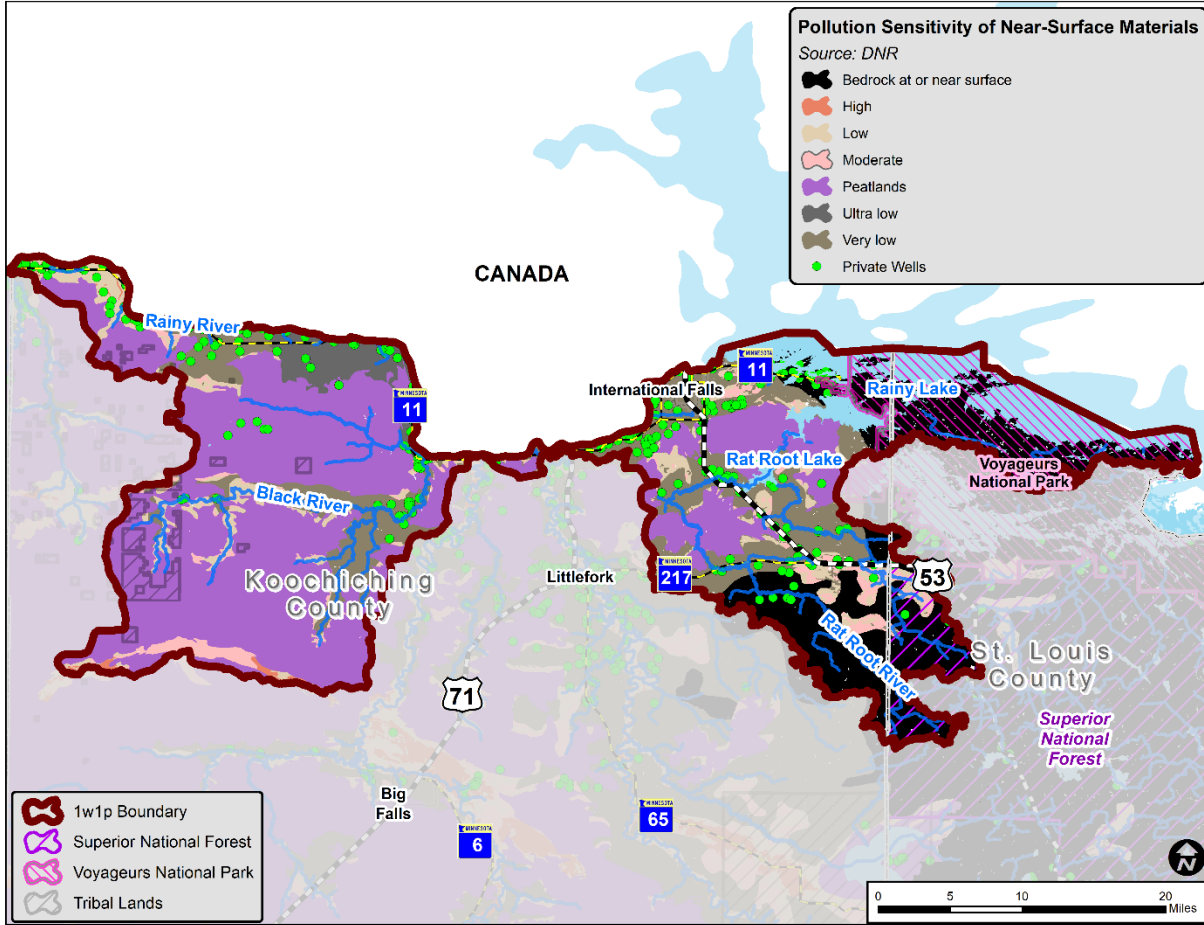
## Meeting Attendees

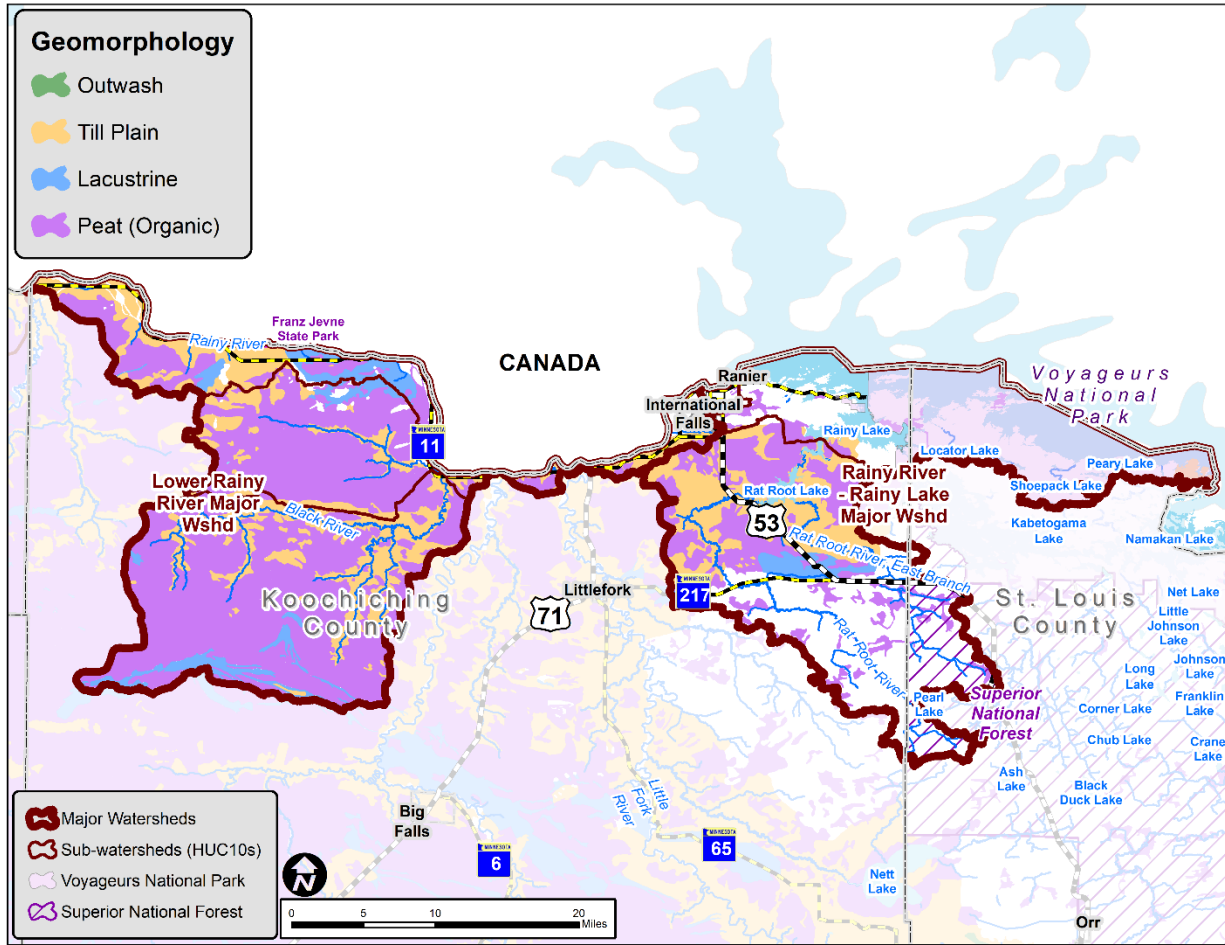
- Pam Tomevi, Koochiching SWCD
- Amy Mustonen, MPCA
- Jeff Hrubes, BWSR
- Phil Talmage, DNR Fisheries
- Phil Norvitch, N. St. Louis SWCD
- Sam Soderman, Koochiching SWCD
- Mike Kennedy, MPCA
- Jason Fisher, International Falls City Engineer, Bolton & Menk
- Ryan Maki, Voyageurs National Park
- Mitch Brinks, Crow Wing County
- Dain Erickson, Red Canoe Cre8tive
- Rian Reed, DNR Waters
- Mike Hanson, North Star Electric Cooperative
- Marcie Peters, Koochiching SWCD
- Matthew Gouin, Koochiching Environmental Services
- James Aasen, Koochiching SWCD
- Rachel Olm, Houston Engineering Inc.
- Aaron Frankl, Houston Engineering Inc.



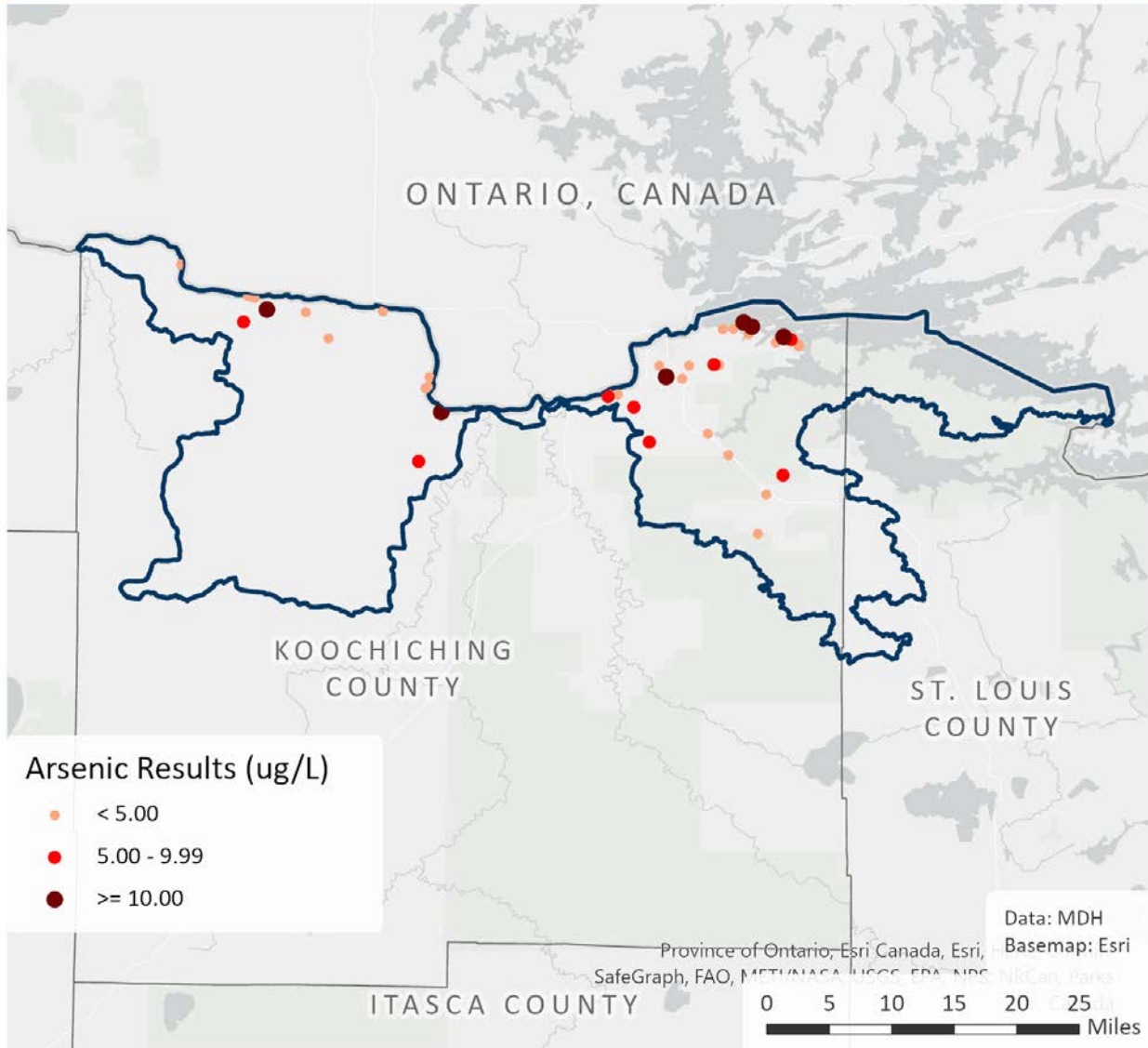








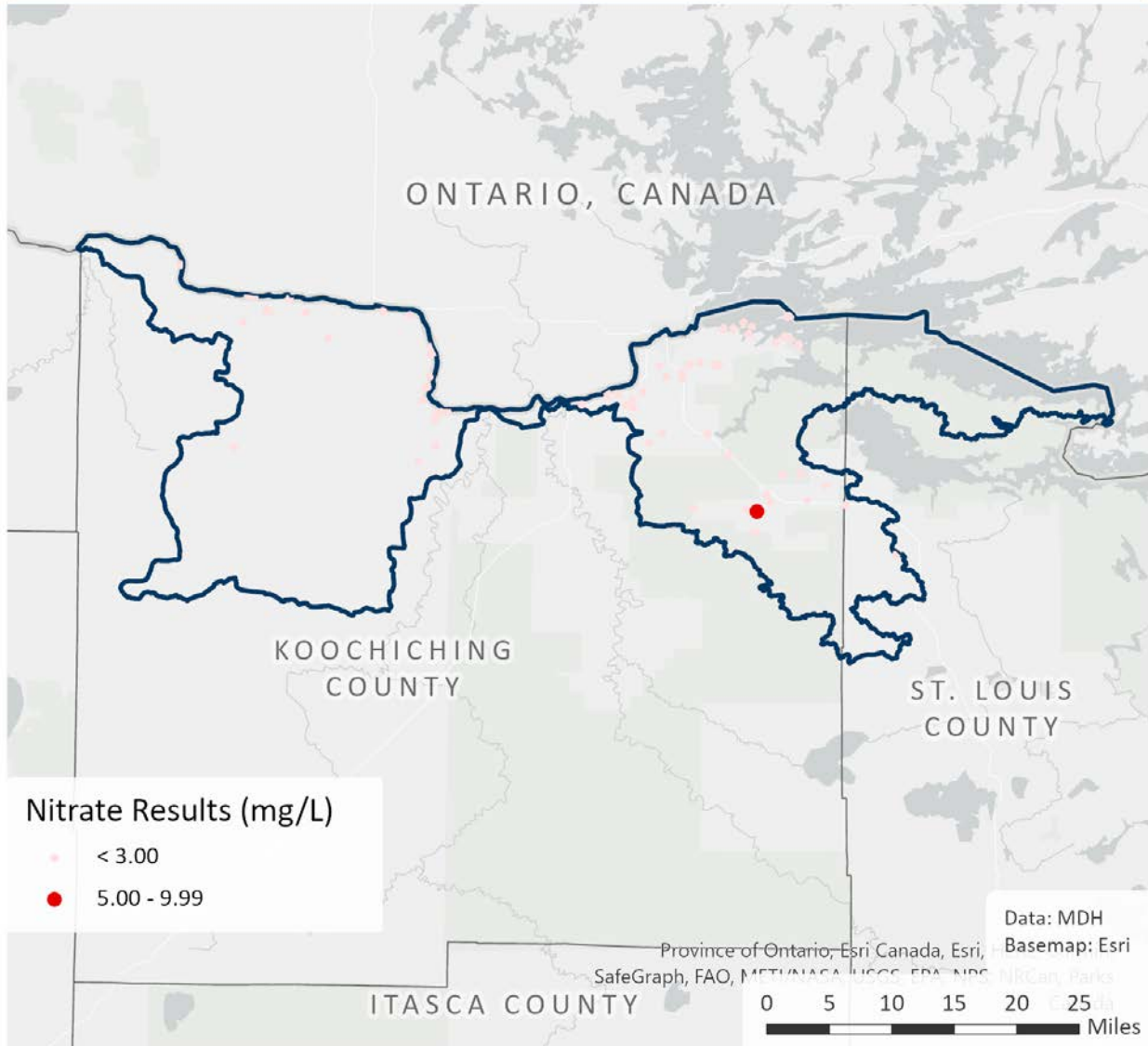
## Arsenic Results (maximum recorded)



Source: MDH Priority Concerns Letter. This information can help you understand which wells in the watershed contain elevated arsenic levels.



## Nitrate Results (maximum recorded)



Source: MDH Priority Concerns Letter. This information reflects nitrate results to highlight areas of the watershed where there is known nitrate contamination of the water people are drinking. This figure can help prioritize implementation activities aimed at reducing nitrate levels in the sources of drinking water.

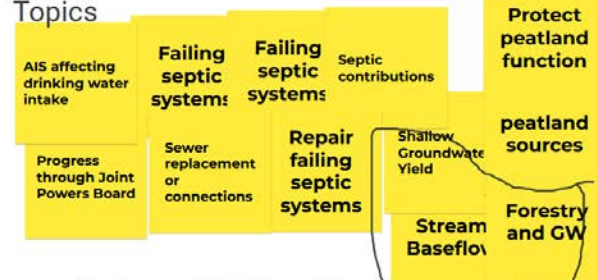


# Groundwater/Drinking Water Issues

## Drinking Water Protection



## Covered by other Topics



## Actions / Funding / Data Gaps



## CITATIONS

DNR, 2017a. Watershed Context Report: Rainy River-Manitou. Minnesota Department of Natural Resources.

DNR, 2017b. Watershed Context Report: Rainy River-Rainy Lake. Minnesota Department of Natural Resources.

Koochiching Soil and Water Conservation District, 2018. Koochiching County Comprehensive Local Water Management Plan, 2018-2028.

MPCA, 2022a. Lower Rainy River Watershed Restoration and Protection Strategy. Minnesota Pollution Control Agency.

MPCA, 2022b. Rainy River- Rainy Lake Watershed Restoration and Protection Strategy. Minnesota Pollution Control Agency.

MPCA, 2022c. Lower Rainy River Watershed Total Maximum Daily Load. Minnesota Pollution Control Agency.



# HABITAT AND FORESTS TOPIC MEETING REPORT

## Introduction

The Rainy River-Rainy Lake/Lower Rainy River (RR-RL) Watershed, situated along Minnesota's northern border with Canada, is a healthy watershed containing natural resources that draw visitors from across the region. The watershed drains approximately 630,000 acres across Koochiching County (84% of the watershed), as well as St. Louis and Lake of the Woods Counties. The International Falls-Ranier urban area is the most densely populated region in the watershed, with much of the watershed covered by sparsely populated lands filled with wetlands (cover 70% of watershed), forests, rivers, and lakes. Major surface waters include the Rainy, Rat Root, and Black Rivers as well as Rainy and Rat Root Lakes.

The Rainy River-Rainy Lake One Watershed, One Plan (1W1P) is a planning partnership between Koochiching County, Koochiching SWCD, the City of International Falls, and the City of Ranier. This partnership aims to maintain the high quality of its natural resources and restore (when appropriate) valuable resources in the RR-RL. Through this process, the planning partners, with guidance from local experts and stakeholders, will develop a comprehensive watershed management plan that contains measurable goals and implementation actions to help achieve those goals.

The 1W1P process is outlined in Figure 1 below. For the first steps of this process (gathering issues, prioritizing issues, and targeting resources), a series of topic meetings will be held to cover the main resource concerns in the watershed. These resource concerns include water quality, water quantity and hydrology, groundwater and drinking water, and habitat and forests. This meeting packet material is for the habitat and forests topic meeting.

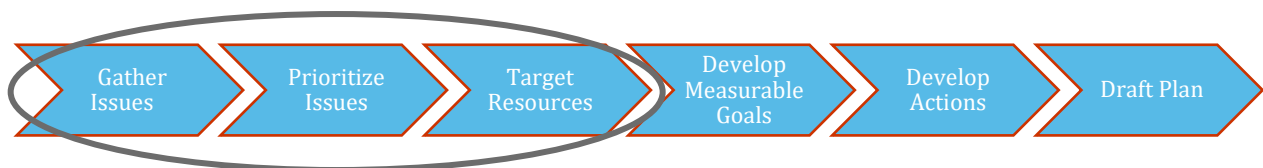


Figure 1. The 1W1P planning process and steps.

## Rainy River – Rainy Lake Habitat and Forests Overview

Prior to European settlement, the RR-RL Watershed was mostly conifer forests and peatlands (DNR, 1988). Compared to many regions in the state, landscape alteration in the watershed is minimal (DNR, 2017a, 2017b). A majority (70%) of the landcover in the RR-RL Watershed is classified as either herbaceous (12%) or woody (58%) wetlands (USGS, 2019; Page 5), much of which would be classified as peatlands. Peatlands contain partially decomposed organic material, unable to fully decompose due to saturated conditions. Generally, peatlands are not economically productive, but provide valuable



ecosystem services, store water, sequester carbon, and improve water quality. Peatlands have historically been drained, but drainage in the RR-RL has been minimal due to difficult growing conditions. Peatlands remain an important habitat for wildlife in the watershed.

Mixed forests cover approximately 15% of the land cover and are concentrated on the eastern side of the watershed. Open water covers 8% of the land cover with a large majority of that being Rainy Lake.

There are a variety of unique habitats in the region due to the varying land cover. In Minnesota's State Wildlife Action Plan, 16 key habitats were identified for land planning (page 3). A large portion of the RR-RL would be considered Forest-Lowland Coniferous, with much smaller portions as Forest-Upland Deciduous habitat (DNR, 2023b).

The dominant habitat in the watershed is the peatlands, which are home to many unique species found only in this area of the state.

Unique species include the northern bog lemming, yellow rail, short-eared owl, and Wilson's phalarope (DNR 2023a). Northern peatlands provide refuge for endangered, threatened, or species of special concern including the English sundew, coastal sedge, bog rush, twig rush, linear-leaved sundew, sooty colored beak-rush, and montane yellow-eyed grass (DNR 2023a).

There are seven lakes of biological significance in the watershed, all located on the eastern side of RR-RL (page 6). Five are categorized as "outstanding" Rainy, Rat Root, Boot, Locator, and Shoepack (highest level of significance); two, Moose and an Unnamed Lake, are "Moderate" (lowest level).

Much of the public land in the region is forested land, managed by the DNR. There are five Scientific and Natural Areas in the Watershed: the North Black River Peatland, South Black River Peatland, West Rat Root River Peatland, East Rat Root River Peatland, and Watrous Island (page 7). There is one Wildlife Management Area, Gold Portage located adjacent to Voyageurs National Park.

Other maps are included at the end of this meeting packet related to habitat and forests: 2016 land cover (page 8), protected lands (page 9) watershed protected lands (page 10), outstanding resources (page 11), LSOHC 25-year forest priorities (page 12), forest stewardship (page 13), forest disturbance areas (page 14), forest land percentage (page 15), Forest for the Future priorities (page 16), ecological subsections (page 17), Wildlife Action Network Rank (page 18), and DNR sites of biodiversity significance (page 19).





## Habitat and Forests Issues

To gather diverse viewpoints about habitats and forests from stakeholders and experts in the watershed, the meeting began by asking each member of the Advisory Committee to use one word to describe habitat and forests in the Rainy River-Rainy Lake Watershed. Their responses are shown below in a word cloud.

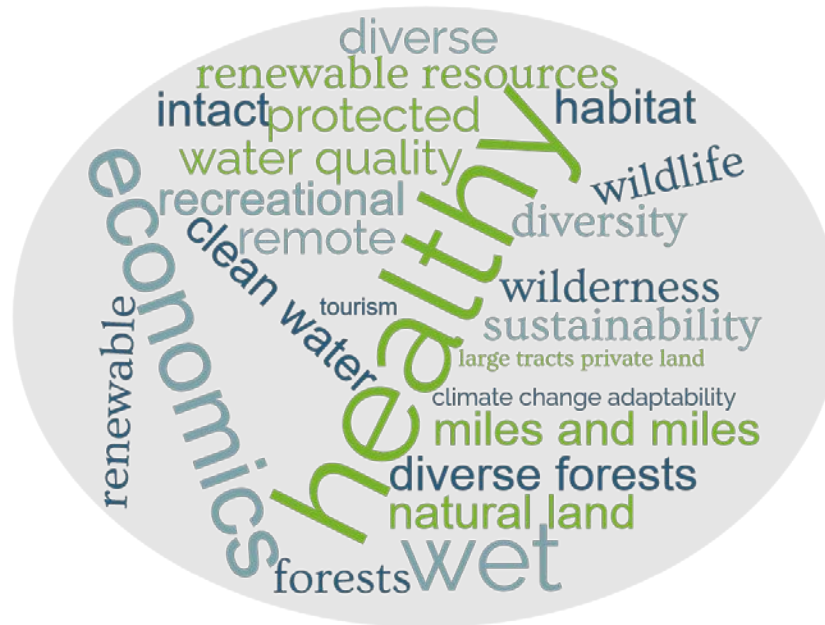


Figure 2 Word cloud for forestry and habitat in the Rainy River-Rainy Lake Watershed.

Prior to the meeting, previous plans, reports, state agency comment letters, and public input were reviewed and gathered to better understand the issues and opportunities in the watershed (Figure 3). These were compiled into common themes, which were then used at the habitat and forests topic meeting for facilitation.

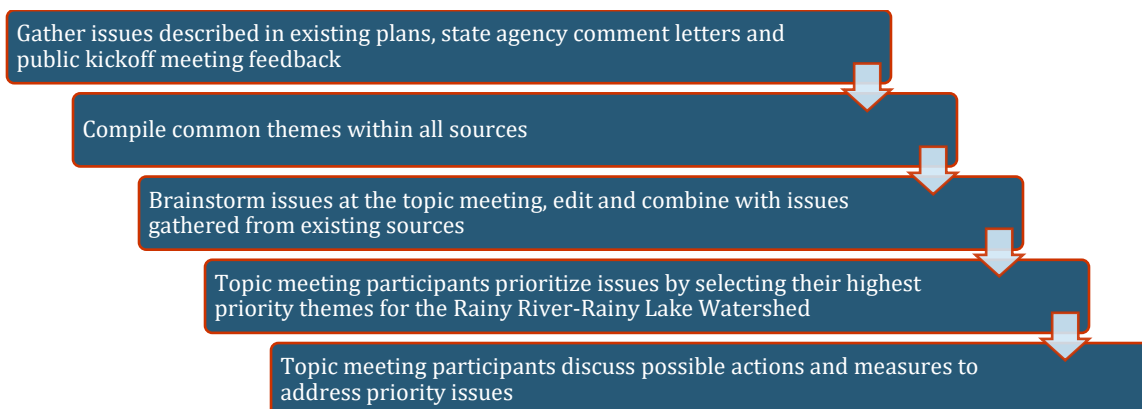


Figure 3 Issue statement development for the Rainy River-Rainy Lake 1W1P.



At the meeting, attendees were asked to write issues and opportunities related to habitat and forests on sticky notes. These notes were then clustered into themes to determine if the Advisory Committee priorities align with the themes gathered from the plans, reports comment letters, and public input. Themes were then adjusted, regrouped, or new themes were created based on feedback and advice from the committee (Jamboard provided as reference at the end of Topic Meeting Report, page 20). While originally proposed as three separate issue statements (see Jamboard), the group ultimately created only one issue statement for habitat and forests, that encompassed a wide-range of aspects including forest management, forest health, forest diversity, terrestrial invasive species, and economics. Other sticky notes were covered by other topics. Also, a number of sticky notes related to planning lenses, specifically climate change, were put forward by the committee.

*Table 1 Draft issue statements related to habitat and forests.*

Draft Issue Statement	Draft Issues Statement
<b>Forest Health and Management</b>	Forest health and management is required to mitigate the impacts of invasive species, changes in climate, and land use changes; it is important to protect economic viability, vulnerable forest types, wildlife, wetlands and peatlands, water quality, and water storage.

Unlike other meetings, there was no prioritization of issues, as only one draft issue statement was developed during this meeting.

## Forest Health and Management Actions

Actions for addressing the forest health and management statement were brainstormed at the meeting. They are listed below in no particular order.

### Diversity

- Plant black ash swales and swamp white oak- strategic planning to diversify ash dominated forest stands
- Diversify with conifers
- Promote nursery stock with containerized seedlings
- Different silvicultural treatments to promote non-ash species

### Shading

- Riparian areas- smaller parcels that don't fit within larger forest tracts
- Replanting along Rat Root especially
- Address bank stability issues

### Parcelization

- Monitor parcelization
- Encourage SFIA and 2C

### Wildlife



- Cost share for pond levelers (managing beaver populations); trapping doesn't work as well anymore
- Note grouse / moose management areas- forest activity summarized in the plans
- Large area of monoculture species- concerns for insect/disease

### Industry/Economic Viability

- Explore opportunities to market underutilized species in the event of forest health issues

### Comprehensive

- Implementation of MN voluntary site-level forest management guidelines
- Absentee landowners or those that inherit-education and outreach to promote program (SFIA and 2C)
- Coordinate opportunities for forest management with neighboring properties
- Collaborate with different agencies for harvesting to ensure forest age diversity
- Reforesting marginal ag lands
- WRAPS has feedback about protection riparian- protection of land within certain areas of the stream

### OTHER TOPICS

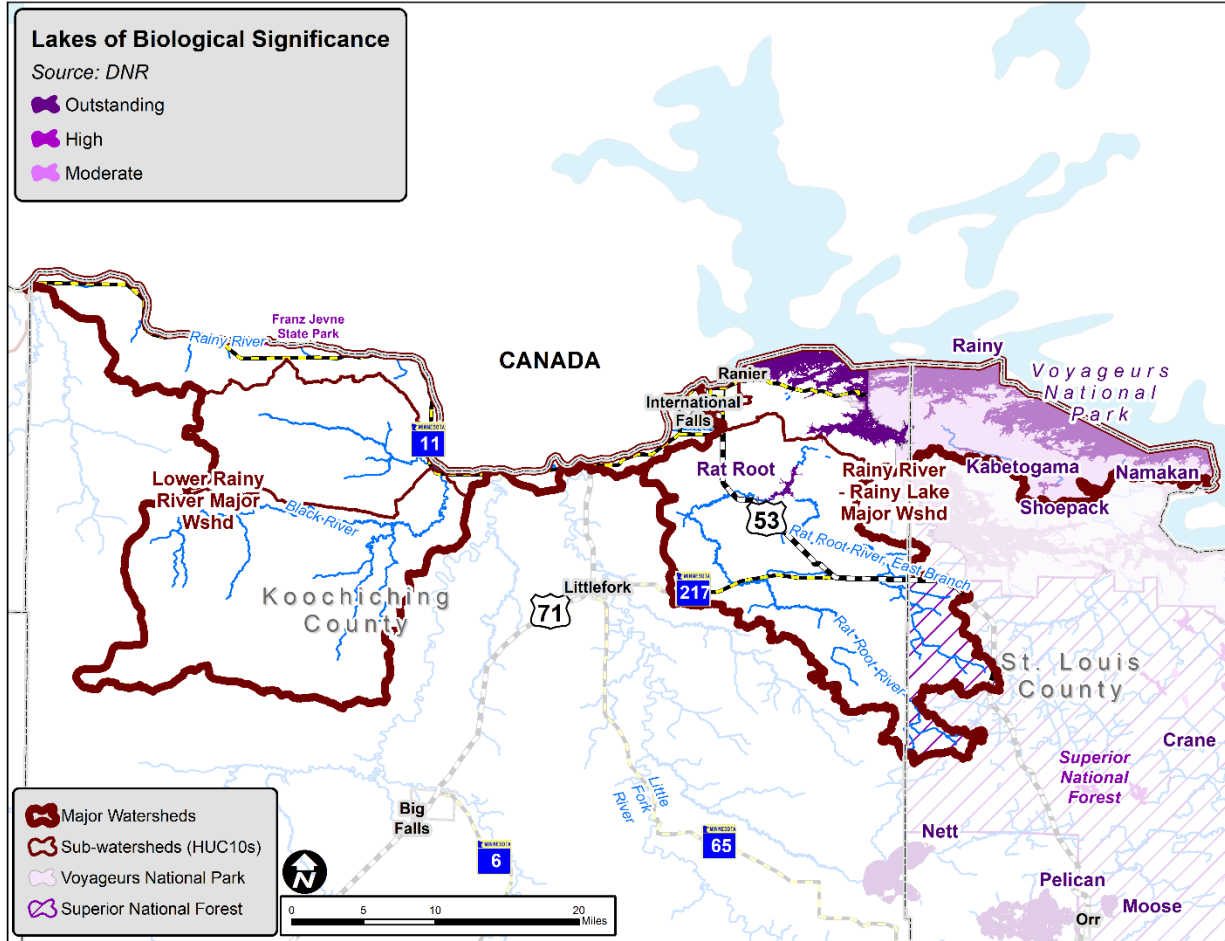
- Septic replacement along the Rat Root River

## Meeting Attendees

- Pam Tomevi, Koochiching SWCD
- Amy Mustonen, MPCA
- Jeff Hrubes, BWSR
- Chad Severts, BWSR
- Dan Disrud, MDH
- Mike Steinhauer, NRCS
- Tony Lench, DNR
- Sam Soderman, Koochiching SWCD
- Tristan Nelson, North St. Louis SWCD
- Mike Kennedy, MPCA
- Jason Fisher, International Falls City Engineer, Bolton & Menk
- Mitch Brinks, Crow Wing County
- Dain Erickson, Red Canoe Cre8tive
- Marcie Peeters, Koochiching SWCD
- Jolen Simon, Koochiching SWCD
- Nathan Heibel, Koochiching Land and Forest
- James Aasen, Koochiching SWCD

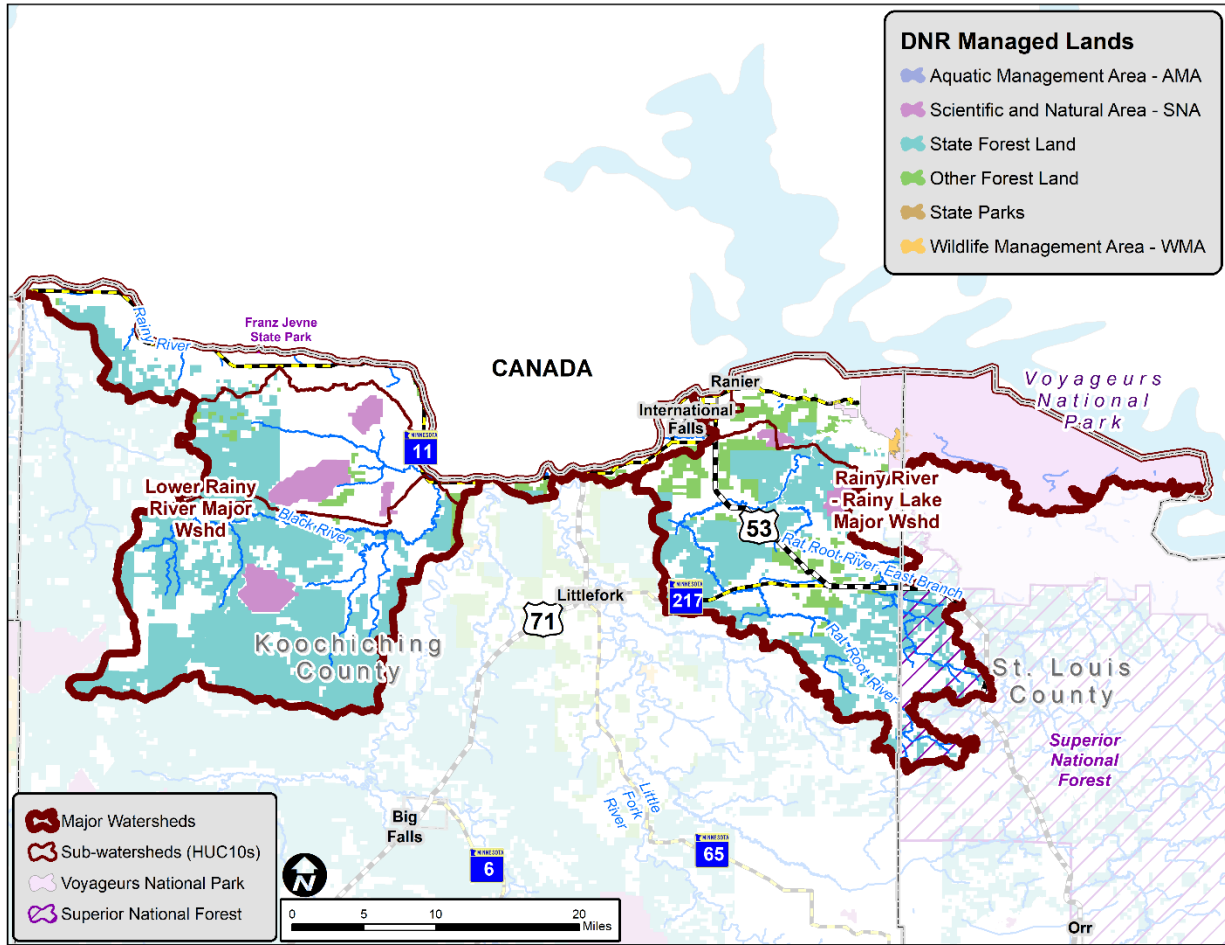


- Rian Reed, DNR Waters
- Rachel Olm, Houston Engineering Inc.
- Aaron Frankl, Houston Engineering Inc.



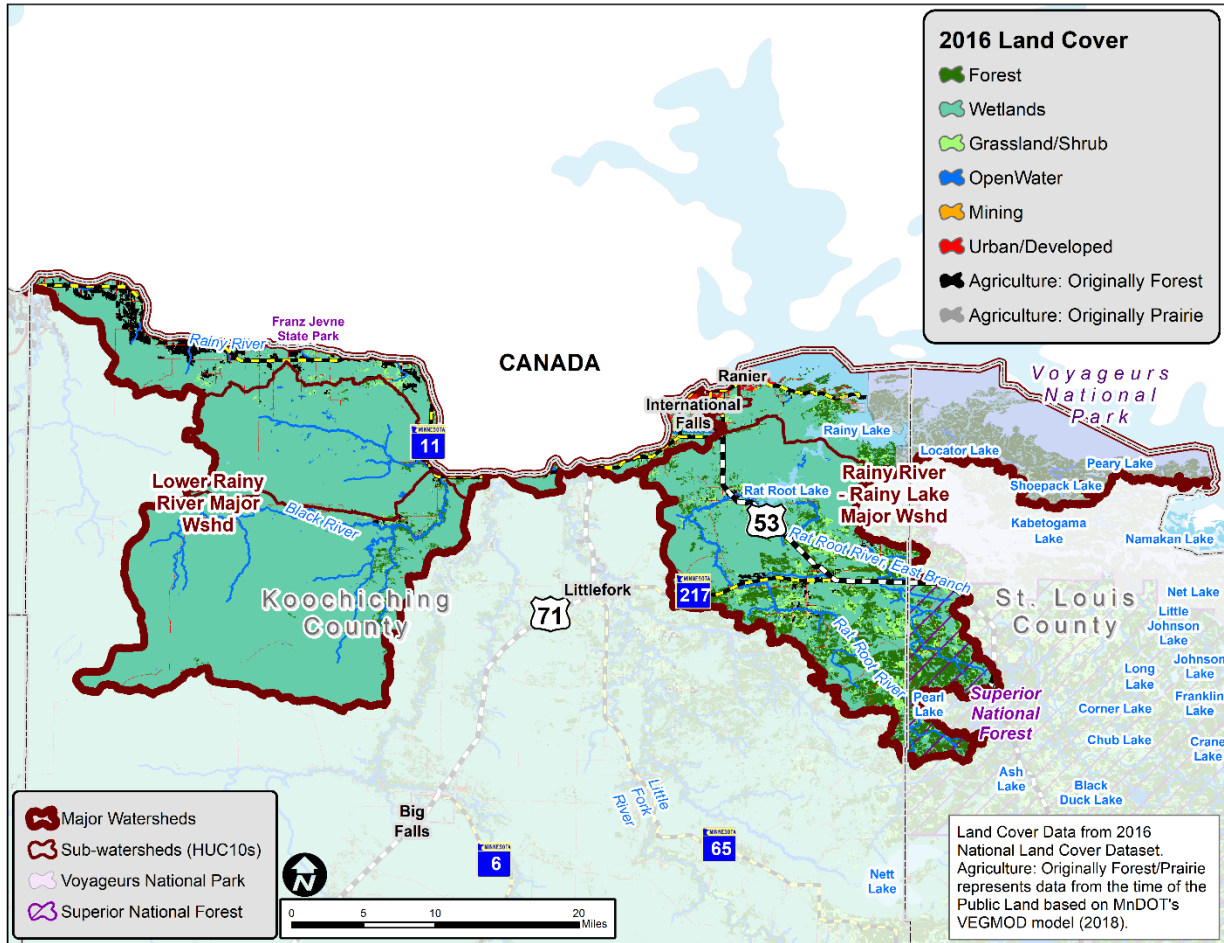
*DNR Lakes of Biological Significance.*





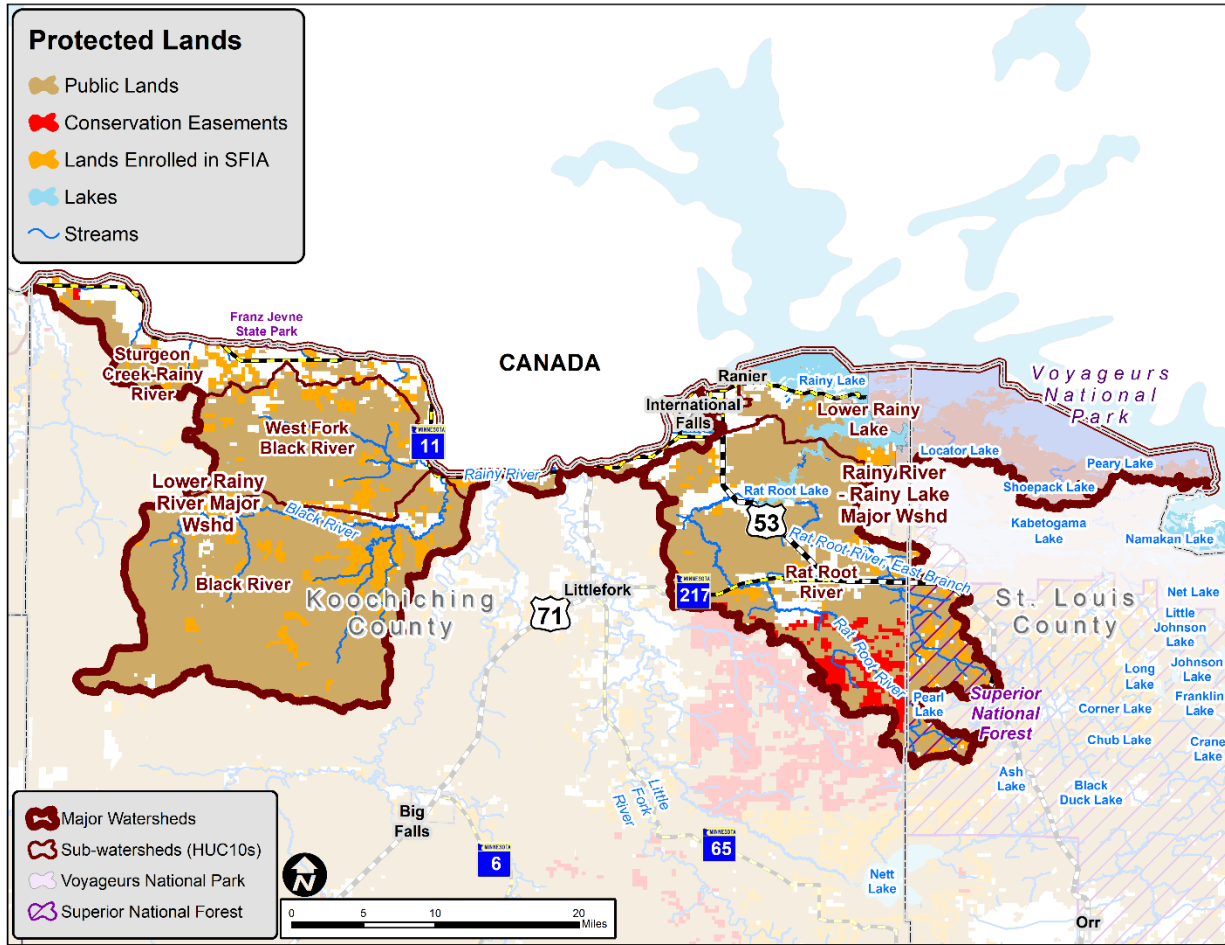
DNR managed lands including natural areas and state owned areas.





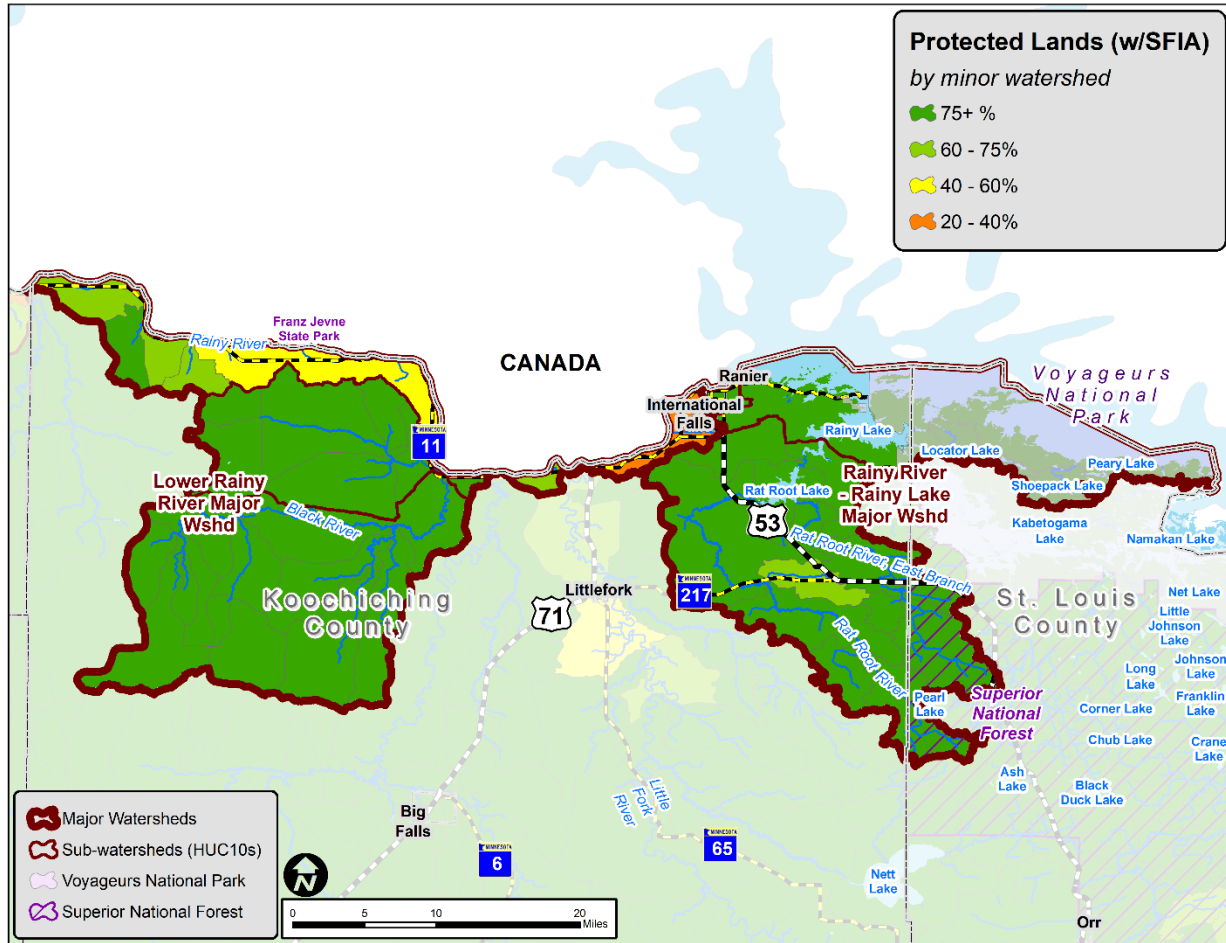
Land cover data in 2016 from the National Land Cover Dataset (NLCD).





Protected lands as public lands, conservation easements, or SFIA.

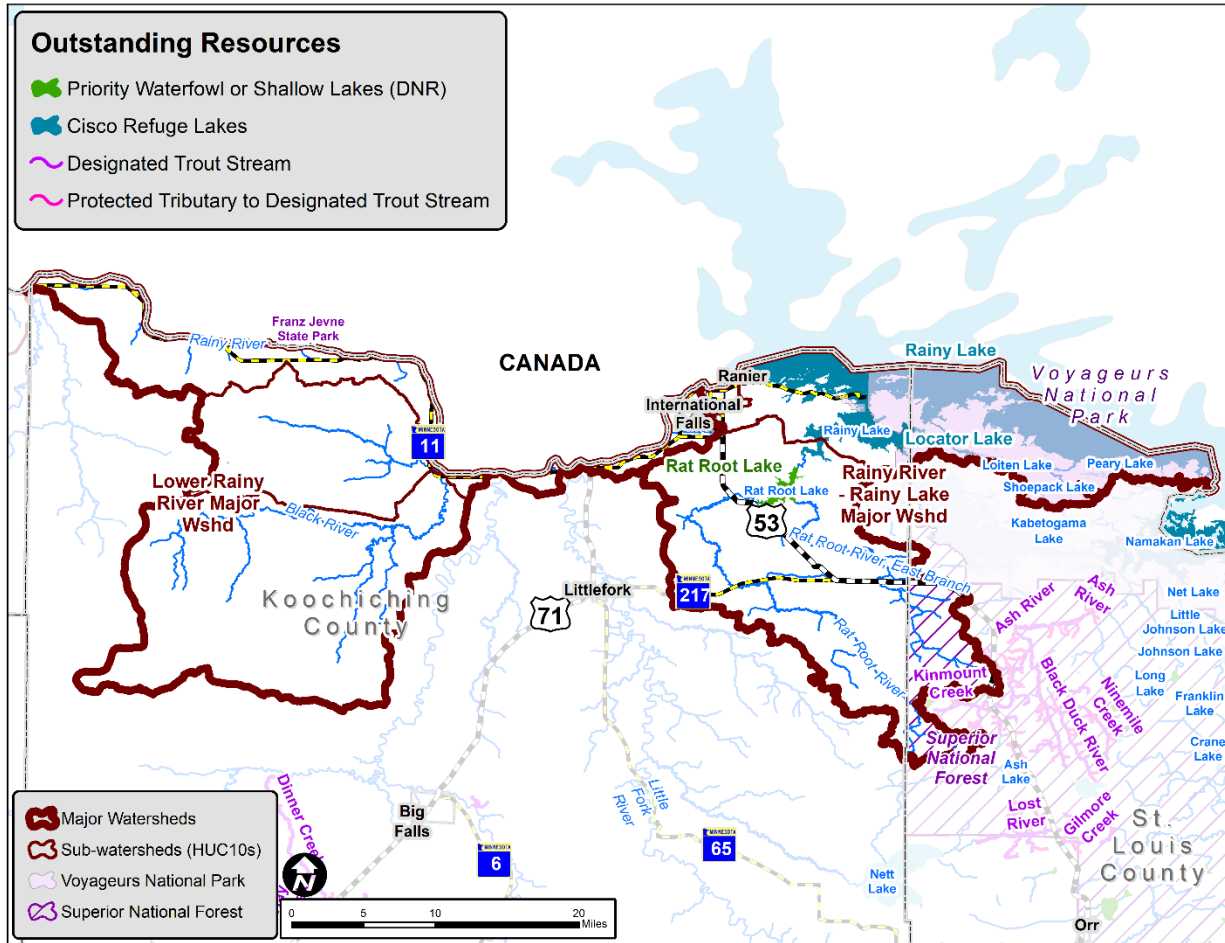




Subwatershed percent protected.

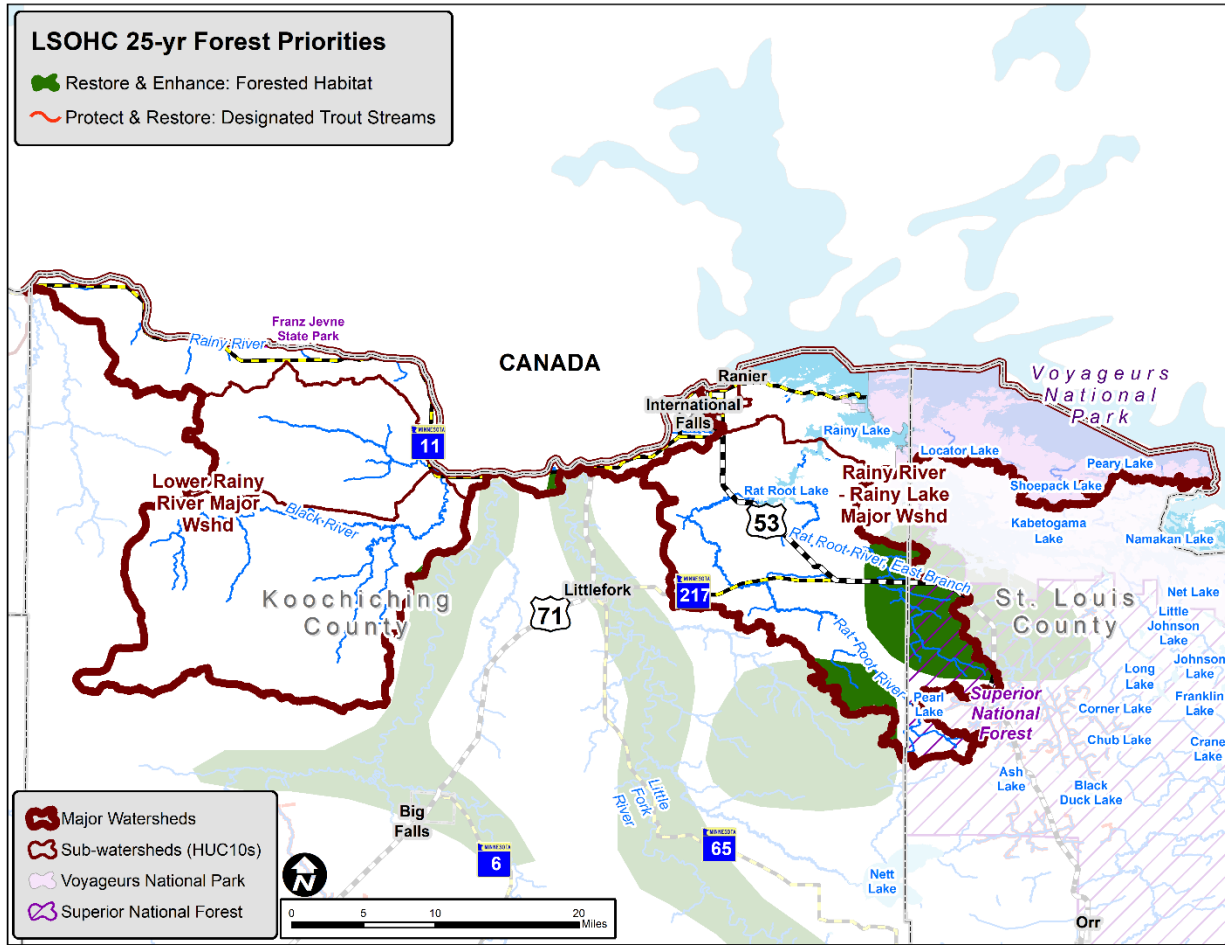






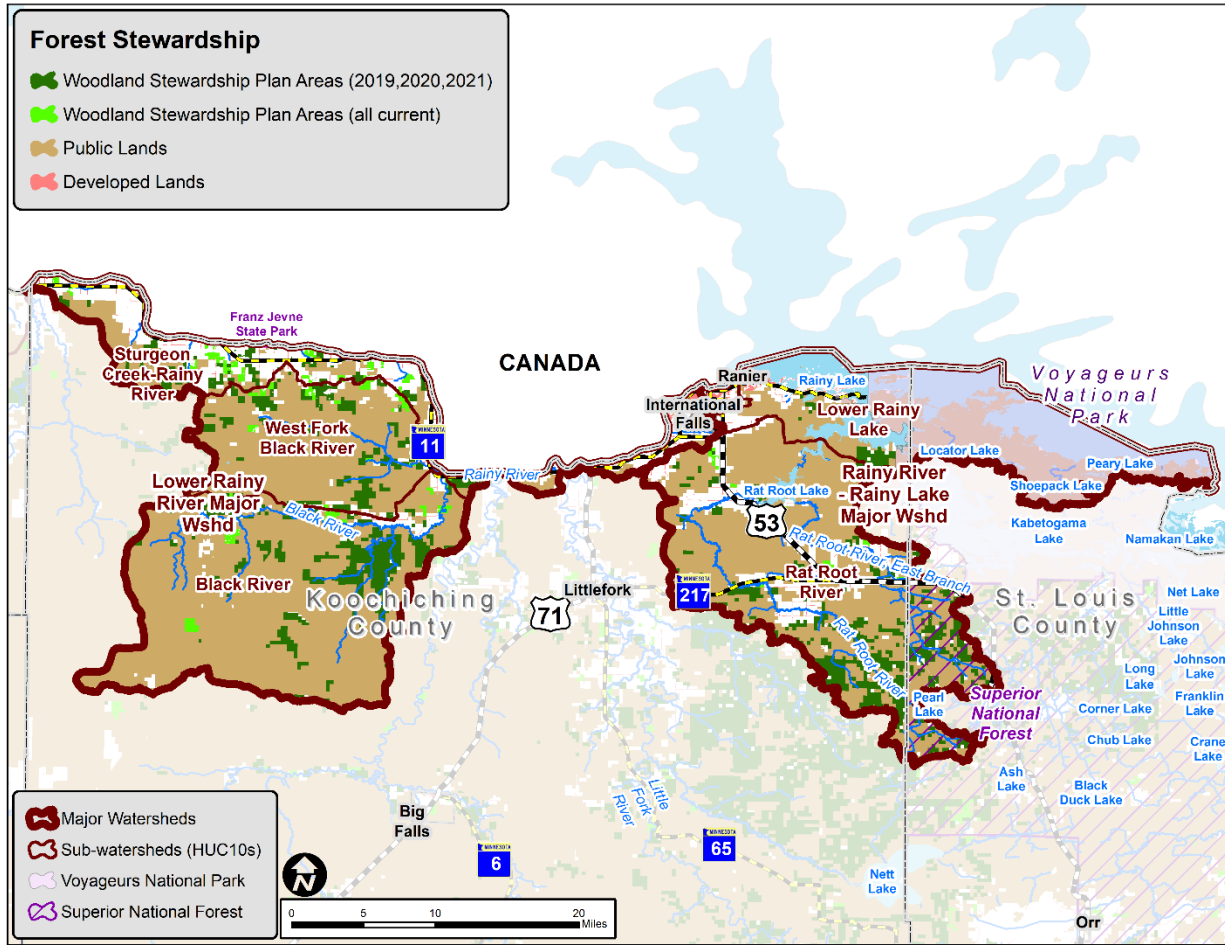
Outstanding resources in the watershed.





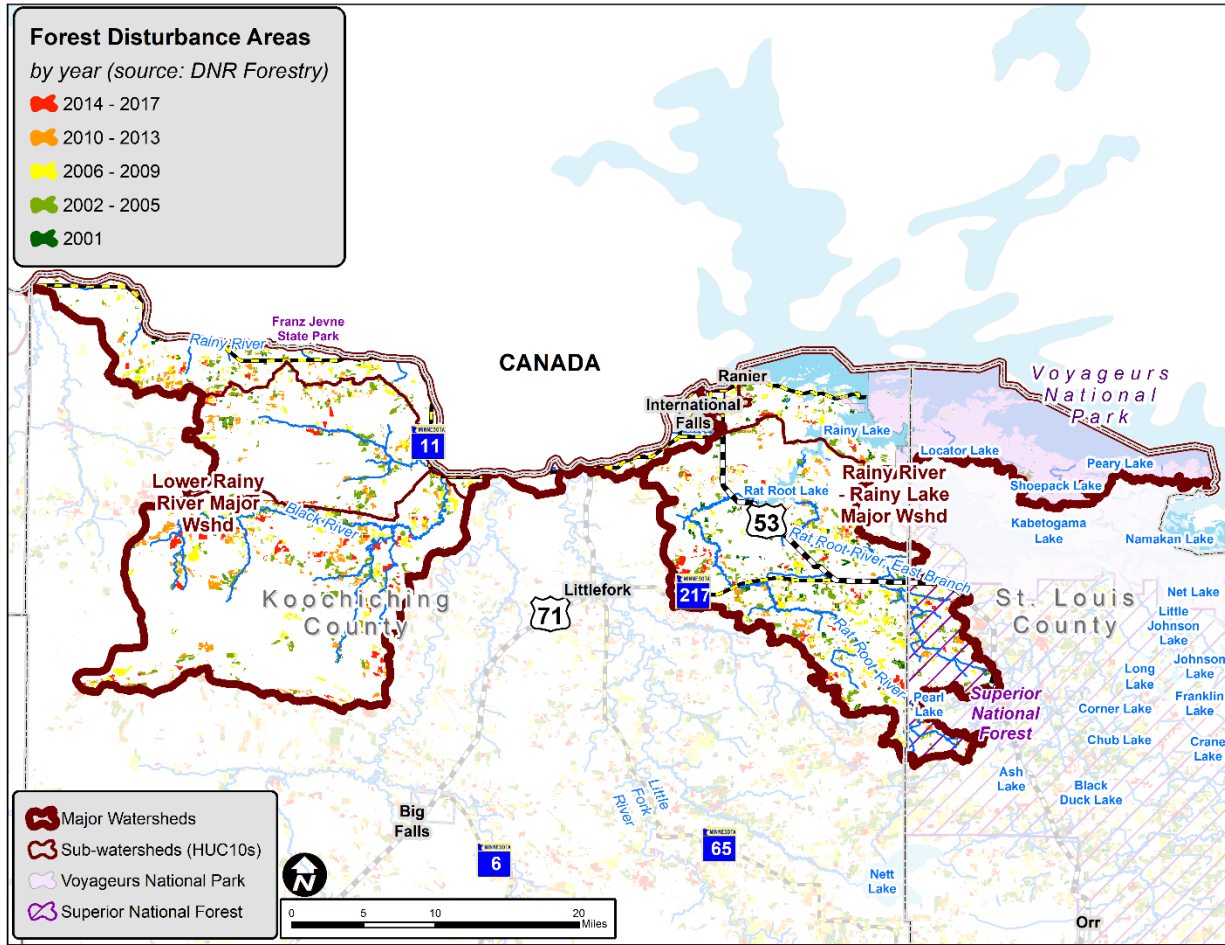
Forest priorities for Lessard-Sams Outdoor Heritage Council (LSOHC).





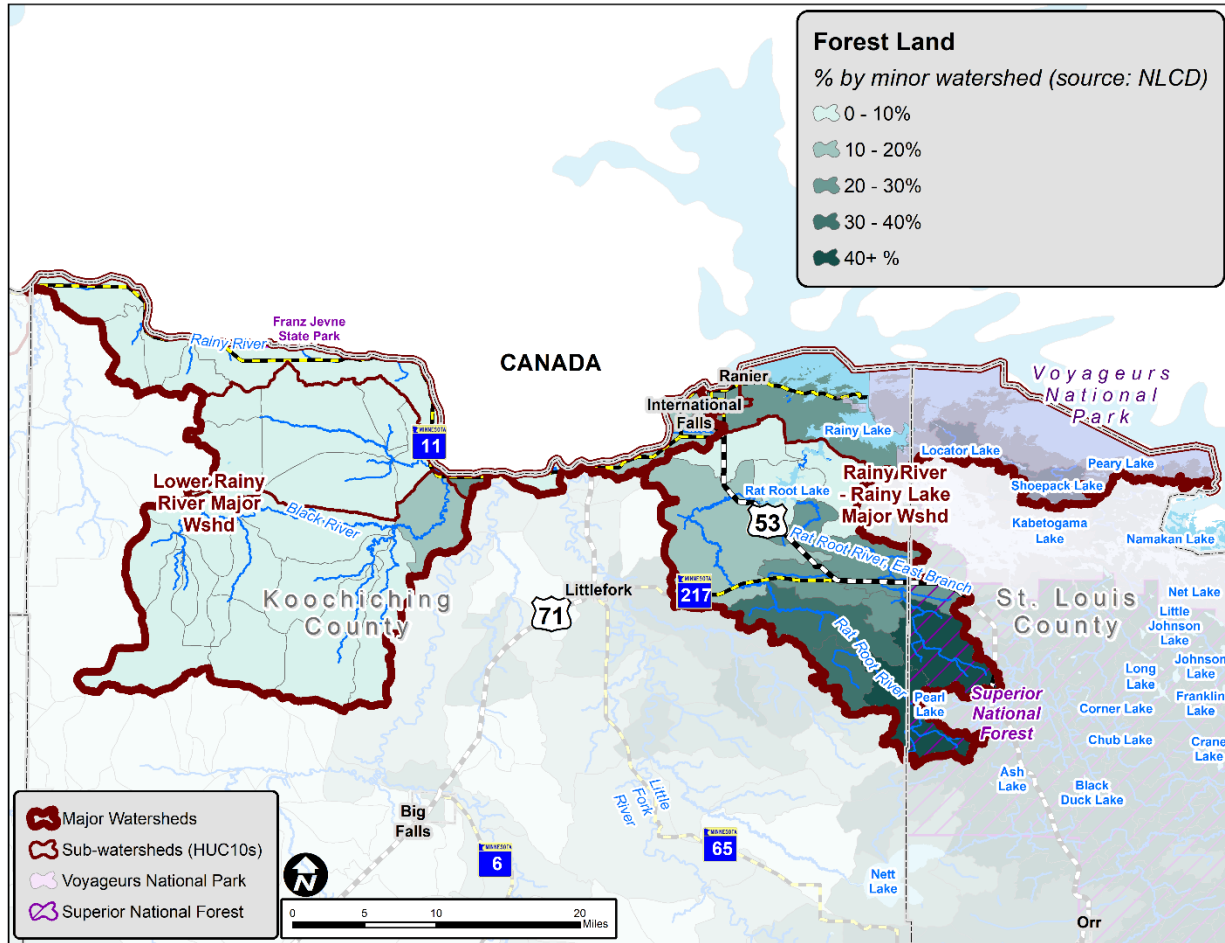
Areas with woodland stewardship plans.





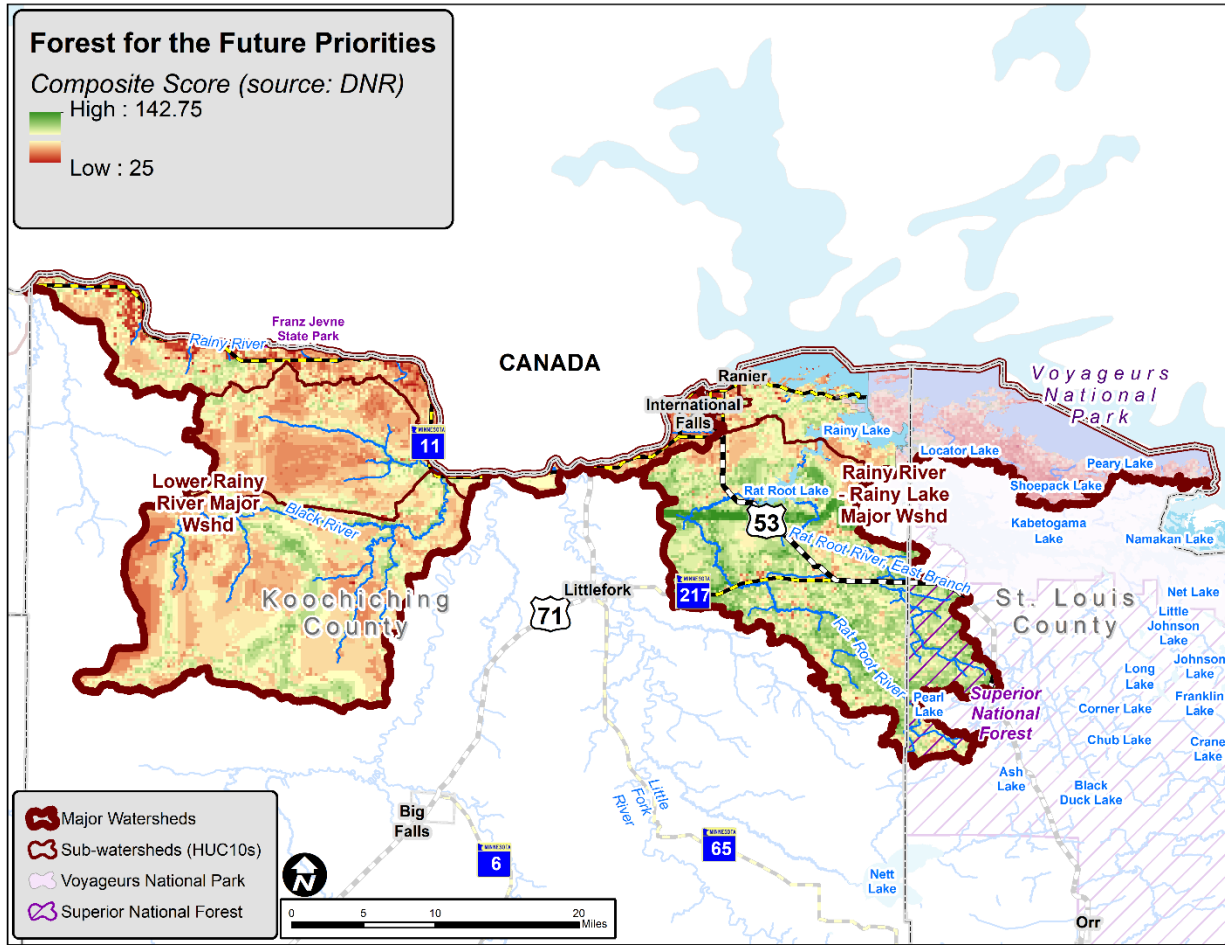
Areas with forest disturbance by year.





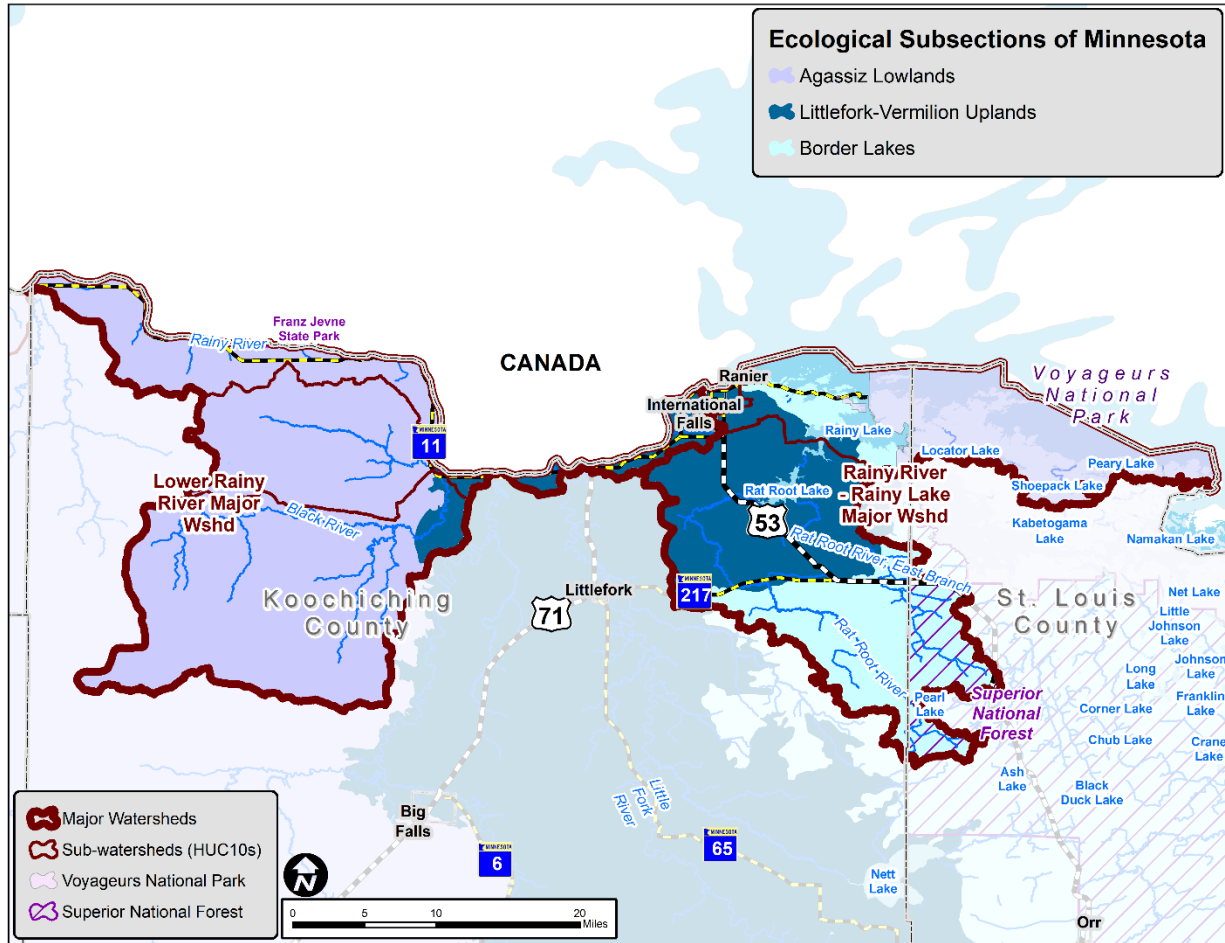
Area forested by subwatershed.





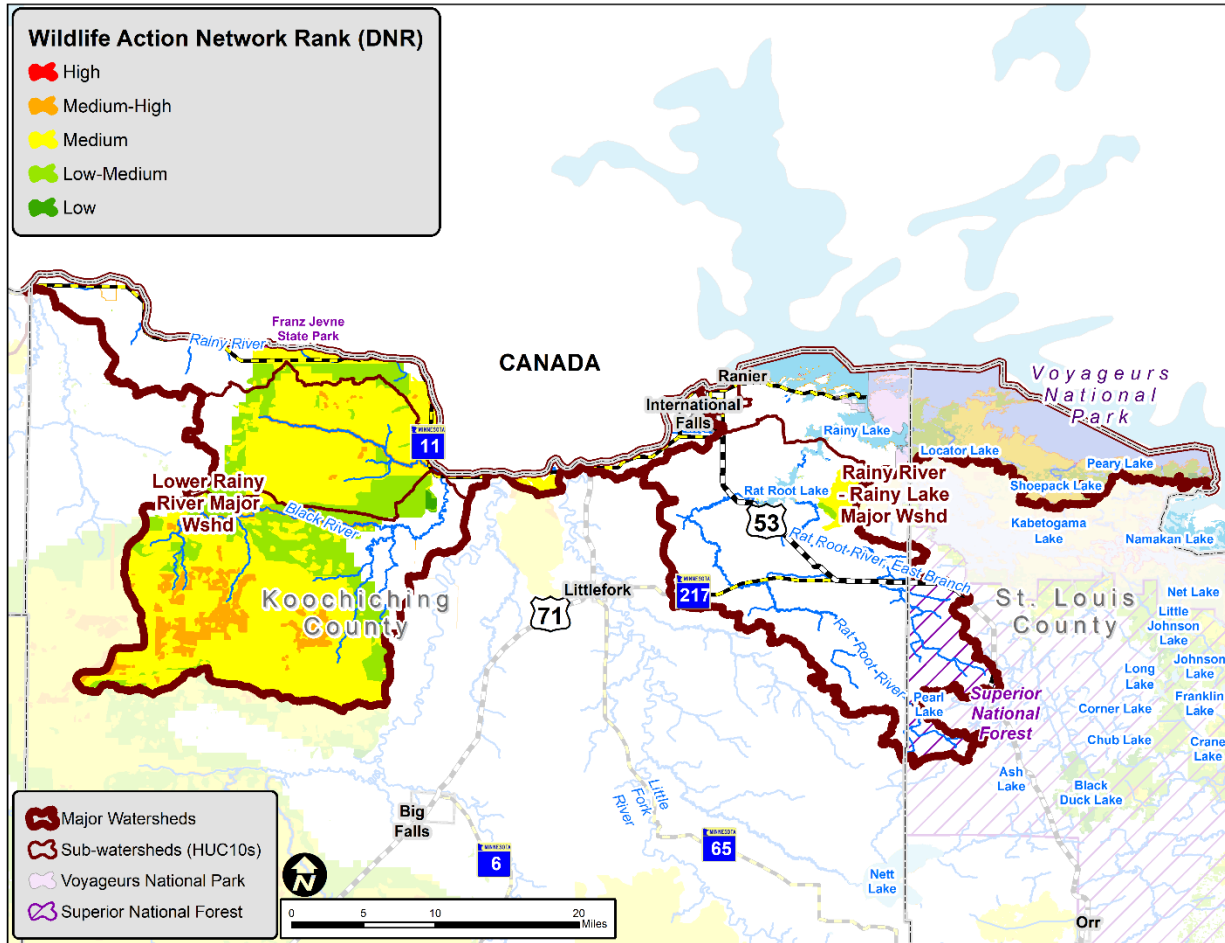
Forest for the future priority areas.





*Ecological subsections of the watershed.*

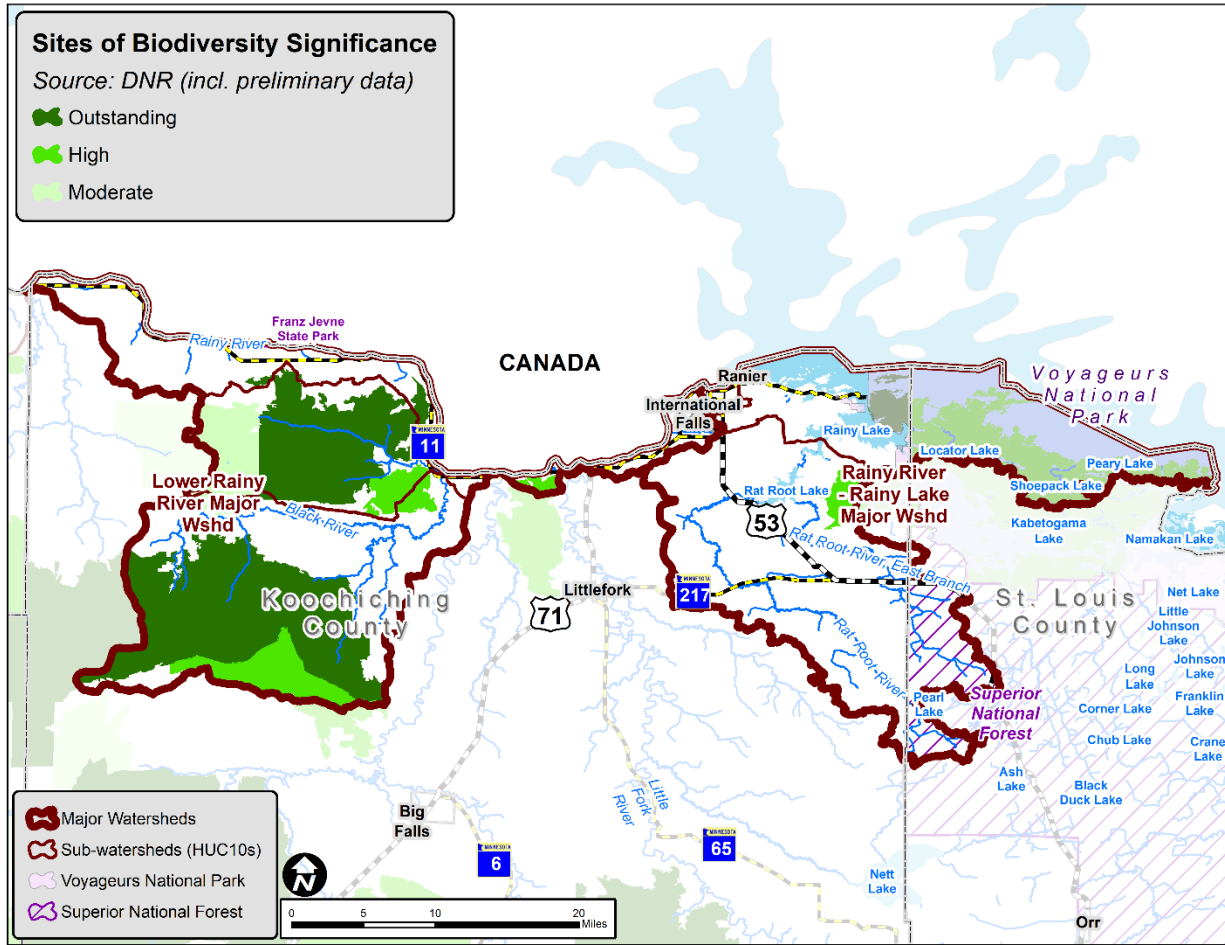




DNR Wildlife Action Network rankings.







DNR Sites of Biodiversity Significance.





## CITATIONS

DNR, 1988. The Natural Vegetation of Minnesota at the Time of Public Land Survey: 1847-1907. Minnesota Department of Natural Resources.

DNR, 2017a. Watershed Context Report: Rainy River-Manitou. Minnesota Department of Natural Resources.

DNR, 2017b. Watershed Context Report: Rainy River-Rainy Lake. Minnesota Department of Natural Resources.

DNR, 2023a. Minnesota Scientific and Natural Areas Patterned Peatlands. <https://www.dnr.state.mn.us/snas/peatlands.html>. Accessed July 2023.

DNR, 2023b. Habitat Descriptions. Minnesota Department of Natural Resources. [https://www.dnr.state.mn.us/cwcs/habitat\\_descriptions.html](https://www.dnr.state.mn.us/cwcs/habitat_descriptions.html). Accessed July 2023.

USGS, 2019. National Land Cover Database. United States Geology Survey.



The background features a serene landscape of a calm lake with a single tree on a rocky island. A semi-transparent blue overlay with a white rain pattern is positioned in the top right corner. The text 'D. Storage Analysis' is centered in the lower half of the image.

# D. Storage Analysis

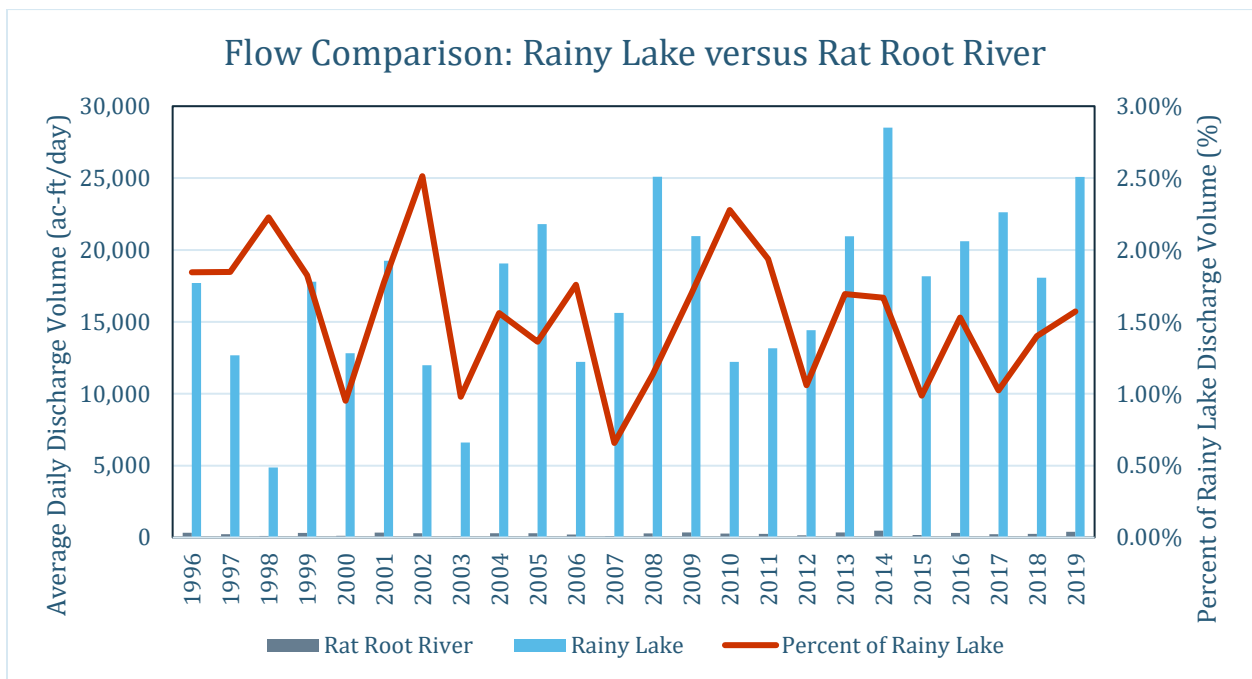
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# STORAGE ANALYSIS

## Flow Analysis

Flows from the Rainy River and Rainy Lake HSPF models were extracted and compared to investigate the portion of flow coming from the Rat Root River to Rainy Lake and the flow from the Black River to the flow in the Rainy River at the outlet of the Black River. These comparisons were made to show what impacts storage practices in the Rat Root River and Black River watersheds might have on the discharge of Rainy Lake or in the Rainy River, respectively.

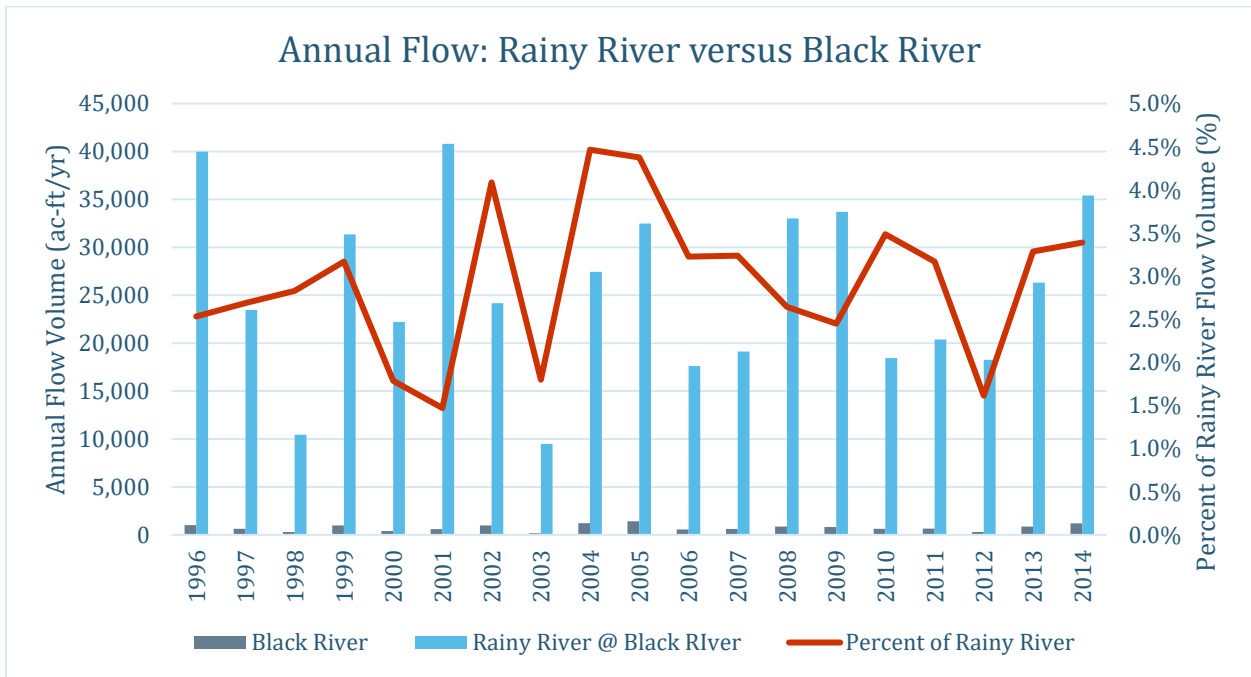
**Figure 1** shows the daily average flow volumes from the Rat Root River to the daily average outflow from Rainy Lake and the percentage of outflow from Rainy Lake accounted for by the Rat Root River. Total annual flow volumes would be the daily average flow volume multiple by 365 days. On average, the Rat Root River account for 1.52% of the outflow from Rainy Lake. The impact of storage practices in the Rat Root River watershed will have minimal impact at the outlet of Rainy Lake.



**Figure 1. Comparison of the outflow from the Rat Root River to the outflow of Rainy Lake.**

**Figure 2** shows the daily average flow volumes from the Black River to the daily average flow in Rainy River at the Black River and the percentage of flow in the Rainy River accounted for by the Black River. On average, the Black River accounts for 2.9% of the flow in the Rainy River. The impact of storage practices in the Black River watershed will have minimal impact on the flow in the Rainy River.

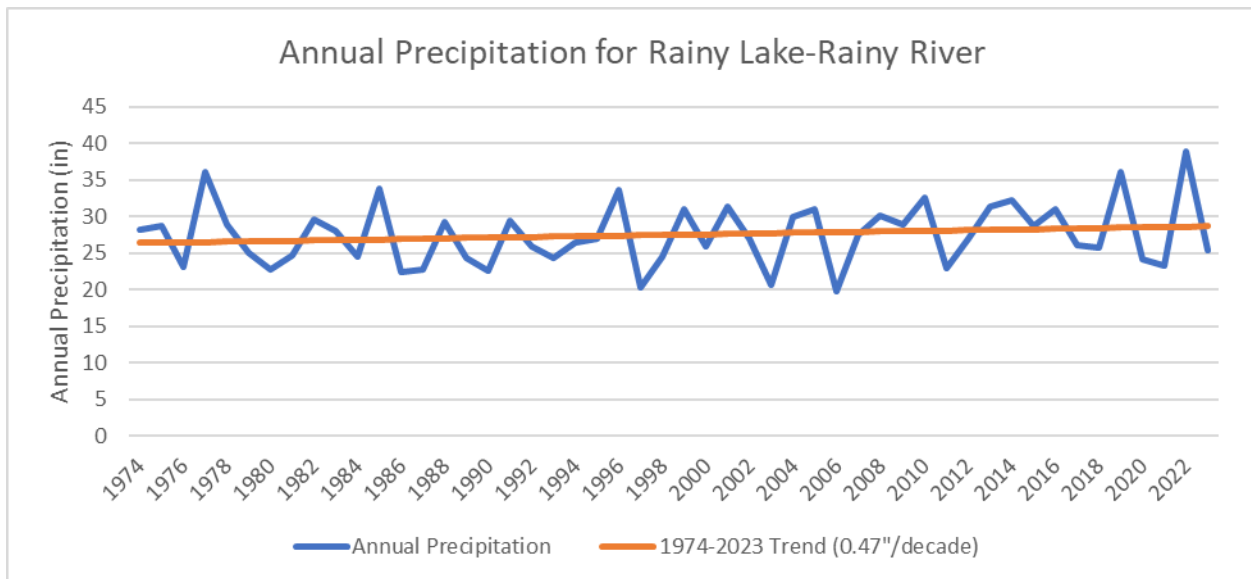




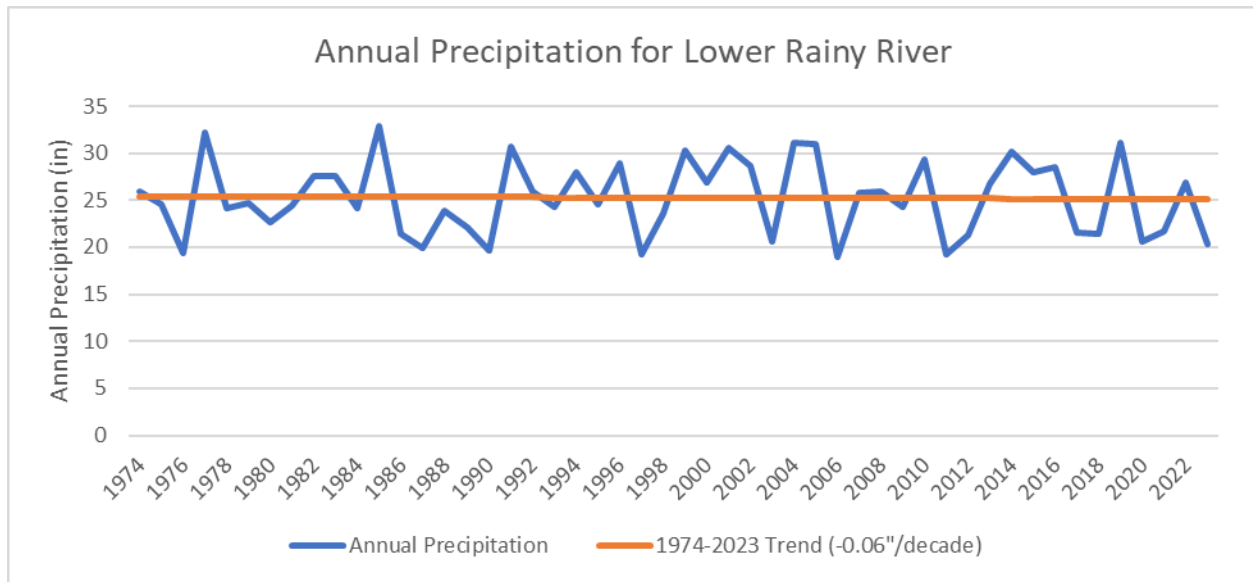
**Figure 2. Comparison of the outflow from the Black River to the flow in the Rainy River.**

## Changes in Precipitation

Historic changes in rainfall were analyzed to determine if a storage goal can be estimated to mitigate increases in annual rainfall depths. The decadal changes in rainfall were obtained from the MNDNR’s Minnesota Climate Trends tool (<https://arcgis.dnr.state.mn.us/ewr/climatetrends/>). The MNDNR’s tool provides trends in climate data by watershed. The decadal trends in rainfall for the last 50 years (1974-2023) for the Rainy River-Rainy Lake (**Figure 3**) and Lower Rainy River (**Figure 4**) watersheds are provided below.



**Figure 3. Annual precipitation in the Rainy River-Rainy Lake Watershed.**



**Figure 4. Annual precipitation in the Lower Rainy River Watershed.**

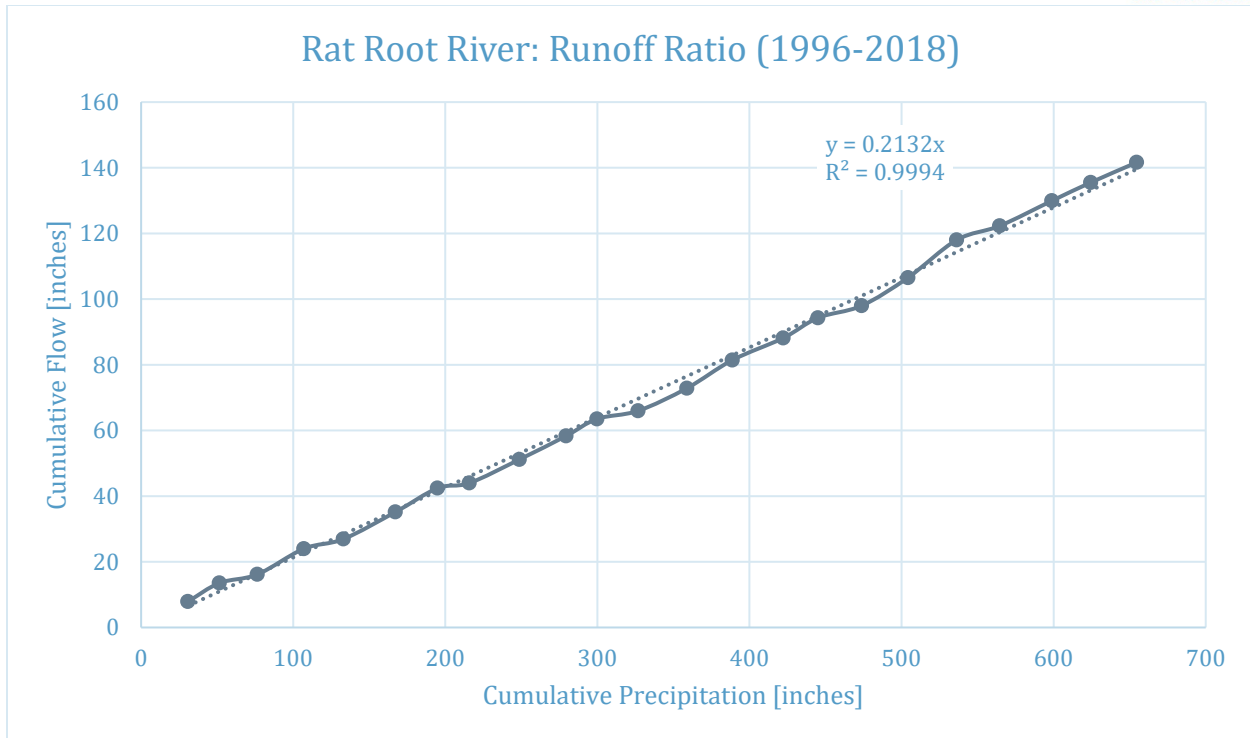
The decadal trend in annual rainfall depths for the Rainy River-Rainy Lake Watershed for the last 50 years (1974-2023) is an increase of 0.47 inches per decade. The decadal trend for the Lower Rainy River Watershed for the last 50 years is a decrease of 0.06 inches per decade.

A storage goal based on the runoff from 0.47 inches of rainfall can be used to mitigate the impacts of climate change in the Rainy River-Rainy Lake watershed, but no mitigation is needed to mitigate the impacts of climate change in the Lower Rainy River watershed because the trend in annual rainfall depths shows a decreasing trend.

## Runoff Ratio

To determine the runoff from the increase in annual rainfall, and ultimately the storage needed to mitigate the increase, the annual runoff ratio was determined. The annual runoff ratio is the ratio of annual flow volumes at the outlet of the river to the annual rainfall and represents the percentage of rainfall that ultimately runs off and becomes flow. The average runoff ratio in a watershed can be found by plotting the cumulative rainfall (precipitation) depth against the cumulative annual flow volume (as a depth) and taking the slope of the line. **Figure 5** shows the cumulative annual rainfall versus cumulative annual flow volume for the Rat Root River. The slope of the line is 0.213 or 21.3% of the annual rainfall becomes flow in the Rat Root River.





**Figure 5. Cumulative rainfall (precipitation) versus cumulative flow depths for the Rat Root River.**

## Storage Goal

The storage goal to offset the increases in annual rainfall is estimated using the long-term decadal increase in rainfall multiplied by the runoff ratio. **Table 1** shows the runoff ratio, rainfall decadal trend, and estimate storage volume in the watershed needed to offset the increase in annual rainfall. The area of the Rat Root River, according to the HSPF model, is 181,687 acres and was used to transform the depths to a storage volume.

**Table 1. Storage goal in the Rat Root River to mitigate increases in annual rainfall.**

Runoff Ratio	0.2132	
Rainfall Trend	0.47	in/decade
Storage	1,517	ac-ft

A storage volume of 1,517 acre-ft is needed to offset an increase of 0.47 inches of rainfall over 10 years in the Rat Root River Watershed. No storage volume is need in Lower Rainy River to offset increases in annual rainfall.





# **E. HSPF Load Reduction Estimates**

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# HSPF LOAD REDUCTION CALCULATOR

## Introduction

The short-term goal to address water quality contaminants in the RRRL is to treat 1,500 acres of cultivated or pastureland with best management practices (BMPs). The MPCA provides the Watershed Pollutant Load Calculator which draws on the Hydrologic Simulation Program – Fortran (HSPF) model to estimate load reductions in phosphorus, nitrogen, or sediment from implementation of conservation practices on the subwatershed scale. This appendix document summarizes the outputs of the calculator if 1,500 acres of various BMPs were implemented in the RRRL. The calculator is available here:

<https://public.tableau.com/app/profile/mpca.data.services/viz/WatershedPollutantLoadReductionCalculator/WatershedPollutantLoadReductionCalculator>

## Limitations

Given that RRRL is far north and does not have much agricultural land in comparison to central or southern Minnesota, data is more limited in the watershed. The calculator does not have pasture management as a BMP, but there was no data for the RRRL.

Additionally, there was no data available for any load reductions in the eastern half of the planning area (the Rainy Lake HUC-8). However, the calculator shows heat maps of TSS and nutrient loading from most subwatersheds, and images of these are included as Figures 1-3.

The calculator provides estimated load reductions at the HUC-8 and HUC-12 scale. Since the planning area for this CWMP includes only the eastern half of the Lower Rainy HUC-8, the load for each HUC-12 in the Lower Rainy planning area was summed (excluding 3 for which there was no data). Then, it was assumed the load reduction of 1,500 acres of a BMP in the entire Lower Rainy was equivalent to the load reduction if those 1,500 acres are only in the CWMP planning area. These load reductions are reported in Table 1.

## Summary

Table 1 includes the modeled load reduction at the watershed outlet if 1,500 acres of a conservation BMP are implemented. For example, the largest load reduction in Table 1 shows implementing 1,500 acres of cover crops after early harvest will result in a 1,621 lbs/yr load reduction in TN in the Lower Rainy planning region outlet.

The most effective BMPs include:

- Filter strips to reduce TSS
- Filter strips or no-till practices to reduce TP
- Cover crops to reduce TN



The estimated load reductions from the calculator can be a useful tool when deciding which BMPs to implement.

Table 1 includes the current load and estimated load reduction. Again, it is important to note that this is only for planning area in the Lower Rainy HUC-8, which is the eastern half of the CWMP plan area, as there is no data for the calculator in the Rainy Lake HUC-8. A visual of pollutant loading in subwatersheds in both the Lower Rainy and Rainy Lake HUCs is shown in Figures 1-3.

*Table 1. TSS, TN, and TP load reduction in the Lower Rainy planning area at the watershed outlet in different BMP scenarios.*

Pollutant	Current Load	Load Reduction if 1,500 acres of BMP are implemented					
		Cover Crops*	Cover Crops**	Nutrient Management***	Reduced Till	No Till	Filter Strip
TSS (tons/yr)	15,099	270	180	N/A	182	292	334
TP (lbs/yr)	36,811	117	94	33	134	277	281
TN (lbs/y)	665,487	1,309	1,621	475	299	716	1,259

\*With corn and soybeans

\*\*After early harvest

\*\*\*Improved rates and timing





Figure 1. Nitrogen loads (lbs/ac/yr) from HUC-12s in the Lower Rainy (left) and Rainy Lake (right) Watersheds.

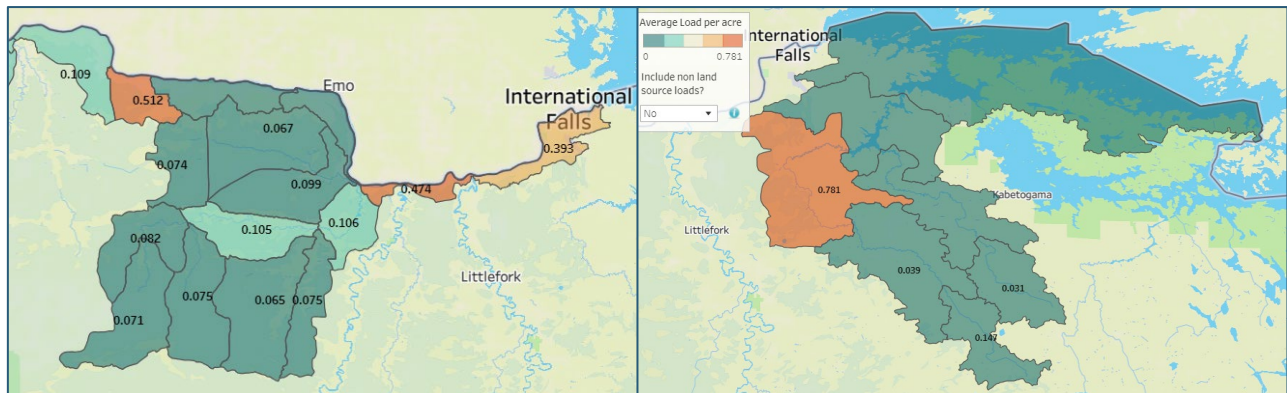


Figure 2. Phosphorus loads (lbs/ac/yr) from HUC-12s in the Lower Rainy (left) and Rainy Lake (right) Watersheds.



Figure 3. TSS loads (tons/ac/yr) from HUC-12s in the Lower Rainy (left) and Rainy Lake (right) Watersheds.





# F. References

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## REFERENCES

- Center for Spatial Information Science and Systems, 2023. CropScape – Cropland Data Layer. <https://nassgeodata.gmu.edu/CropScape/>. Accessed July 2023.
- DNR, 2017a. Watershed Context Report: Rainy River-Manitou. Minnesota Department of Natural Resources.
- DNR, 2017b. Watershed Context Report: Rainy River-Rainy Lake. Minnesota Department of Natural Resources.
- DNR, 2022. Minnesota Climate Trends. Minnesota Department of Natural Resources.
- DNR, 2023a. Climate Trends. Minnesota Department of Natural Resources. [https://www.dnr.state.mn.us/climate/climate\\_change\\_info](https://www.dnr.state.mn.us/climate/climate_change_info). Accessed July 2023.
- DNR, 2023b. Habitat Descriptions. Minnesota Department of Natural Resources. [https://www.dnr.state.mn.us/cwcs/habitat\\_descriptions.html](https://www.dnr.state.mn.us/cwcs/habitat_descriptions.html). Accessed July 2023.
- DNR, 2023c. Minnesota Scientific and Natural Areas Patterned Peatlands. <https://www.dnr.state.mn.us/snas/peatlands.html>. Accessed July 2023.
- DNR, 1988. The Natural Vegetation of Minnesota at the Time of Public Land Survey: 1847-1907. Minnesota Department of Natural Resources.
- EPA, 2023. Available at: <https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products>
- International Joint Commission, 1909. Available at: <https://ijc.org/en/what/water-quality>
- Koelmans et al., 2019. Microplastics in freshwaters and drinking water: Critical review and assessment of data quality. Water Res.155, 410-422.
- Koochiching County. History. <https://www.co.koochiching.mn.us/206/History> Accessed August 2023.
- Koochiching Soil and Water Conservation District, 2018. Koochiching County Comprehensive Local Water Management Plan, 2018-2028.
- Mason, John E., 1940. Isolated Settlement in Koochiching County, Minnesota. United States Department of Agriculture Bureau of Agricultural Economics.
- MPCA, 2021. MPCA, DNR: Minnesota's lake ice season decreased by up to 14 days due to climate change. <https://www.pca.state.mn.us/mpca-dnr-minnesotas-lake-ice-season> Accessed July 2023.





MPCA, 2022a. Lower Rainy River Watershed Restoration and Protection Strategy. Minnesota Pollution Control Agency.

MPCA, 2022b. Rainy River-Rainy Lake Watershed Restoration and Protection Strategy. Minnesota Pollution Control Agency.

National Park Service, 2020. Voyageurs of the Fur Trade. <https://www.nps.gov/voya/learn/historyculture/the-fur-trade.htm> Accessed August 2023.

United States Census Bureau, 2021. Koochiching County, Minnesota. [https://data.census.gov/profile/Koochiching\\_County\\_Minnesota](https://data.census.gov/profile/Koochiching_County_Minnesota). Accessed July, 2023.

USGS, 2019. National Land Cover Database. United States Geology Survey.

