

Understanding Algae Blooms

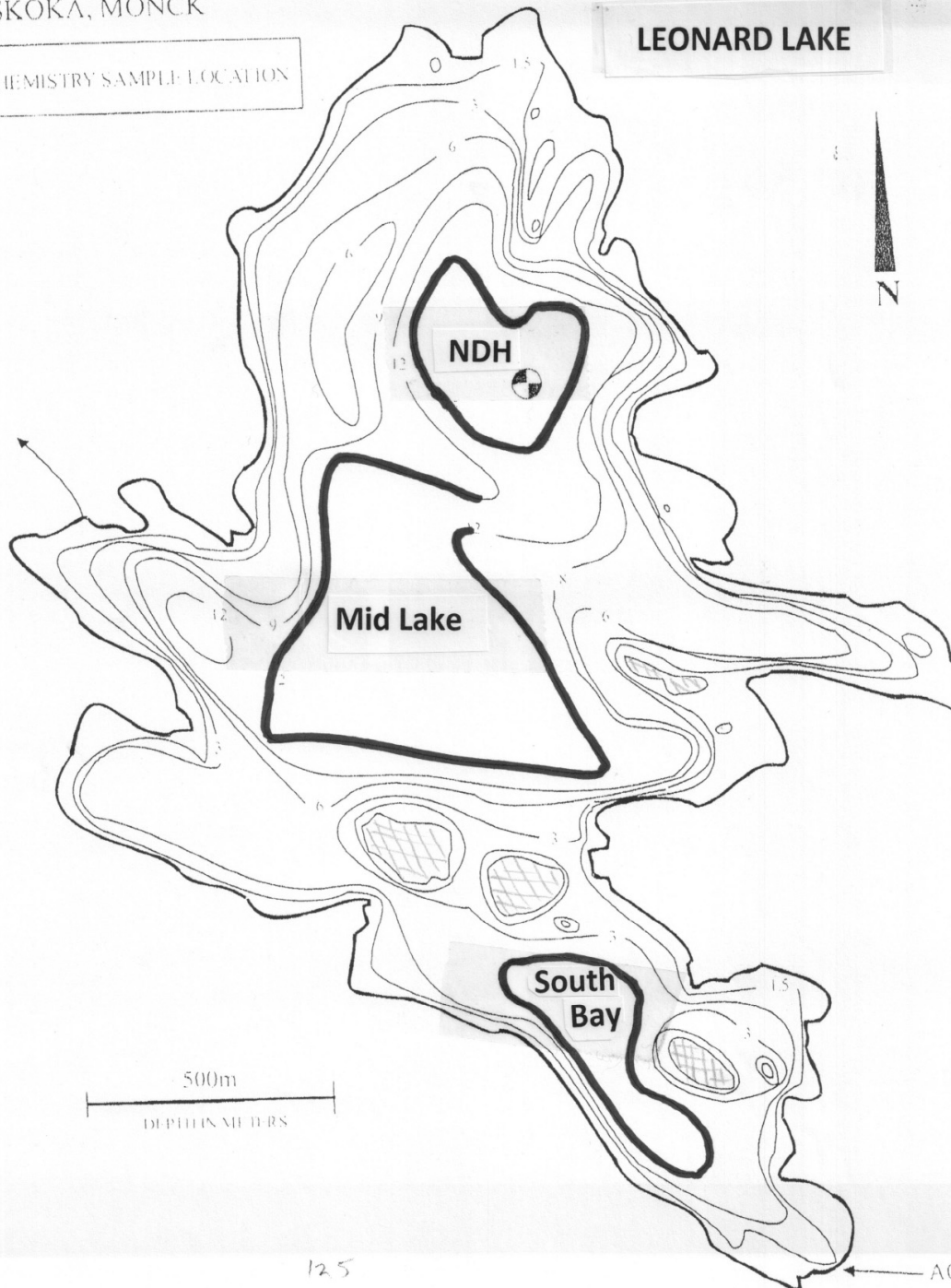
LEONARD LAKE

What we learned in 2022.

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CHEMISTRY SAMPLE LOCATION

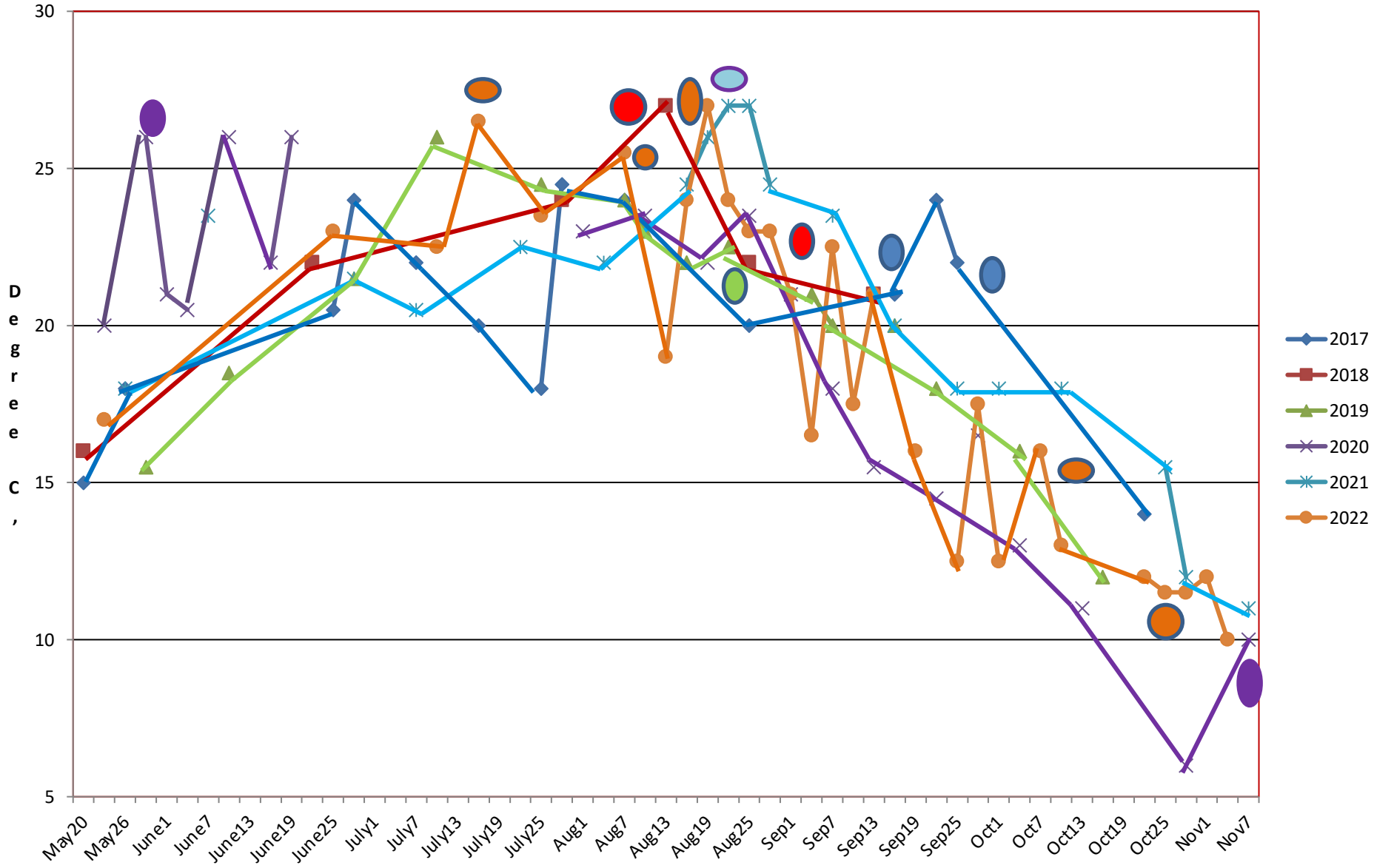
LEONARD LAKE



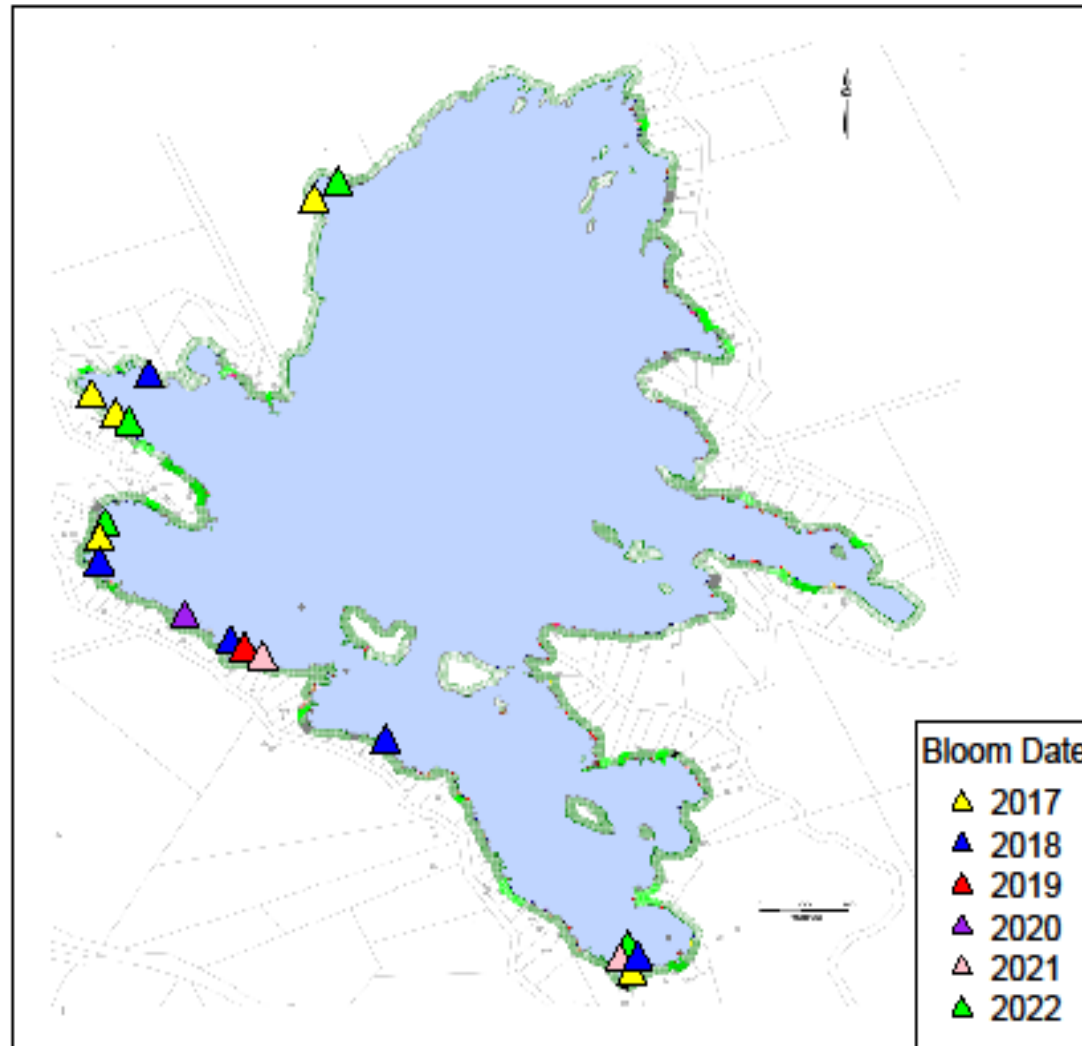
Water Monitoring

- **Agencies have often tested at only one spot, usually in the Spring.**
- **But lakes are complex and unique; there are important variations between deep areas and shoreline areas.**
- **Results change over the course of the Summer and into the Fall.**

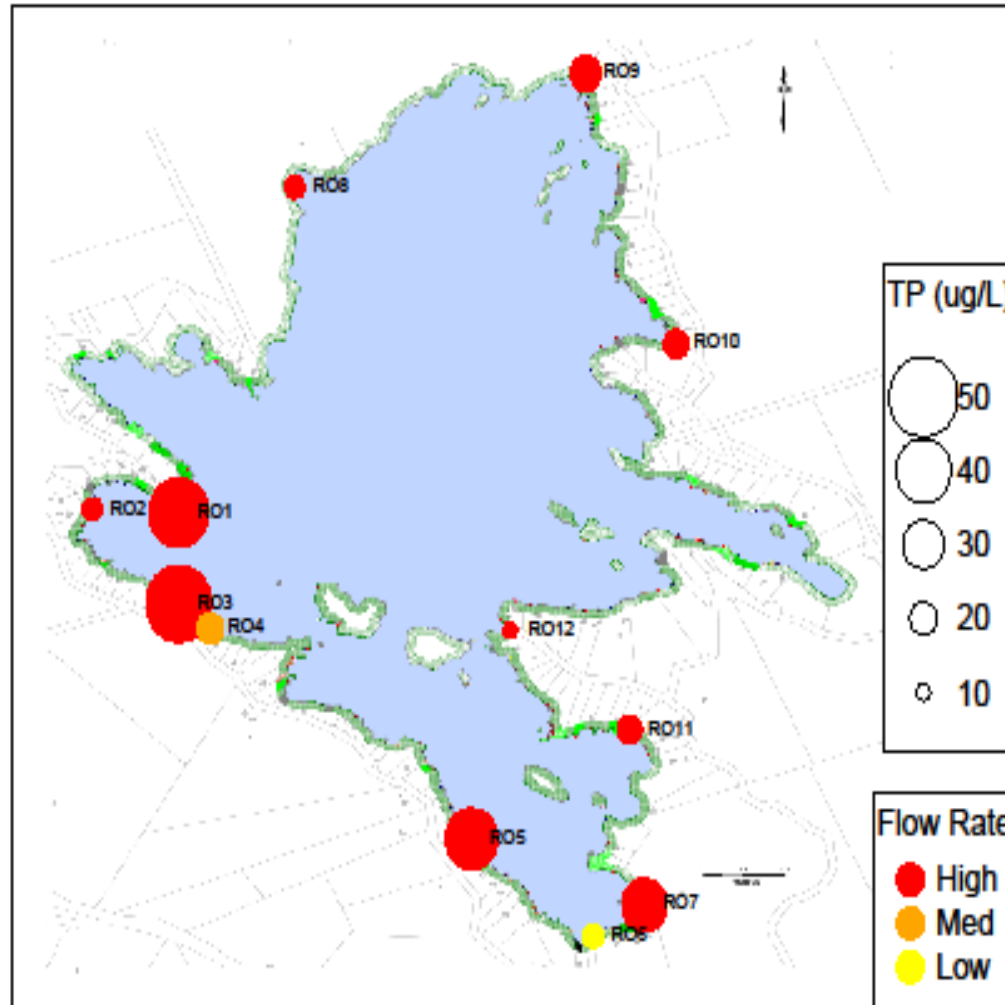
Algal Blooms and LEONARD LAKE Water Temp. 2017-2022



Bloom Sites, 2017-2022



Run -Off Sites

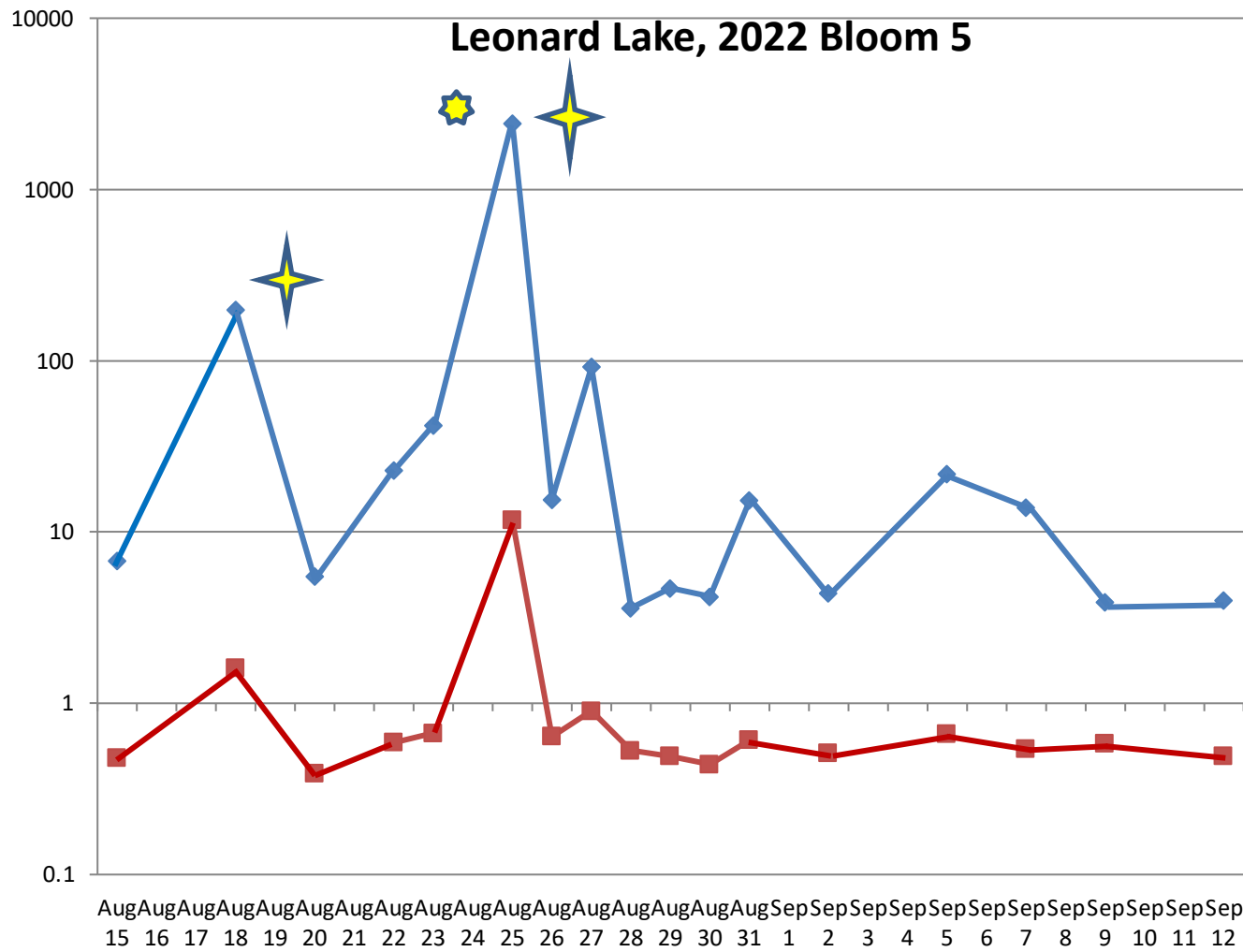



A closer look at the Deep Sites


- We studied the deep sites with a Sonde – a probe with multiple sensors on the end; it records data from the surface to the sediment.
- Collected data on: July 26, Aug 23, Sep 13.
- Temperature drops from 24 degrees (surface) to 6 degrees (sediment).
- Dissolved Oxygen level drops; if it drops below 1 (anoxia), that area becomes a “dead zone”. South Bay was already anoxic in July; Mid-lake in Aug; and NDH in Sept.

What Happens When There is NO Oxygen near the Sediment ?

- Lack of oxygen means that nutrients, such as **Phosphorus** and **Iron**, that are usually retained in the sediment, can be released into the water. We documented this increase.
- And in mid-Sept, we also detected *Dolichospermum* right above the sediment in South Bay.
- Two weeks later there were blooms of the same species along a section of the western shoreline.



Phycocyanin > 1000 ug/L -- visible bloom 

Dolichospermum identified microscopically 

In Summary:

- The “Eyes-on-the-Lake” is essential; we can monitor the water, report a bloom, and then have it tested for toxins by the Ministry.
- The Fluorometer rapidly identifies a pre-bloom, then monitors the course of the bloom.
- The Run-off sites are a likely source of **Phosphorus**; some contained up to 10x the amount in the lake. High levels of **Chloride** were found at several sites, especially near Highway 118, indicating that road salt is a primary contributor.

Where are the Blooms Coming From?

- They can start from the “spores” left in the sediment from previous blooms.
- They can arise from deep spots like the South Bay, where anoxia (lack of oxygen) caused the release of nutrients such as phosphorus and iron from the sediment.
- The same type of Cyanobacteria found in the blooms, was identified for the first time near the sediment in South Bay; this area appears to be “The Bloom Nursery”.