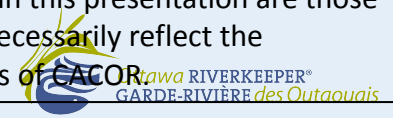


Welcome to this week's presentation & conversation hosted by the **Canadian Association for the Club of Rome**, a Club dedicated to intelligent debate & action on global issues.

The views and opinions expressed in this presentation are those of the speaker & do not necessarily reflect the views or positions of CACOR.



## **CACOR Live** Understanding How Road Salt and Other Contaminants Are Impacting the Health of the Ottawa River.

Ottawa Riverkeeper has applied a number of strategies to better understand the health of the Ottawa River and its tributaries. This includes working with over 125 community scientists located throughout the watershed who collect water samples and observations, as well as our team completing analysis of publicly accessible data available from provincial and federal sources. As a result, Ottawa Riverkeeper has found some alarming results. This includes chronically toxic levels of chloride concentrations from road salt application within urban streams to high levels of mercury in remote areas of the watershed. These levels have led to more of a focus on how to best address the threat of contaminants of emerging concern. This talk will provide an overview of some of these findings, plus the actions Ottawa Riverkeeper has taken as a result. It will also highlight the value of working with community scientists and supporting community-based monitoring.

CACOR acknowledges that we all benefit from sharing the traditional territories of local Indigenous peoples (First Nations, Métis, & Inuit in Canada) and their descendants.



Website: [canadiancor.com](http://canadiancor.com)

YouTube: [Canadian Association for the Club of Rome](#)

2025 Jul 23 Zoom #255

# Understanding How Road Salt and Other Contaminants Are Impacting the Health of the Ottawa River

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**Presentation by**  
**Larissa Holman**  
*Director of Science and Policy*

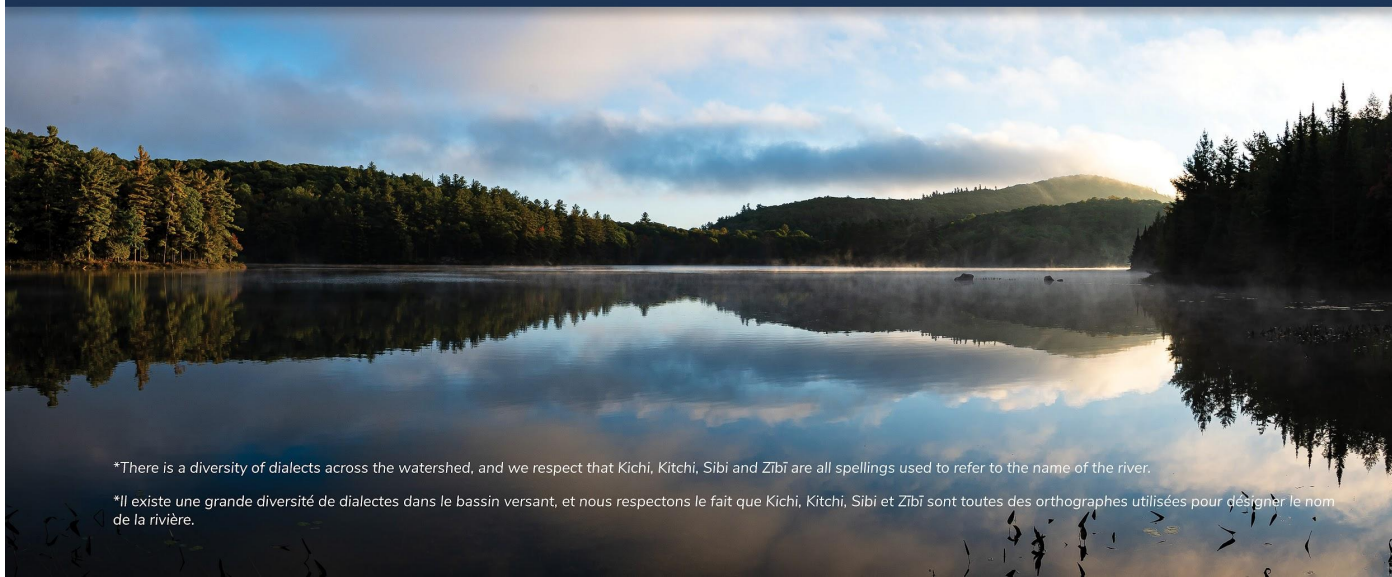


The watershed of the Kichi Zībī\*, known in English as the Ottawa River, is located on the unceded territories of the Anishinābeg Algonquin Nation. The people of the Anishinābeg Algonquin Nation are the traditional and ongoing stewards of these lands and waters.

Ottawa Riverkeeper recognizes the legacy of colonialism that continues to have profound impacts on the rights of Algonquin people, and that there is urgent need for meaningful actions that truly confront this legacy.

Le bassin versant de la Kichi Zībī, connue en français sous le nom de rivière des Outaouais, est situé sur les territoires non cédés de la Nation algonquine Anishinābeg. Les peuples de la Nation algonquine Anishinābeg sont les gardiens traditionnels et permanents de ces terres et de ces eaux.

Garde-rivière des Outaouais reconnaît l'héritage du colonialisme qui continue d'avoir de profondes répercussions sur les droits du peuple algonquin, et il est urgent de prendre des mesures concrètes pour véritablement s'attaquer à cet héritage.

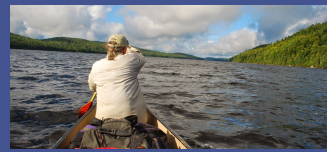


\*There is a diversity of dialects across the watershed, and we respect that Kichi, Kitchi, Sibi and Zībī are all spellings used to refer to the name of the river.

\*Il existe une grande diversité de dialectes dans le bassin versant, et nous respectons le fait que Kichi, Kitchi, Sibi et Zībī sont toutes des orthographes utilisées pour désigner le nom de la rivière.



# Ottawa River Watershed



Lac des Outaouais, QC

1, 270 km

Largest tributary  
of the St. Lawrence



Ottawa, ON



Lac des Deux  
Montagnes, QC



# About Us

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Watchdog/Guardian  
of your river



Work across  
jurisdictions



Connected nationally  
and internationally



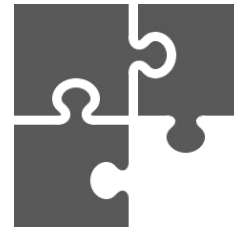
Independent,  
non-government,  
non-partisan



Science-based



Solutions-oriented



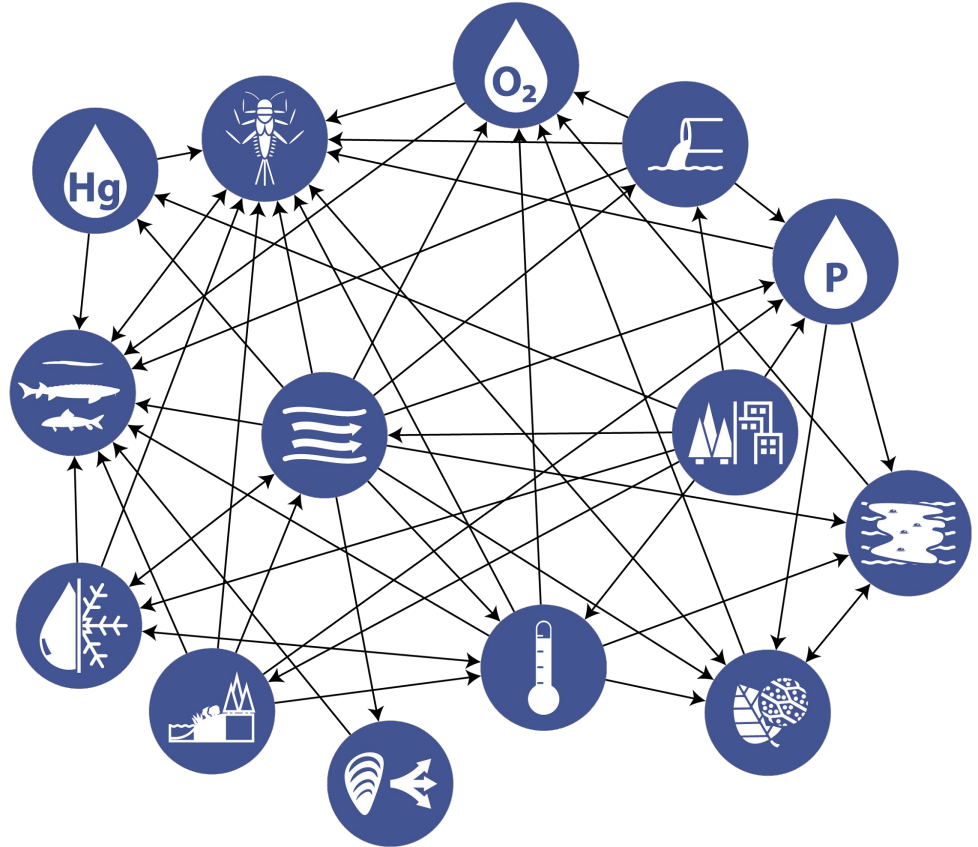
Collaborative

# Watershed Health Assessment & Monitoring Initiative

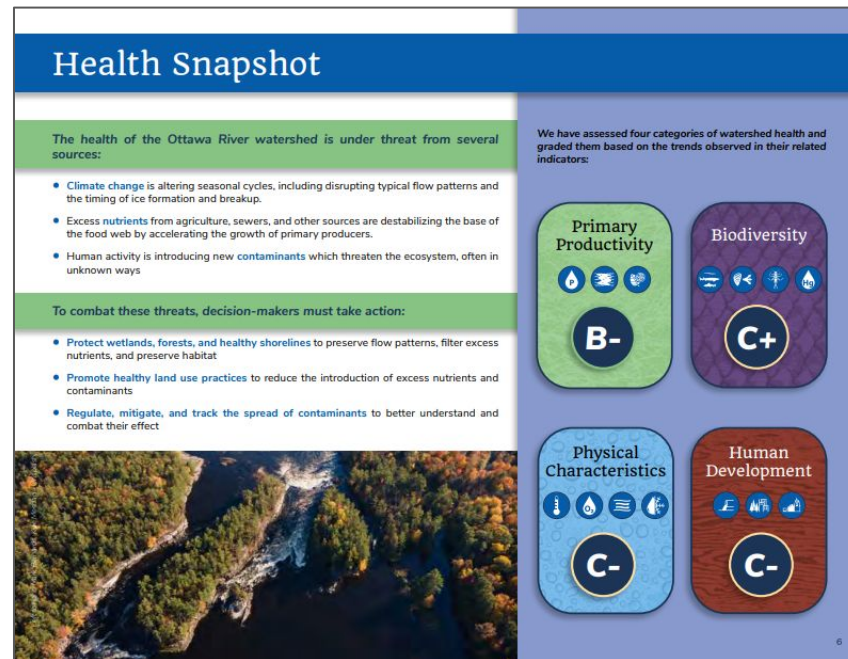
Completed the report *Assessing the Health of the Ottawa River Watershed*,

Began this initiative to study 14 ecological indicators of watershed health

Used a variety of sources for data and, to fill data gaps, community based monitoring programs.



# Watershed Report Card - 2024



Visit our website for the full report!

# Health Snapshot

The health of the Ottawa River watershed is under threat from several sources:

- Climate change is altering seasonal cycles, including disrupting typical flow patterns and the timing of ice formation and breakup.
- Excess nutrients from agriculture, sewers, and other sources are destabilizing the base of the food web by accelerating the growth of primary producers.
- Human activity is introducing new contaminants which threaten the ecosystem, often in unknown ways

To combat these threats, decision-makers must take action:

- Protect wetlands, forests, and healthy shorelines to preserve flow patterns, filter excess nutrients, and preserve habitat
- Promote healthy land use practices to reduce the introduction of excess nutrients and contaminants
- Regulate, mitigate, and track the spread of contaminants to better understand and combat their effect



We have assessed four categories of watershed health and graded them based on the trends observed in their related indicators:

## Primary Productivity



B-

## Biodiversity



C+

## Physical Characteristics



C-

## Human Development



C-

Les changements provenant de l'activité humaine dégradent la rivière des Outaouais.



Human-driven changes are degrading the Ottawa River.

# Total Phosphorus Monitoring Program

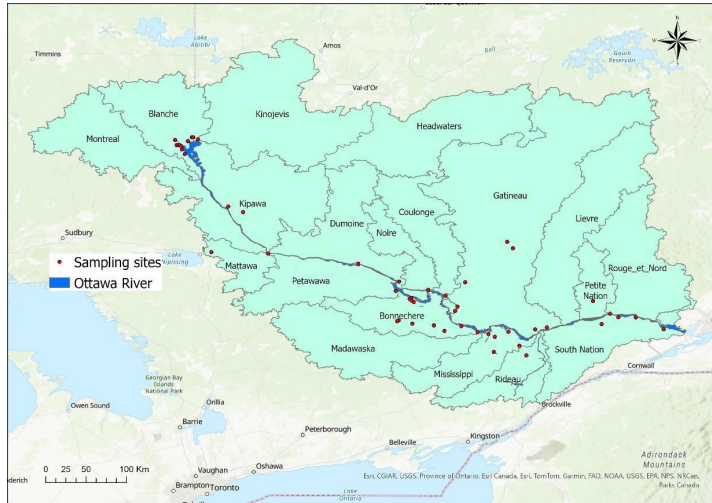
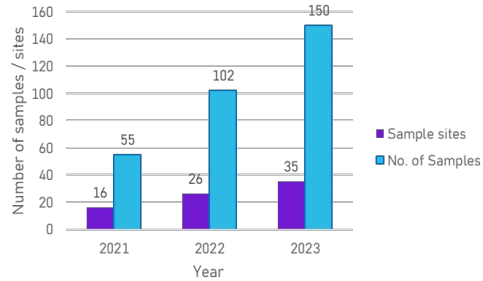


Figure 1. CBM Total Phosphorus sampling sites



# Total Phosphorus Monitoring Program



Figure 2. Total Phosphorus concentration vs Percentage of Agriculture Land

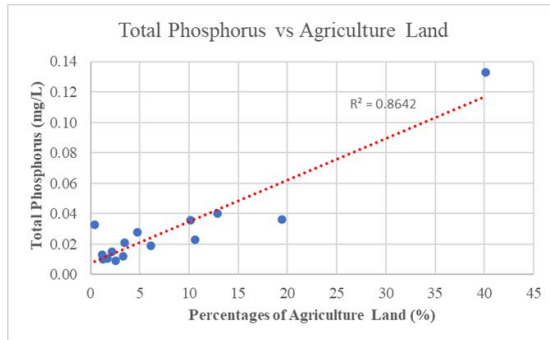


Figure 3. Relationship between Total Phosphorus and Percentage of Agriculture Land for all sub watersheds

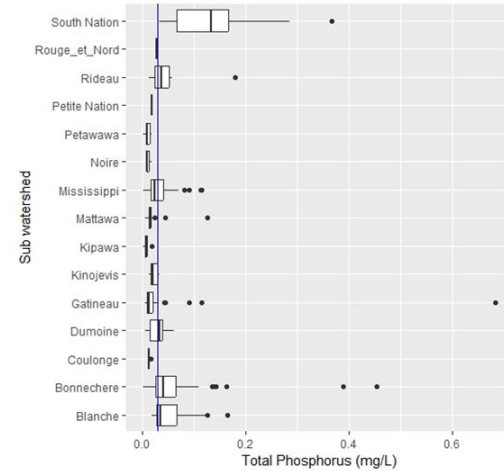
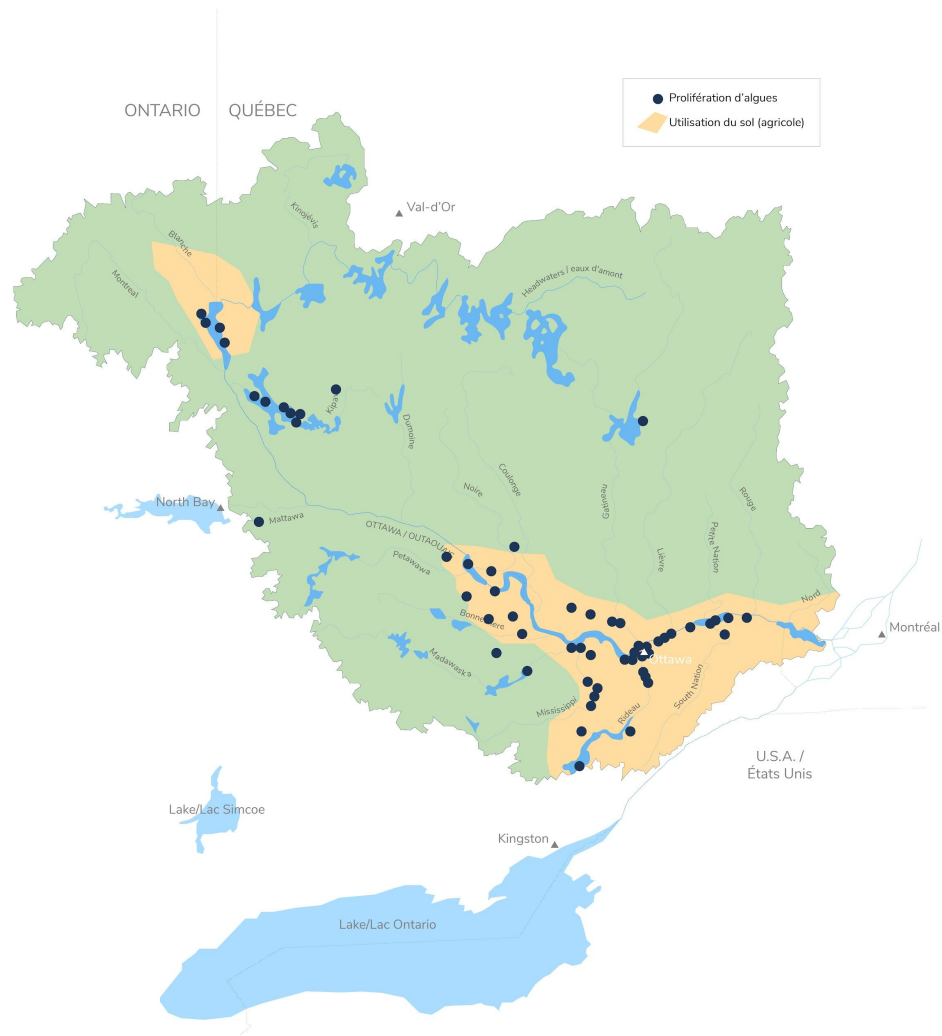
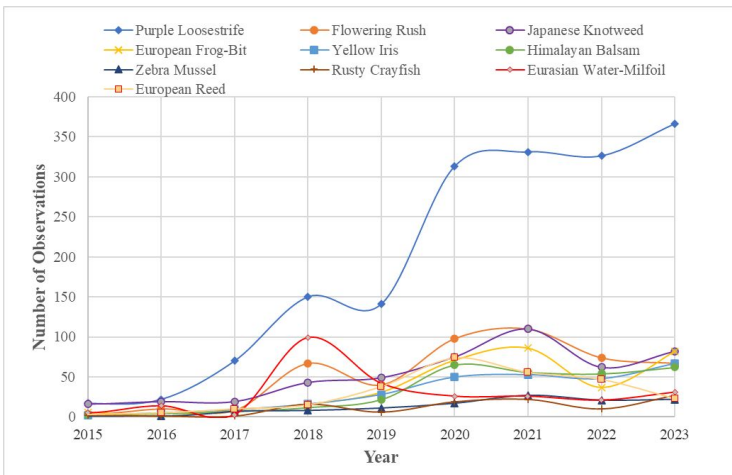
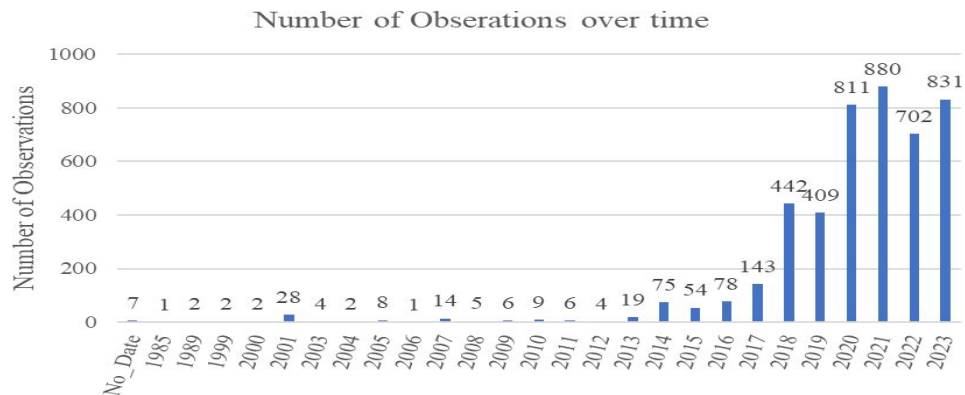
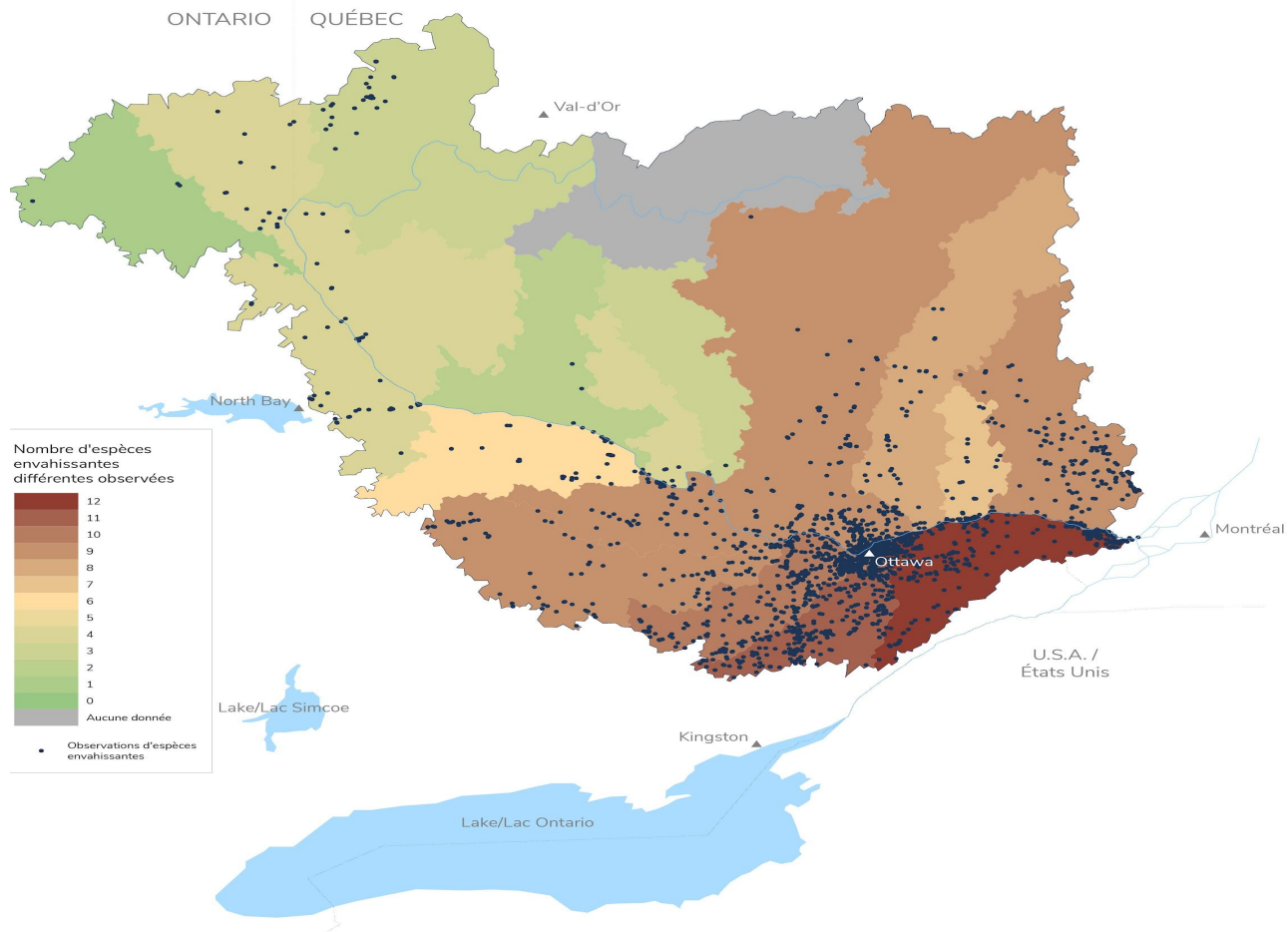


Figure 4. Boxplot of 2023 Total Phosphorus data by sub watershed. Blue line: Canada guideline



# Invasive Species Monitoring Program





# Mercury Analysis



Figure 7. Temporal trends of mercury concentration of 4 common species

Small

Medium

Large

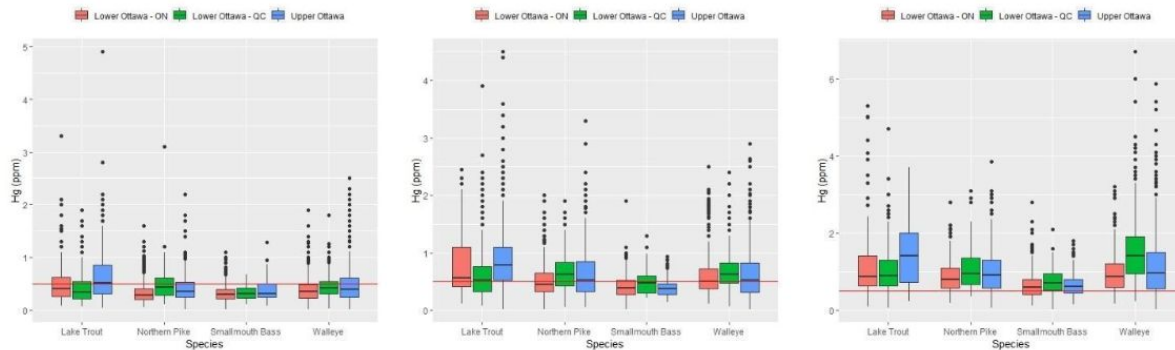
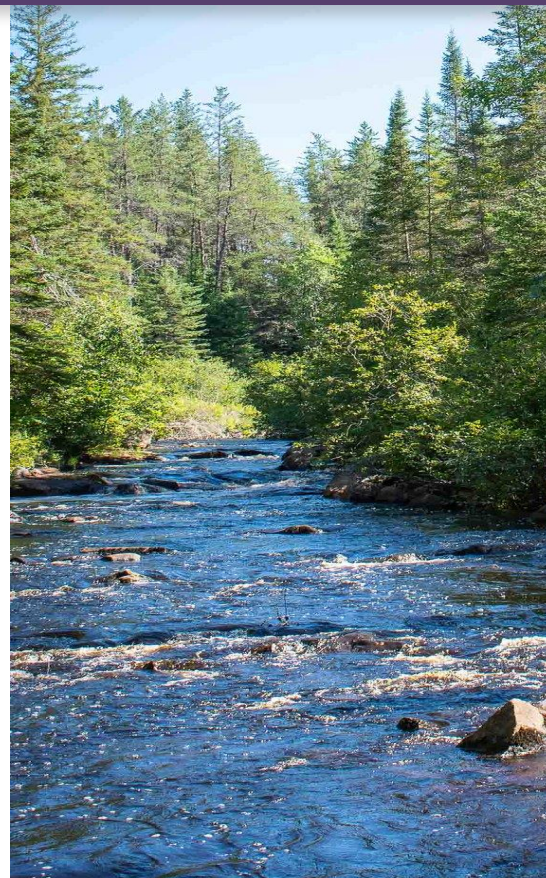


Figure 3. Mercury concentration of most common species by region. Red line: Canadian guideline (0.5 ppm).



# Mercury Analysis

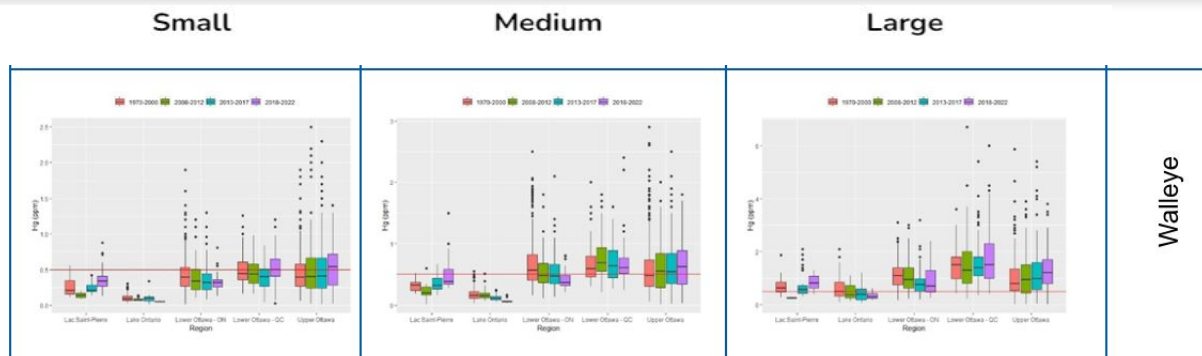
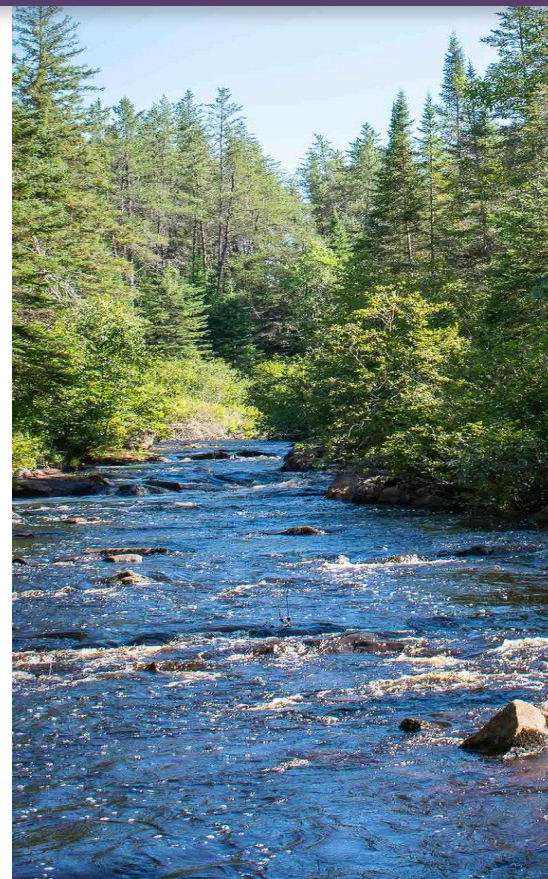
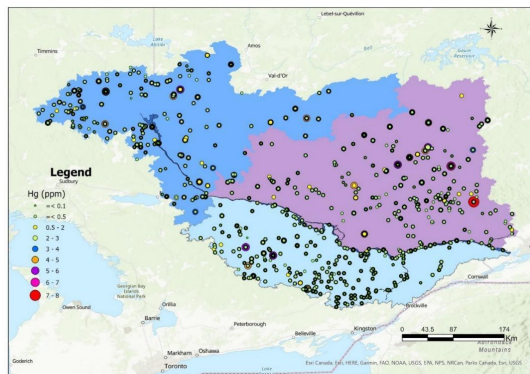
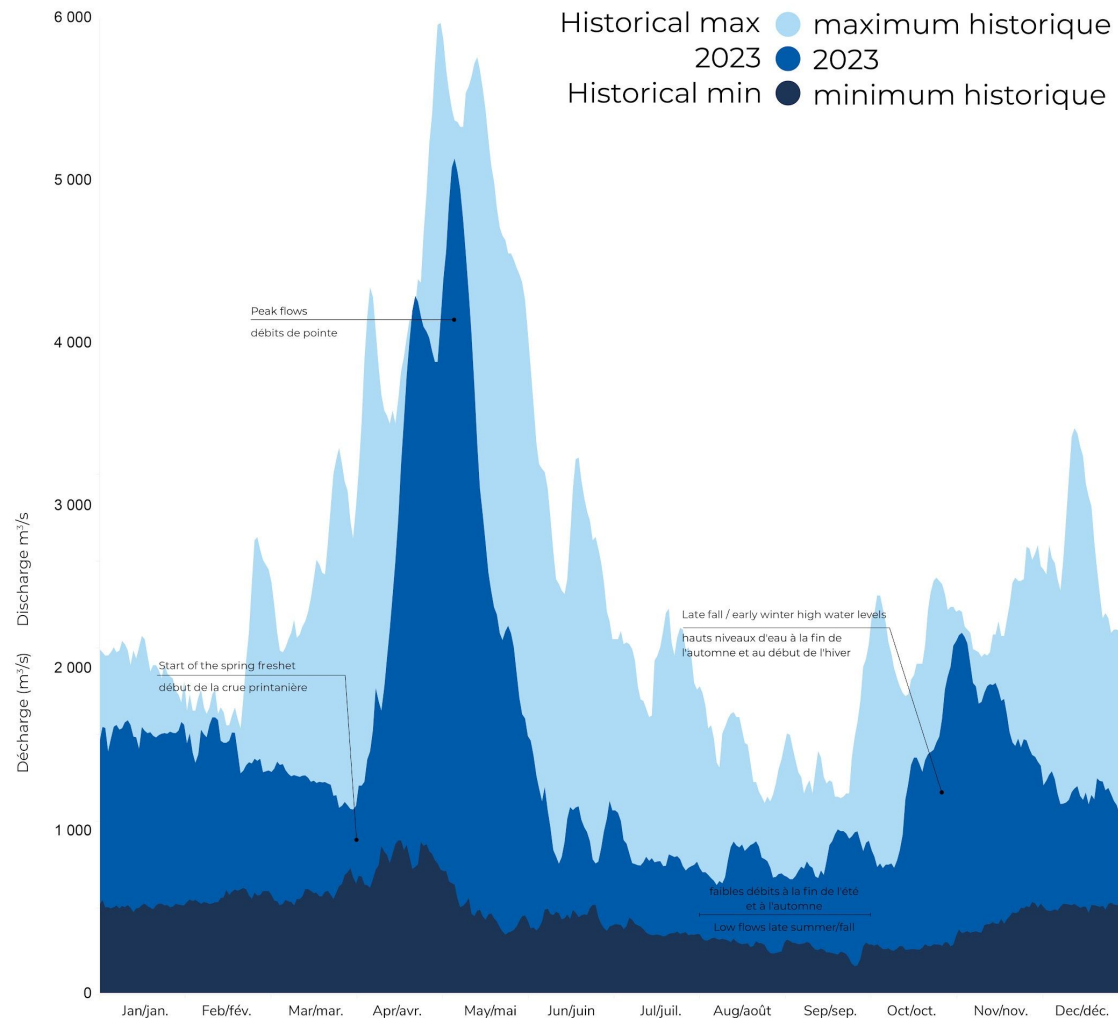
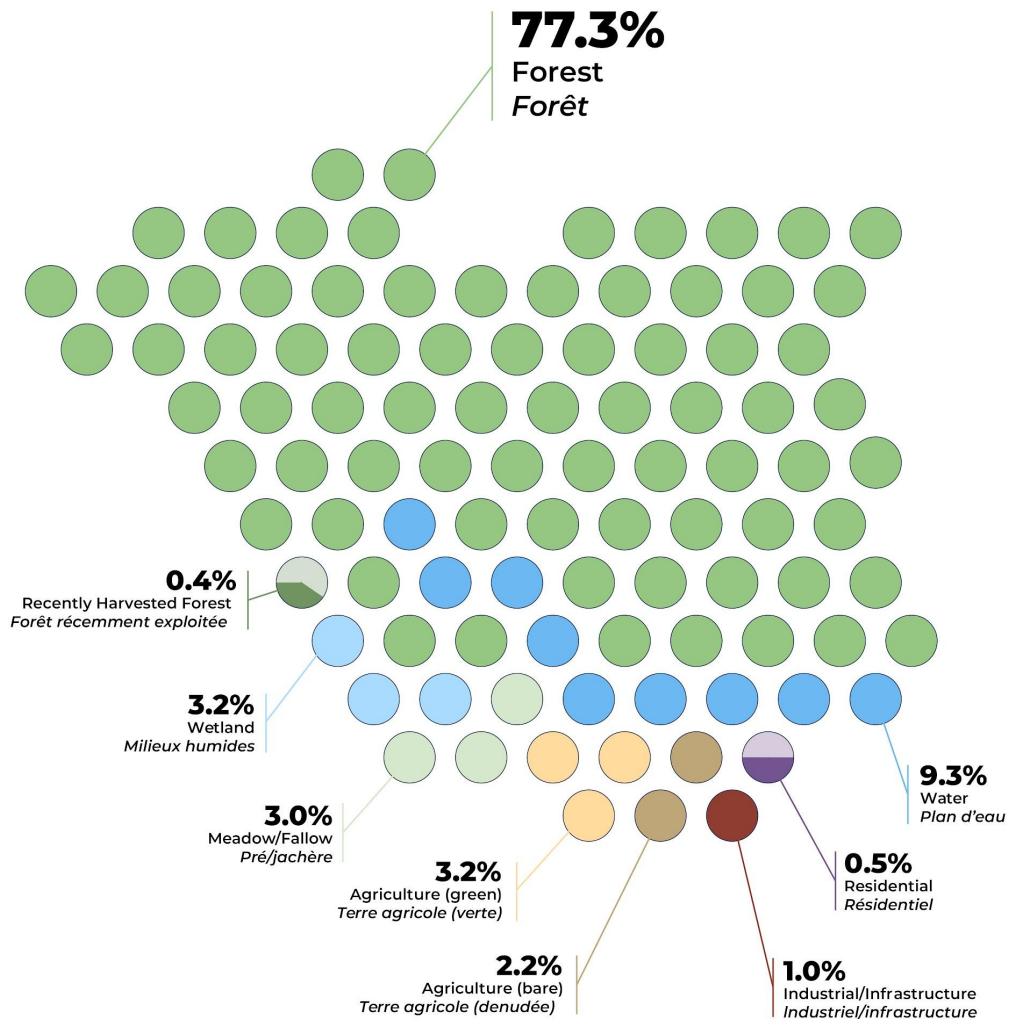


Figure 5. Mercury concentration between Ottawa River regions, Lake Ontario, and Lac Saint-Pierre over different temporal periods.







# Contaminants of Emerging Concern

Contaminants of emerging concern are substances that are in or introduced into the environment which persist for long periods of time. Their effects are either harmful or poorly understood. As a result, they are among the most difficult threats to counter in a watershed.

- Microplastics
- Per- and polyfluoroalkyl Substances (PFAS)
- Road Salt
- Radioactive Waste



A photograph of a winter scene featuring a snow-covered riverbank. The foreground is filled with deep, uneven snowdrifts. In the background, a river flows through a wooded area with snow-laden trees and bushes. A solid blue rectangular box is superimposed over the center of the image, containing the text "Road Salt" in white.

# Road Salt

# Programme de surveillance du sel de voirie

## *Road Salt Monitoring Program*

Impacts des sels de voirie sur la santé aquatique :

- Le chlorure du sel de voirie est très persistant

*Chloride in road salt is very persistent*

- Réduit la biodiversité des animaux aquatiques

*Reduces biodiversity of aquatic animals*

- Réduit les processus d'«auto-épuration » de l'eau

*Reduces water "self-purification" processes*



# Programme de surveillance du sel de voirie

## *Road Salt Monitoring Program*

### Objectives / Objectifs :

- Évaluer les concentrations de sel (chlorure) dans les ruisseaux locaux

*Assess salt (chloride) concentrations in local streams*

- Identifier les points chauds et les moments chauds de la contamination par les sels de voirie

*Identify hot spots and hot moments in time for road salt contamination*

- Sensibiliser la population aux conséquences du sursalage.

*Raise public awareness of the consequences of over-salting*



# Programme de surveillance du sel de voirie

## *Road Salt Monitoring Program*

- L'échantillonnage est effectué par des scientifiques communautaires sur un cours d'eau local.

*Sampling is conducted by community scientists at a local stream.*

- Les échantillons sont prélevés deux fois par mois de décembre à avril, et une fois par mois en été.

*Samples are collected 2 times a month from December to April, and one time per month in the summer.*

- Les bénévoles collectent des échantillons et enregistrent des données d'observation par Survey123.

*Volunteers collect samples and record observational data through Survey123.*



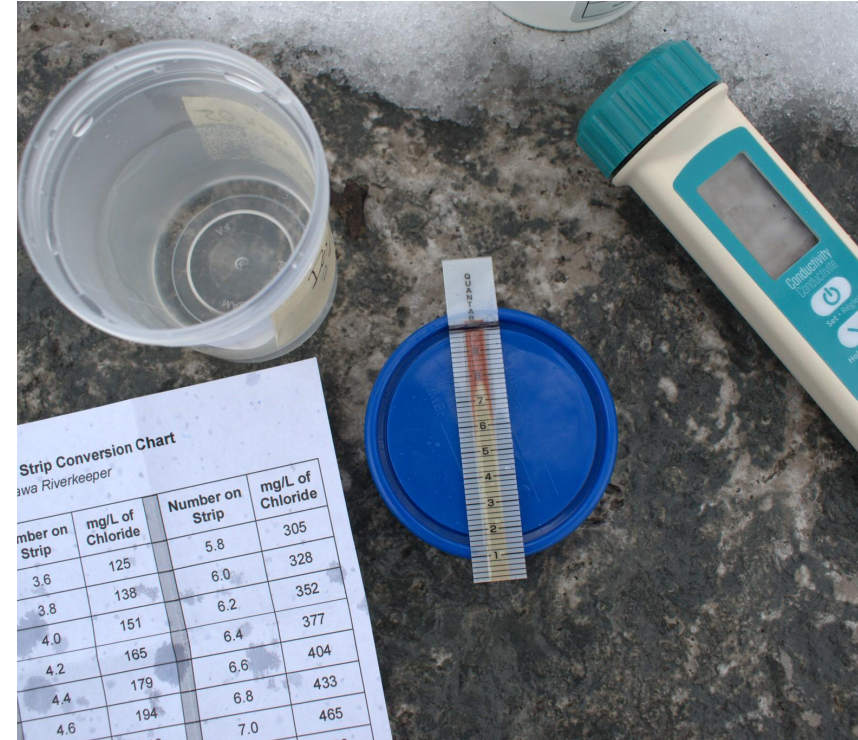
## Autres projets *Additional Projects*

- Analyse de l'eau pour le projet pilote de quartier écologique de la Ville de Gatineau

*Water Testing for the Ville de Gatineau Ecological Neighborhood Pilot Project*

- Programmes de formation et partage de données avec la ville d'Ottawa

*Training programs and sharing of data with the City of Ottawa*



# Seuils de toxicité

## Toxicity thresholds

### CONCENTRATIONS MOYENNES DE CHLORURE DANS LES MASSES D'EAU

**< 100 mg/L**

Les rivières

**250 - 400 mg/L**

L'eau a un goût salé

**500 - 5,000 mg/L**

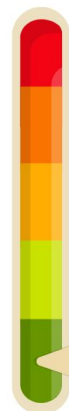
Brackish / Estuaire

**20,000 mg/L**

Eau de mer

Note : L'océan contient une variété de sels et environ 55% de chlorure.

### SEUILS DU CHLORURE DANS LES MILIEUX AQUATIQUES



**Toxicité aiguë**  
**> 640 mg/L**

*L'exposition instantanée peut  
nuire à la vie aquatique*

**Toxicité chronique**  
**120-640 mg/L**

*Une exposition prolongée (4+ jours)  
peut nuire à la vie aquatique.*

**Niveau sûr**  
**0 - 120 mg/L**

*Généralement sans danger pour  
la vie aquatique*

Established by the Canadian Council of Ministers of the Environment

# Sites d'échantillonnage

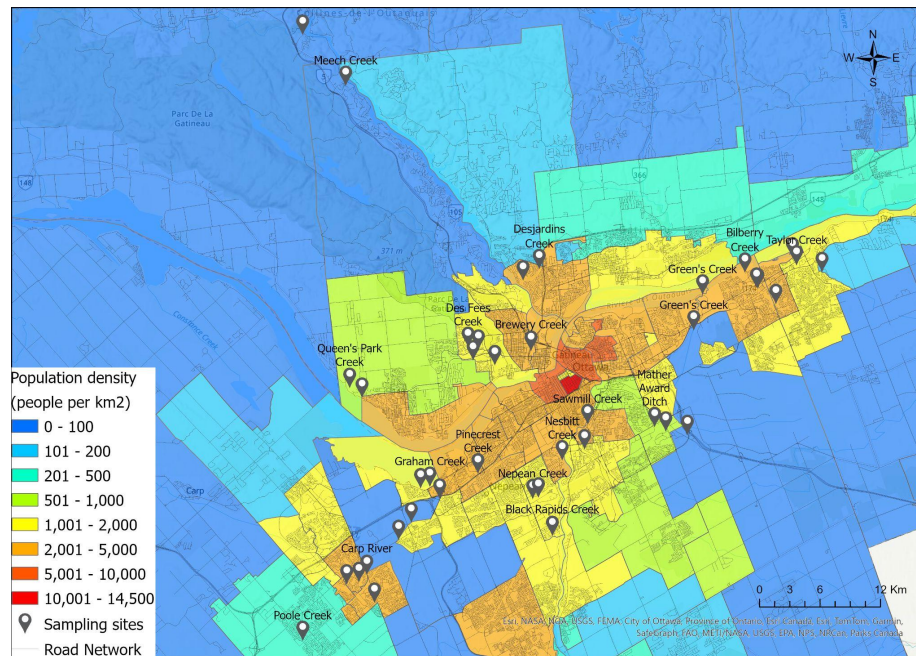
## *Sampling locations*

- Zones à forte densité, centres-villes, zones résidentielles et zones rurales

*Areas with higher densities, downtowns, residential areas and rural areas*

- Distribution autour d'Ottawa et de Gatineau

*Selected across Ottawa and Gatineau*



*Sites d'échantillonnage pour le programme de surveillance du sel de voirie (2019-2024).*

*Sample locations for the Road Salt Monitoring Program (2019-2024).*

# Résultats

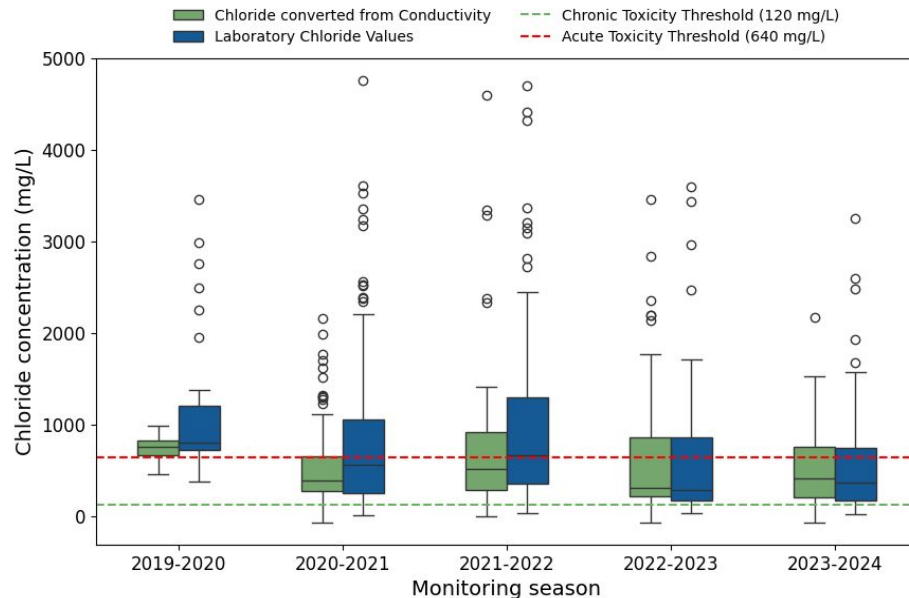
## Findings

- Les concentrations de chlorure varient de 4,5 mg/L à 5 000 mg/L.

*Chloride concentrations ranged from 4.5 mg/L up to 5000 mg/L*

- Les concentrations médianes étaient supérieures aux seuils de toxicité chronique chaque année.

*The median concentrations remained above the threshold for chronic toxicity each year*



*Concentration de chlorure par année*

*Chloride concentration per year*

# Résultats

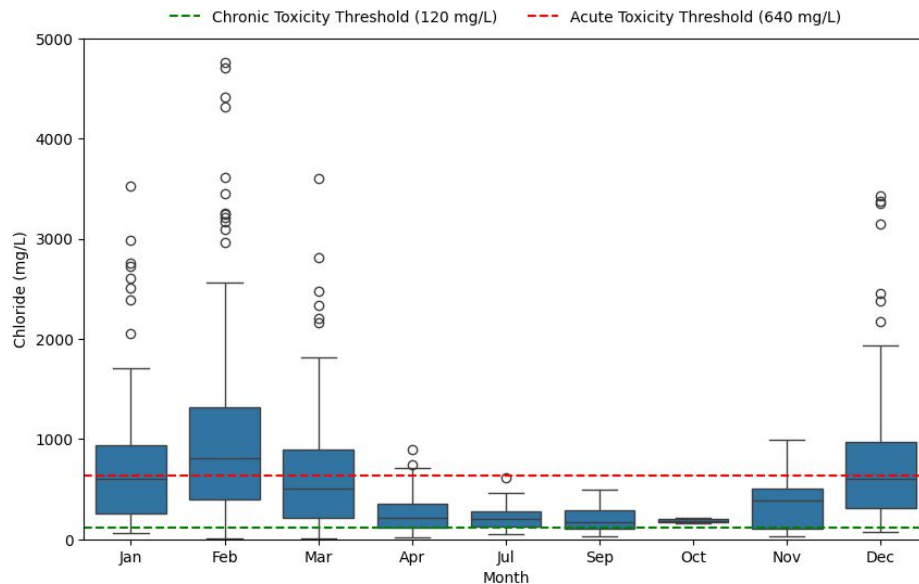
## Findings

- Les concentrations de chlorure les plus élevées sont observées pendant les mois d'hiver.

*Chloride concentrations are highest throughout the winter months*

- Les concentrations les plus faibles sont observées pendant les mois d'été

*The lowest concentrations of chloride are observed during the summer months*



*Concentration de chlorure par mois*

*Chloride concentration per month*

# Recommendations

## **Recommendation 1:**

Les municipalités et les grands propriétaires fonciers doivent tirer parti des ressources disponibles pour garantir l'efficacité de l'épandage des sels de voirie

Municipalities and large property owners need to take advantage of available resources to ensure road salt application is effective

## **Recommendation 2:**

Élaborer et mettre régulièrement à jour des plans de gestion des sels de voirie

Develop and regularly update Road Salt Management Plans



# Recommendations

## **Recommendation 3:**

Identifier les zones où l'épandage de sel de voirie doit être limité.

Identify areas to restrict the application of road salt.

## **Recommendation 4:**

S'informer sur l'utilisation appropriée des sels de voirie afin de réduire les dommages causés aux cours d'eau locaux.

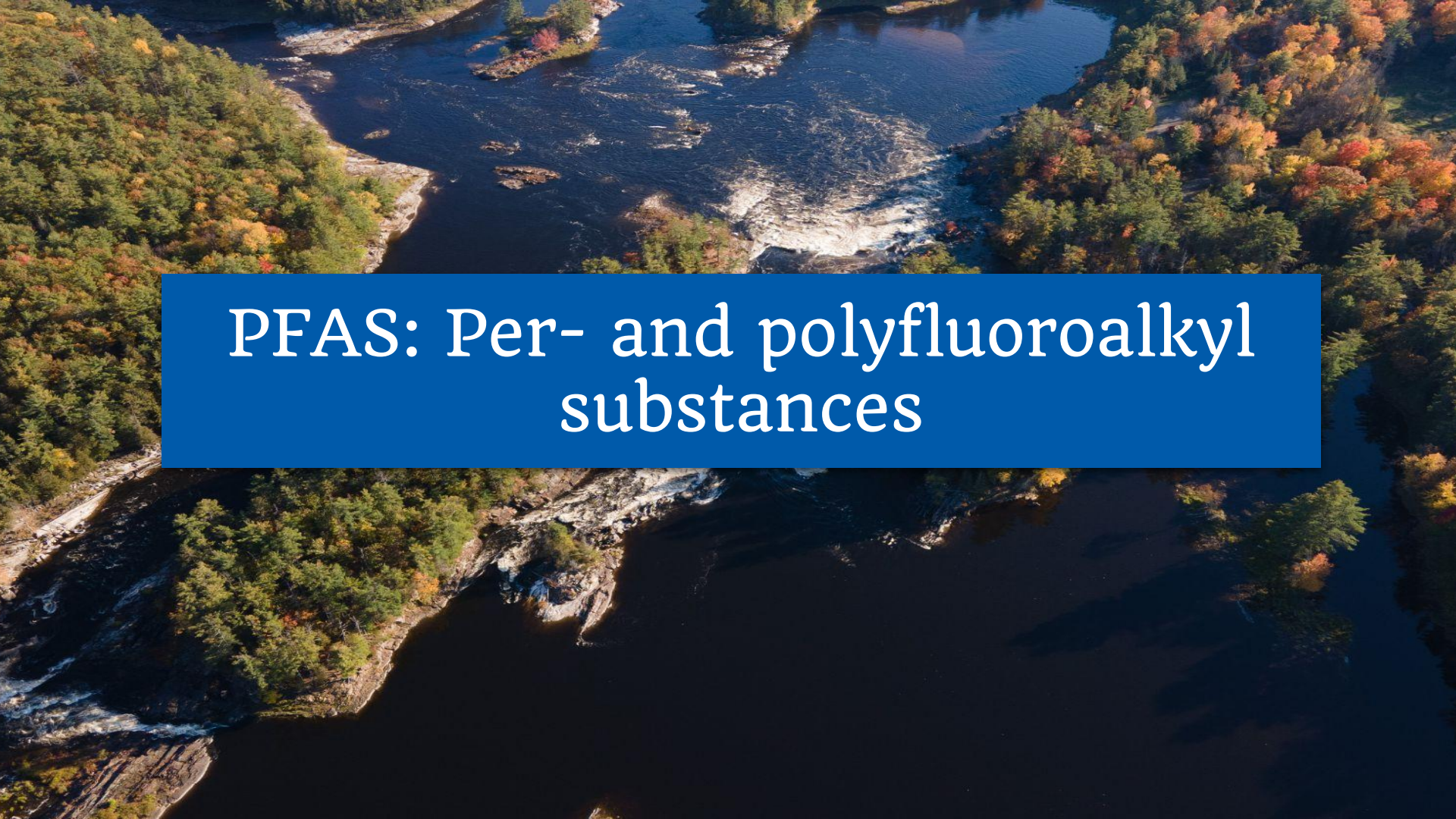
Become informed about appropriate road salt use to reduce the harm to local streams.

5 ans de surveillance des sels  
de voirie dans la région de la  
capitale nationale



Ottawa RIVERKEEPER®  
GARDE-RIVIÈRE des Outaouais





# PFAS: Per- and polyfluoroalkyl substances

# PFAS: What and where they are

---

- A class of synthetic chemicals that are used in a variety of products including lubricants, cosmetics, surfactants, firefighting foams, non-stick cookware, food packaging materials, and textiles such as carpets, furniture, and clothing (more than 4700 individual chemicals)
- Present almost everywhere in the environment, air, oceans, soils, water, wastewater treatment plants, landfill leachate, sewage sludge, and polluted sites
- Can move through soils and contaminate drinking water sources
- They do not naturally break down in the environment, “forever chemicals.”

# PFAS: Is there a health risk?

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- PFAS have been proven to have significant negative health effects on a variety of organisms, ranging from aquatic life to wildlife and plants.
- Exposure to PFAS has been associated with developmental abnormalities, reduced reproductive success, increased risk of cancer, and impaired immune function in aquatic species as well as in terrestrial wildlife, including humans.
- PFAS bioaccumulate which results in higher concentrations of PFAS in species that are higher up their food chain.

# PFAS: Current policy

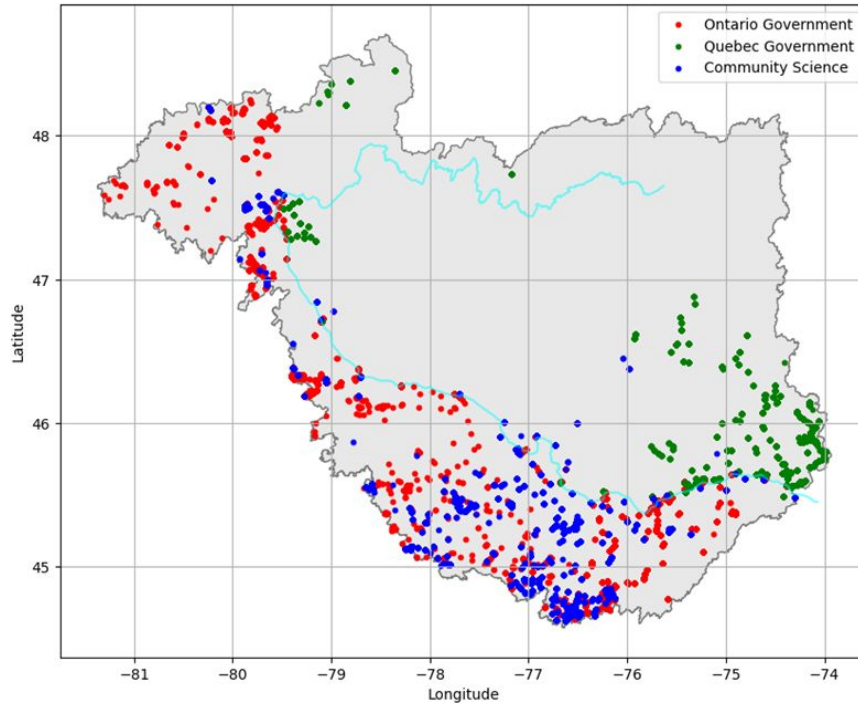
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- Most recent comment period to comment on the PFAS closed in May 2025
- Health Canada and Environment and Climate Change Canada had released : Risk Management Approach for Per- and polyfluoroalkyl substances (PFAS), excluding fluoropolymers
- Ottawa Riverkeeper's most recent comments included:
  - Need to embracing the Guiding Principles for CEPA 1999
  - Support for PFAS to be listed under CEPA 1999
  - Excluding Fluoropolymers from the Risk Assessment Approach
  - Adopting Meaningful Guidelines for Thresholds
  - Urgency is Required for Managing PFAS

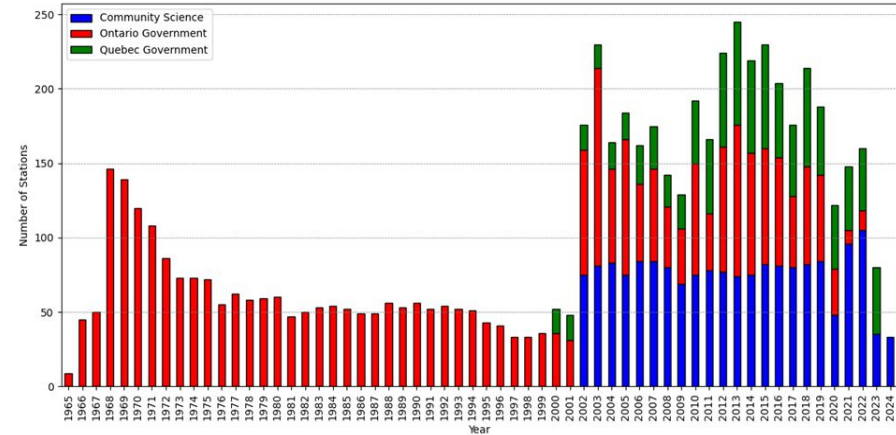
A scenic view of a wetland or marsh area. In the foreground, there is a body of water reflecting the sky and the surrounding vegetation. To the left, there are several tall, thin trees with green foliage. To the right, there are dense patches of reeds and grasses. The sky is a clear blue with some light, wispy clouds. A dark blue rectangular box is superimposed over the center of the image, containing white text.

# Making the case for community based monitoring

# Additional sources of data

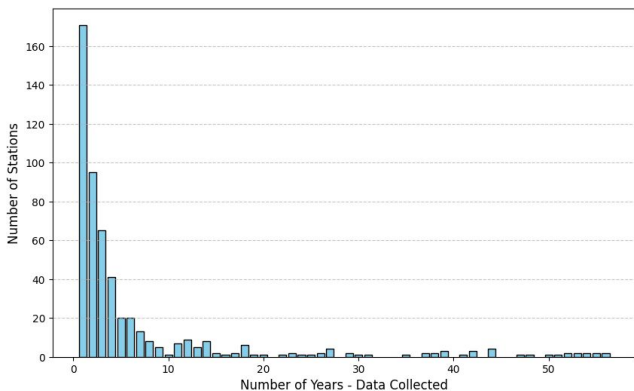


Total Phosphorus sampling locations

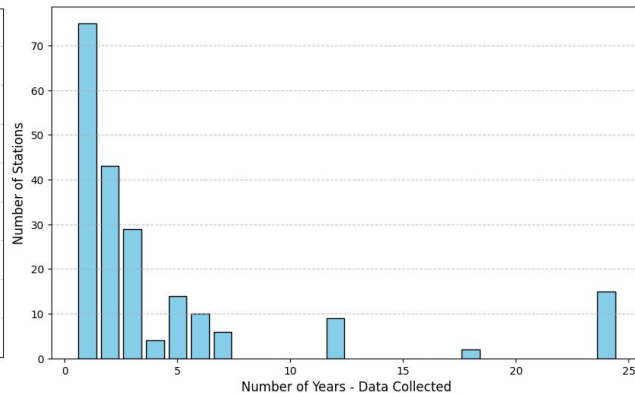


Number of stations by year

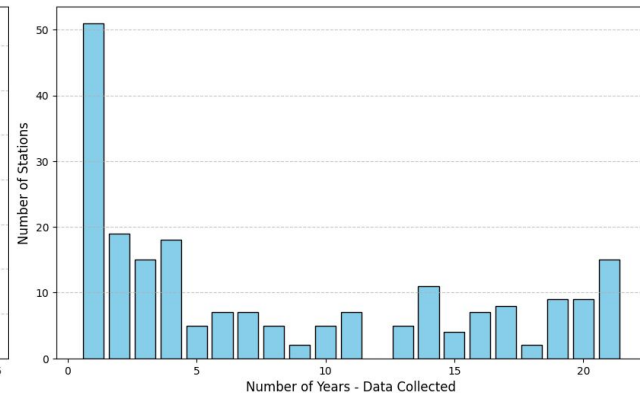
# Additional sources of data



Ontario Government



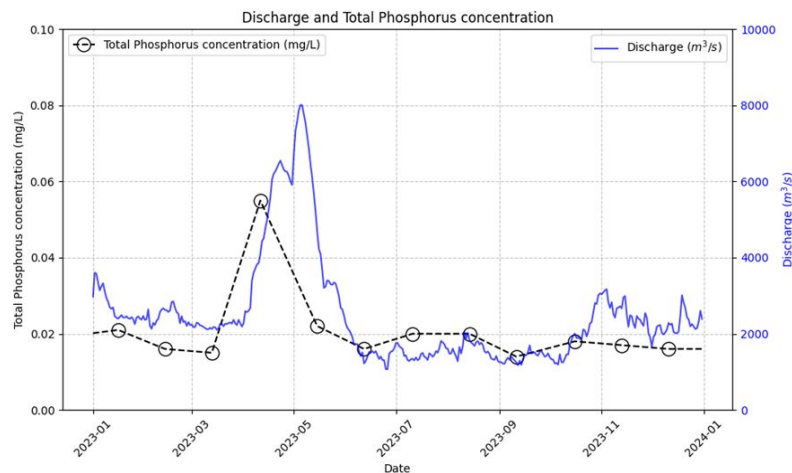
Quebec Government



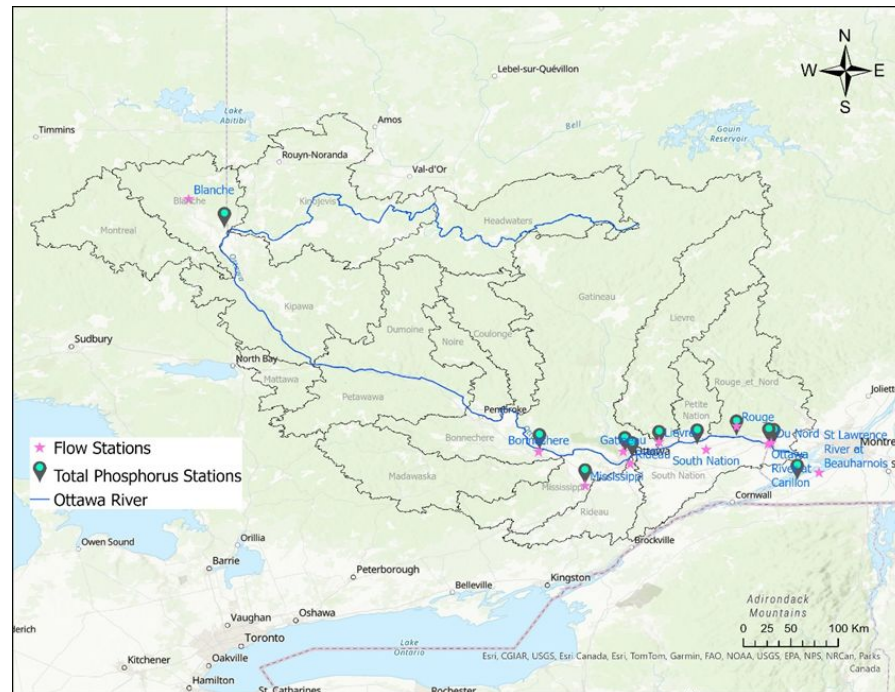
Community Science

*Histogram of Stations by Years of Data Collection*

# Phosphorus Loading in the Watershed

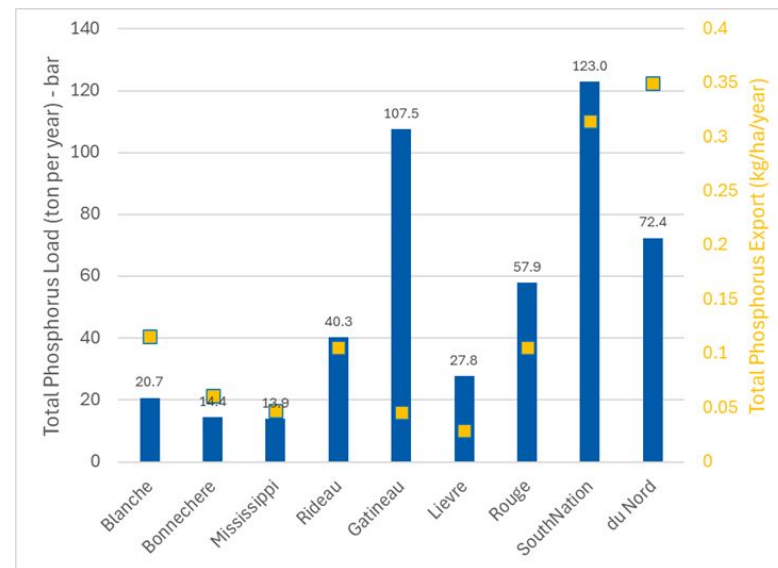
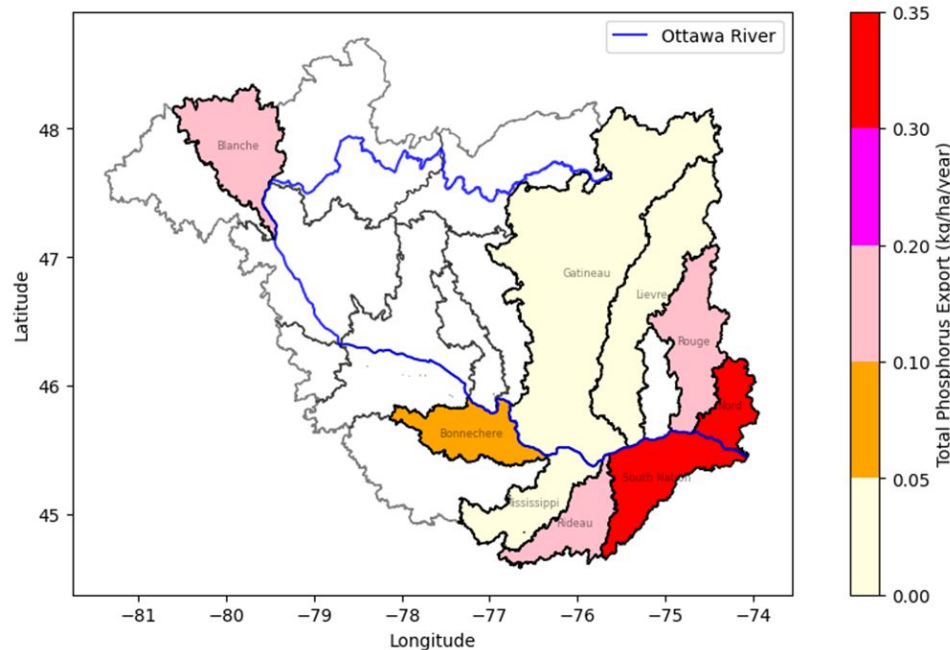


*Discharge and total phosphorus concentration  
for the Ottawa River at Carillon.*



*Locations of Flow and Total Phosphorus stations*

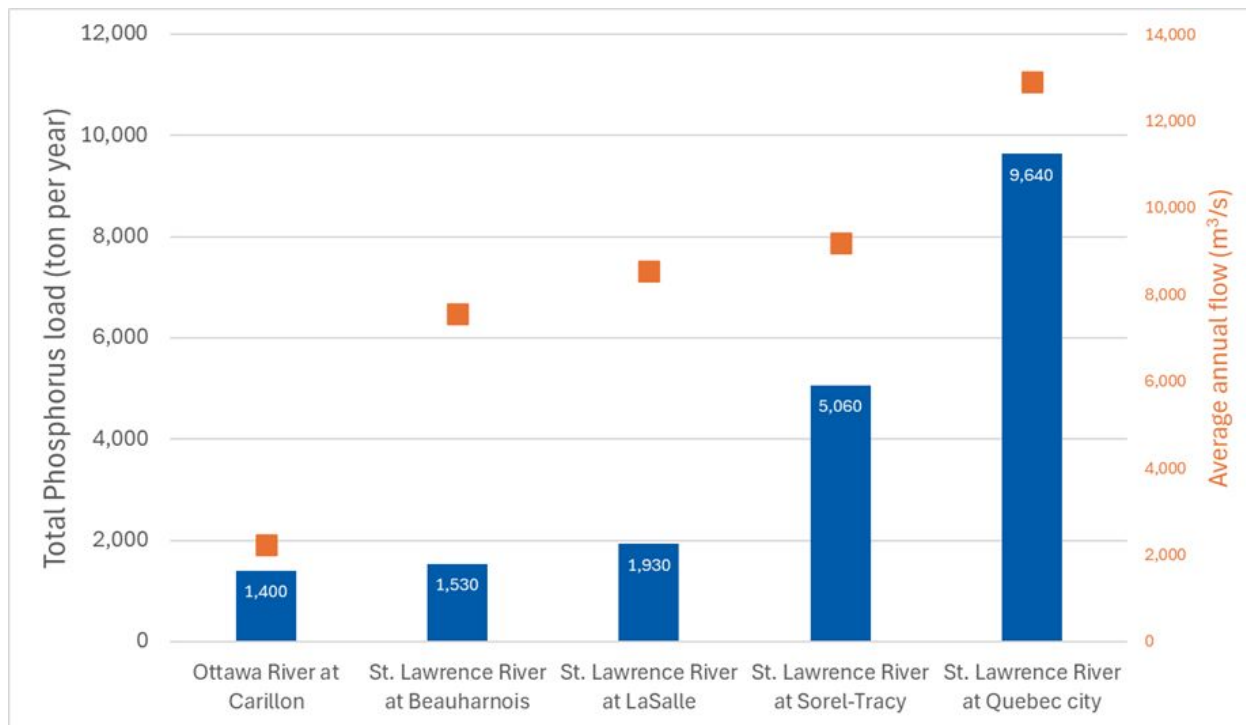
# Phosphorus Loading in the Watershed



Total Phosphorus Loading and Total Phosphorus Export into the Ottawa River. (\*Gatineau: Flow data from 1991–1994; Lievre: All data from 1974–1975)

Total Phosphorus export (kg/ha/year) by each subwatershed

# Phosphorus Loading in the Watershed



Total Phosphorus load and average flow at Ottawa River and St. Lawrence River

# Merci !

