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## LWCA WATER QUALITY REPORT SUMMER 2023 AGM

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**TO:** LWCA BOARD

**FROM:** CLAIRE VANDERVOORT

**SUBJECT:** WATER QUALITY BOARD REPORT

**DATE:** 12 AUGUST 2023

### **DO/TEMPERATURE SAMPLING**

Deep water sampling has been completed twice in early and late July. August sampling will take place shortly. Chemistry sampling will take place sometime in late August, results for the chemistry sampling will take a bit longer to come back but will be shared to residents when they are returned and entered into the database.

A visual of deep water sampling locations has been mapped, allowing for a greater scope and understanding of the water quality program within the LWCA and for lake residents. I aim to post this on the LWCA website. In the fall I intend to create another digital map of the 21 chemistry sampling sites.

### **2023 SAMPLING PROGRAM**

Same as last year, DO/temp readings have been taken approx. monthly with a few exceptions due to weather and time constraints. Chemistry sampling will take place in late August. Additionally, this year is the first year we have been officially added to the Lake Partner Program which is a province wide water quality initiative to understand the current water quality status of Canadian Shield lakes. Water samples were collected in early April and Secchi depths are recorded every month until October. This program tests water samples for total phosphorus, calcium, chloride, and water clarity and are posted to the province dataset. This data will be available at <https://data.ontario.ca/dataset/ontario-lake-partner>. 2023 data has not been uploaded yet.

### **2023 SAMPLING RESULTS THUS FAR**

Comprehensive data analysis for the 2023 season has not been completed yet. At the end of the field season, Lisa Thompson and I will work towards process both the deep water and chemistry results to provide an update for members. Attached below is the 2022 water quality data for review.

So far for the 2023 season, dissolved oxygen and temperature water quality results are following the same trends as this time last year, this is a good sign! In the fall graphs similar to 2022 will be updated with the final water quality data as well as August chemistry data for the 2023 season. Any significant changes will be highlighted.

### **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) 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.
- 3) Implement septic inspections. Arrange for an inspector to come inspect your current septic system to ensure it is operating properly.
- 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.

## **CLOSING REMARKS**

Wishing you all a very happy and fun remainder of the summer season. I will have more data to share as the season goes on! Please feel free to reach out if you have any additional questions.

Cheers,

Claire Vandervoort

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## **REVIEW OF 2022 WATER QUALITY DATA**

### **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**

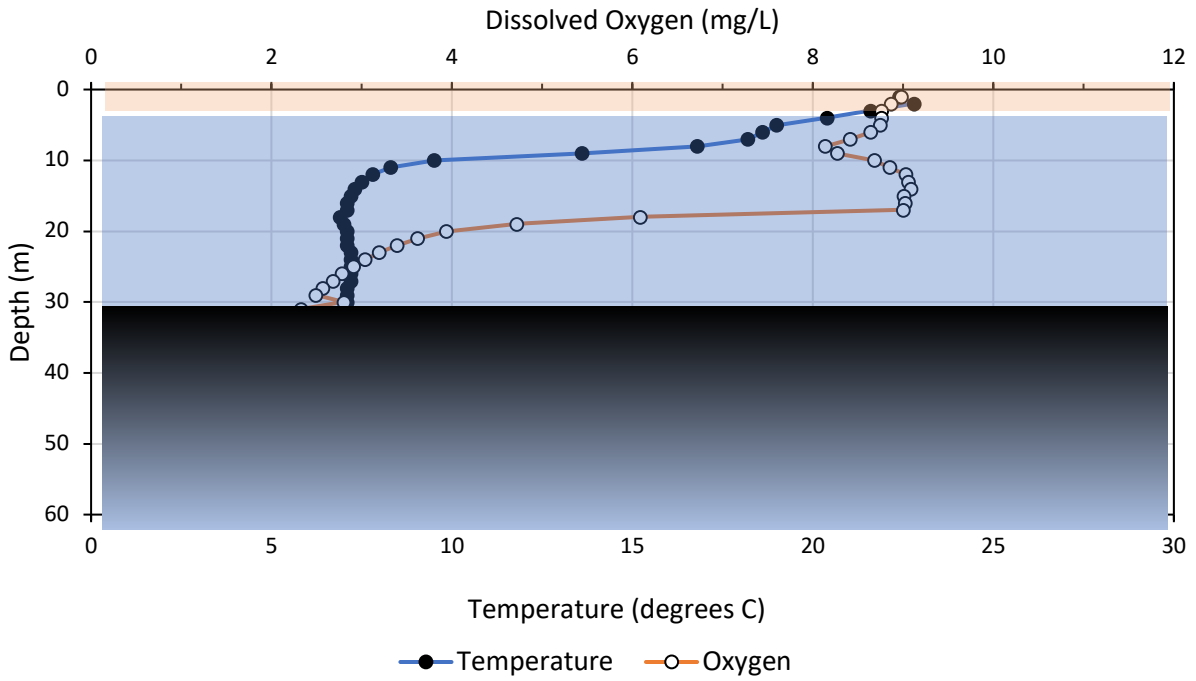
21 samples were collected from various locations ranging from the North end to the South end of Weslemkoon on August 28, 2022. These samples were sent to Caduceon Labs in Kingston for testing of phosphorous, nitrogen, total coliforms and e.coli. These results can be seen in Appendix J.

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 I). 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 I), 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.

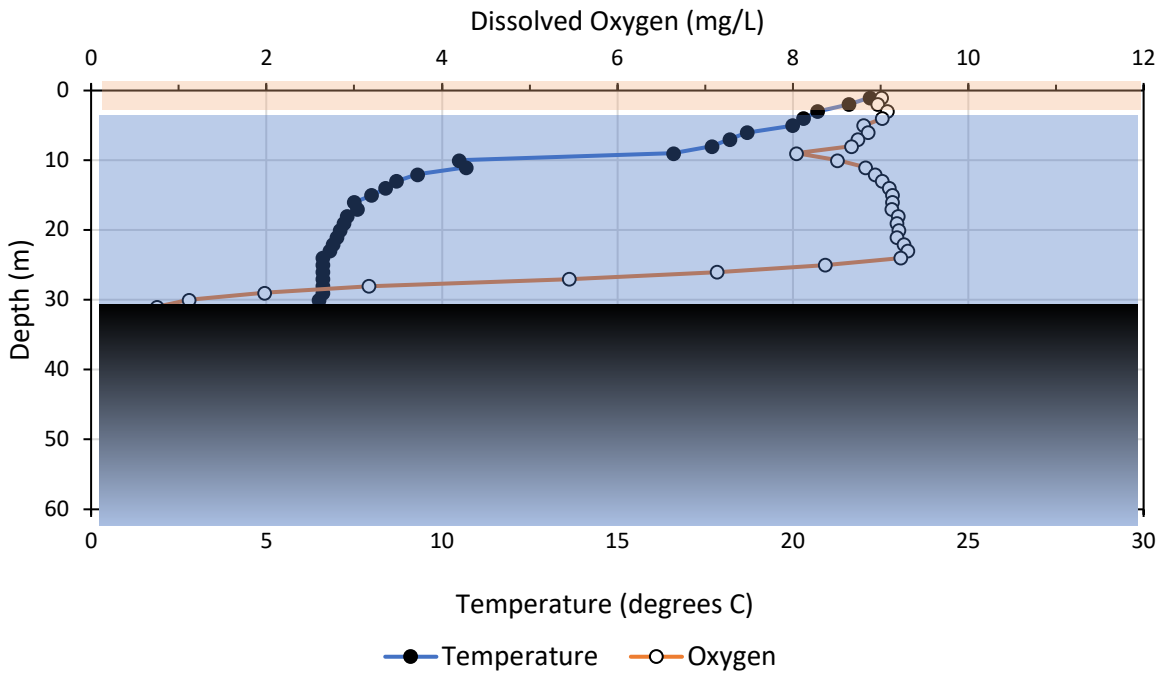
The results for total coliforms for this sampling season were very high (Appendix J). Total coliforms are bacteria that are found naturally in an environment through soil, surface water and animals. Total coliforms are not always bacteria that can make an individual sick, instead e.coli, a fecal coliform 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.

Appendix A

Temperature & Dissolved Oxygen - Lighthouse - June 2022

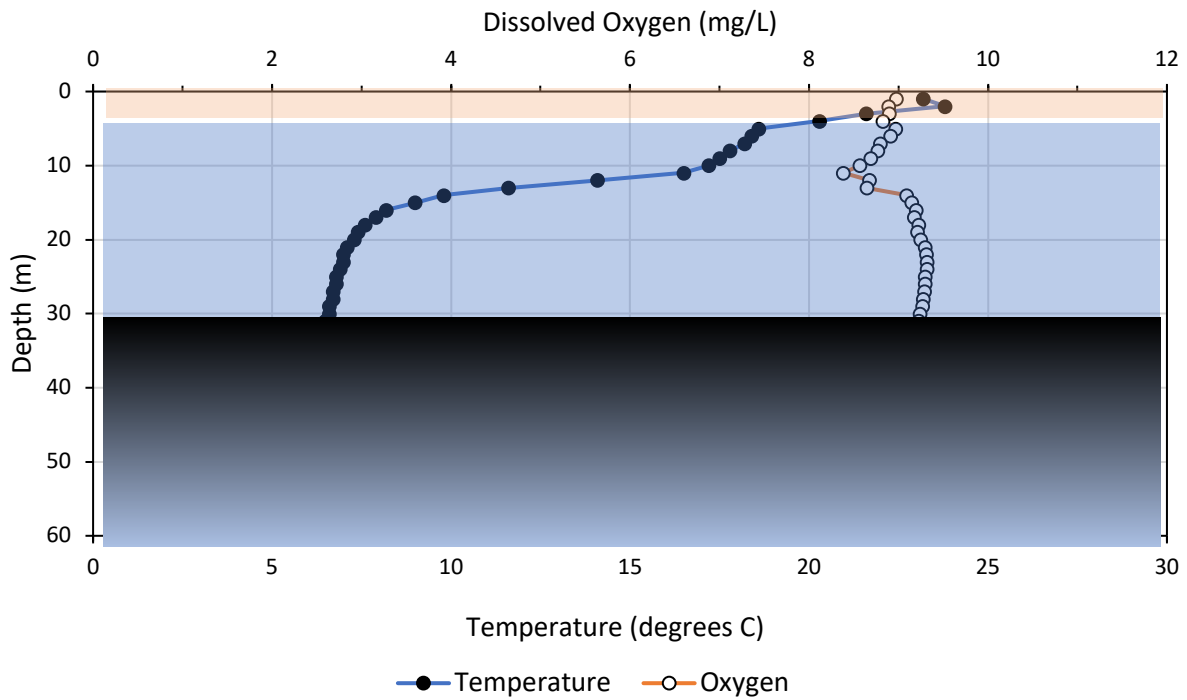


Temperature & Dissolved Oxygen - Snake Point - June 2022

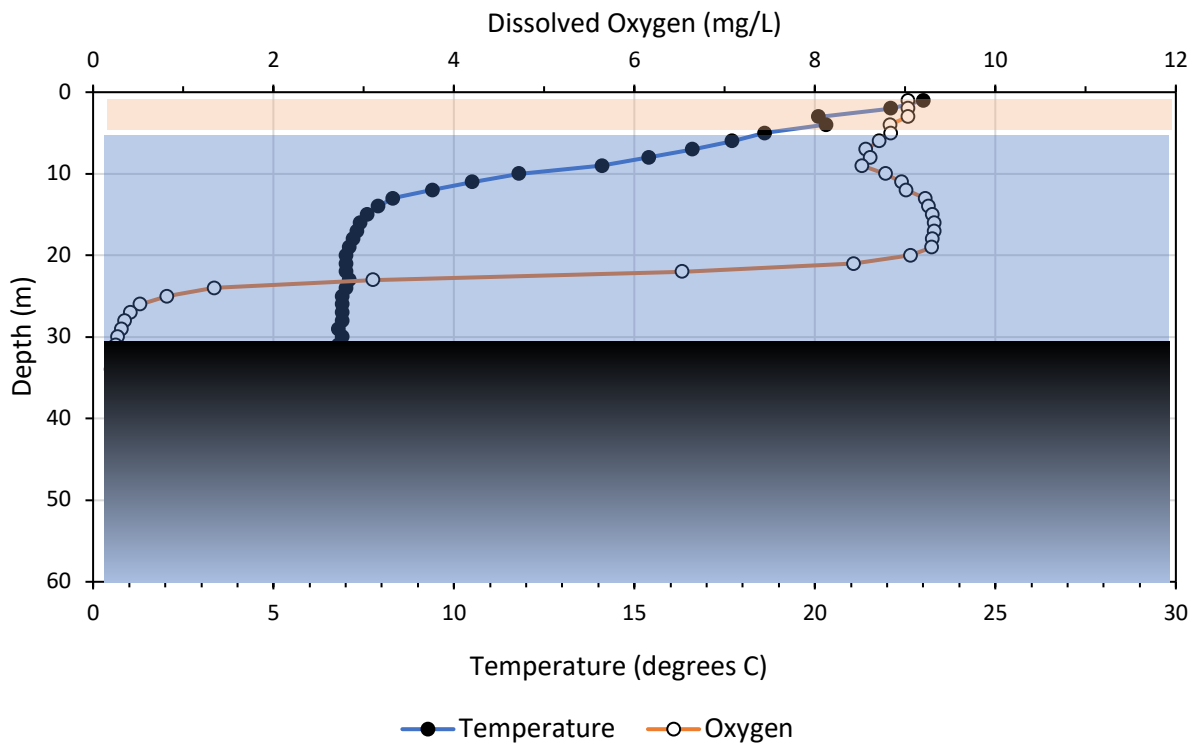


## Appendix B

### Temperature & Dissolved Oxygen - Elmardon - June 2022

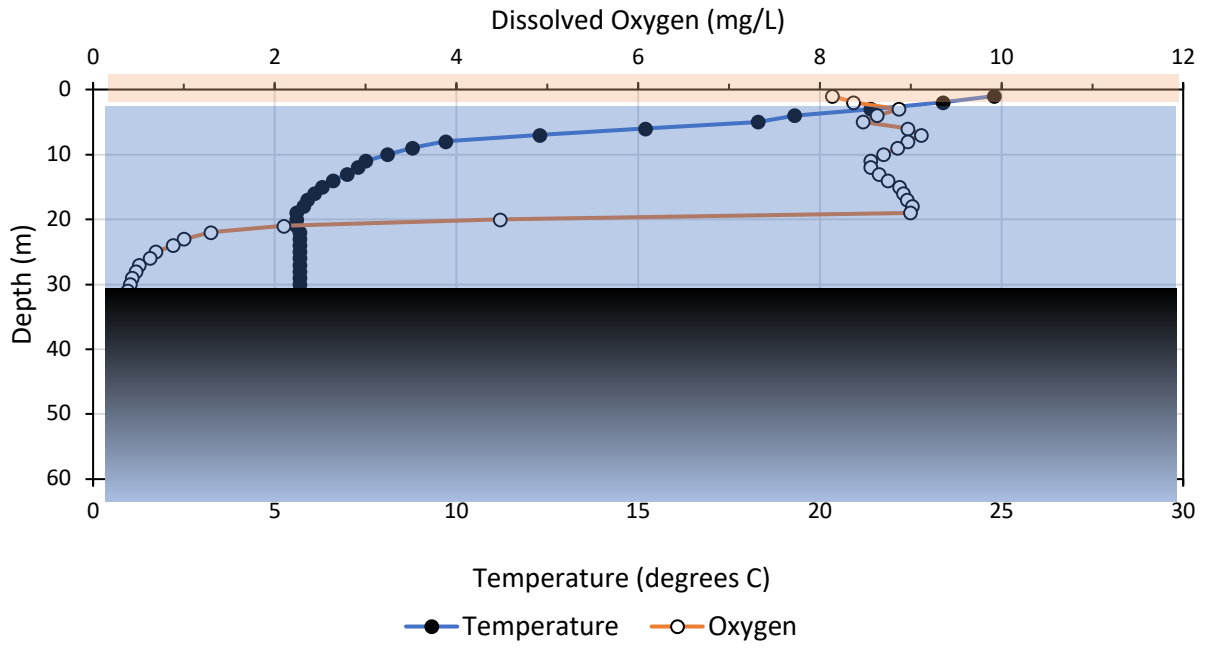


### Temperature & Dissolved Oxygen - Black Duck - June 2022

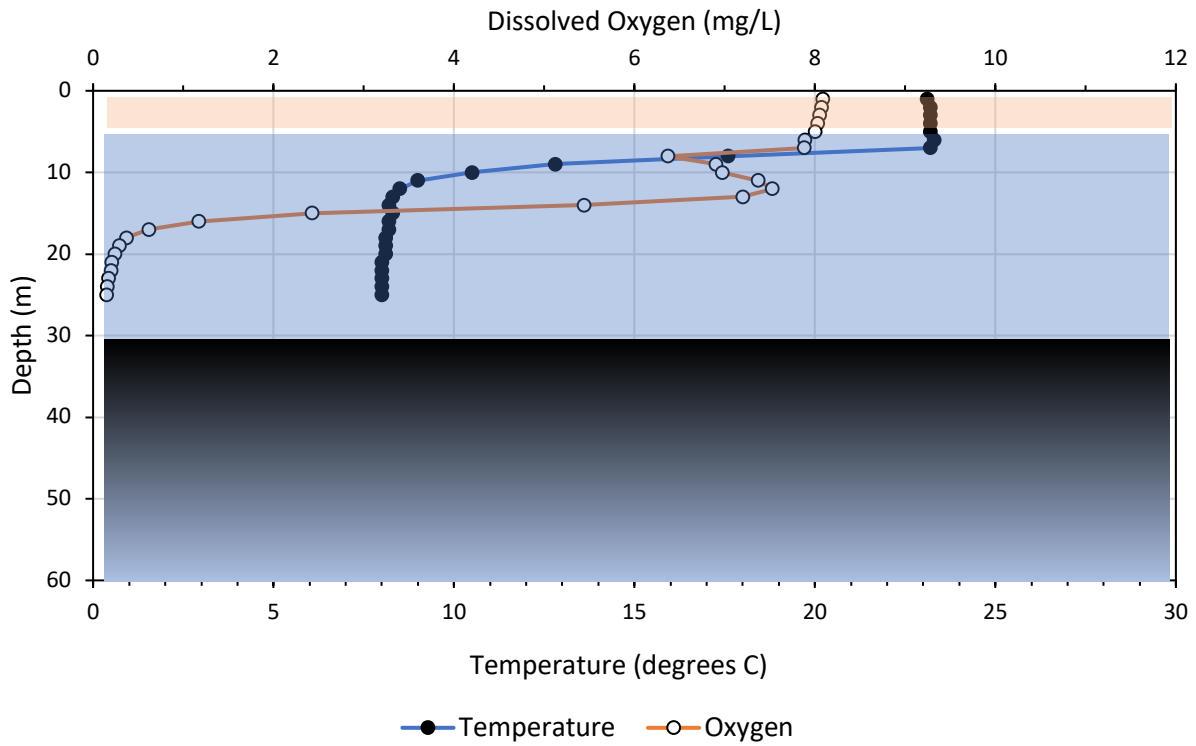


# Appendix C

## Temperature & Dissolved Oxygen - Otter Lake - June 2022

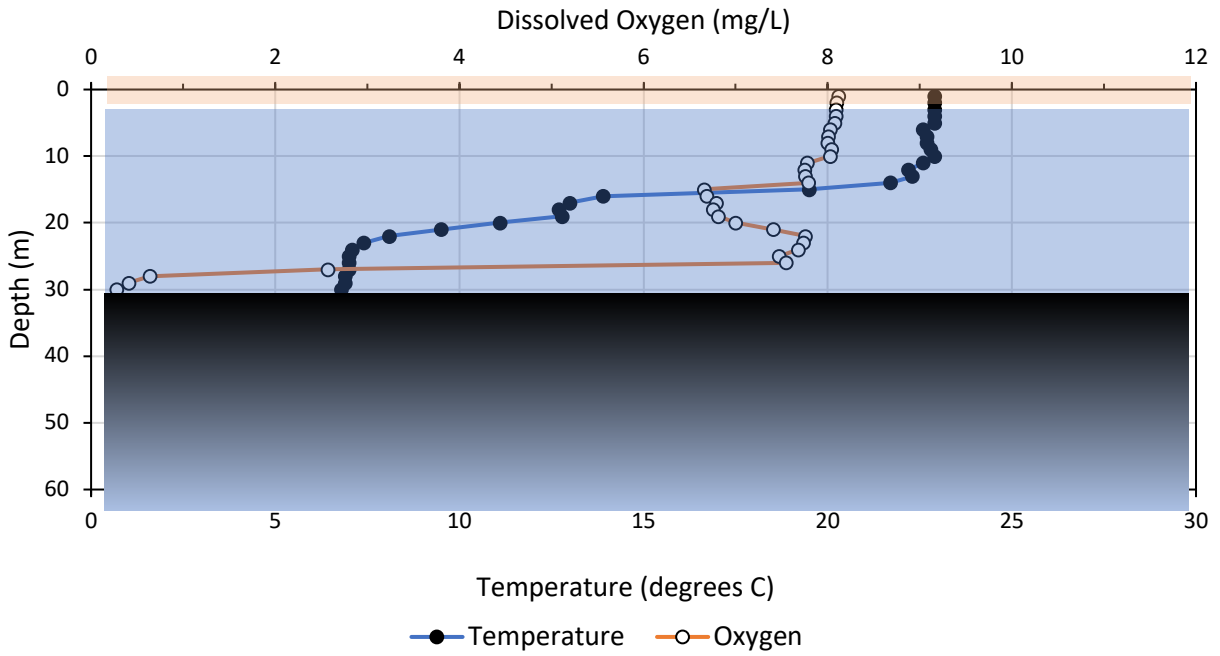


## Temperature & Dissolved Oxygen - Lighthouse - July 2022

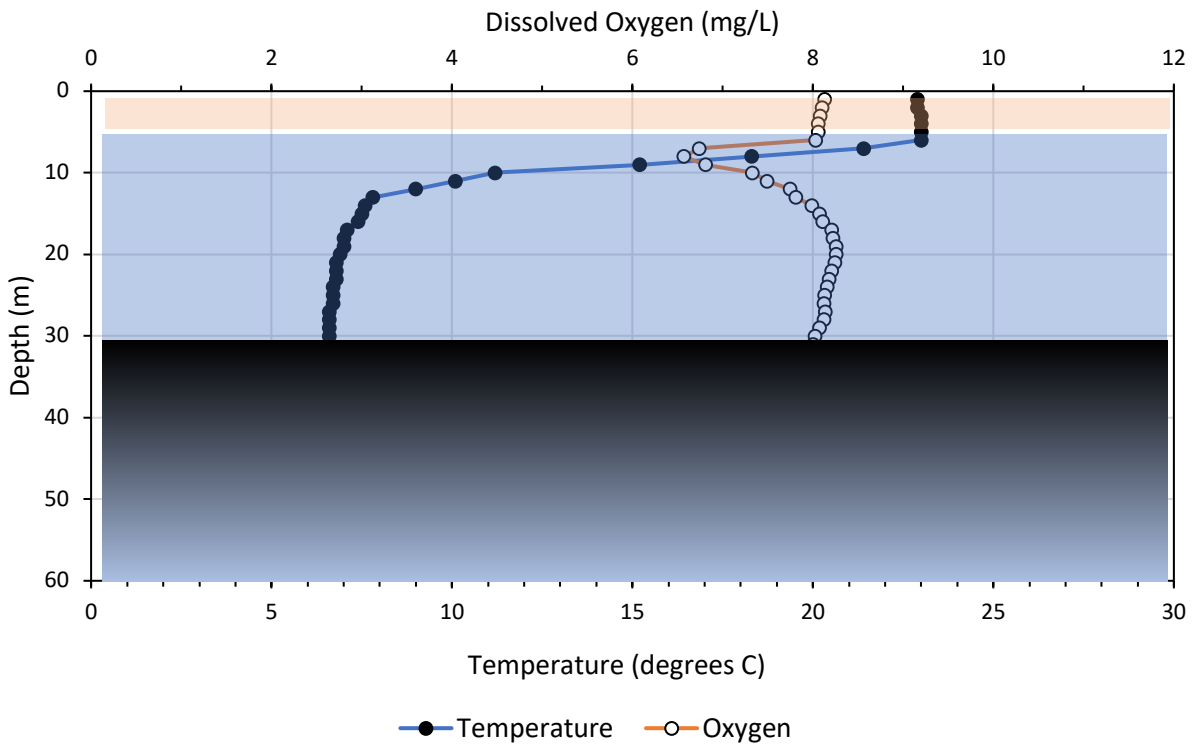


Appendix D

Temperature & Dissolved Oxygen - Snake Point - July 2022

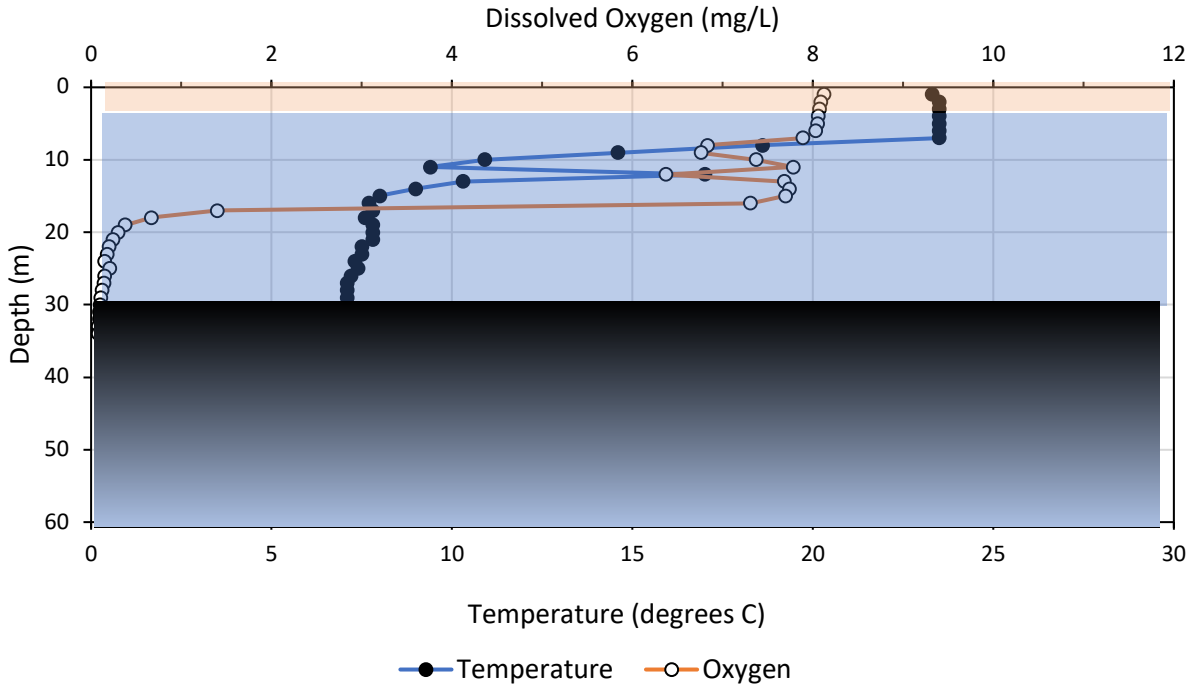


Temperature & Dissolved Oxygen - Elmardon - July 2022

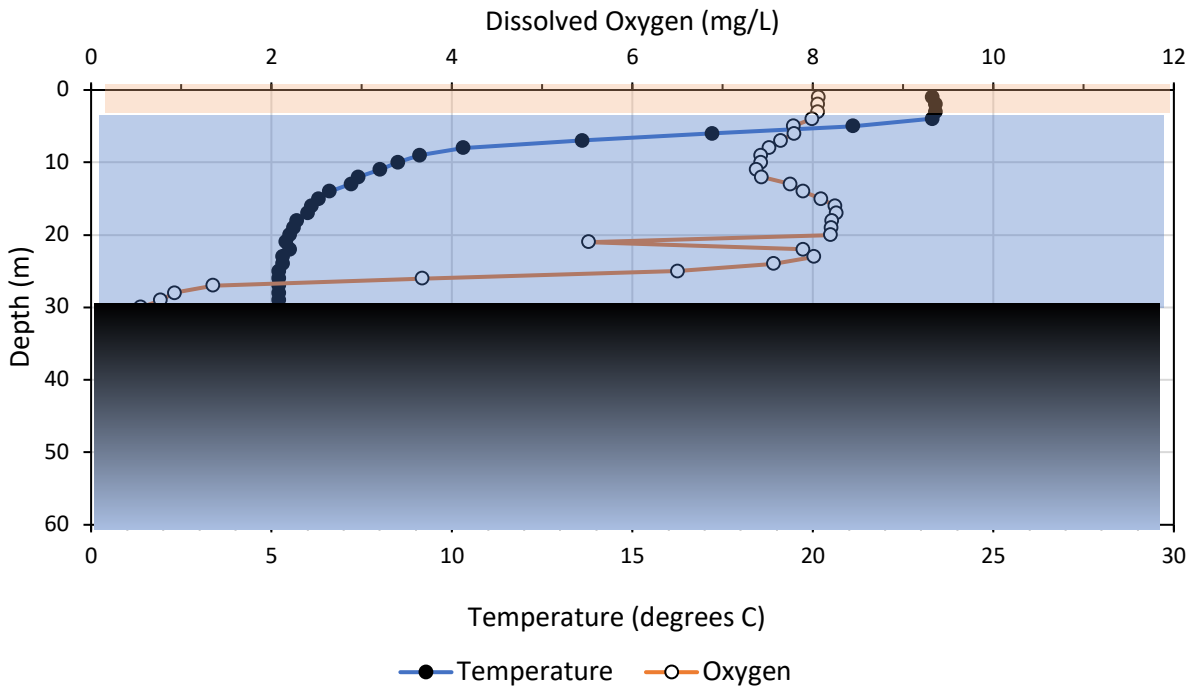


Appendix E

Temperature & Dissolved Oxygen - Black Duck - July 2022



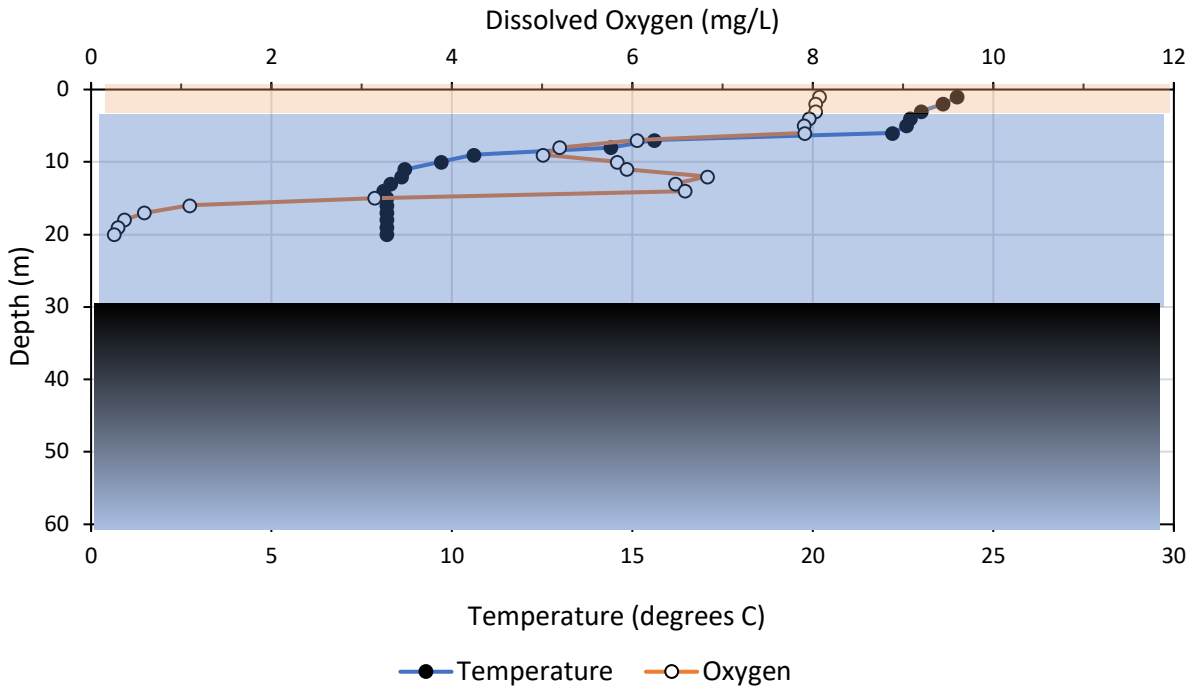
Temperature & Dissolved Oxygen - Otter Lake - July 2022



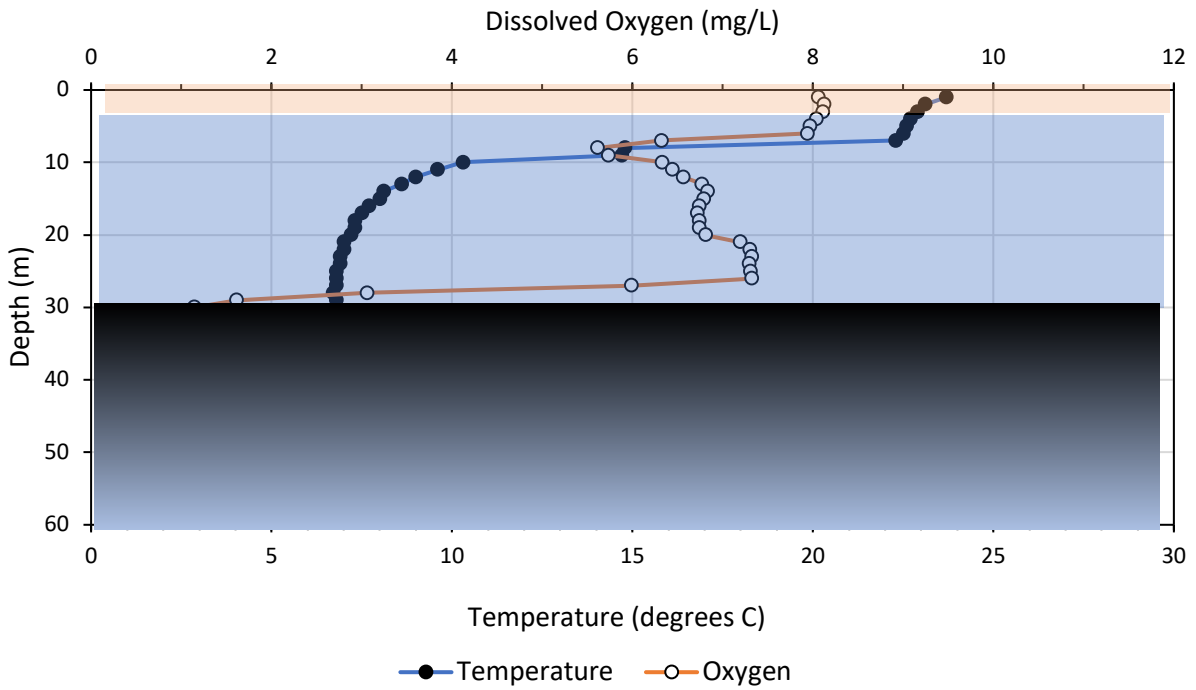


Appendix F

Temperature & Dissolved Oxygen - Lighthouse - Aug 2022

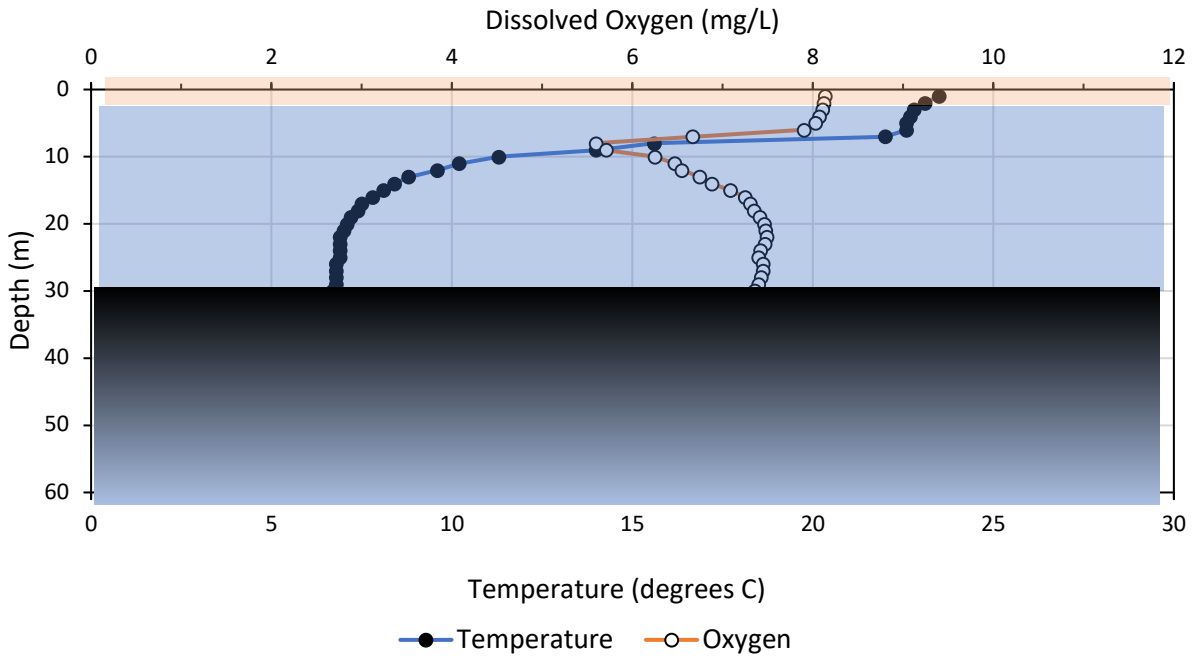


Temperature & Dissolved Oxygen - Snake Point - Aug 2022

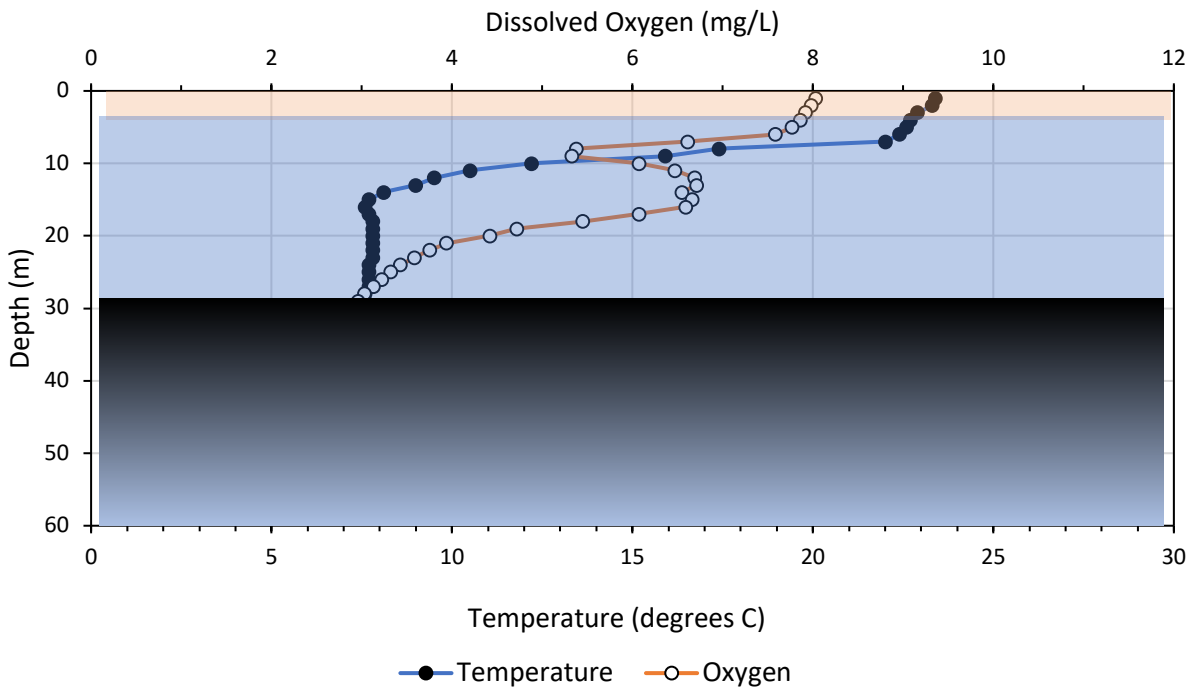


Appendix G

Temperature & Dissolved Oxygen - Elmaridon- Aug 2022

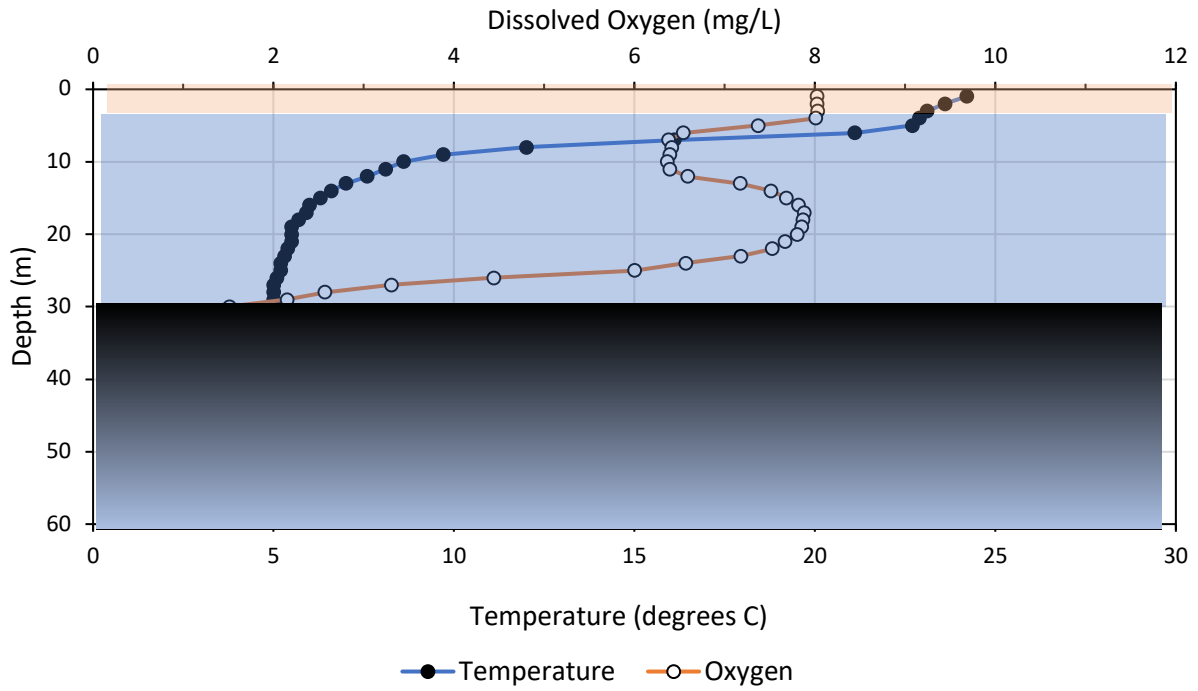


Temperature & Dissolved Oxygen - Black Duck - Aug 2022



Appendix H

Temperature & Dissolved Oxygen - Otter Lake - Aug 2022



Appendix I

	Total Coliform	E coli	Total Kjeldahl Nitrogen	Total Phosphorus
<b>Units</b>	cfu/100ml	cfu/100ml	mg/L	mg/L
<b>Target</b>	<b>2 ct/100</b>	<b>0 ct/100</b>	<b>0.02</b>	<b>0.02-0.5</b>
<b>Year</b>	2022	2022	2022	2022
<b>1</b>	60	2	0.4	0.006
<b>2</b>	200	4	0.3	0.004
<b>3</b>	20	2	0.3	0.004
<b>4</b>	360	4	0.5	0.016
<b>5</b>	100	2	0.3	0.007
<b>6</b>	80	2	0.3	0.007
<b>7</b>	160	6	0.3	0.005
<b>8</b>	180	4	0.3	0.006
<b>9</b>	40	2	0.3	0.007
<b>10</b>	20	2	0.3	0.009
<b>11</b>	60	2	0.4	0.01
<b>12</b>	200	8	0.3	0.008
<b>13</b>	60	2	0.4	0.006
<b>14</b>	140	2	0.3	0.007
<b>15</b>	240	2	0.5	0.022
<b>16</b>	80	2	0.3	0.009
<b>17</b>	<b>900</b>	30	0.6	0.016
<b>18</b>	220	6	0.3	0.011
<b>19</b>	240	2	0.6	0.018
<b>20</b>	<b>1120</b>	28	0.4	0.008
<b>21</b>	100	2	0.4	0.012

Appendix J

