



Lake Beulah

Update on USGS data collection and water quality results through 2025

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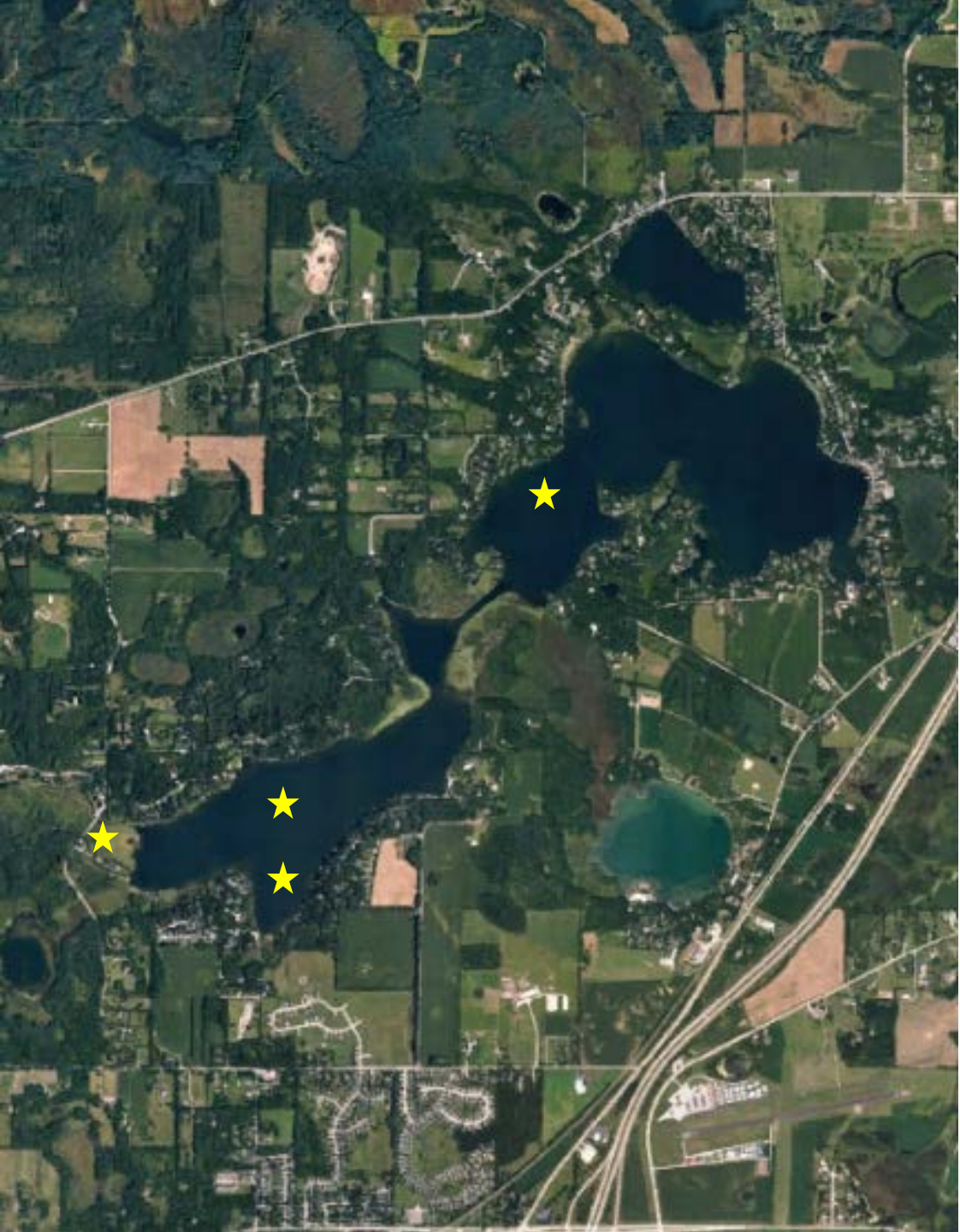
US Geological Survey

Upper Midwest Water Science Center

Madison, WI

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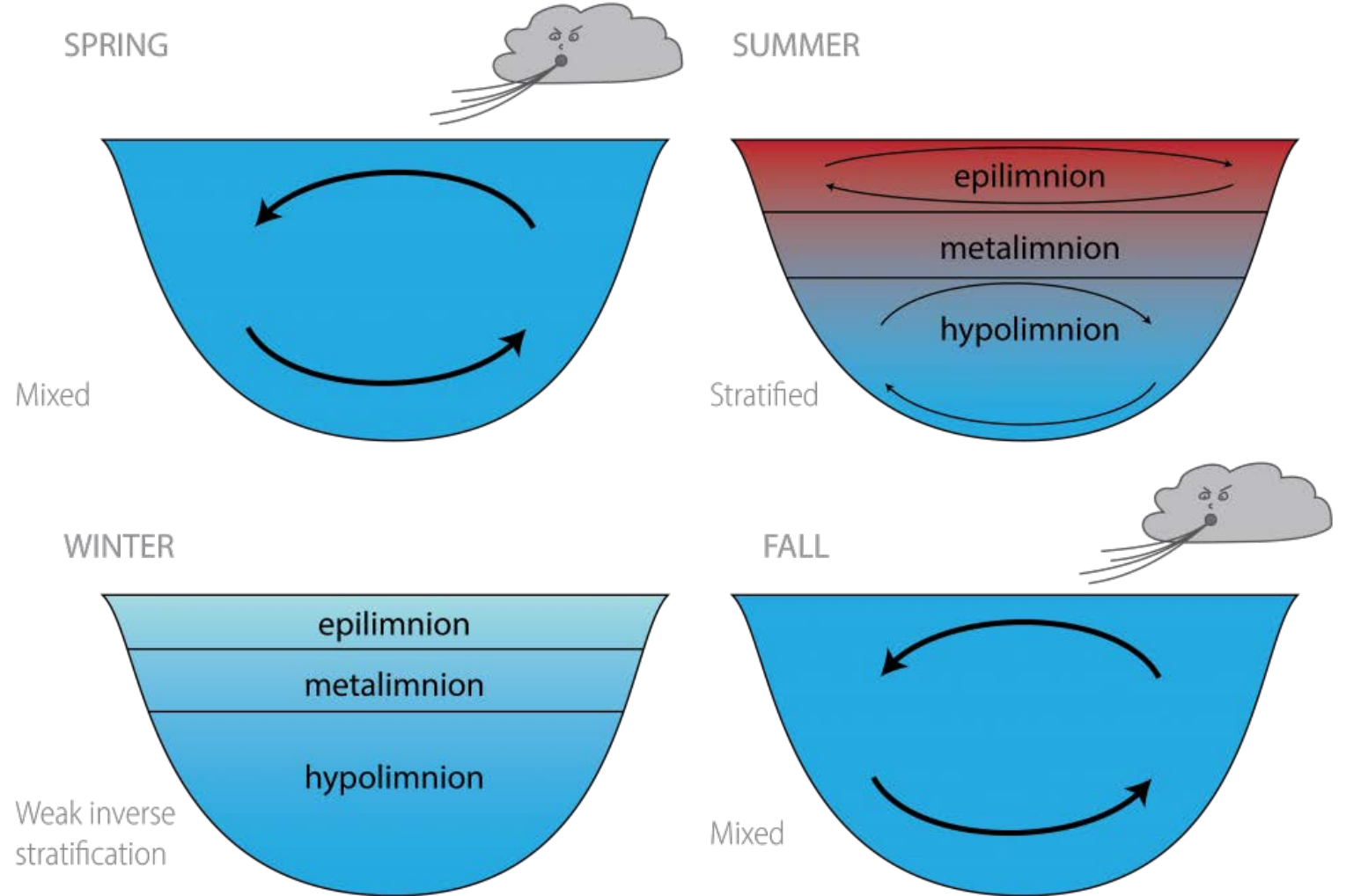
A reminder of what the USGS has been doing...

- Sampling four sites 2 times a year (spring, August)
 - Standard sampling:
 - Secchi depth, water quality profiles, epilimnion and hypolimnion water quality
 - Extra spring sampling: metals, other nutrients, minerals
- Extra sampling the third year (this year)
 - June, July, fall sampling at deep hole

...for 19 years!
(with a few gaps)

Why collect water quality in multiple seasons?

Seasonal differences in lake stratification affects water quality in different layers of the lake.



What can we say about the lake with these data?

Trophic state gives us a sense of the level of biological activity in the lake.

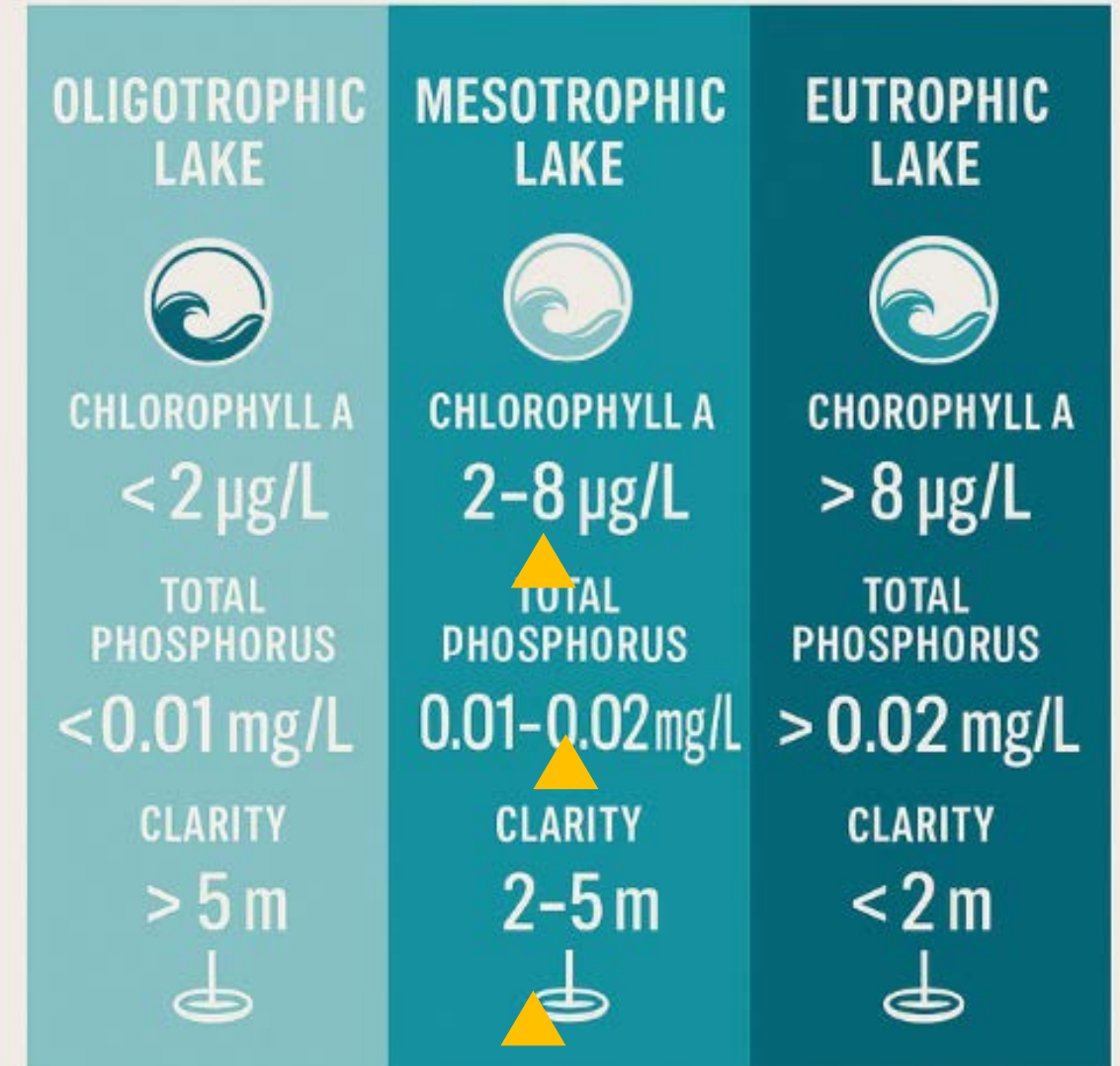
OLIGOTROPHIC LAKE	MESOTROPHIC LAKE	EUTROPHIC LAKE
		
CHLOROPHYLL A < 2 µg/L	CHLOROPHYLL A 2–8 µg/L	CHLOROPHYLL A > 8 µg/L
TOTAL PHOSPHORUS < 0.01 mg/L	TOTAL PHOSPHORUS 0.01–0.02 mg/L	TOTAL PHOSPHORUS > 0.02 mg/L
CLARITY > 5 m 	CLARITY 2–5 m 	CLARITY < 2 m 

What did 2025 look like?

▲ Deep hole, August

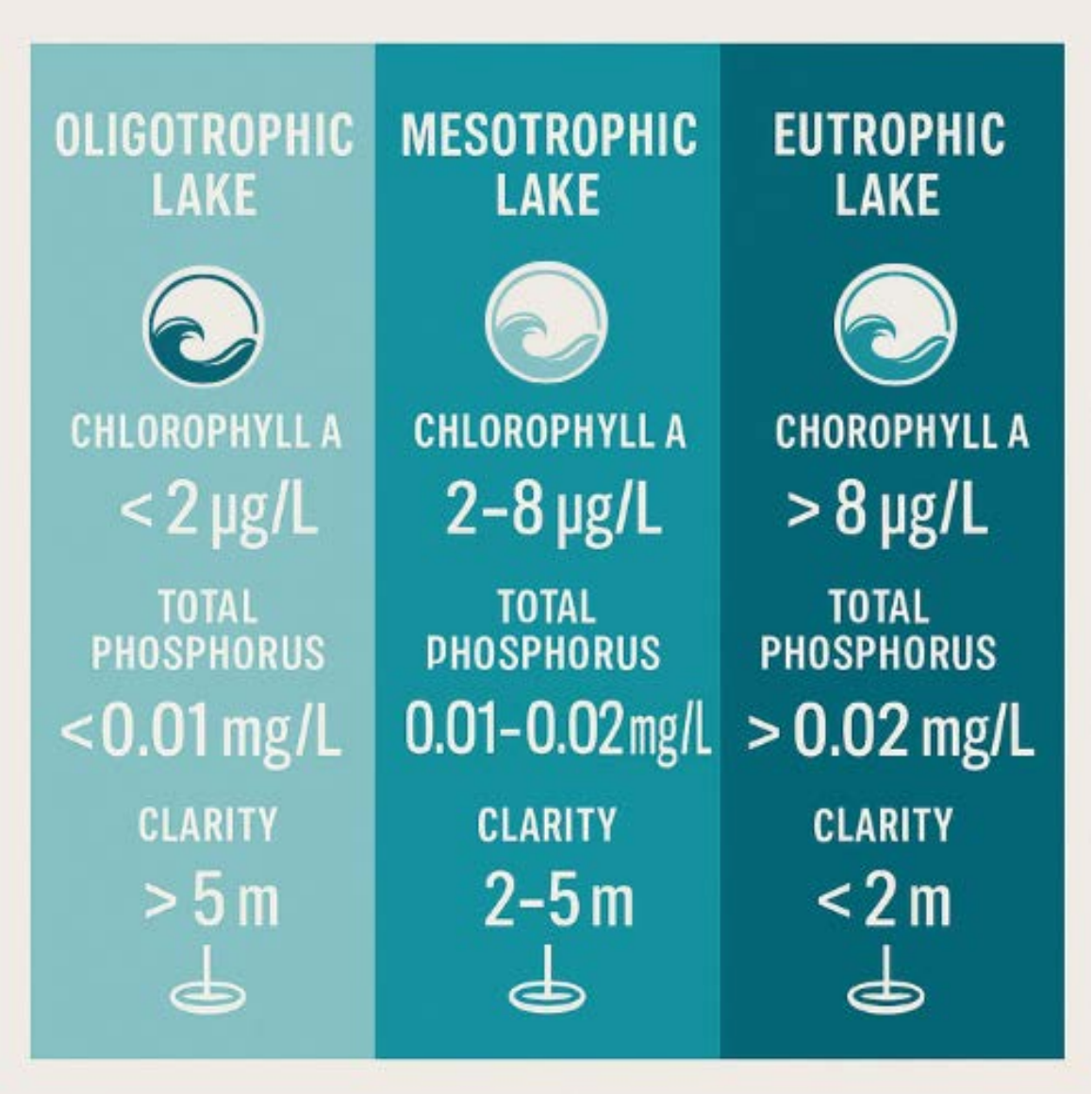
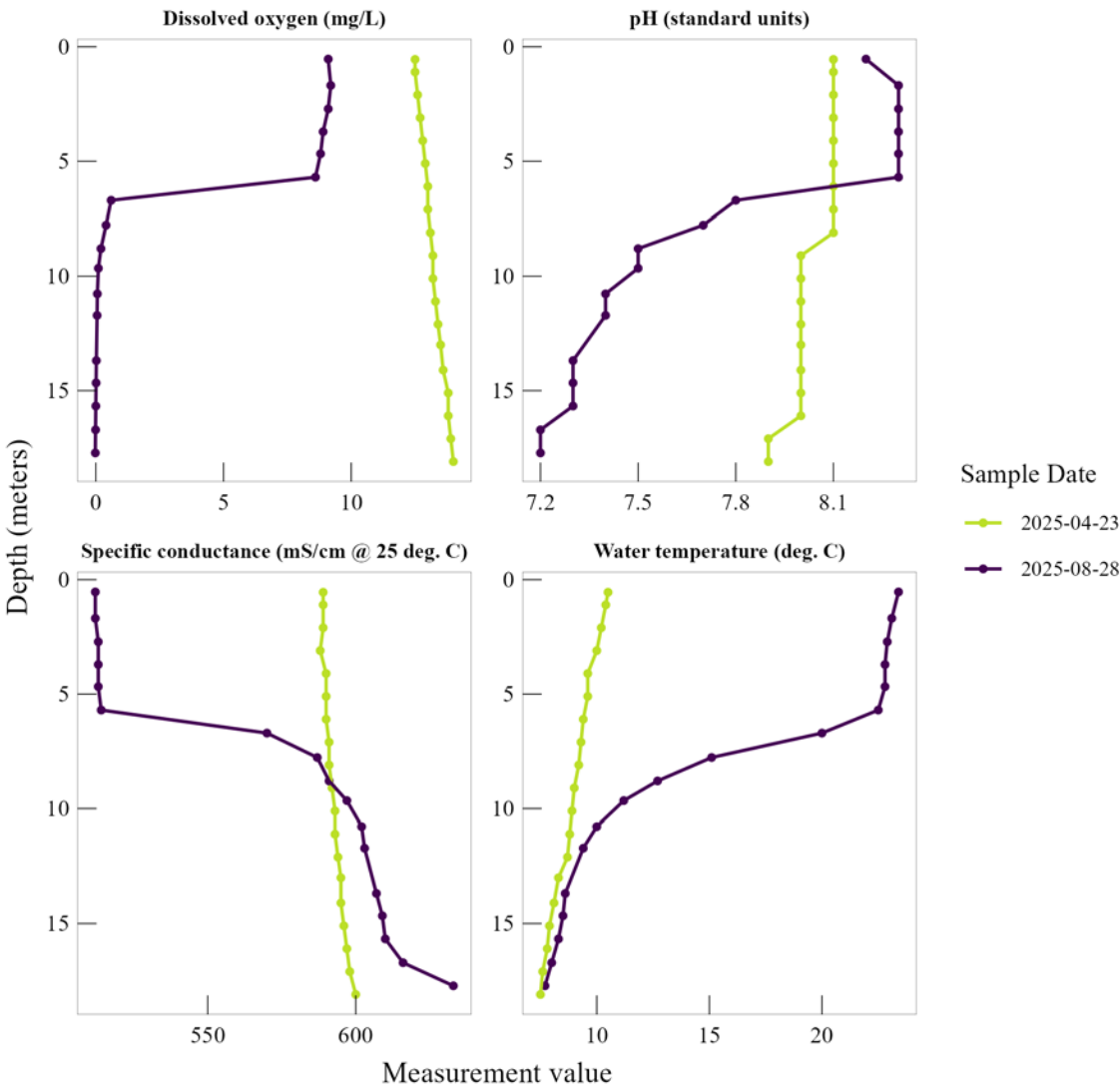
	Deep	Hateley's Bay	Station 2	Inlet
Clarity (m)	3.1	3.05	4.07	1.5
Chlorophyll (ug/L)	4.7	4.7	3.0	0.3
Total P (mg/L)	0.015	0.013	0.012	0.016

Reported values are surface (0.5m) from August



What did 2025 look like?

LAKE BEULAH AT DEEP HOLE NEAR EAST TROY, WI
Lake water quality profiles; Apr 23, 2025 to Aug 28, 2025



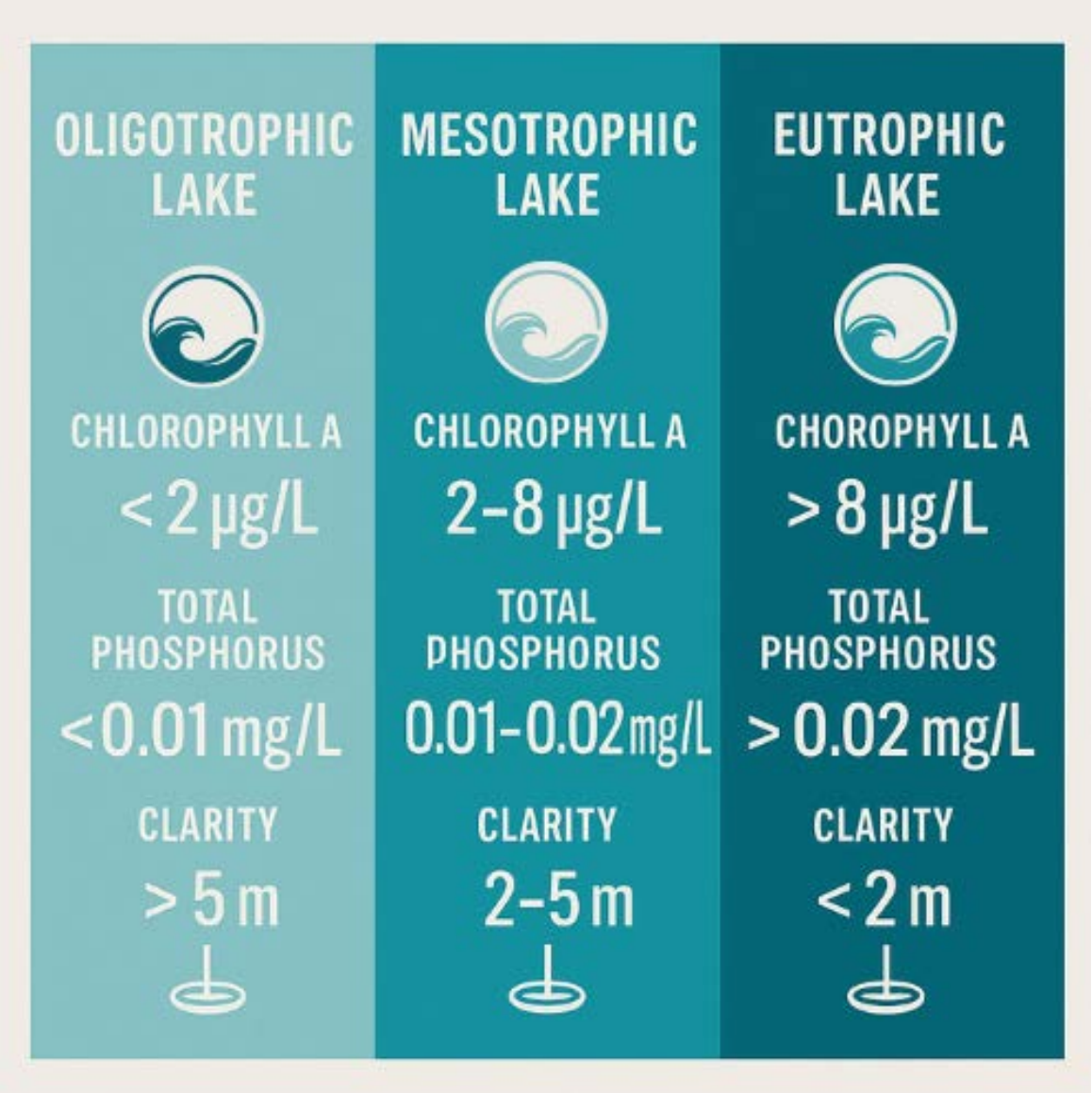
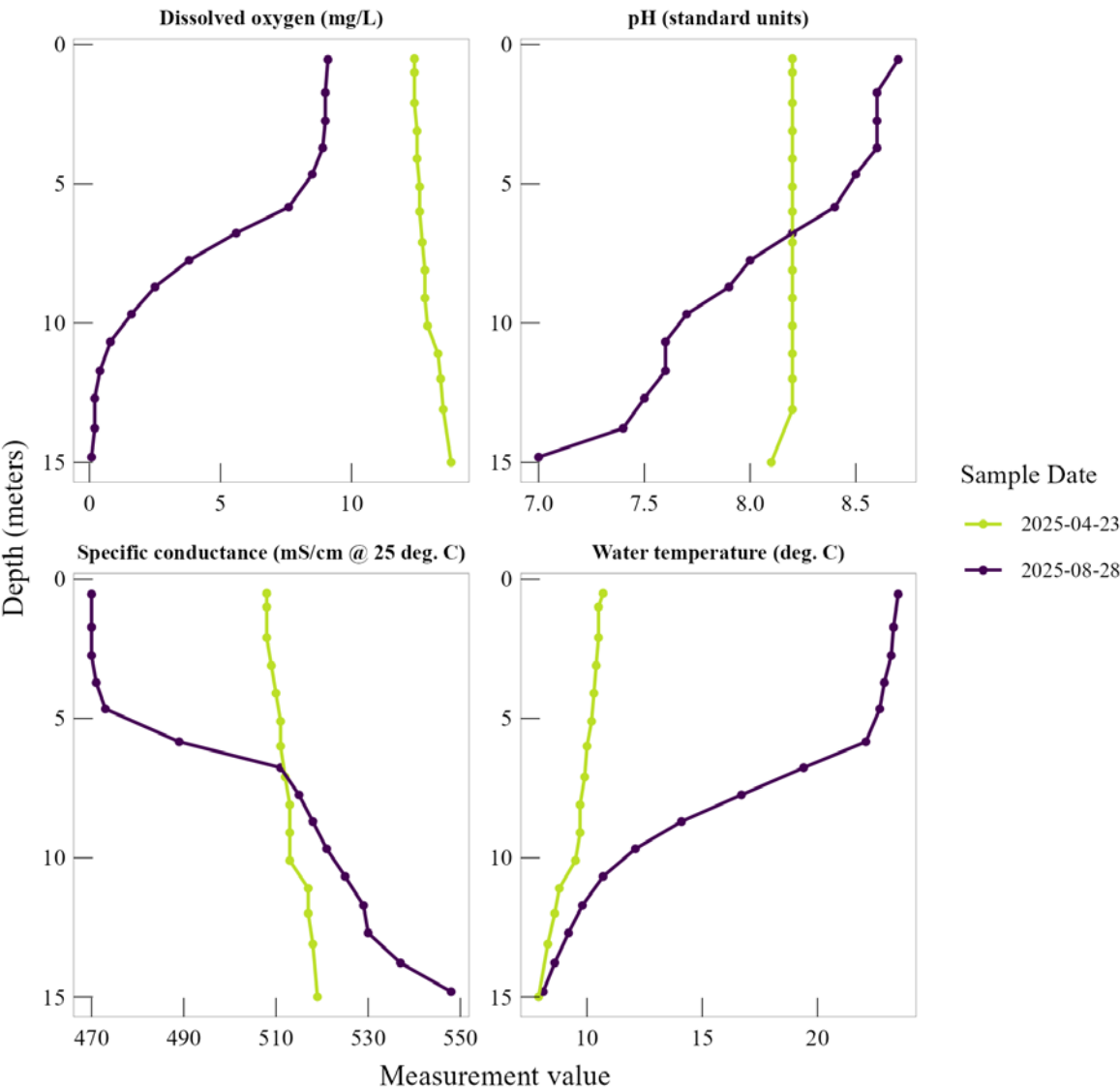
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What did 2025 look

like

LAKE BEULAH STATION 2 NEAR EAST TROY, WI

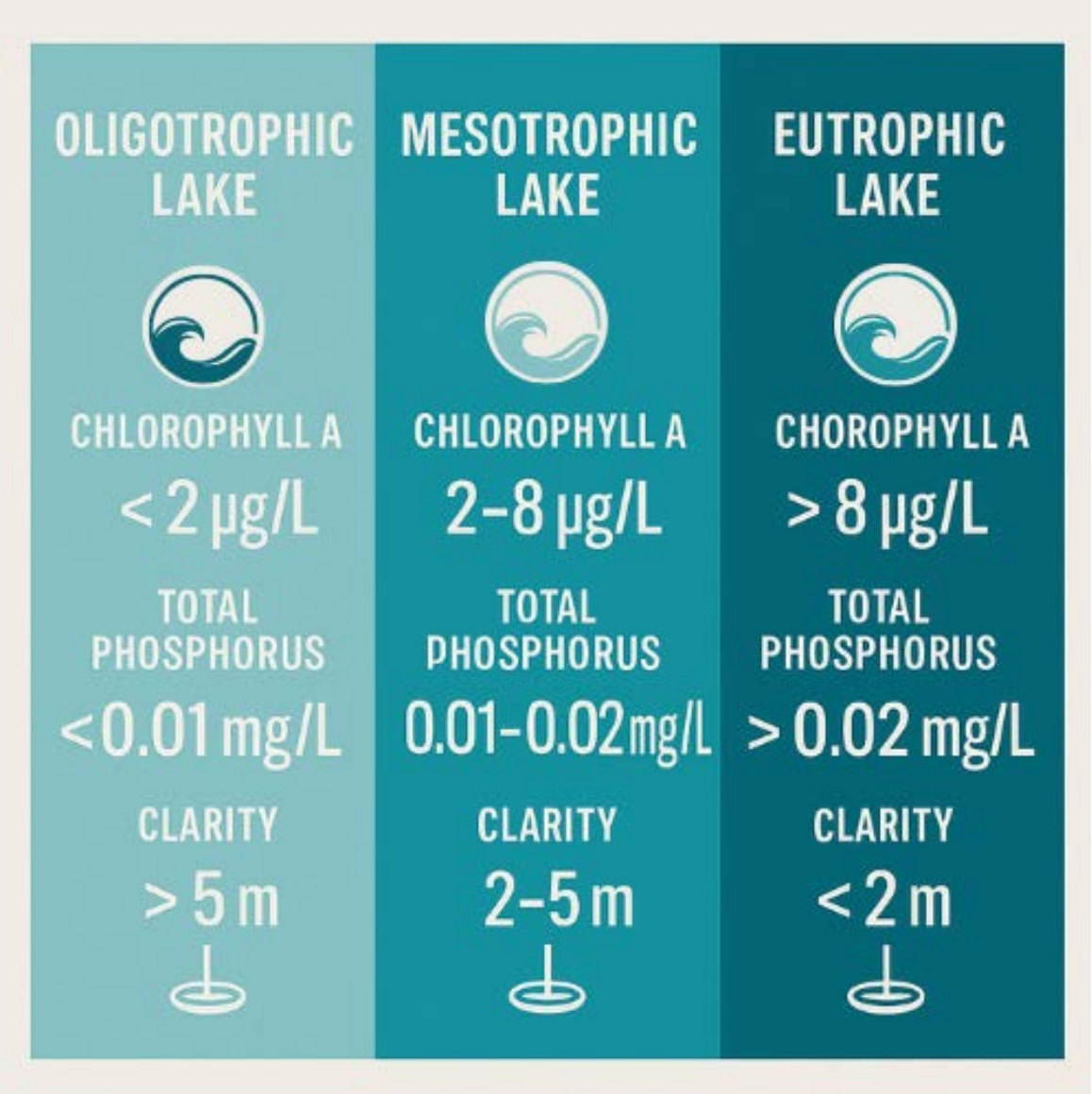
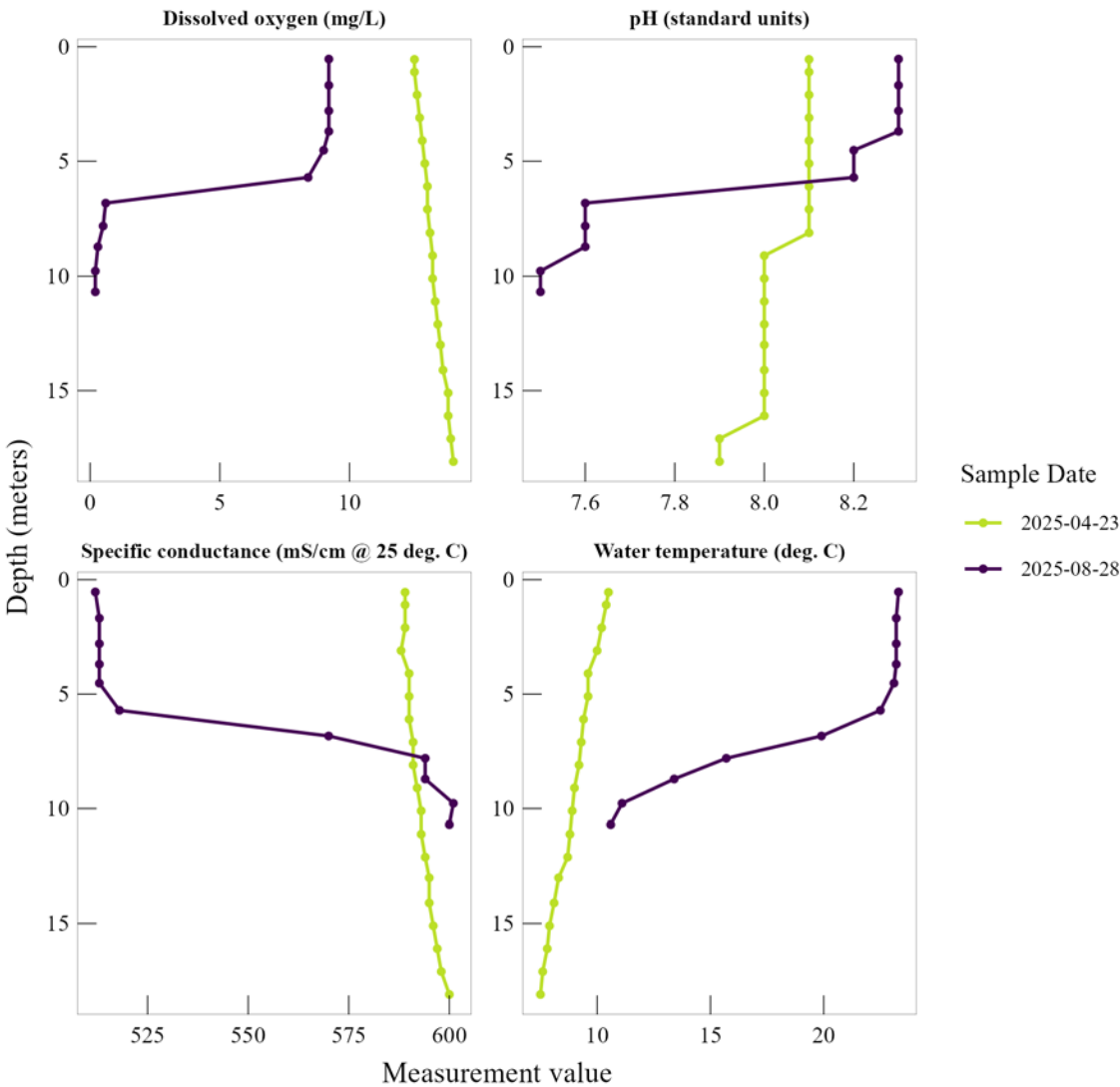
Lake water quality profiles; Apr 23, 2025 to Aug 28, 2025



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What did 2025 look like?

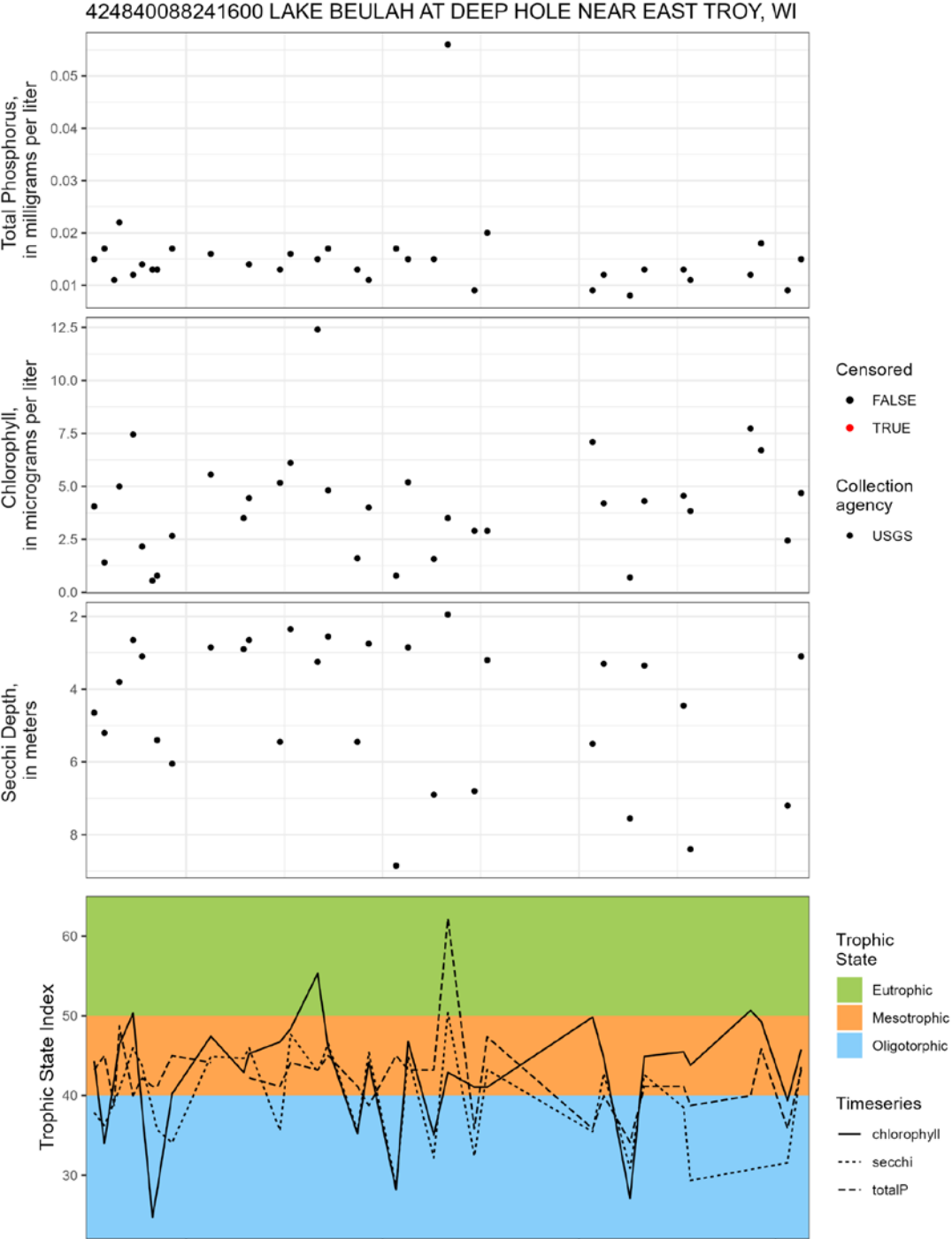
Hateleys Bay at Lake Beulah near East Troy, WI
Lake water quality profiles; Apr 23, 2025 to Aug 28, 2025



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How is the lake changing?

Overall, the lake has generally remained mesotrophic to oligotrophic since ~2008



How is the lake changir

Chloride is around 30 mg/L and is increasing by ~0.4 mg/L per year.

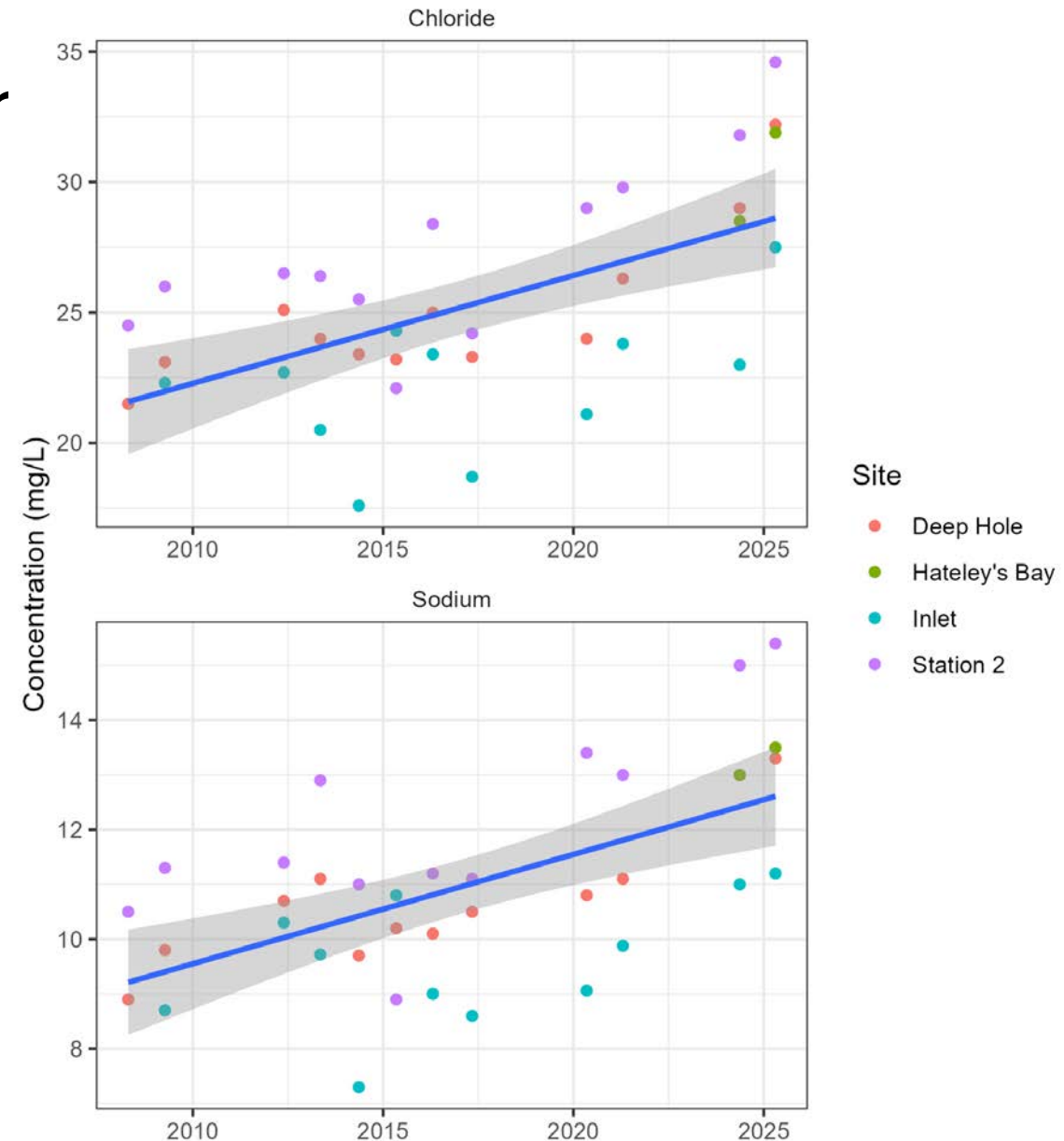
US regulatory threshold: 230 mg/L; Canada: 120 mg/L

Road salt, commonly sodium chloride (NaCl) – has about 1.6 times more chloride than sodium by weight.

The lake is ~2.3 by total mass but increasing at ~2.

Sodium is around 13 mg/L and is increasing by ~0.2 mg/L per year.

Note, chloride and sodium is roughly half the concentration and half the rate of change compared to other lakes in the region.





Questions?

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