

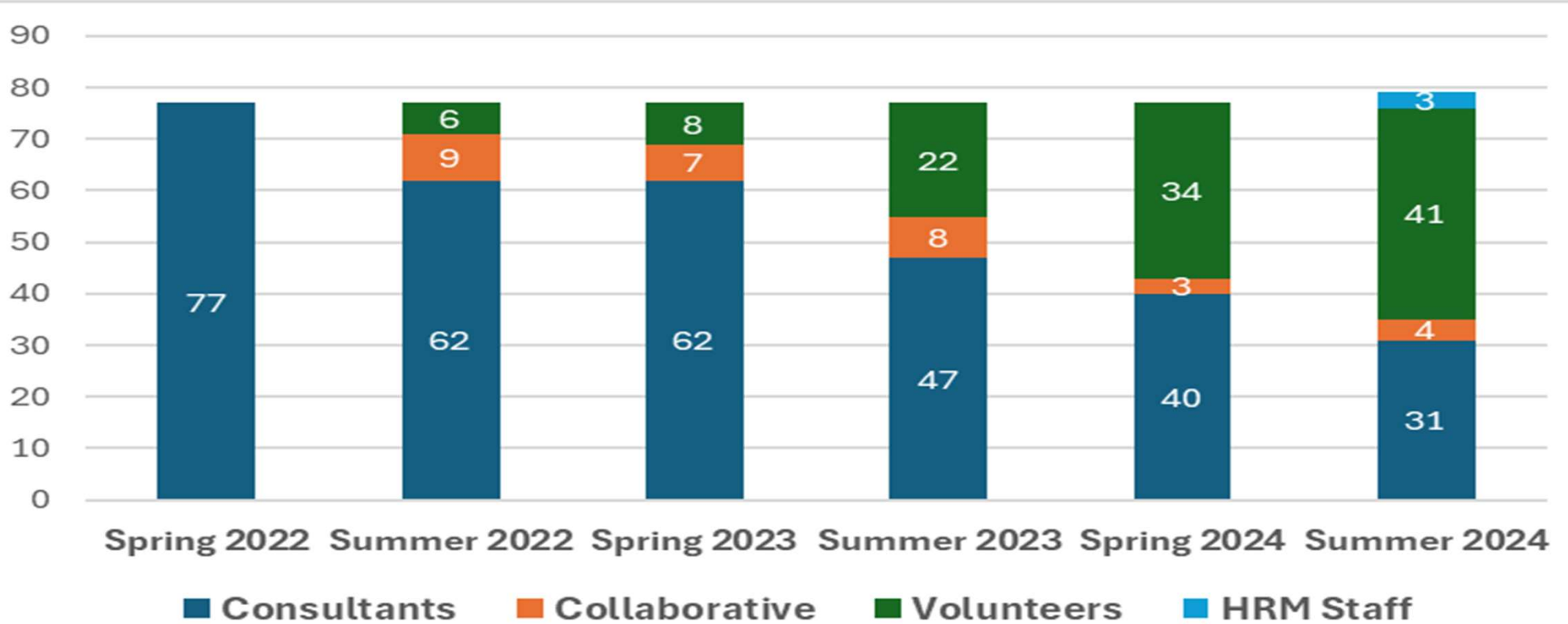


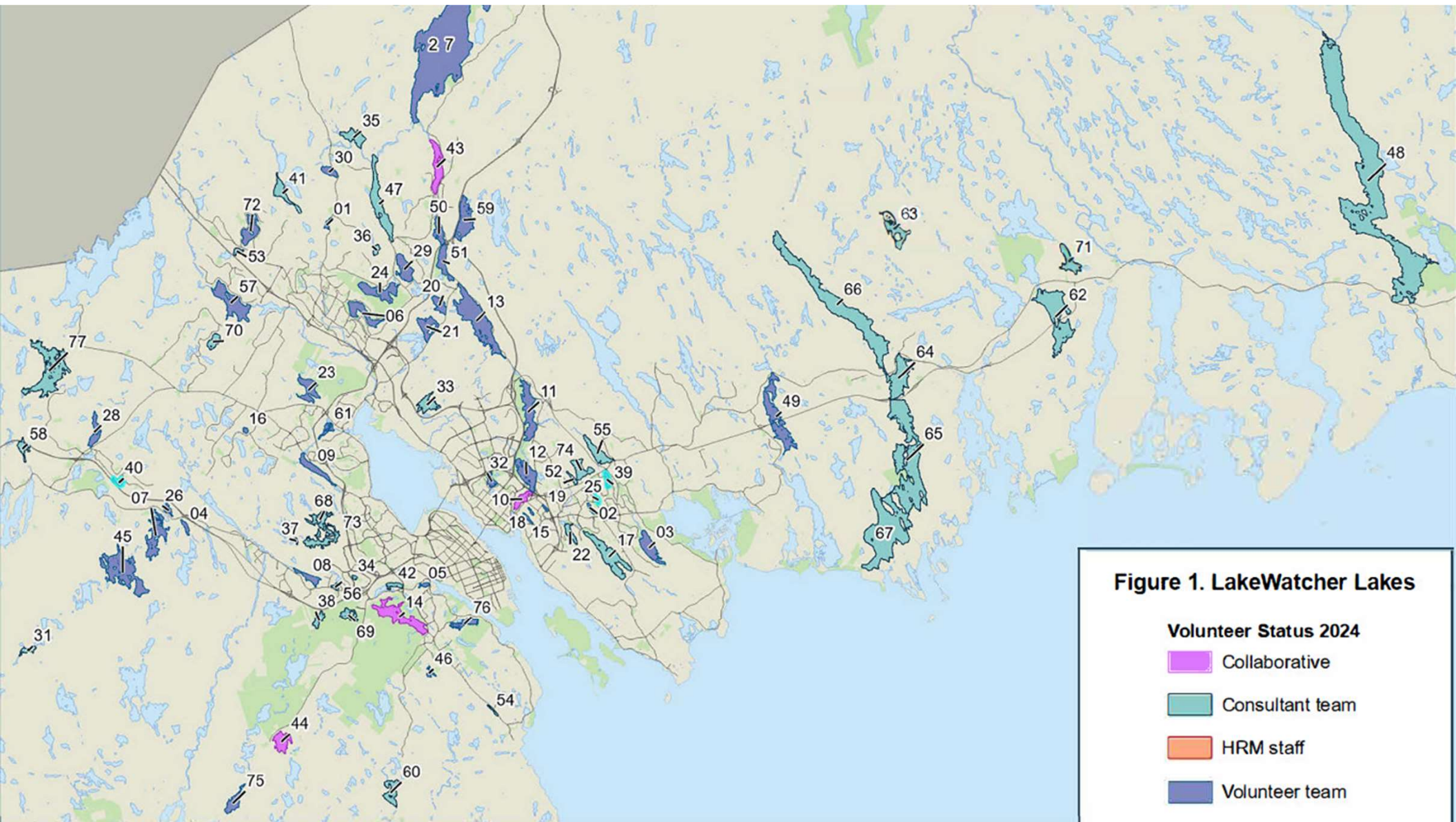
# LakeWatchers

State of the Lakes Report 2022-2024

# What is the HRM Lakewatchers Program?

- Community-based lake water quality monitoring at 70+ lakes in HRM

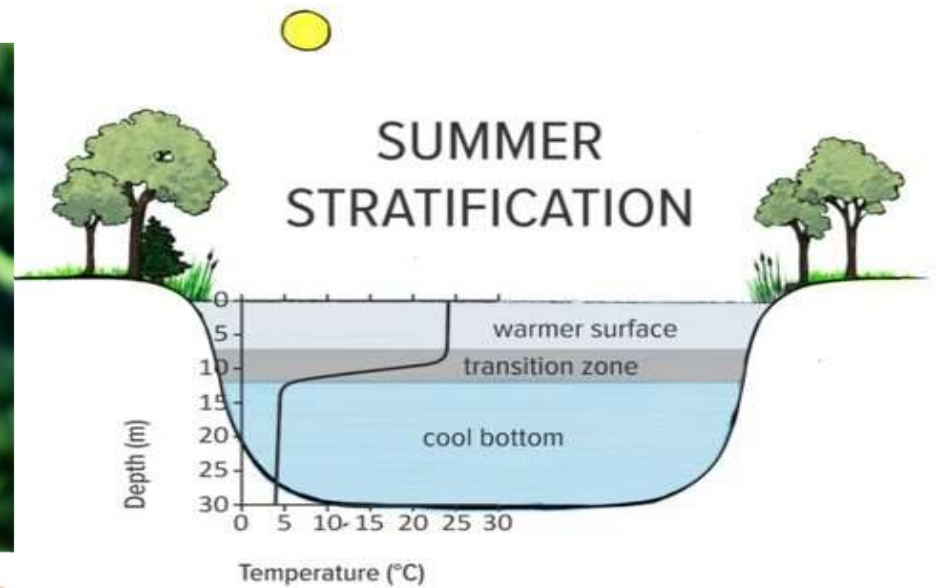
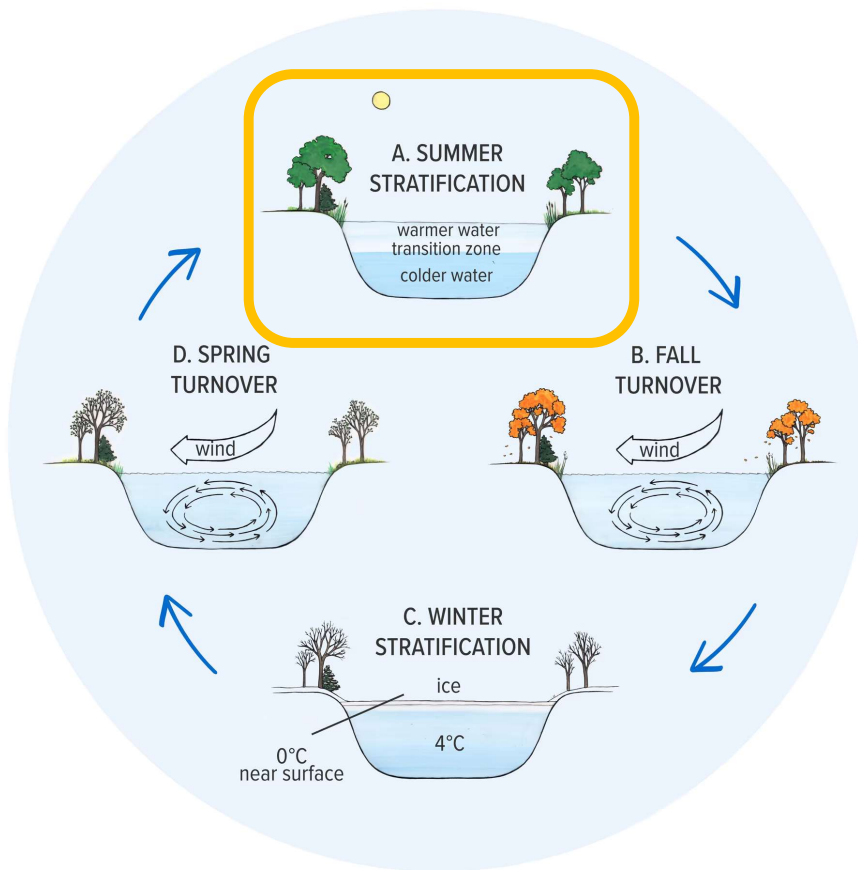




# Annual Lake Cycle

- Two basic states: Stratified and Mixed (Turnover).

- Driven by water temperature and changing water densities.



## 3 Key Concerns for Local Lakes

### 1) Eutrophication (Nutrient Enrichment)

- Can trigger excessive aquatic plant and algae growth

### 2) Salinization (Chloride Enrichment)

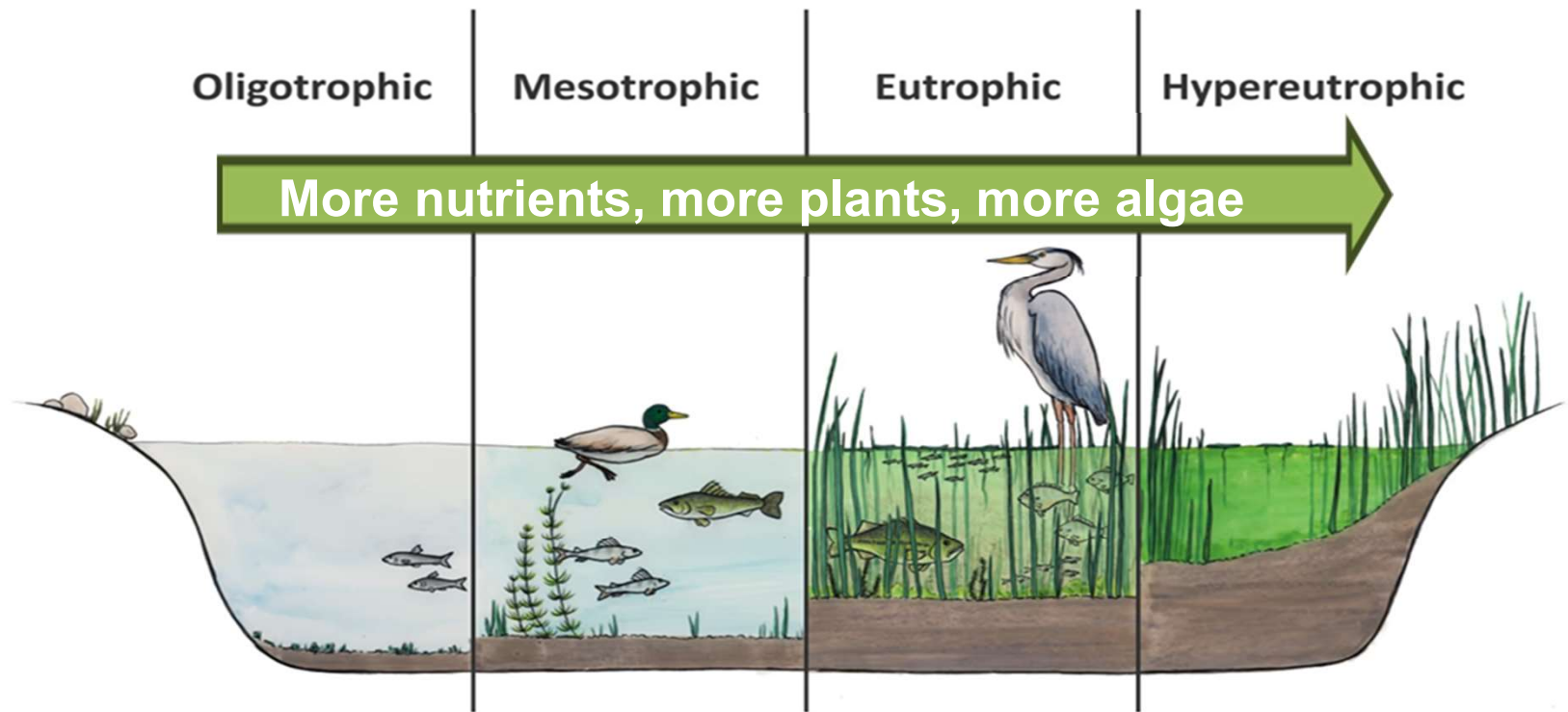
- Can interfere with natural lake cycling and is toxic to freshwater organisms

### 3) Bacterial Contamination

- Can impact the recreational uses of a lake by making it unsafe to swim or enter the water.

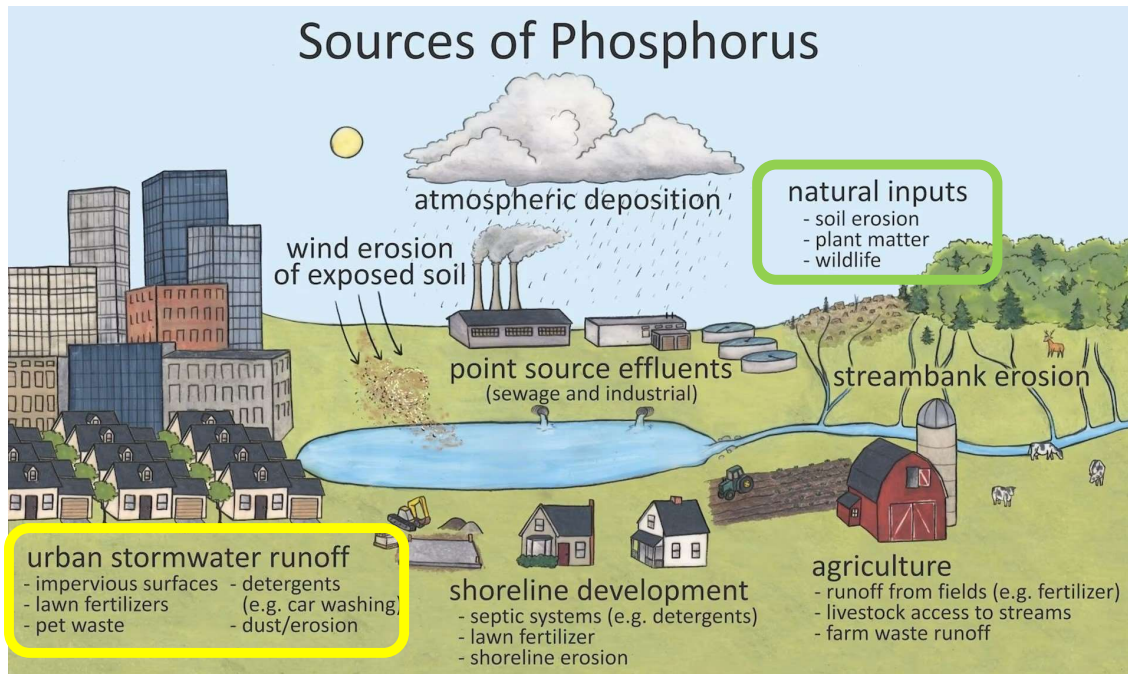


**Eutrophication** is the process by which a lake becomes overly enriched with nutrients – often Phosphorus.



# Where do the extra nutrients come from?

## Sources of Phosphorus



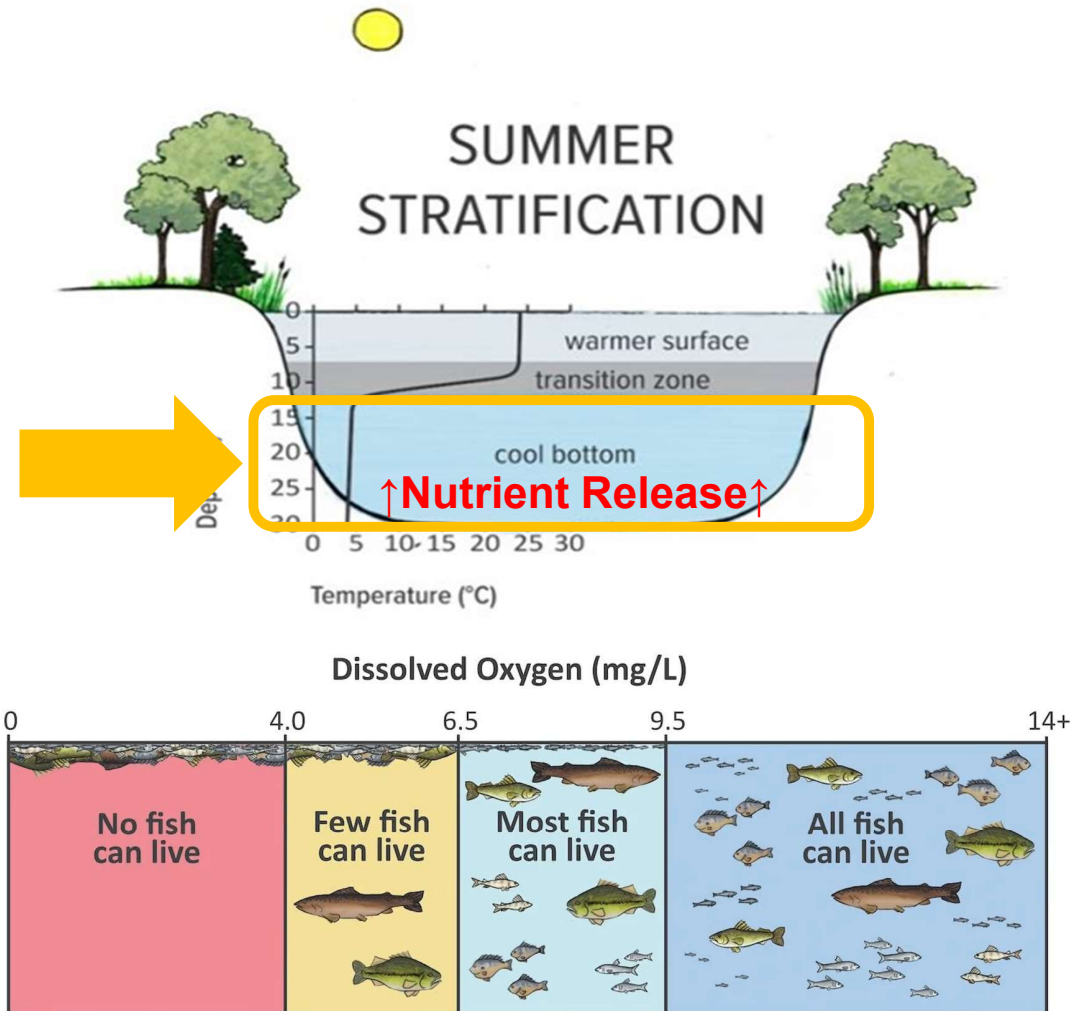
# Current impacts

- Increasing number of resident reports of excessive aquatic plant and algae growth.
- Annual contract for aquatic weed harvesting to protect recreational value of Lake Banook and Lake Micmac



# Early Trends: Eutrophication

- Most lakes shows signs of nutrient enrichment.
  - Elevated Chlorophyll- $\alpha$  levels
  - Deepwater oxygen loss in summer
  - Evidence for internal loading
  - Resident reports of more aquatic plants and algae



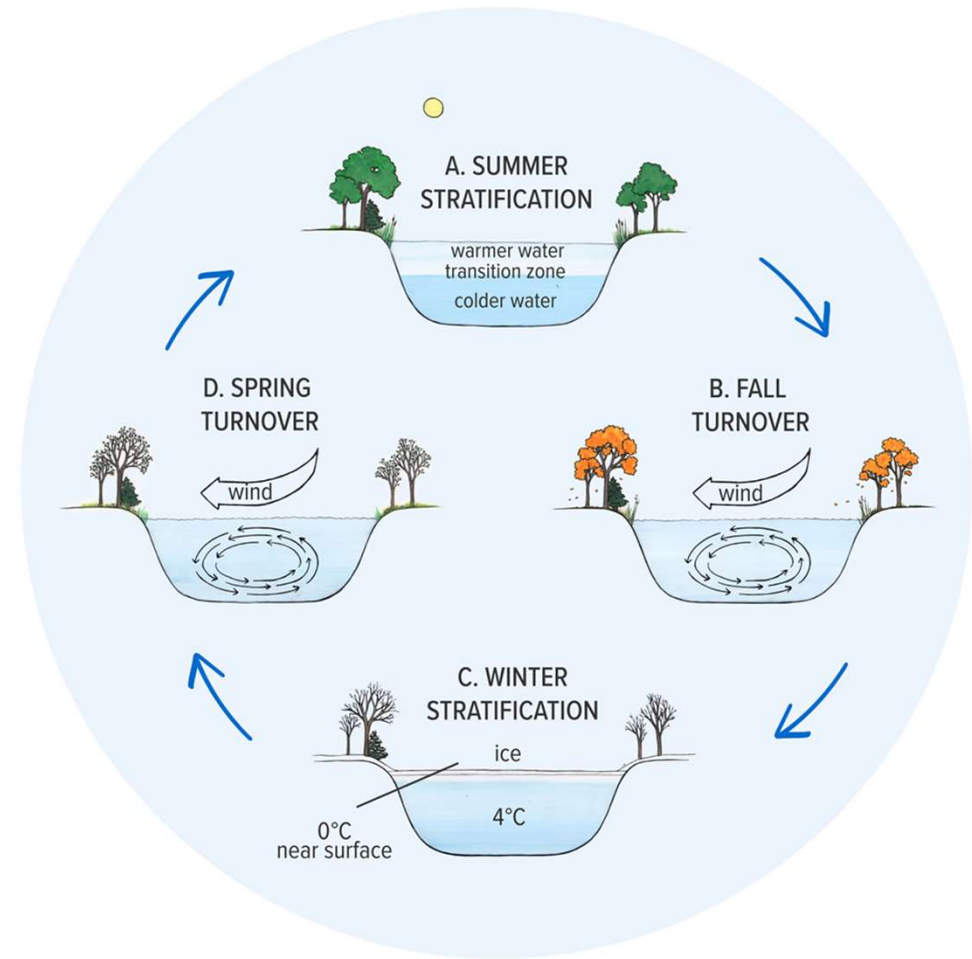
**Salinization** or chloride enrichment is the process of a freshwater lake becoming saltier over time.



**Canadian Water Quality Guidelines for the Protection of Aquatic Life - CHLORIDE**

Table 1. Canadian Water Quality Guideline for the Chloride ion<sup>a</sup> for the protection of aquatic life.

	Long-Term Exposure <sup>b</sup> (mg Cl/L)	Short-Term Exposure <sup>c</sup> (mg Cl/L)
Freshwater	120 <sup>d</sup>	640



# Where does the salt come from?

- De-icing salts / road salt  
Sodium Chloride (NaCl)



## Urban Stormwater Run-off



# Early Trends: Salinization

- Many lakes routinely exceed the federal guideline for the protection of freshwater life.
- Clear trend between high chloride levels and densely developed areas in the municipality.

Lake Name	2022		2023		2024		'22 – '24 Average
	Spring	Summer	Spring	Summer	Spring	Summer	
1. Lake Banook	240	240	180	200	180	180	203.3
2. Lovett Lake	260	200	270	190	150	150	203.3
3. Lake Micmac	240	220	220	120	170	160	188.3
4. Russell Lake	220	180	190	170	160	150	178.3
5. Oat Hill Lake	190	160	180	170	180	180	176.7
6. Bayers Lake	190	170	170	76	110	130	141.0
7. Governor Lake	150	150	120	120	110	110	126.7
8. Penhorn Lake	140	130	130	130	110	110	125.0
9. First Lake	140	140	120	120	110	110	123.3
10. Bissett Lake	140	110	150	100	96	95	115.2
11. Settle Lake	150	130	110	57	100	110	109.5
12. Albro Lake	110	110	100	86	92	110	101.3
13. Cranberry Lake	160	110	120	44	86	83	100.5
14. Chocolate Lake	57	160	120	89	74	70	95.0
15. Maynard Lake	91	94	87	89	88	78	87.8
16. Morris Lake	100	93	90	69	73	72	82.8

**Bacterial contamination** refers to the presence of micro-organisms in the water that can cause illness to humans.

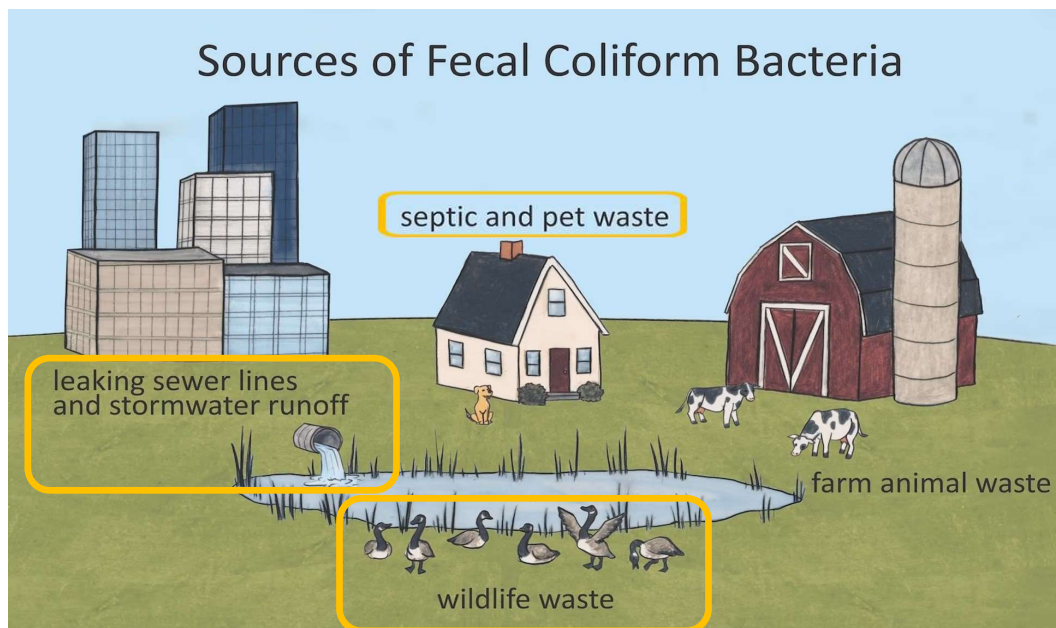


*Health Canada – Freshwater Recreation*  
*E. coli* LESS than 235 CFU per 100 ml

**HALIFAX**

# Where does the Bacterial Contamination come from?

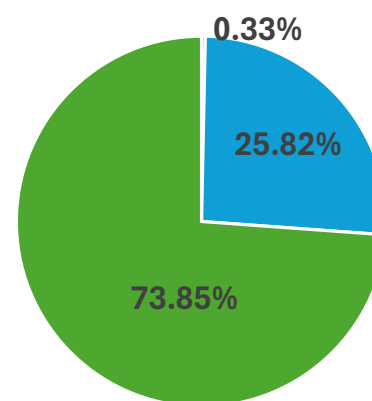
Sources of Fecal Coliform Bacteria



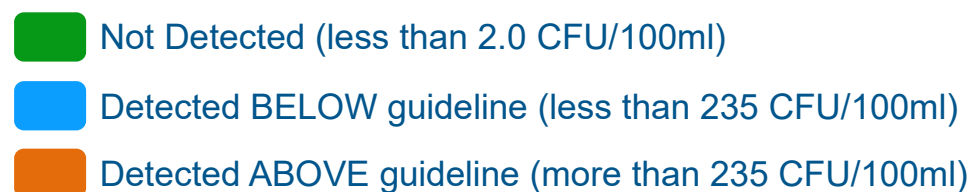
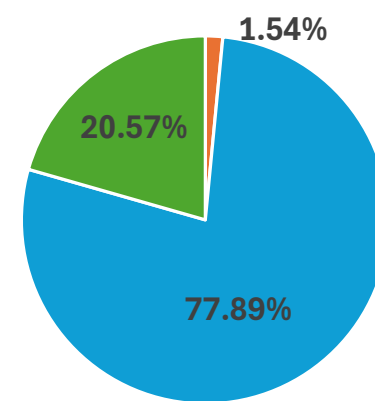
# Early Trends: Bacterial Contamination

- *E.coli* was detected above Health Canada guidelines on only 8 occasions out of 760 total samples (~1%).
- *E.coli* was detected much more frequently during the summer sampling
- Nearshore sampling locations had consistently higher *E. coli* counts than mid-lake locations.

Springtime *E. coli* Detection Rates



Summertime *E. coli* Detection Rates



# Recommendation #1

- Direct staff to add the supervised beaches at Kidston Lake, Penhorn Lake, Albro Lake, Birch Cove (Lake Banook), Lake Echo, Springfield Lake and Kearney Lake to the Naturalization Strategy.



## Recommendation #2

- Direct Staff to explore shoreline and in-lake green infrastructure options for addressing stormwater discharge locations within 100 m of supervised beaches.



A scenic view of a lake with a wooden dock in the foreground. The dock is made of weathered wooden planks and has several white posts. The water is calm and reflects the sky. In the background, there are several houses, some with blue roofs, and a mix of evergreen and deciduous trees. The sky is blue with scattered white clouds. The word "Questions?" is overlaid in the center of the image in a white, sans-serif font.

Questions?