
LWCA FINAL WATER QUALITY REPORT 2022

TO: LWCA BOARD AND MEMBERS

FROM: CLAIRE VANDERVOORT

SUBJECT: WATER QUALITY BOARD REPORT

DATE: DECEMBER 2022

SAMPLING UPDATE

Dissolved oxygen and temperature sampling has been completed for the months of June, July and August. Chemistry sampling was completed on August 28th and sent to Caduceon Labs for testing the following day. A graph outlining chemistry data can be found in Appendix I, with raw results in Appendix J.

2022 SAMPLING RESULTS; DISSOLVED OXYGEN AND TEMPERATURE

Detailed graphs outlining the dissolved oxygen and temperature readings for June to August of 2022 can be found in Appendices A through H. The graphs have bands of colour to indicate the suitability of the water temperature for lake trout. Pink indicates the zone from which lake trout would be excluded because of high temperature (>23 °C). Fish may make short forays into warmer water to feed, but need to spend most of their time in cooler water. Blue indicates the zone where the water temperature is in the preferred range for lake trout (<13 °C). Grey shading indicates a water layer from which lake trout would be excluded because of low dissolved oxygen (<6 mg/L DO, the bottom of the range set by PWQO). Thus, the plain blue zone has both preferred temperature and dissolved oxygen, and is the “sweet spot” for lake trout.

There continues to be a stable band of dissolved oxygen ranging between 8 to 10 mg/L of dissolved oxygen within the 20 to ~30 metre depths across all sampled sites within the early summer season. As usual, during the middle of summer (June and August), dissolved oxygen levels decrease slightly with the overall warming of the lake. The shallower sites (Otter Lake and Lighthouse) typically see lower dissolved oxygen levels than that seen in the deeper sites (Elmardon, Black Duck and Snake Point). That being said, there is still adequate dissolved oxygen for various fish species within Lake Weslemkoon.

Notably, there has been an increase in water temperatures closer to the surface depths across the majority of sites compared to previous years (Appendix H). The temperatures increase across the sampling sites are most notable within the 1 metre column, which saw varying temperature increases of 1 to 3 degrees (Appendix H). As climate change issues loom, monitoring the water temperature of the lake will be increasingly important as increased temperatures throughout the water column can have adverse effects on fish communities.

2022 SAMPLING RESULTS; CHEMISTRY

21 samples were collected from various locations ranging from the North end to the South end of Weslemkoon on August 28, 2022. These samples were sent to Caduceon Labs in Kingston for testing of phosphorous, nitrogen, total coliforms and e.coli. These results can be seen in Appendix I.

Both phosphorous and e.coli results have been relatively stable over recent years, with a downward trend this year. The ranges set by the Provincial Water Quality Objectives (PWQO) for phosphorous are 0.01-0.02

mg/L (10-20 ug/L), the raw results for the 2022 season are within this range (Appendix J). Similarly, the PWQO ranges set for e.coli are 100 cfu (colony forming units) per 100 mL of sample, the results this year are well below this range, there is no health concern for swimming in Lake Weslemkoon. It should be noted that the South end inflow typically has the highest levels of e.coli (30 cfu/100mL) (Appendix J), likely to its densely populated nature. Despite this, the range for the South end is still within the Provincial standards. The results for nitrogen levels within Weslemkoon are extremely similar to previous years. There is no official PWQO standard for nitrogen levels in Ontario, but waters not influenced by organic inputs typically range from 0.1 to 0.5 mg/L. Of all 21 sampled sites, the overwhelming majority were within 0.1 to 0.5 mg/L of nitrogen.

The results for total coliforms for this sampling season were very high (Appendix I). Total coliforms are bacteria that are found naturally in an environment through soil, surface water and animals. Total coliforms are not always bacteria that can make an individual sick, instead e.coli, a fecal coliform is used to determine sanitary conditions of a waterbody. In the case of Weslemkoon, e.coli levels were extremely low and did not indicate any health concern for cottage owners. Since e.coli is used to determine sanitary conditions, PWQO recommends against using total coliforms as a sanitary measure, but indicated 1000 cfu/100 mL is acceptable in freshwater systems. There are a number of reasons that the results for total coliforms were so high this year, it could be due to temperature increases within the upper column of the lake (Appendix H), rainfall or storm events (there were several significant ones this year), which allow soil erosion into the lake, or even upstream events which we are unaware of. Most importantly, these high results are not an immediate health concern. These results will need to be compared to next year's results to gather more sufficient information.

CONSIDERATIONS FOR COTTAGERS

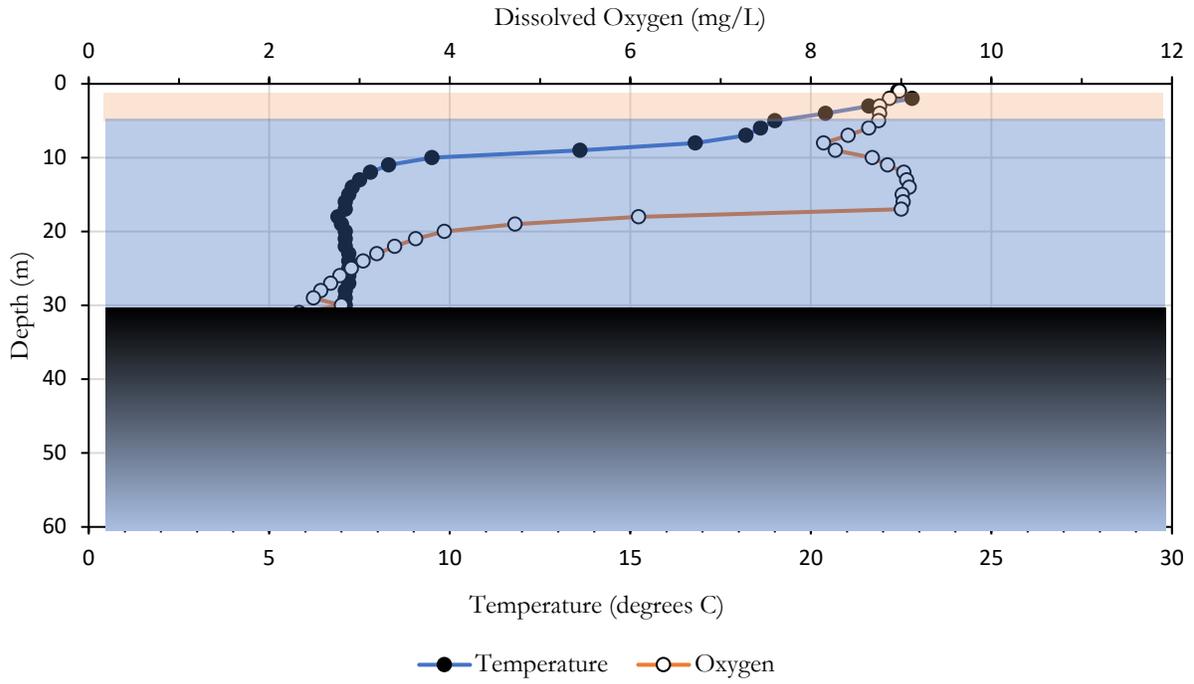
Here are some things to consider to help protect the water quality of Lake Weslemkoon:

According to FOCA, in recreational lakes that do not have a large point source of phosphorus (e.g., sewage treatment plant), **domestic waste from septic systems is the largest human source of phosphorus. The concentrations of phosphorus in septic wastewaters are roughly 200-300 times higher than the concentrations needed to stimulate significant algal growth in lakes!** Therefore, as cottage owners, we have a shared responsibility to maintain the health of our lakes by limiting the inputs of phosphorus. Below are some ways that you can help reduce the effects of shoreline development on water quality:

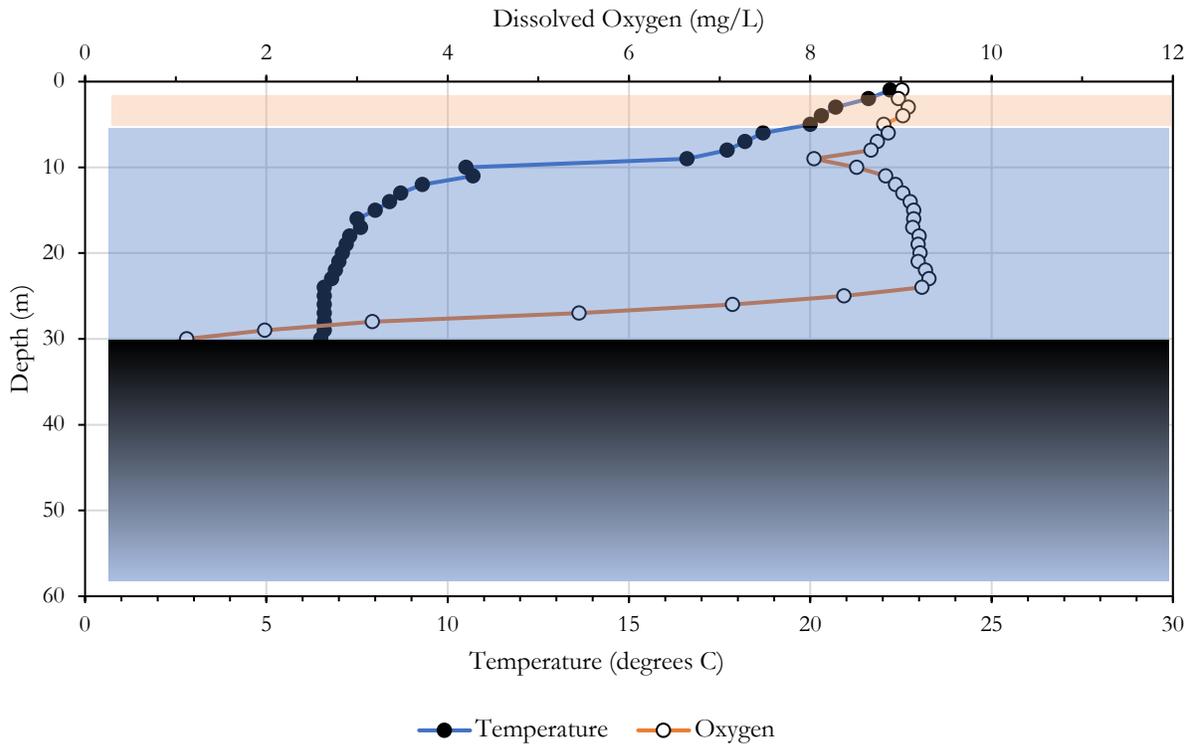
- 1) Maintain a properly functioning septic system. Have your septic system pumped every 3-5 years to remove the build-up of solids and scum, and take this opportunity to have the system checked for any required maintenance. If you are converting a cottage into a permanent dwelling be sure to check the capacity of your septic system. Exceeding the capacity of your septic could result in the remobilization of phosphorus in the soil.**
- 2) Implement septic inspections. Arrange for an inspector to come inspect your current septic system to ensure it is operating properly.**
- 3) Reduce your water use at the cottage. Excessive water use is the most common cause of septic failure. Cut down on the amount of water entering your septic by installing low flow toilets and showerheads, and taking laundry home to wash.
- 4) Naturalize your shorelines (e.g., vegetated buffer strips, wetlands) to help control soil erosion and the runoff of nutrients to the lake and nearby rivers and streams. Aim to keep natural areas natural!
- 5) Limit the amount of impervious surfaces, including roofs, parking areas, and patios, to reduce runoff to nearby waterbodies.

Appendix A

Temperature & Dissolved Oxygen - Lighthouse - June 2022

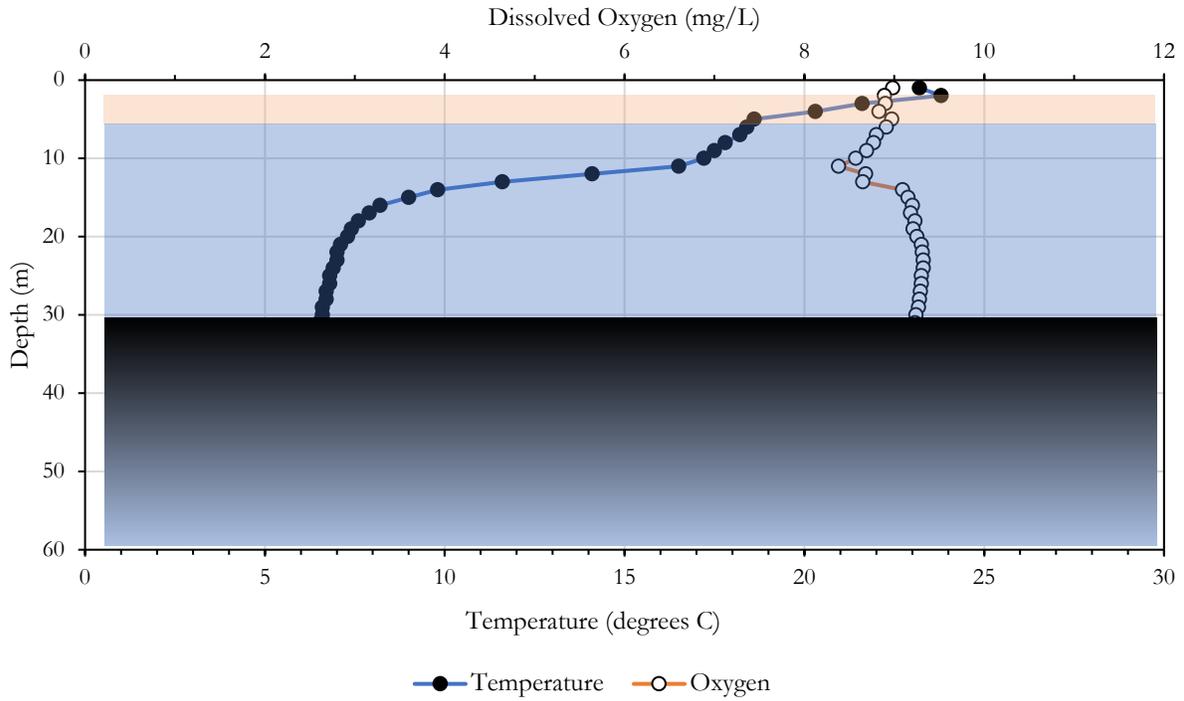


Temperature & Dissolved Oxygen - Snake Point - June 2022

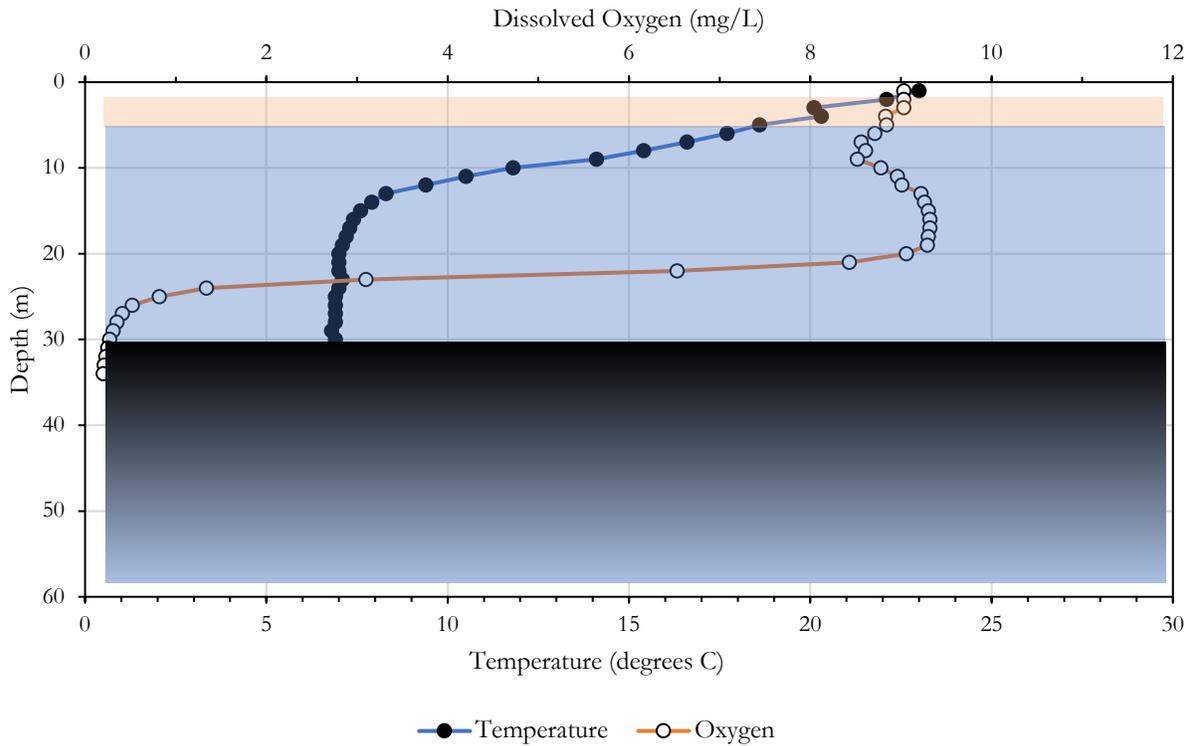


Appendix B

Temperature & Dissolved Oxygen - Elmdon - June 2022

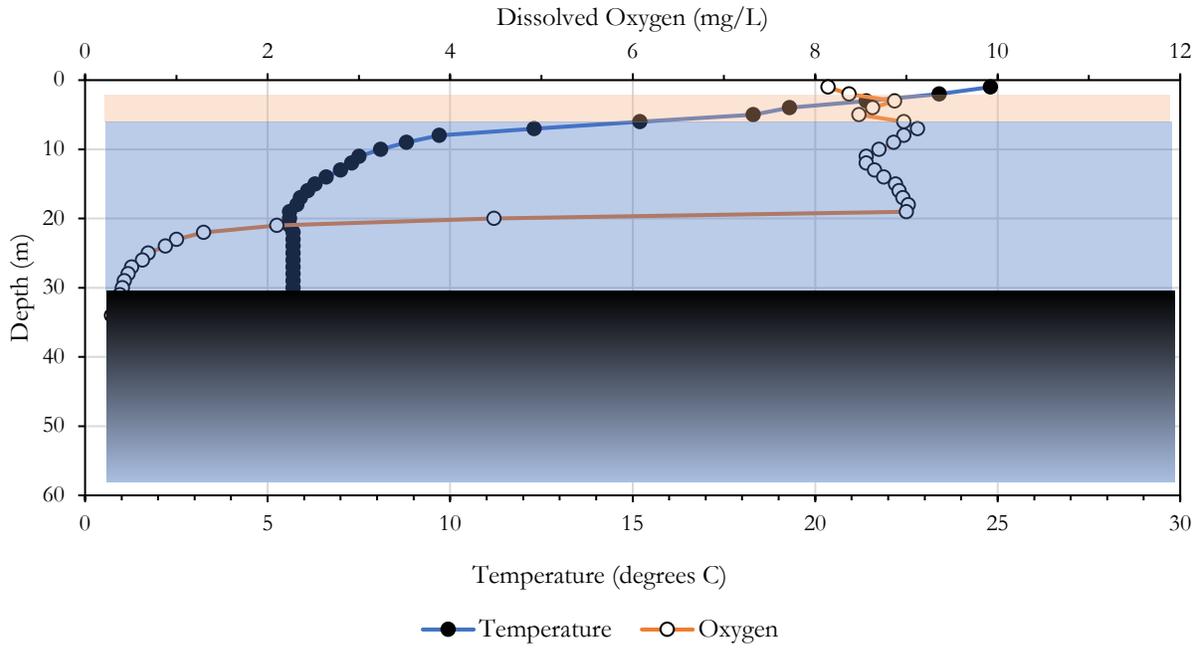


Temperature & Dissolved Oxygen - Black Duck - June 2022

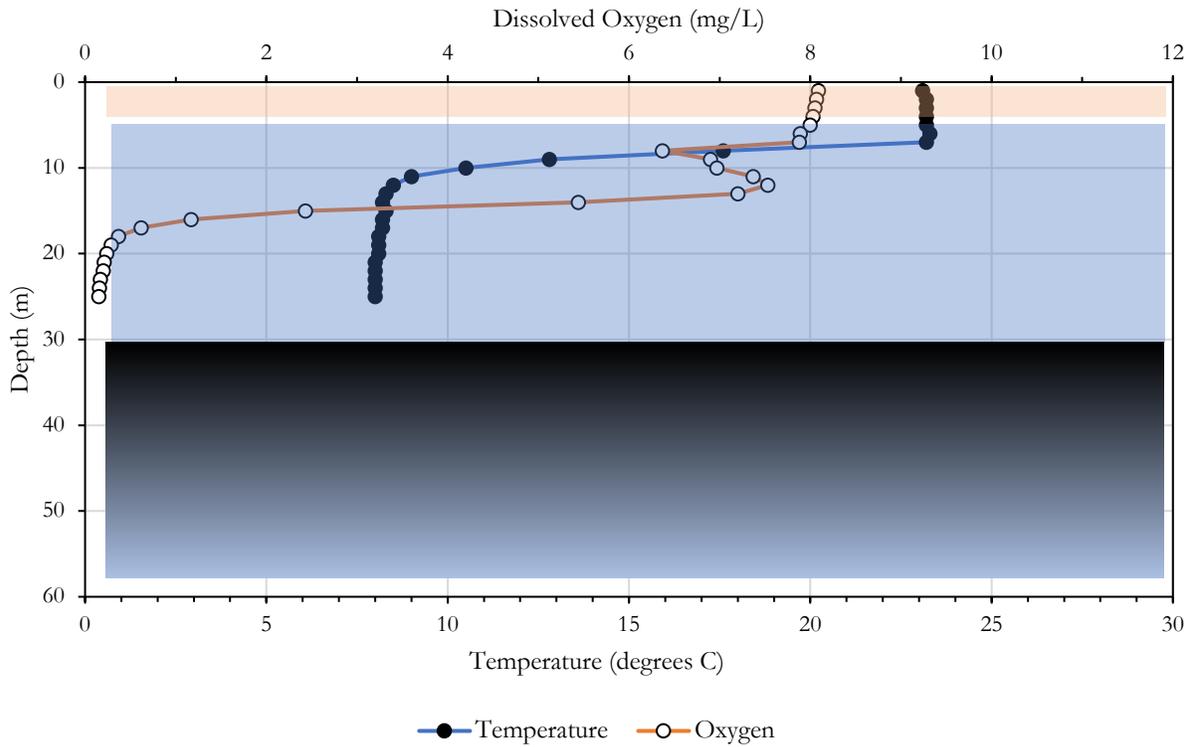


Appendix C

Temperature & Dissolved Oxygen - Otter Lake - June 2022

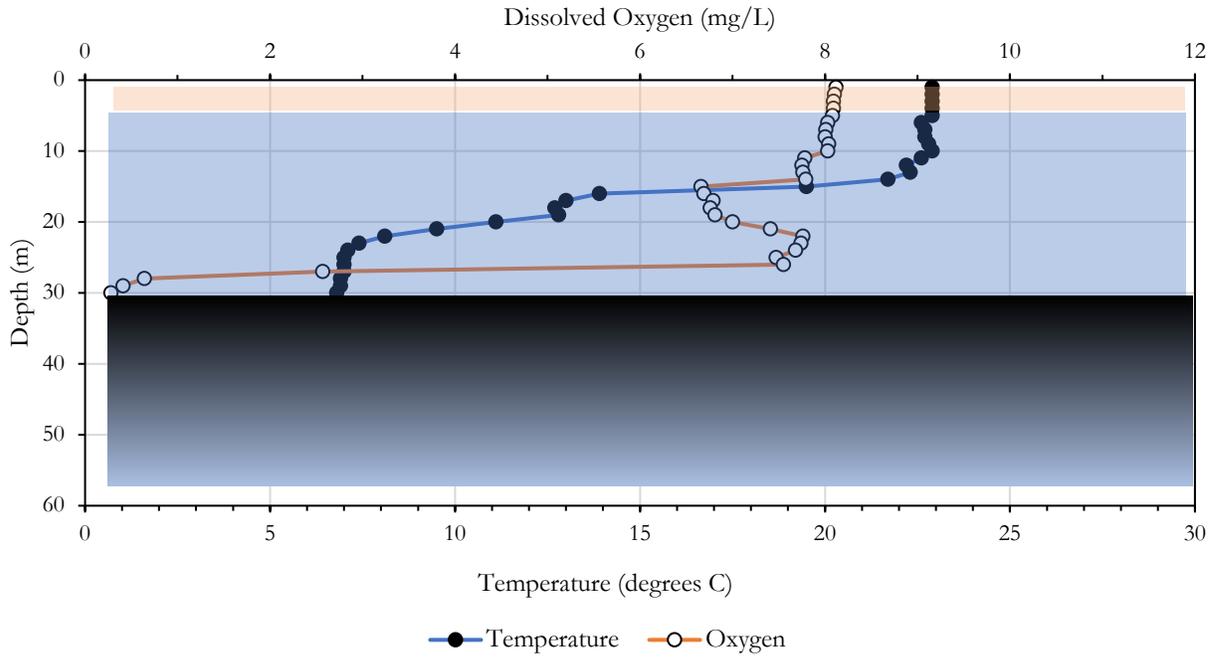


Temperature & Dissolved Oxygen - Lighthouse - July 2022

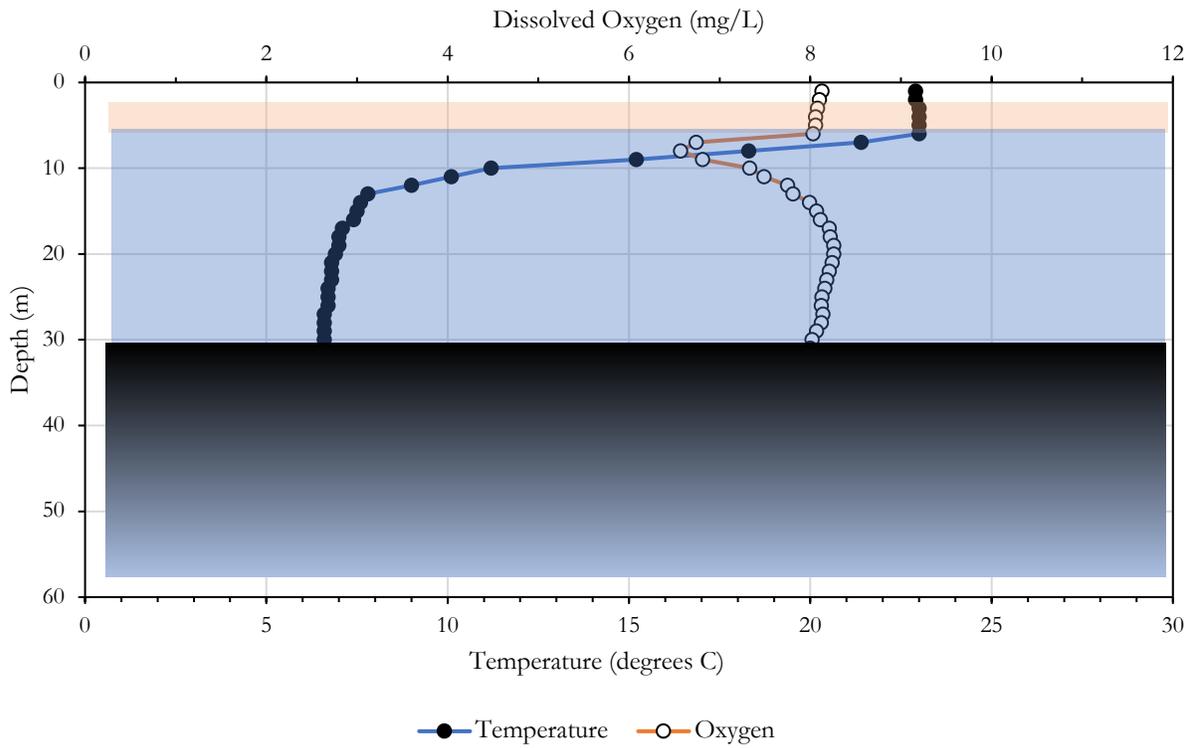


Appendix D

Temperature & Dissolved Oxygen - Snake Point - July 2022

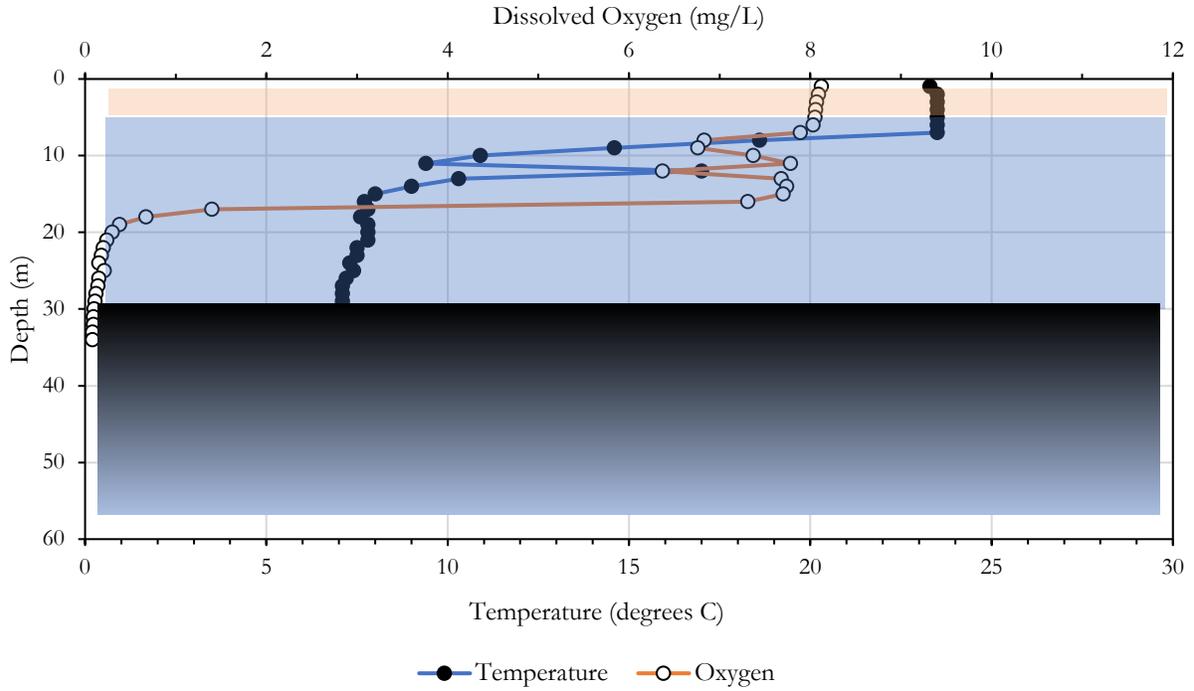


Temperature & Dissolved Oxygen - Elmardon - July 2022

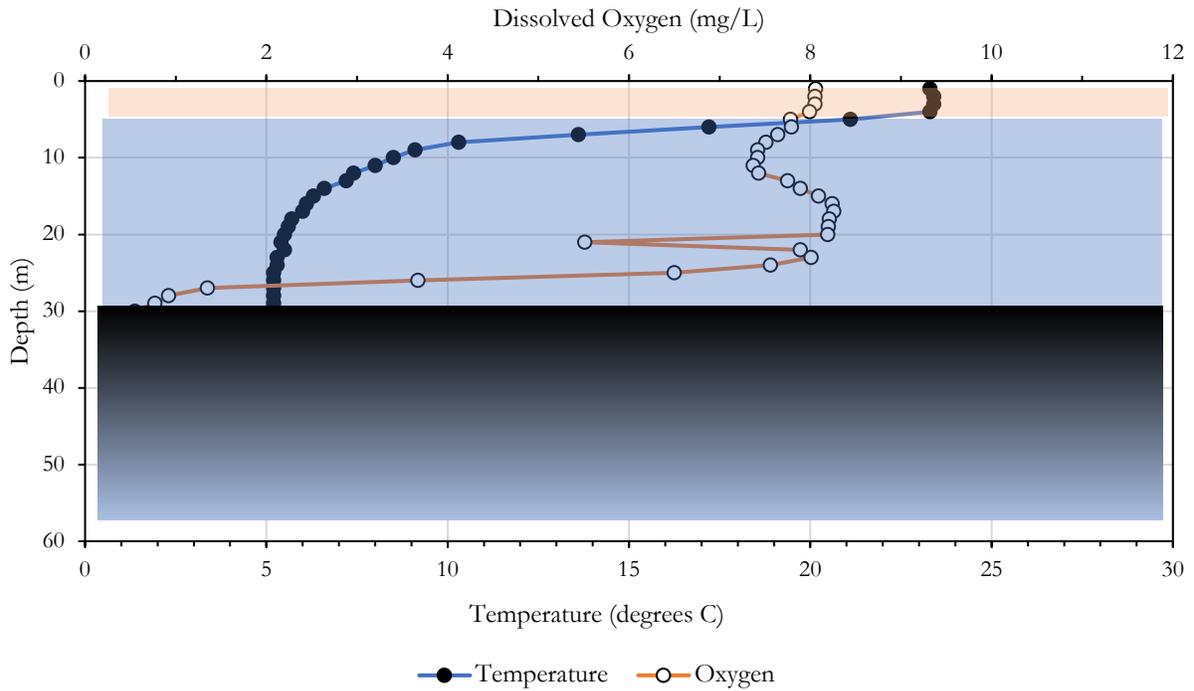


Appendix E

Temperature & Dissolved Oxygen - Black Duck - July 2022

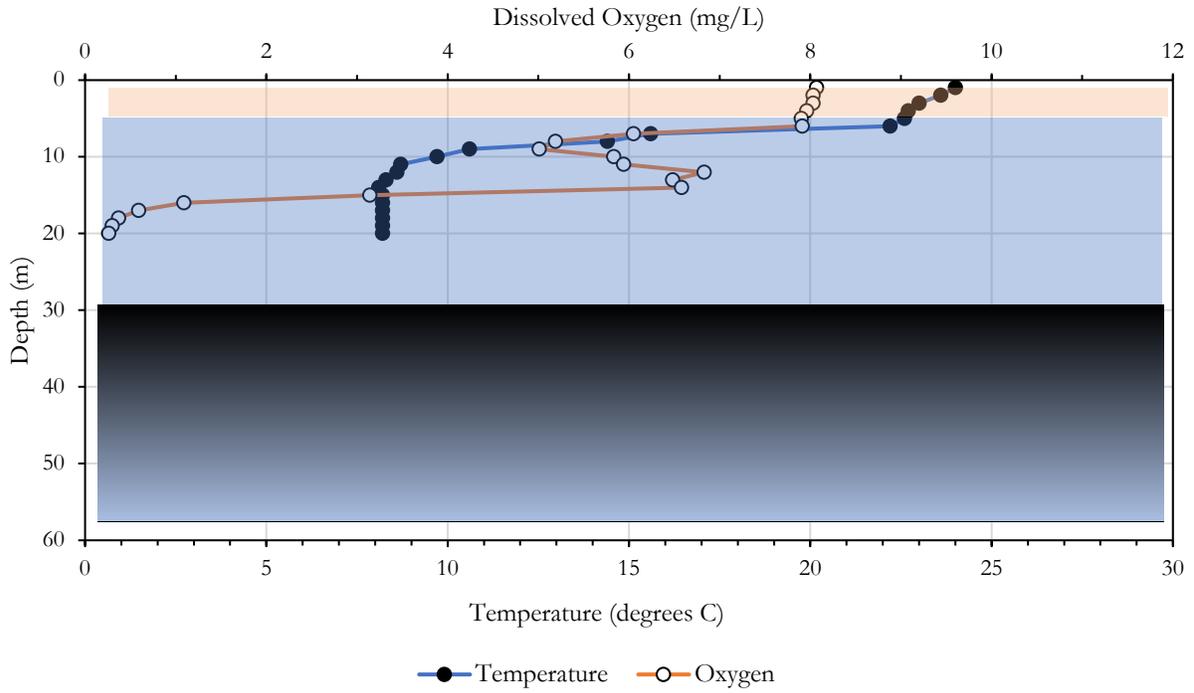


Temperature & Dissolved Oxygen - Otter Lake - July 2022

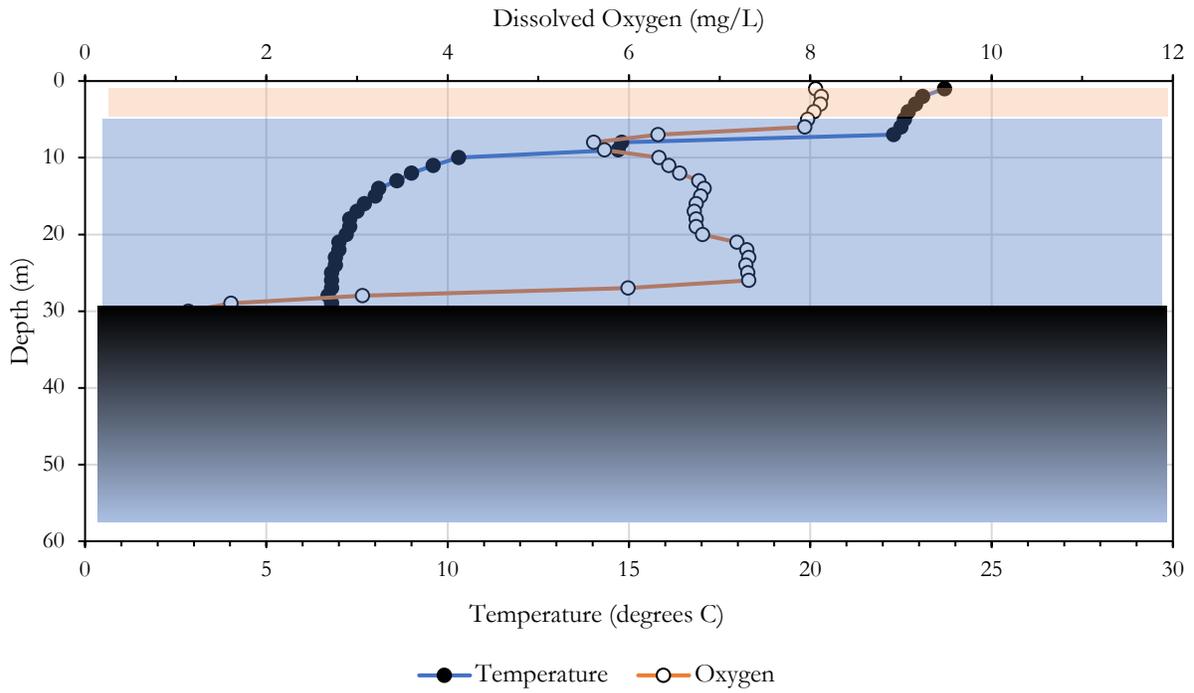


Appendix F

Temperature & Dissolved Oxygen - Lighthouse - Aug 2022

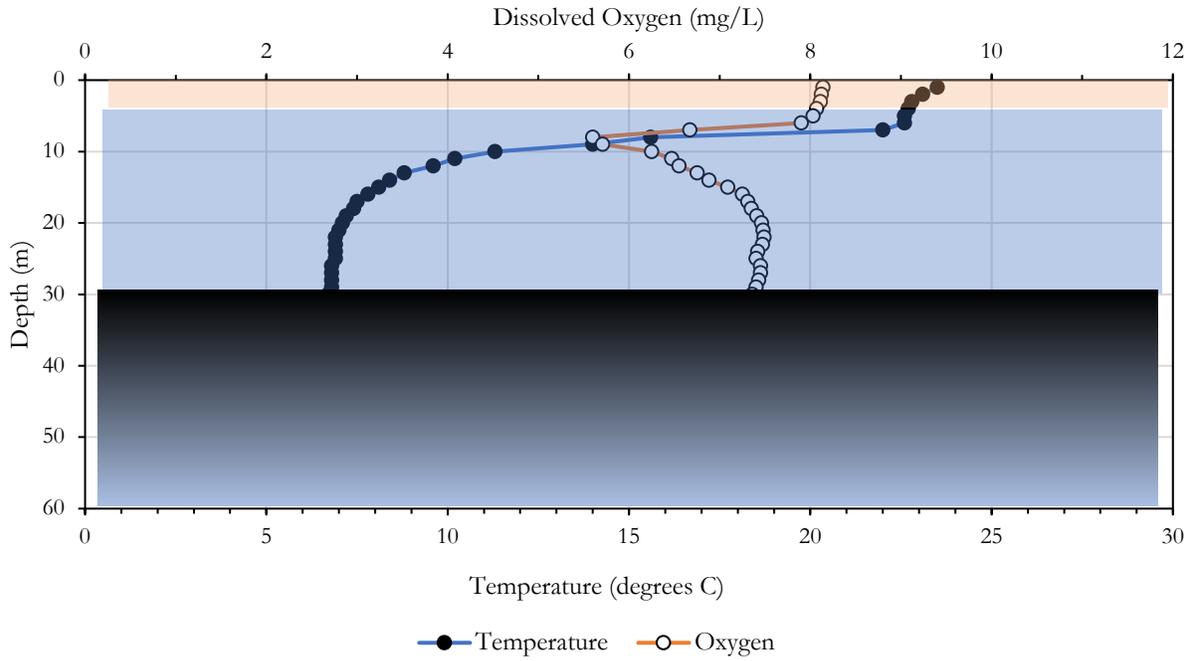


Temperature & Dissolved Oxygen - Snake Point - Aug 2022

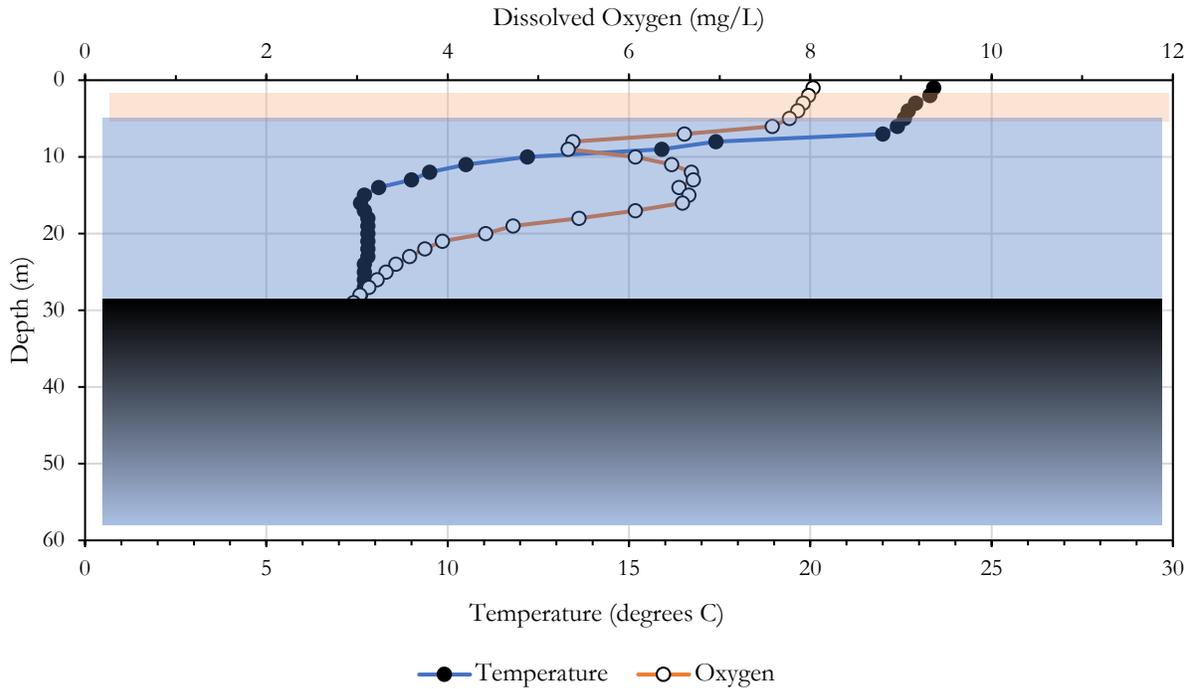


Appendix G

Temperature & Dissolved Oxygen - Elmardon- Aug 2022

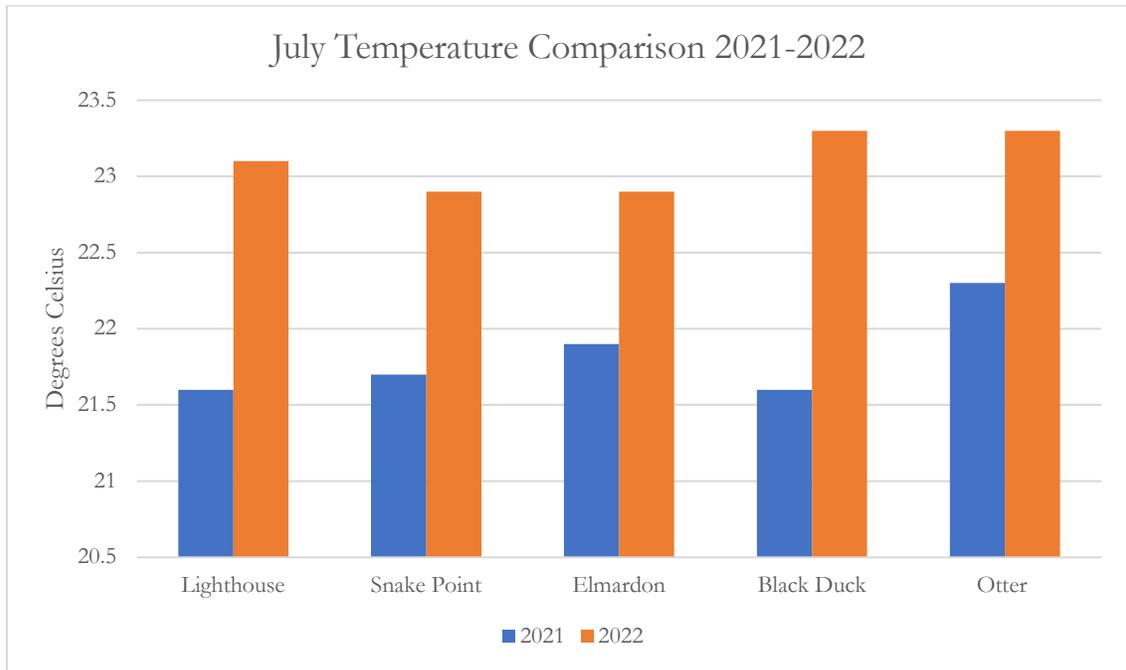
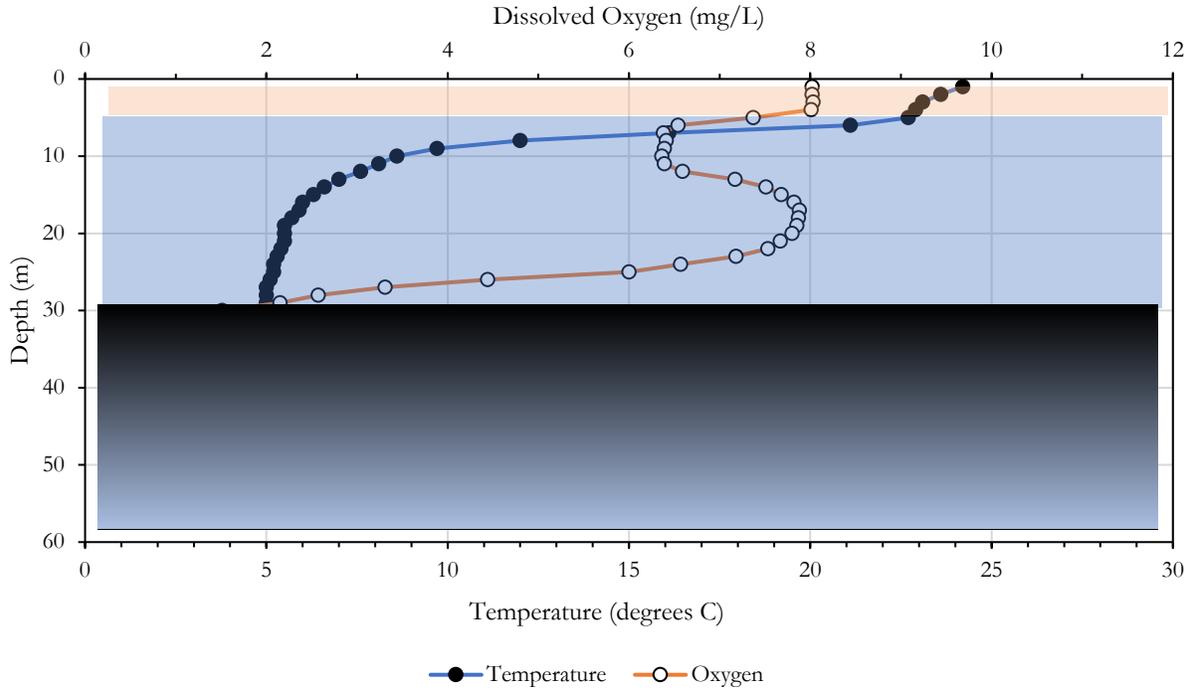


Temperature & Dissolved Oxygen - Black Duck - Aug 2022

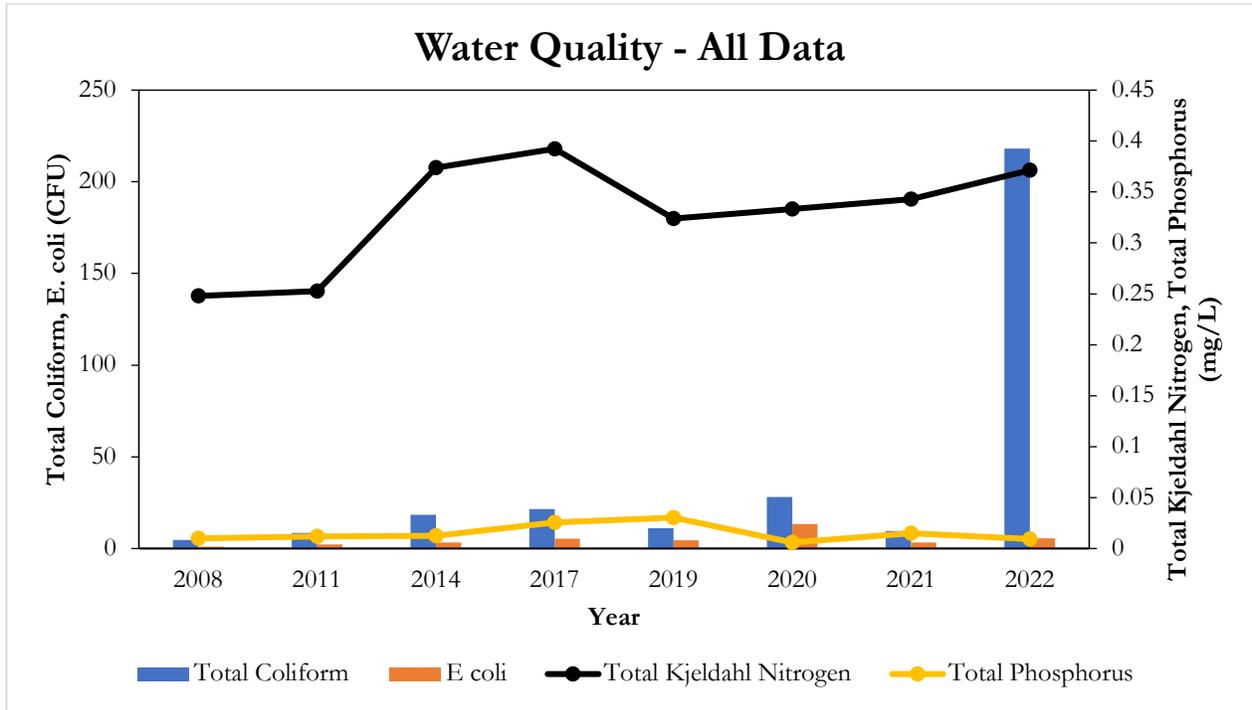


Appendix H

Temperature & Dissolved Oxygen - Otter Lake - Aug 2022



Appendix I



Appendix J

Aug 2022	Total Coliform	E coli	Total Kjeldahl Nitrogen	Total Phosphorus
Units	cfu/100ml	cfu/100ml	mg/L	mg/L
PWQO Guides	<i>1000 cfu/100</i>	<i>100 cfu /100</i>	<i>0.1-0.5</i>	<i>0.01-0.03</i>
1	2022	2022	2022	2022
1	60	2	0.4	0.006
2	200	4	0.3	0.004
3	20	2	0.3	0.004
4	360	4	0.5	0.016
5	100	2	0.3	0.007
6	80	2	0.3	0.007
7	160	6	0.3	0.005
8	180	4	0.3	0.006
9	40	2	0.3	0.007
10	20	2	0.3	0.009
11	60	2	0.4	0.01
12	200	8	0.3	0.008
13	60	2	0.4	0.006
14	140	2	0.3	0.007
15	240	2	0.5	0.022
16	80	2	0.3	0.009
17	900	30	0.6	0.016
18	220	6	0.3	0.011
19	240	2	0.6	0.018
20	1120	28	0.4	0.008
21	100	2	0.4	0.012