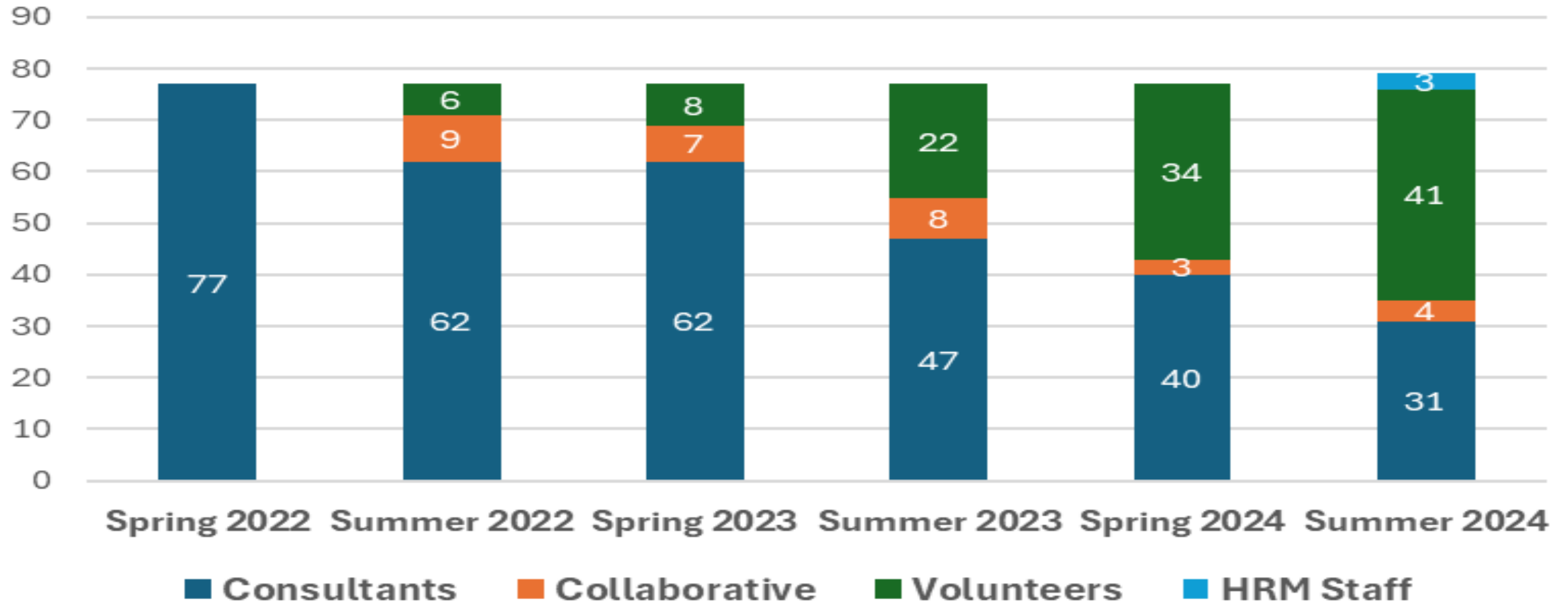


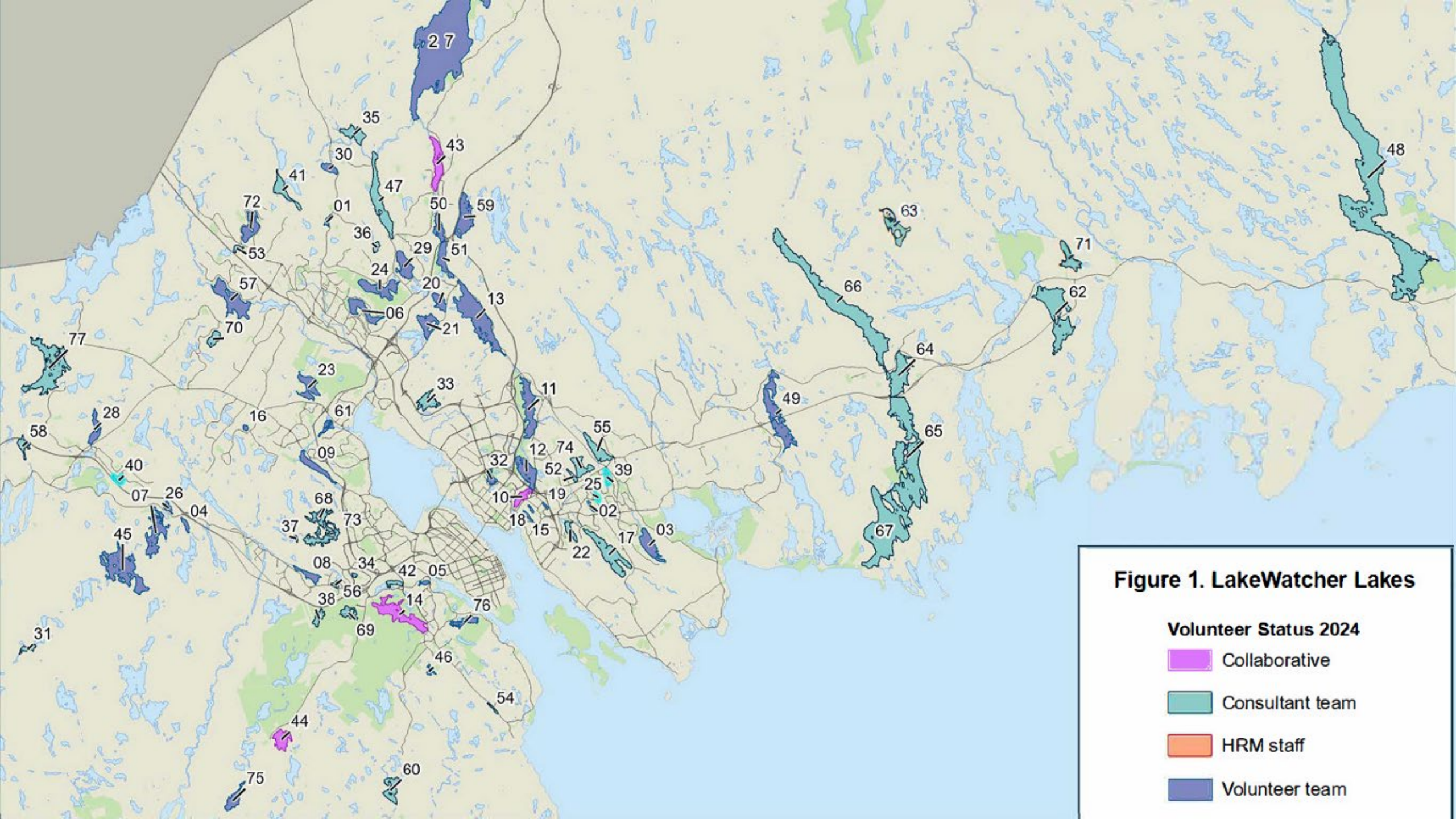
LakeWatchers

State of the Lakes Report 2022-2024

What is the HRM Lakewatchers Program?

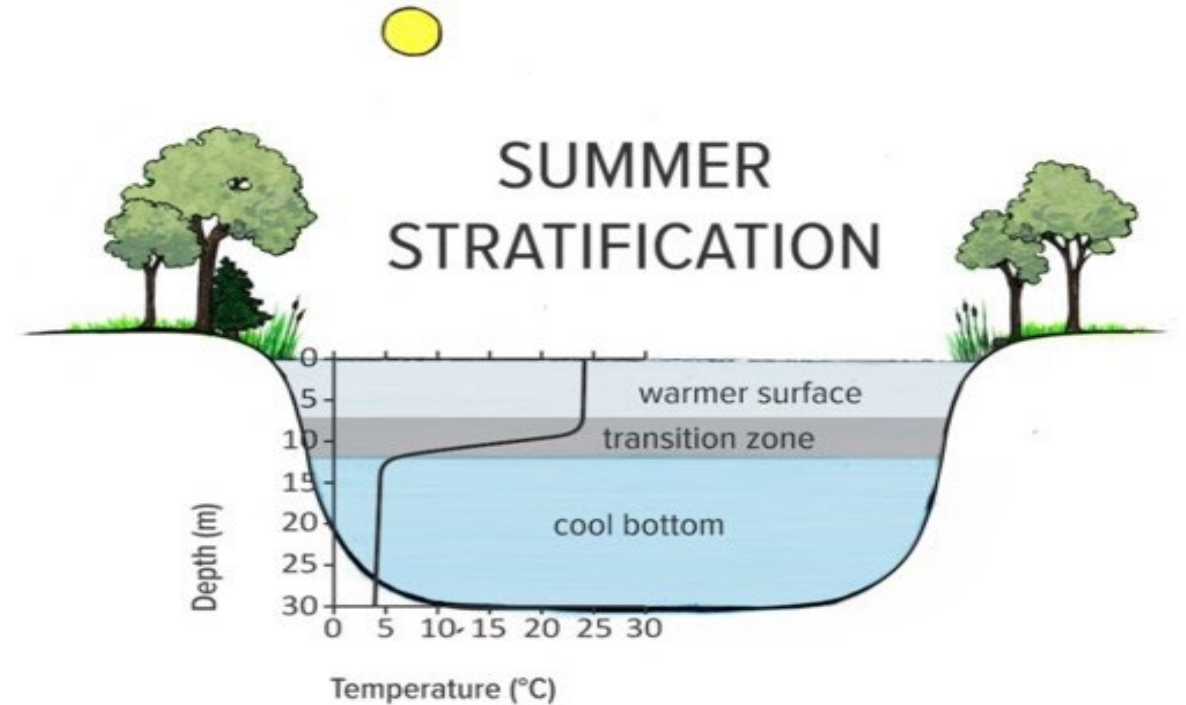
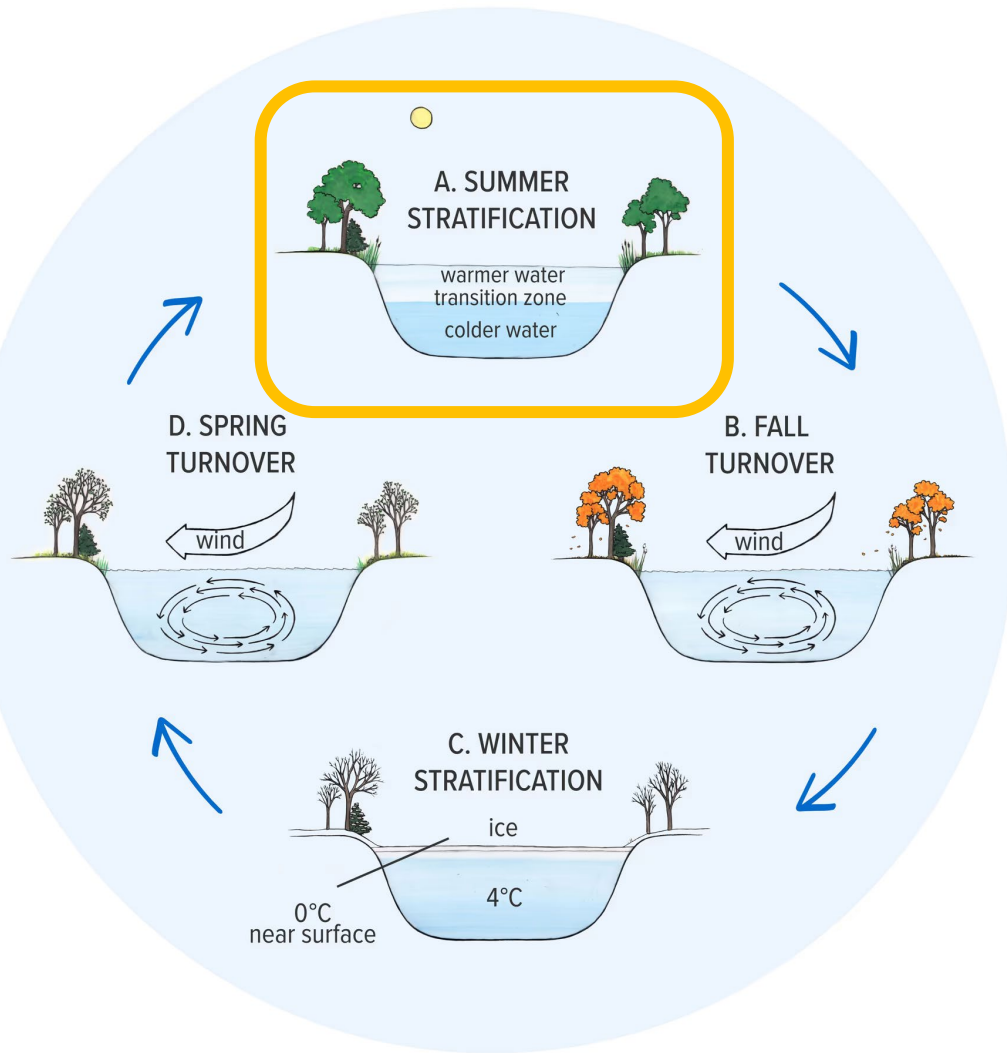
- Community-based lake water quality monitoring at 70+ lakes in HRM





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 cycles and is toxic to aquatic organisms

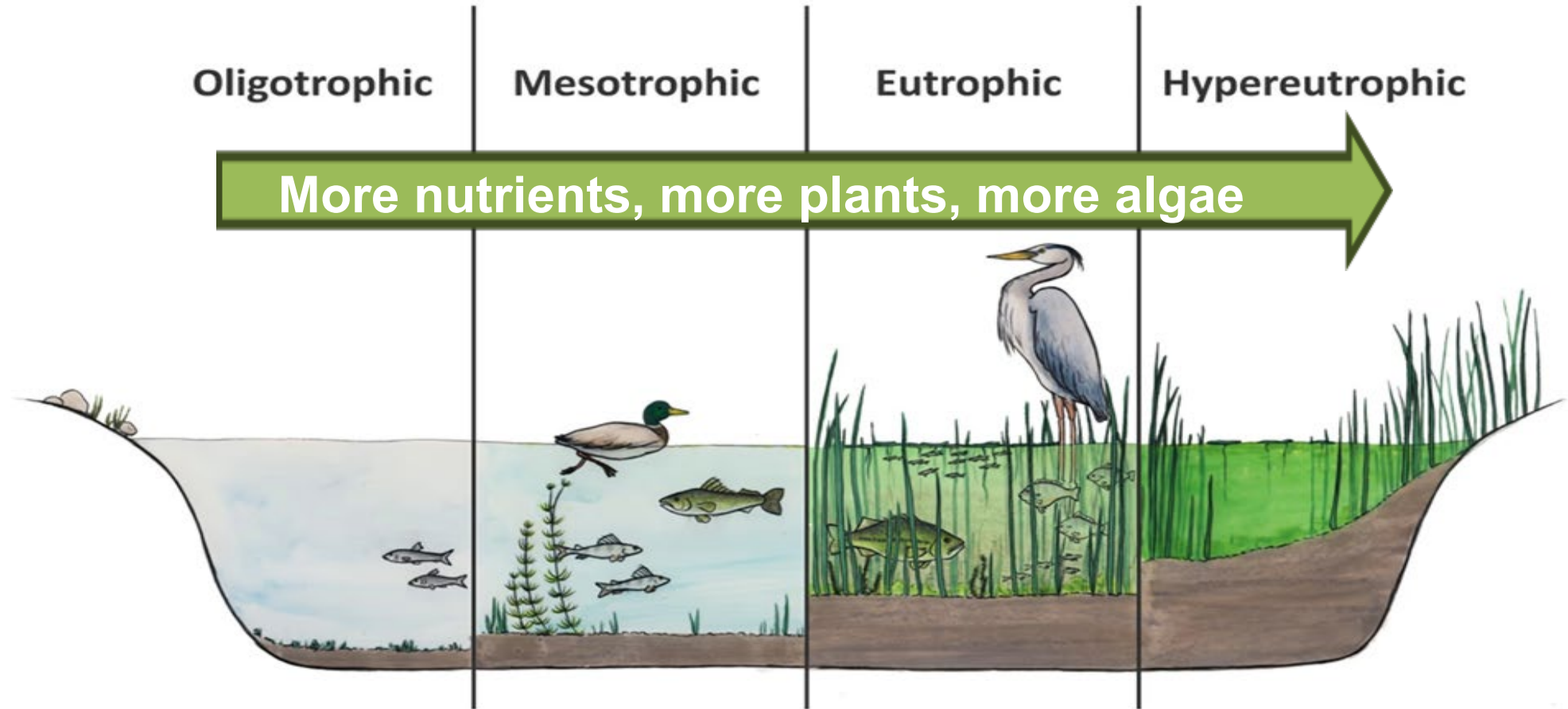


3) Bacterial Contamination

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

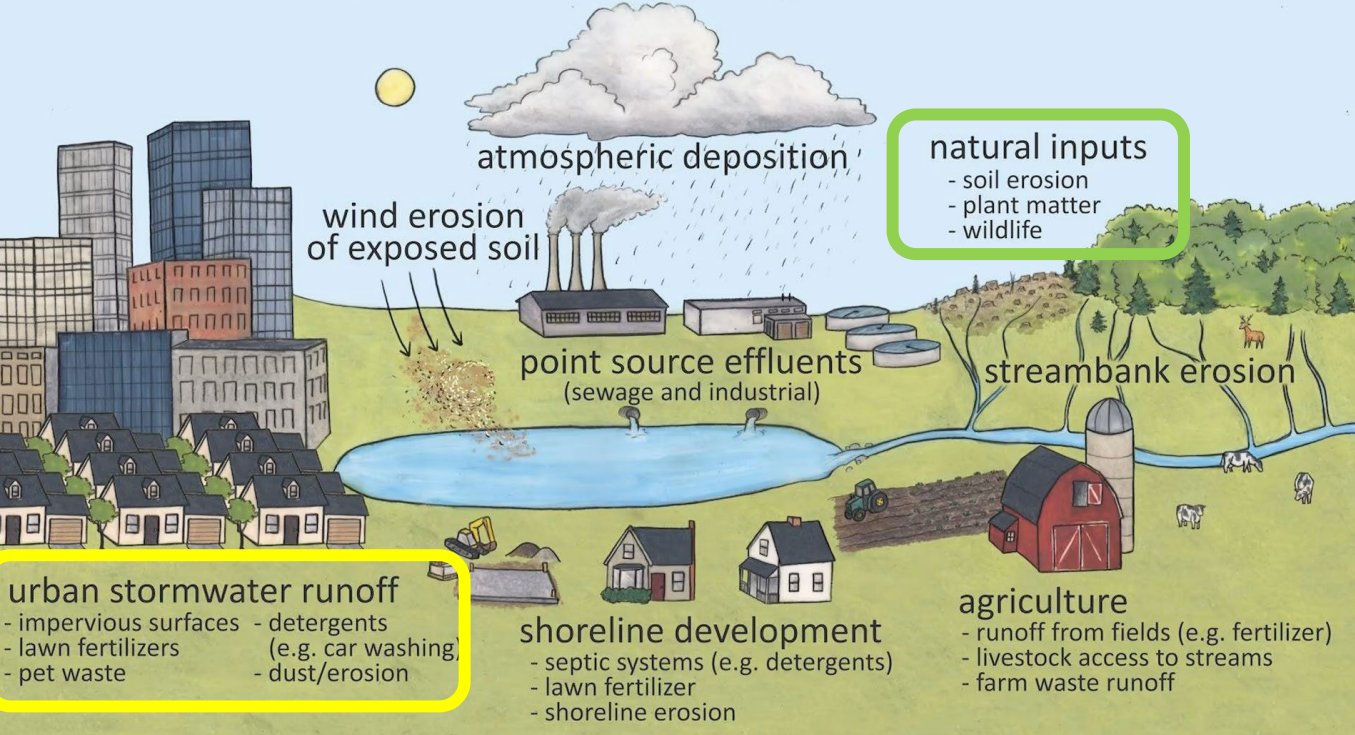


Eutrophication is the process by which a lake becomes overly enriched with nutrients – often Phosphorus.



Where do the extra nutrients come from?

Sources of Phosphorus



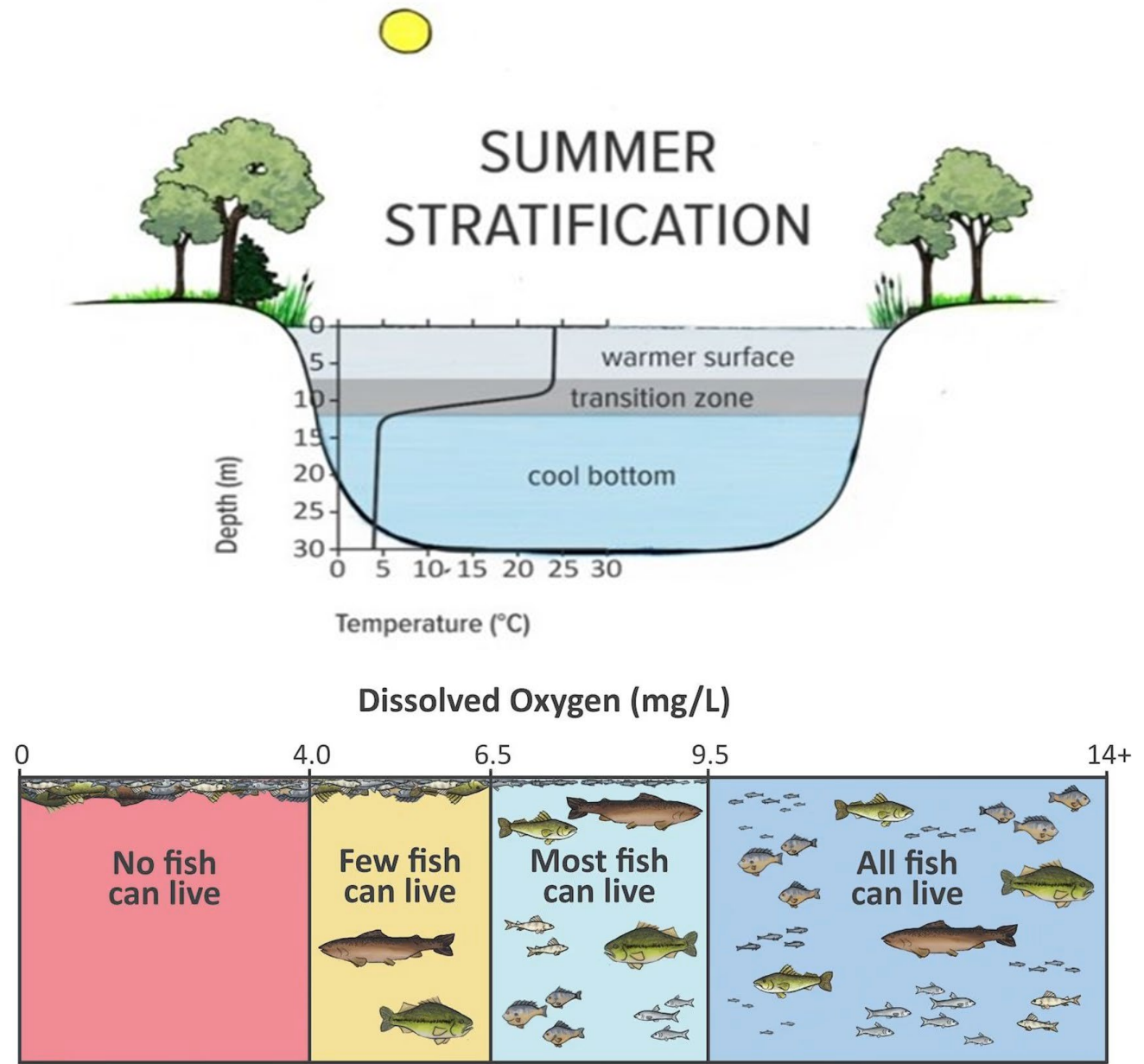
Current impacts

- 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 monitored lakes appear to be impacted by nutrient enrichment.
 - Elevated concentrations of Chlorophyll- α
 - Deepwater oxygen loss observed during the summer
 - Evidence for internal loading
 - Growing reports of aquatic plants and algae interfering with recreation uses.



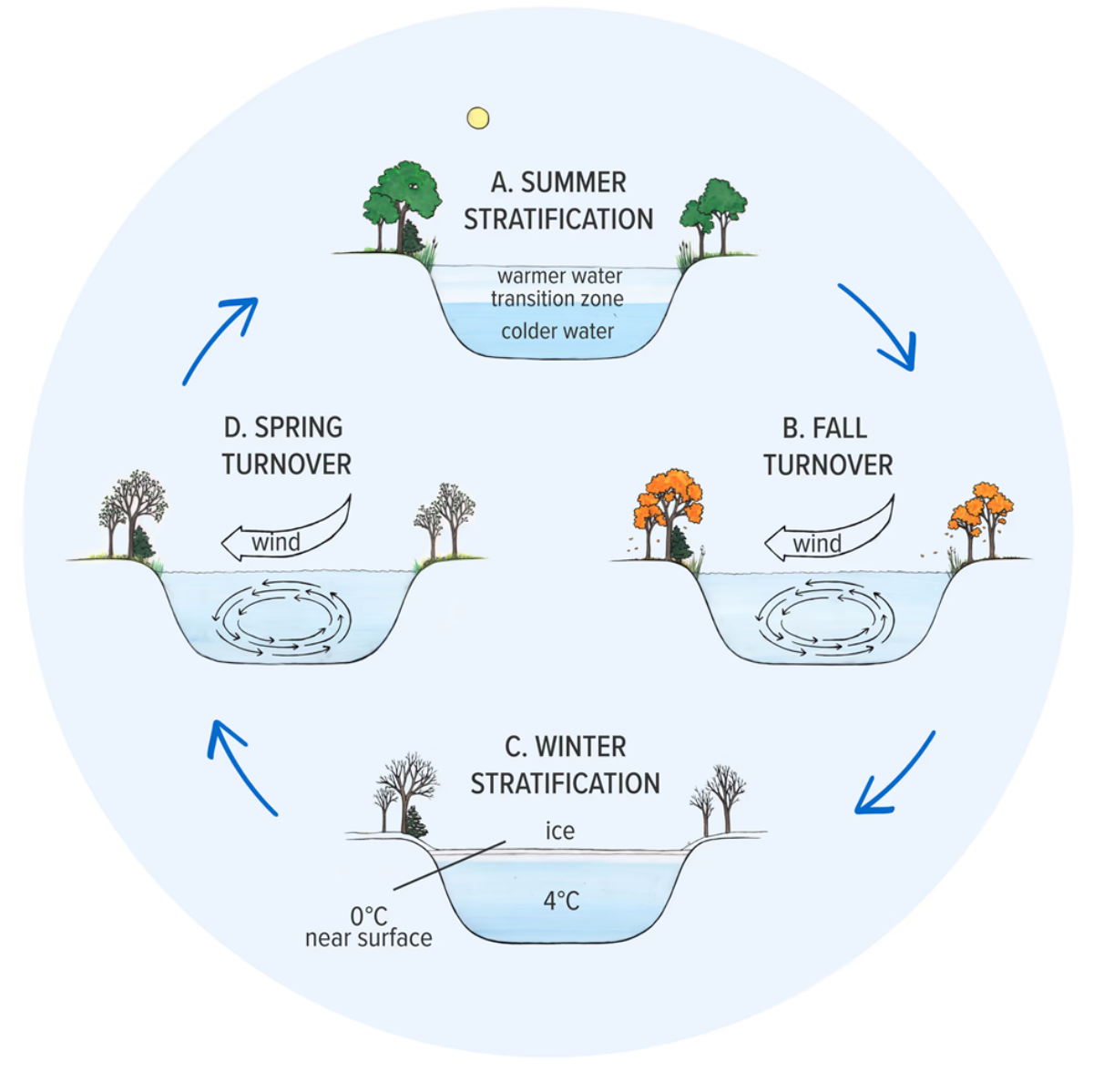
Salinization or chloride enrichment is the process of a freshwater lake becoming saltier over time.



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

Table 1. Canadian Water Quality Guideline for the Chloride ion^a for the protection of aquatic life.

| | Long-Term Exposure ^b (mg Cl ⁻ /L) | Short-Term Exposure ^c (mg Cl ⁻ /L) |
|------------|--|---|
| Freshwater | 120 ^d | 640 |



Where does the salt come from?

- De-icing salts or road salt used to improve winter driving safety is the primary source of chloride to lakes.



Urban Stormwater Run-off



Early Trends: Salinization

- Many lakes routinely exceed the federal guideline for the protection of freshwater life.
- Clear trend between high levels of chloride 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.

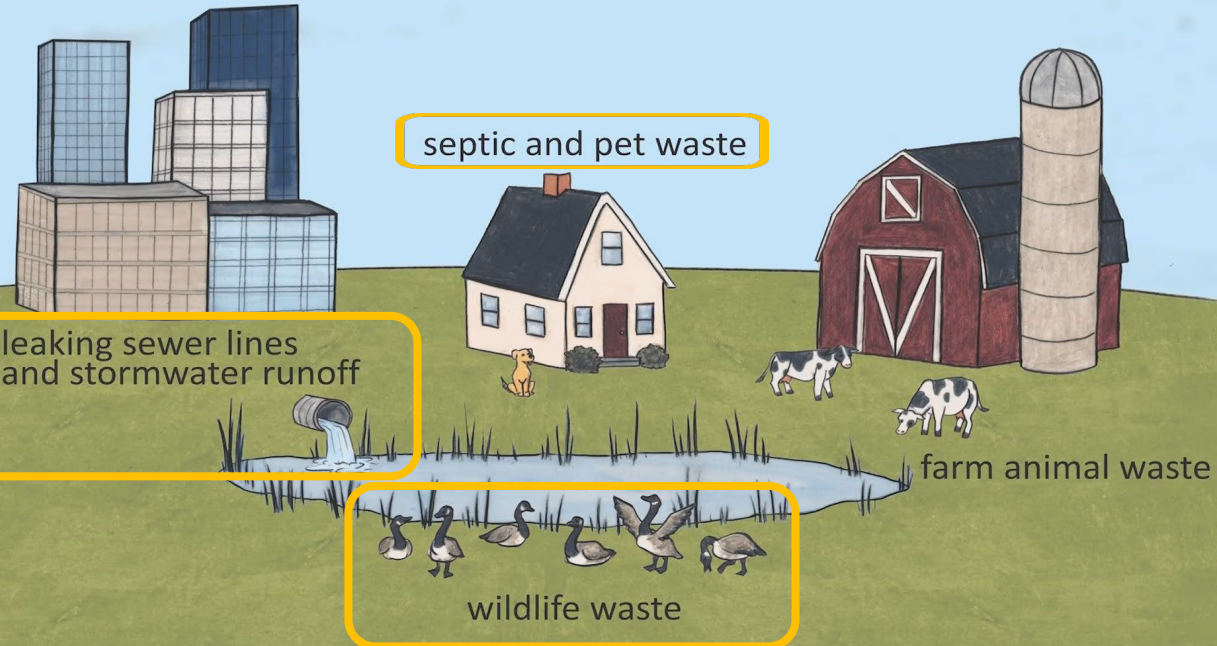


Health Canada – Freshwater Recreation
***E. coli* LESS than 235 CFU per 100 ml**

HALIFAX

Where does the Bacterial Contamination come from?

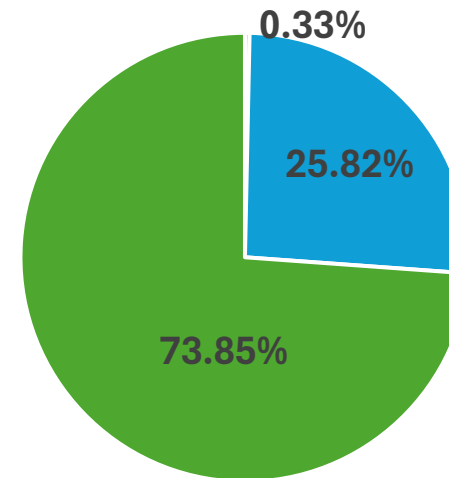
Sources of Fecal Coliform Bacteria



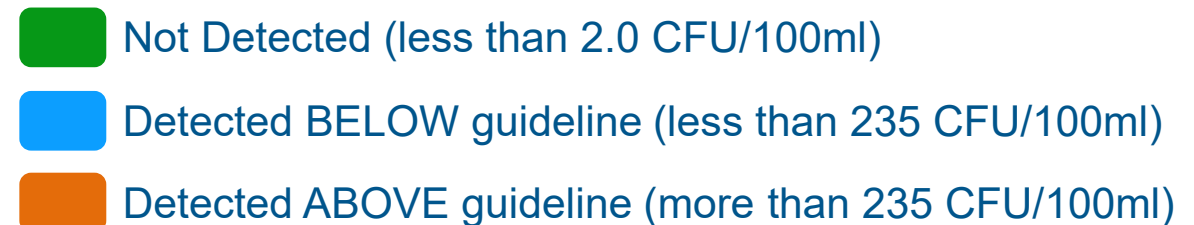
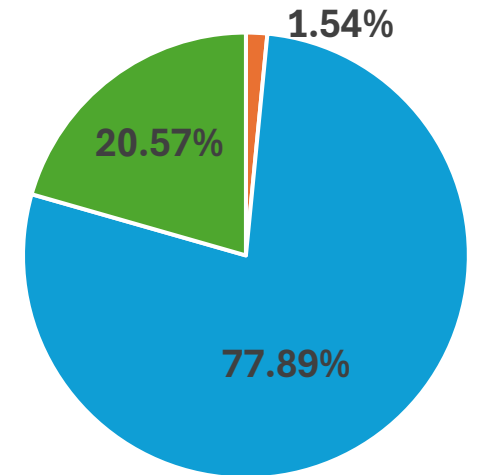
Early Trends: Bacterial Contamination

- *E.coli* was detected above Health Canada guidelines for recreational activity 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 two white piers at its end. The water is calm and reflects the sky. In the background, there are several houses, some with blue siding, and a mix of evergreen and deciduous trees. A tall, multi-story building is visible in the distance. The sky is blue with scattered white clouds.

Questions?