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## **Yukon River Watershed - Lakes**

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- **Lake 13-587**
- **Bennett Lake**
- **Enger Lake**
- **Ethel Lake**
- **Fish Eye Lake**
- **Fox Lake**
- **Gravel Lake (pond)**
- **Jackfish Lake**
- **Chu Cho (Little Salmon Lake)**
- **Minto Lake**

## Lake 13-587

### Unnamed lake adjacent to Marsh Lake



Figure 1. Lake 13-587 and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

<b>LAKE SURFACE AREA</b>	<b>WATERSHED AREA</b>
0.11 km <sup>2</sup>	0.77 km <sup>2</sup>
<b>MAXIMUM DEPTH</b>	<b>POPULATION</b>
6 m	12
<b>AVERAGE DEPTH</b>	<b>ELEVATION</b>
4 m	664 m
<b>SAMPLING DATE</b>	<b>AREA FOREST FIRES 2014-2019</b>
2019-08-17	0 km <sup>2</sup>

### Location

Lake 13-587 is located in southcentral Yukon, within the Marsh Lake community and on the east side Judas Creek Drive. The lake coordinates are 60°27'01.1"N 134°15'55.2"W.

### Land Use

81.83% of Lake 13-587's 0.77 km<sup>2</sup> watershed is natural. 15.04% is composed of water (including the lake itself). The remaining 3.13% of the watershed is urbanized land (Figure 3).

— Yukon lakes mean  
 — 13-587

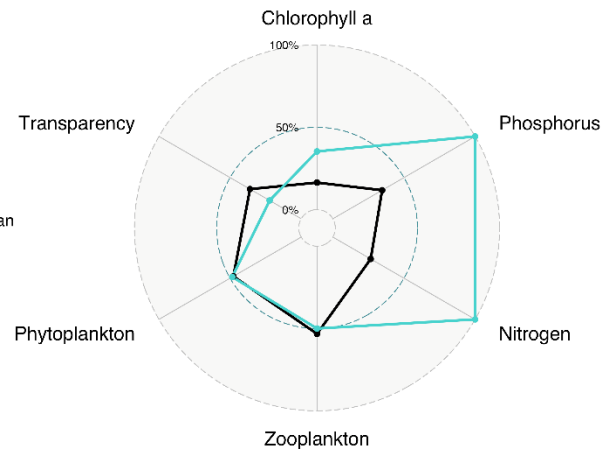


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (black) in comparison with Lake 13-587 (blue).

*The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.*

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 4.0 m. The color value was 14.38 mg/L Pt, while the dissolved organic carbon was 19.71 mg/L.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (28.50 µg/L) and total nitrogen (0.84 mg/L) values in Lake 13-587 were above the Yukon average, while chlorophyll a (3.81 µg/L) was below the Yukon average (Figure 2). According to the Canadian water quality guidelines for the protection of aquatic life, Lake 13-587 is meso-eutrotrophic.

### Food chain health

Four zooplankton species and 23 phytoplankton species were identified in Lake 13-587, which is the same as the Yukon average (Figure 2). Cyanobacteria concentration indicated a low risk of cyanotoxin exposure. One potential bloom formers / toxin producer species of the cyanobacteria group was identified.

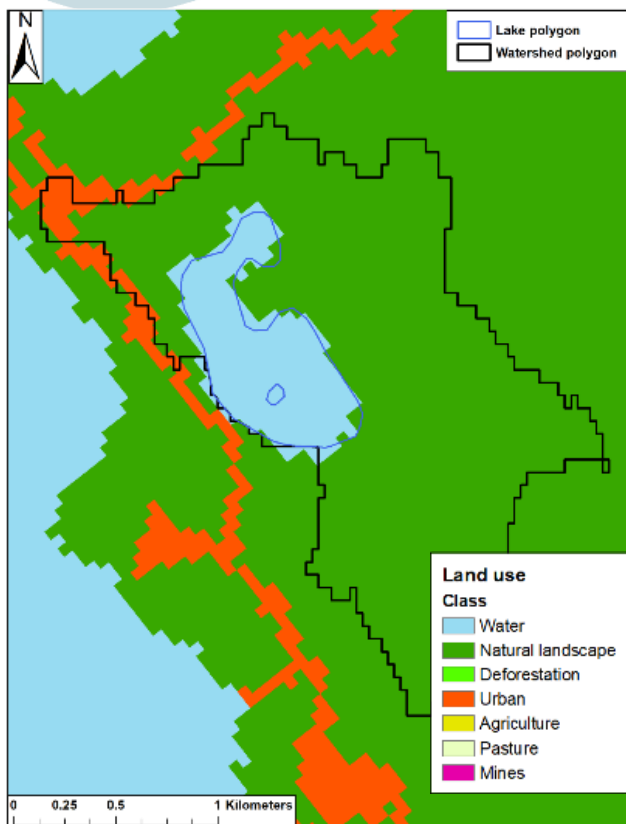


Figure 3. Immediate watershed and land use around Lake 13-587. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

No pesticides, insecticides or herbicides were found in Lake 13-587.

### Pharmaceuticals

No pharmaceutical products were reported in Lake 13-587.

### Industrial chemicals

No industrial chemicals were reported.

### Fecal coliforms

Fecal coliforms, including *E. coli* bacteria were detected in Lake 13-587 from the littoral sampling site on the northern side of the lake. Fecal coliforms that were not of *E. coli* species were also detected at the index site near the deepest point of the lake.

## Change over time

Sediment cores were retrieved from Lake 13-587, but have not yet been analyzed for total metals, diatoms or zooplankton cladoceran temporal changes. The longest core was 48 cm.



Figure 4. The longest sediment core retrieved from Lake 13-587.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 4.6 m and a hypolimnion at 4.8 m on the sampling day (Figure 5a). Dissolved oxygen was elevated throughout the profile, but reduced to 50% of oxygen in the hypolimnion (Figure 5b).

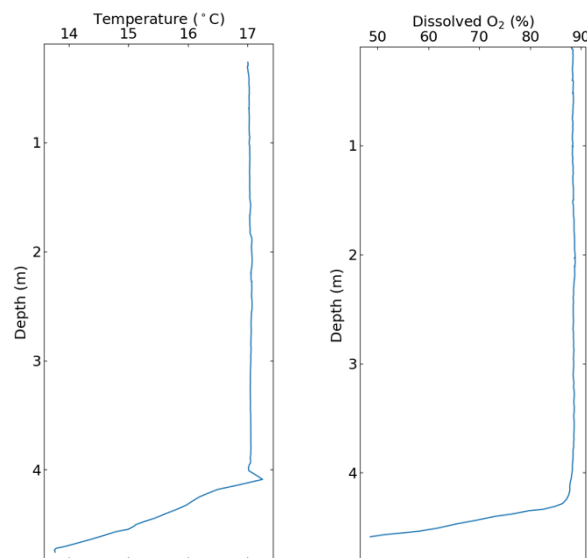


Figure 5. a) Temperature (°C) and b) Dissolved oxygen (%) as measured in Lake 13-587. Figures from Fradette, 2021.

# Bennett Lake



Figure 1. Bennett Lake and immediate watershed delineated in black. Adapted from Fradette, 2021

## Lake and watershed information

LAKE SURFACE AREA	WATERSHED AREA
91.12 km <sup>2</sup>	3341.37 km <sup>2</sup>
MAXIMUM DEPTH	POPULATION
127 m	468
AVERAGE DEPTH	ELEVATION
68.6 m	640 m
SAMPLING DATE	AREA FOREST FIRES 2014-2019
2019-07-23	0 km <sup>2</sup>

### Location

Bennett Lake is located in Southwestern Yukon. It is located near Carcross along the South Klondike Highway.

### Land Use

95.6% of Bennett Lake's 3341.37 km<sup>2</sup> watershed is natural. 4.2% is composed of water (including the lake itself). The remaining 0.2% of the watershed is comprised of 0.1% urbanization, 0.01% forest loss and <0.01% mines (Figure 3).

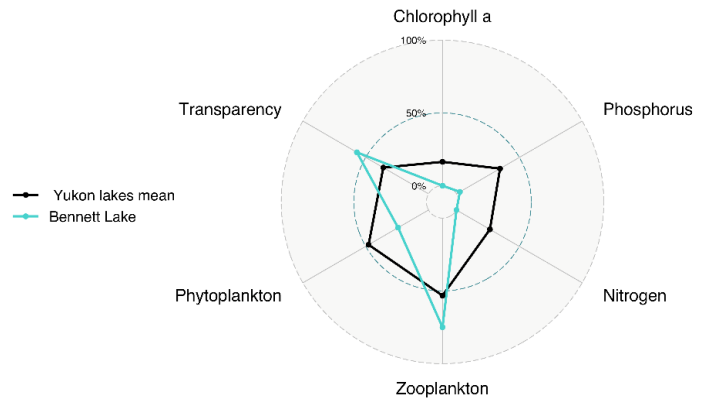


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (shown in black) in comparison with Bennett Lake (shown in blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 8.7m on the day of sampling. The color value was 0.5 mg/L Pt, which was the lowest value of all Yukon lakes sampled. Dissolved organic carbon had a value of 0.6 mg/L, which was also the lowest of all lakes sampled in Yukon.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (6.68 µg/L) and total nitrogen (0.03 mg/L) concentrations in Bennett Lake were low compared to the Yukon mean (Figure 2). Chlorophyll a (0.42 µg/L) was also below the mean. According to the Canadian water quality guidelines for the protection of aquatic life, Bennett Lake is oligotrophic.

### Food chain health

Five zooplankton species were identified in Bennett Lake, which is more than the Yukon mean. However, only 15 phytoplankton species were identified which is below the Yukon mean (Figure 2). Cyanobacteria concentration indicated a low risk of cyanotoxin exposure, but 2 potential bloom formers / toxin producer species of the cyanobacteria group were identified.



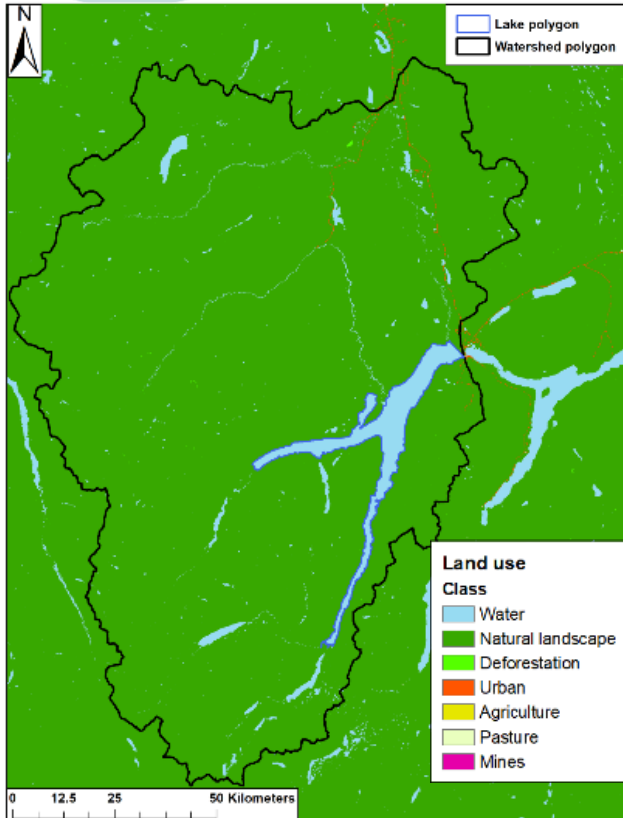


Figure 3. Immediate watershed and land use around Bennett Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

No pesticides, insecticides or herbicides were found in Bennett Lake.

### Pharmaceuticals

No pharmaceutical products were reported in Bennett Lake.

### Industrial chemicals

No industrial chemicals were reported.

### Fecal coliforms

No fecal coliforms, including *E. coli* bacteria were detected in Bennett Lake, either from the littoral sampling site near the train station or from the index site near the deepest point of the lake.

## Change over time

Sediment cores were retrieved from Bennett Lake, but core length was not long enough for analysis.



Figure 4. The longest sediment core retrieved from Bennett Lake was 11cm long.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 0.3 m and a hypolimnion at 8.8 m to 25m on the sampling day (Figure 4a). Dissolved oxygen remained elevated throughout the profile, with the lowest values of 100% saturation found at lake bottom (Figure 4b).

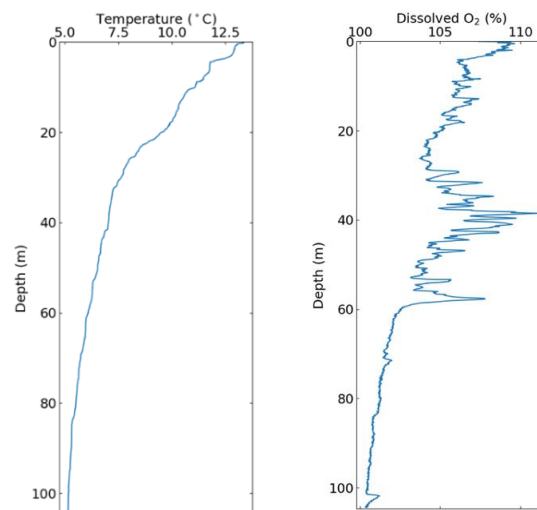


Figure 5. a) Temperature (°C) and b) Dissolved oxygen (%) as measured in Bennett Lake. Figure from Fradette, 2021.

# Enger Lake



Figure 1. Enger Lake and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

LAKE SURFACE AREA	WATERSHED AREA
1.17 km <sup>2</sup>	11.31 km <sup>2</sup>
MAXIMUM DEPTH	POPULATION
16 m	0
AVERAGE DEPTH	ELEVATION
6.3m	741 m
SAMPLING DATE	AREA FOREST FIRES 2014-2019
2019-07-27	8.17 km <sup>2</sup>

### Location

Enger Lake is located in Southwestern Yukon, about 2 km north of Snag Junction, on the east side of the Alaska Highway.

### Land Use

80.5% of Enger Lake's 11.31 km<sup>2</sup> watershed is natural. 17.7% is composed of water (including the lake itself). 1.4% of the watershed is urbanized, while the remaining 1.4% is comprised of forest loss and mines (Figure 3).

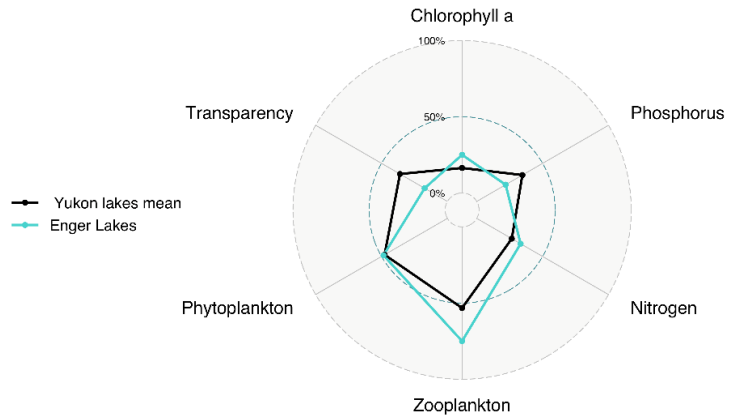


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (black) in comparison with Enger Lake (blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 3.3m on the day of the sampling. The color value was of 7.12 mg/L Pt. Dissolved organic carbon had a value of 12.50 mg/L. These values could be partially influenced by the forest fires that occurred in the watershed 2-3 weeks prior to sampling.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (10.99 µg/L) and total nitrogen (0.30 mg/L) values in Enger Lake were slightly below the Yukon mean (Figure 2). Chlorophyll a (2.82 µg/L) was also below average. According to the Canadian water quality guidelines for the protection of aquatic life, Enger Lake is mesotrophic.

### Food chain health

Five zooplankton species were identified in Enger Lake, which is above Yukon average. Phytoplankton diversity was equivalent to Yukon average, with 23 species identified (Figure 2). Cyanobacteria concentration indicated a low risk of exposure to cyanotoxins, and no potentially bloom former / toxin producer species of the cyanobacteria group were identified.

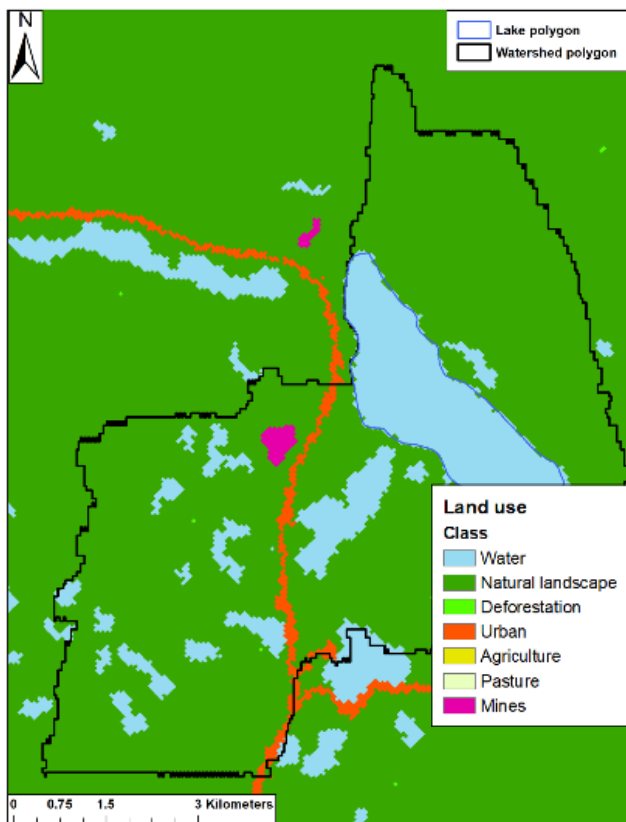


Figure 3. Immediate watershed and land use around Enger Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

Enger Lake was not analyzed for pesticides.

### Pharmaceuticals

Enger Lake was not analyzed for pharmaceuticals.

### Industrial chemicals

Enger Lake was not analyzed for industrial chemicals.

### Fecal coliforms

Fecal coliforms were detected in Enger Lake, both from the littoral sampling site on the North side of the lake and index site near the deepest point of the lake. However, the fecal bacteria detected were not of the *E. coli* species.

## Change over time

Sediment cores were retrieved from Enger Lake, but have not yet been analyzed for total metal, diatoms or zooplankton cladoceran temporal changes. The longest core was 56 cm. A black layer was observed on top of the core that might have been caused by forest fire that occurred 2-3 weeks prior to sampling.



Figure 4. The second-longest sediment core retrieved from Enger Lake was 43 cm. Picture from the longest core was lost.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 7.8m and a hypolimnion at 9.5m on the sampling day (Figure 5). Dissolved oxygen data was unavailable due to instrumentation malfunction.

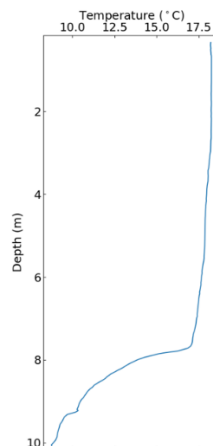


Figure 5. Temperature (°C) profile as measured in Enger Lake. Figures from Fradette, 2021.

# Ethel Lake

Takwānt'ye

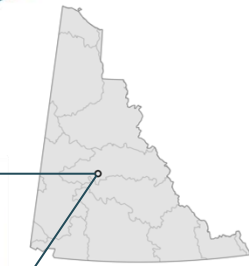


Figure 1. Ethel Lake, (Takwānt'ye) and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

<b>LAKE SURFACE AREA</b> 43.31 km <sup>2</sup>	<b>WATERSHED AREA</b> 289.35 km <sup>2</sup>
<b>MAXIMUM DEPTH</b> 60 m	<b>POPULATION</b> 0
<b>AVERAGE DEPTH</b> 37 m	<b>ELEVATION</b> 675 m
<b>SAMPLING DATE</b> 2019-07-23	<b>AREA FOREST FIRES 2014-2019</b> 69.65 km <sup>2</sup>

### Location

Ethel Lake is located in central Yukon, about 15 km east of Stewart Crossing. It is located at 63°21'41.9"N 136°03'44.7"W.

### Land Use

84.7% of Ethel Lake's 2449.32 km<sup>2</sup> watershed is natural. 15.2% is composed of water (including the lake itself). The remaining 0.2% of the watershed is comprised of forest loss or urbanized land (Figure 3).

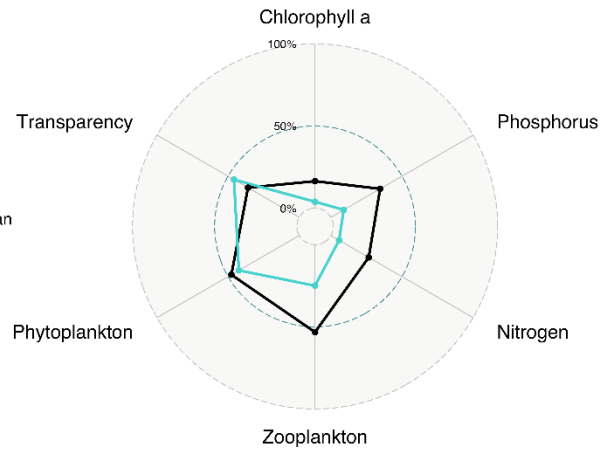


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (shown in black) in comparison with Ethel Lake (shown in blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 7.2 m the day of the sampling. The color value was of 6.62 mg/L Pt. Dissolved organic carbon had a value of 4.35 mg/L.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (8.10 µg/L) and total nitrogen (0.07 mg/L) values in Ethel Lake were both lower than the Yukon mean (Figure 2). Chlorophyll a (0.80 µg/L) was also below average. According to the Canadian water quality guidelines for the protection of aquatic life, Ethel Lake is oligotrophic.

### Food chain health

Three zooplankton and 21 phytoplankton species were identified in Ethel Lake, which is below Yukon's diversity average (Figure 2). Cyanobacteria concentration indicated a low risk of exposure to cyanotoxins. No potential bloom former / toxin producer species of the cyanobacteria group were identified.



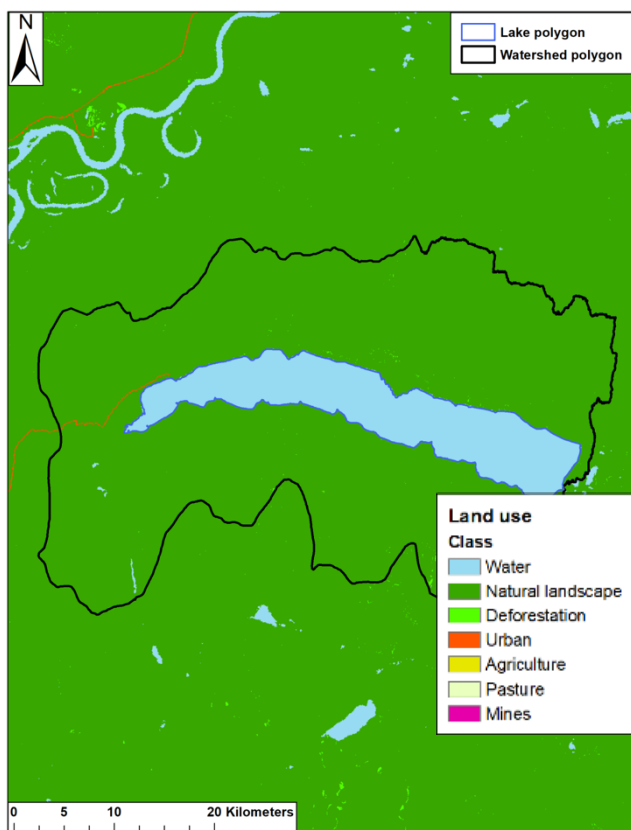


Figure 3. Immediate watershed and land use around Ethel Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

No pesticides, insecticides or herbicides were found in Ethel Lake.

### Pharmaceuticals

No pharmaceutical products were reported in Ethel Lake.

### Industrial chemicals

6 ng/L of Tris(2-chloroethyl) Phosphate(TCEP), a flame retardant was detected in Ethel Lake.

### Fecal coliforms

No fecal coliforms, including *E. coli* bacteria were detected in Ethel Lake, from either the littoral sampling site near the campground, or from the index site near the deepest point of the lake.

## Change over time

Sediment cores were retrieved from Ethel Lake, but have not yet been analyzed for total metals, diatoms or zooplankton cladoceran temporal changes yet. The longest core was 46 cm.

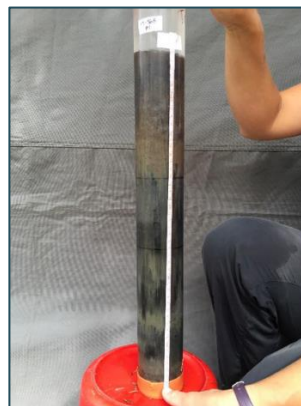


Figure 4. The longest sediment core from Ethel Lake.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 7.7 m and a hypolimnion at 14.1 m on the day of sampling (Figure 5a). Dissolved oxygen had a value of 106% at the surface and reduced to 85% in the hypolimnion (Figure 5b).

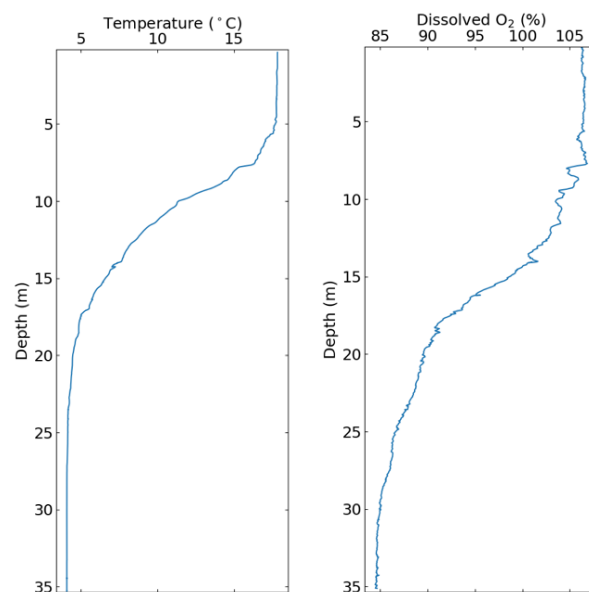


Figure 5. a) Temperature (°C) and b) Dissolved oxygen (%) as measured in Ethel Lake. Figures from Fradette, 2021.

# Fish Eye Lake



Figure 1. Fish Eye Lake and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

LAKE SURFACE AREA	WATERSHED AREA
0.36 km <sup>2</sup>	3.47 km <sup>2</sup>
MAXIMUM DEPTH	POPULATION
21 m	0
AVERAGE DEPTH	ELEVATION
7.6 m	773 m
SAMPLING DATE	AREA FOREST FIRES 2014-2019
2019-07-20	0 km <sup>2</sup>

### Location

Fish Eye Lake is located in central Yukon, 13 km southeast of Faro. It lies on the south side of Robert Campbell Highway.

### Land Use

80.3% of Fish Eye Lake's 3.47 km<sup>2</sup> watershed is natural. 14.5% is composed of water (including the lake itself). Urban land composes the remaining 5.2% of the watershed (Figure 3).

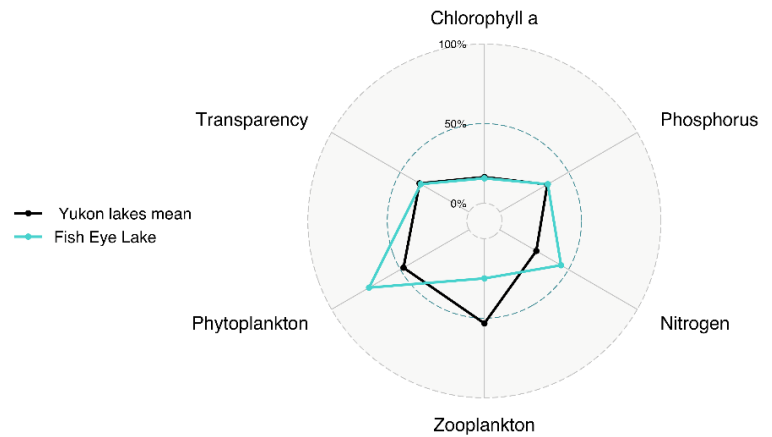


Figure 1. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (shown in black) in comparison with Fish Eye Lake (shown in blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 5.7 m the day of the sampling. The color value was of 10.89 mg/L Pt. Dissolved organic carbon had a value of 15.90 mg/L.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (13.92 µg/L) and total nitrogen (0.39 mg/L) values in Fish Eye Lake were similar to the Yukon mean. Chlorophyll a (1.92 µg/L) was slightly below the mean (Figure 2). According to the Canadian water quality guidelines for the protection of aquatic life, Fish Eye Lake is mesotrophic.

### Food chain health

Three zooplankton species were identified in Fish Eye Lake, which is below the average of sampled Yukon lakes. However, phytoplankton diversity was above the Yukon average, with 31 species identified (Figure 2). Cyanobacteria concentration indicated a low risk of exposure to cyanotoxins, and one potential bloom formers / toxin producer species of the cyanobacteria group was identified.

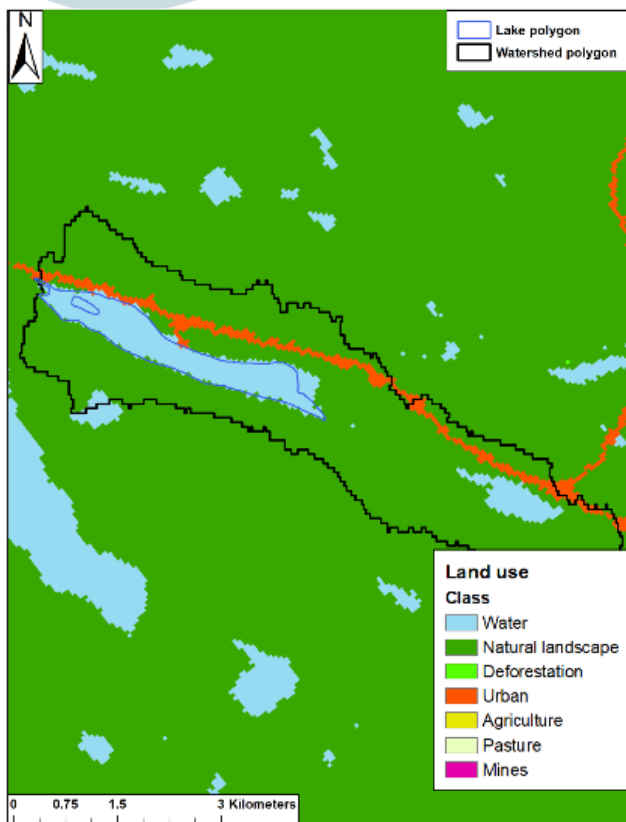


Figure 3. Immediate watershed and land use around Fish Eye Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

No pesticides, insecticides or herbicides were found in Fish Eye Lake.

### Pharmaceuticals

No pharmaceutical products were reported in Fish Eye Lake.

### Industrial chemicals

No industrial chemicals were detected in Fish Eye Lake.

### Fecal coliforms

Fecal coliforms were detected in Fish Eye Lake, from the littoral sampling site located on the north shore of the lake, near the highway. However, the fecal bacteria detected were not of the *E. coli* species.

## Change over time

The longest core retrieved from Fish Eye Lake was 49 cm long. The bottom of the core was dated to 1864 (Figure 4a). The analysis of diatom assemblage from top and bottom of the core revealed a temporal dissimilarity of 0.43 (Figure 4b).

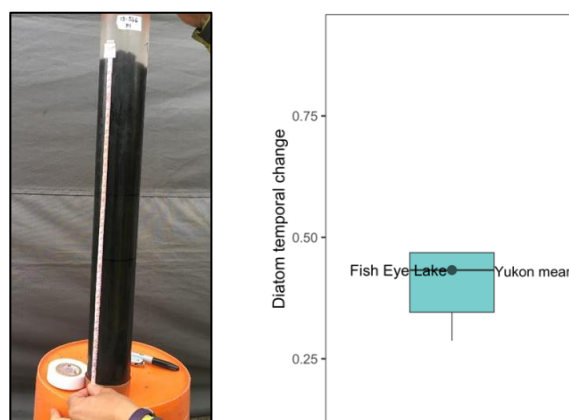


Figure 4. a) The longest sediment core retrieved from Fish Eye Lake. b) Mean ( $\pm$  Standard error) of diatom temporal change between the bottom and the top of the core. Fish Eye Lake value is indicated with a green point.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 6.6 m and a hypolimnion at 8.5 m on the sampling day (Figure 5a). Dissolved oxygen had a value of 105% at the surface of the lake, but reduced to 16.7% of oxygen in the hypolimnion (Figure 5b).

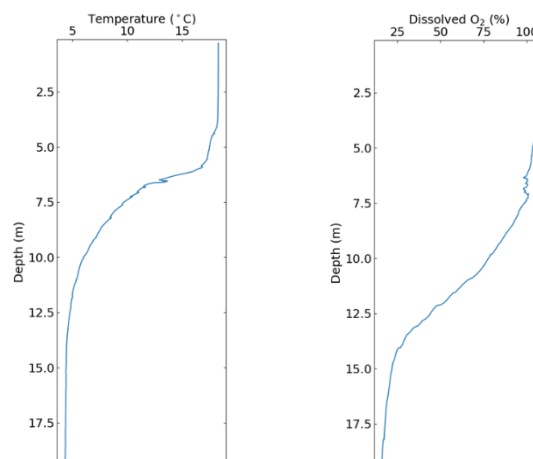


Figure 5. a) Temperature ( $^{\circ}$ C) and Dissolved oxygen (%) as measured in Fish Eye Lake. Figures from Fradette, 2021.

# Fox Lake



Figure 1. Fox Lake and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

<b>LAKE SURFACE AREA</b>	<b>WATERSHED AREA</b>
15.15 km <sup>2</sup>	282.79 km <sup>2</sup>
<b>MAXIMUM DEPTH</b>	<b>POPULATION</b>
45 m	51
<b>AVERAGE DEPTH</b>	<b>ELEVATION</b>
39.5 m	746 m
<b>SAMPLING DATE</b>	<b>AREA FOREST FIRES 2014-2019</b>
2019-08-16	0 km <sup>2</sup>

### Location

Fox Lake is located in southcentral Yukon, about 70 km north of Whitehorse. It lies on the west side of the Klondike Highway.

### Land Use

91.5% of Fox Lake's 282.79 km<sup>2</sup> watershed is natural. 8.2% is composed of water (including the lake itself). The remaining 0.3% of the watershed is comprised of forest loss or urbanized land (Figure 3).

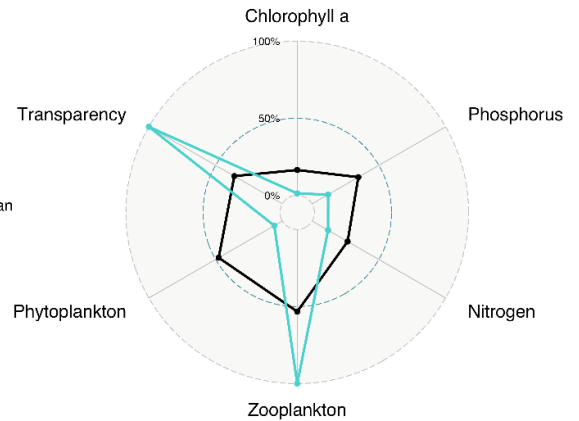


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (shown in black) in comparison with Fox Lake (shown in blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 14.5 m. This transparency is the highest of all 24 sampled lakes in Yukon. The color value was of 2.80 mg/L Pt, while the dissolved organic carbon had a value of 5.19 mg/L.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (8.76 µg/L) and total nitrogen (0.12 mg/L) values in Fox Lake were below the Yukon mean (Figure 2). Chlorophyll a (0.54 µg/L) was also below average. According to the Canadian water quality guidelines for the protection of aquatic life, Fox Lake is oligotrophic.

### Food chain health

Six zooplankton species were identified in Fox Lake, which is the highest zooplankton diversity found in any of the Yukon sampled lakes. However, nine phytoplankton species were identified, which is the lowest diversity of all Yukon lakes (Figure 2). Cyanobacteria concentration indicated a low risk of cyanotoxin exposure. One potential bloom formers / toxin producer species of the cyanobacteria group was identified.



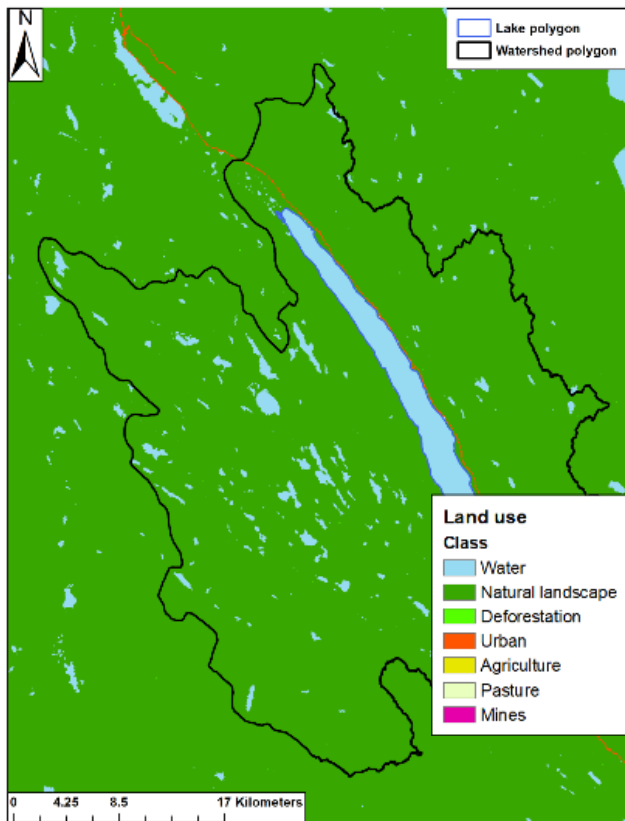


Figure 3. Immediate watershed and land use around Fox Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

No pesticides, insecticides or herbicides were found in Fox Lake.

### Pharmaceuticals

No pharmaceutical products were reported in Fox Lake.

### Industrial chemicals

No industrial chemicals were reported.

### Fecal coliforms

No fecal coliforms, including *E. coli* bacteria were detected in Fox Lake, either from the littoral sampling site near Fox lake campground or from the index site near the deepest point of the lake.

## Change over time

Sediment cores were retrieved from Fox Lake, but have not yet been analyzed for total metals, diatoms or zooplankton cladoceran temporal changes. The longest core was 22 cm.



Figure 4. The longest sediment core from Fox Lake.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 9.8m and a hypolimnion at 14.7m on the sampling day (Figure 5a). Dissolved oxygen was elevated throughout the profile, with minimal values around 83% of oxygen in the hypolimnion (Figure 5b).

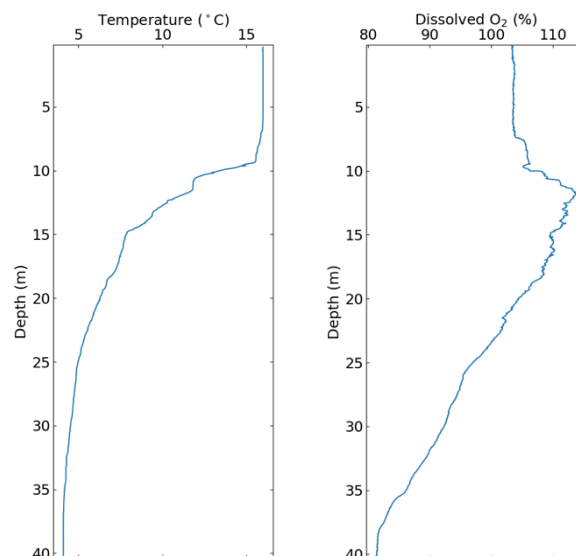
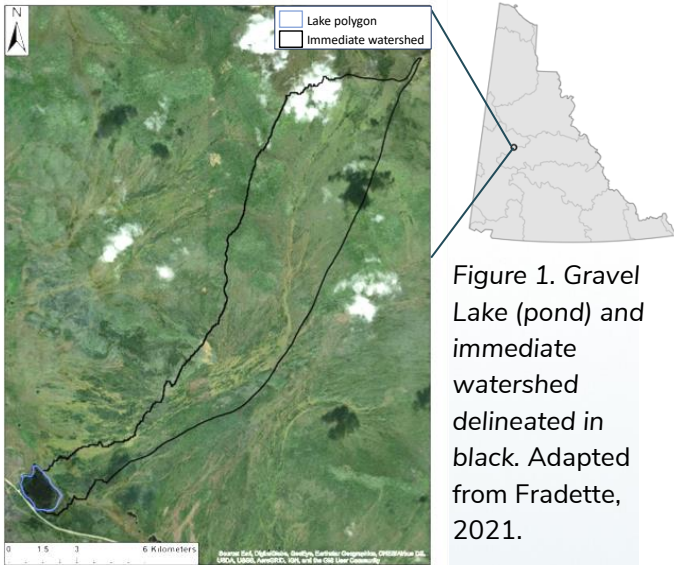


Figure 5. a) Temperature (°C) and b) Dissolved oxygen (%) as measured in Fox Lake. Figures from Fradette, 2021.

# Gravel Lake (pond)



## Lake and watershed information

LAKE SURFACE AREA	WATERSHED AREA
0.38 km <sup>2</sup>	14.61 km <sup>2</sup>
MAXIMUM DEPTH	POPULATION
0.9 m	0
AVERAGE DEPTH	ELEVATION
NA	628 m
SAMPLING DATE	AREA FOREST FIRES 2014-2019
2019-08-14	0 km <sup>2</sup>

### Location

Gravel Lake (pond) is located in central Yukon. It is located on the north side of the North Klondike Highway, 92 km from Dawson City.

### Land Use

97.3% of Gravel Lake (pond)'s 14.61 km<sup>2</sup> watershed is natural. 2.6% is composed of water (including the lake itself). The remaining 0.1% of the watershed comprised of 0.08% of forest loss and <0.01% of urbanization (Figure 3).

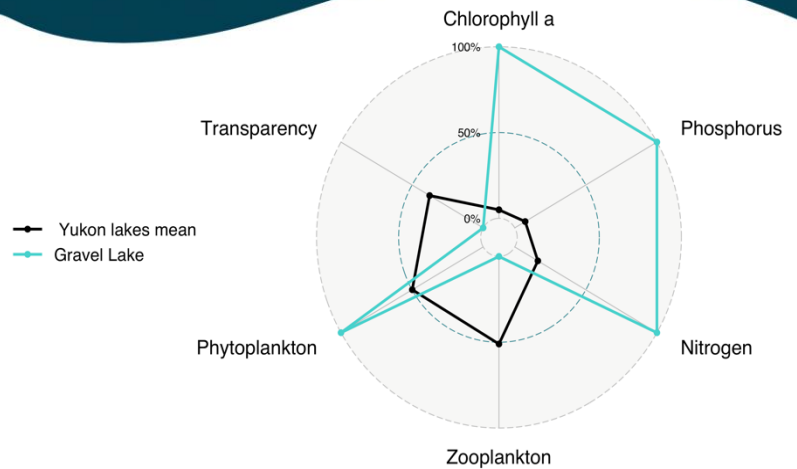


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes sampled (black) in comparison with Gravel Lake (blue).

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 0.18 m. This transparency was the lowest of all 24 Yukon sampled lakes. The color value was of 48.23 mg/L Pt, while the dissolved organic carbon had a value of 101.54 mg/L, both of which were the highest values of all lakes sampled in Yukon.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (240.10 µg/L) and total nitrogen (1.80 mg/L) values in Gravel Lake were the highest values observed in sampled Yukon Lakes (Figure 2). Chlorophyll a (189.49 µg/L) was also the highest value observed across Yukon lakes. According to the Canadian water quality guidelines for the protection of aquatic life, Gravel Lake is hyper-eutrophic. These high values might be partially explained by the very shallow depth and small size of the lake and the proximity of the Highway.

### Food chain health

Two zooplankton species were identified in Gravel Lake, which is the lowest zooplankton diversity found in any of the Yukon sampled lakes. However, phytoplankton diversity was the highest in all Yukon Lakes sampled. Cyanobacteria concentration was also the highest across Yukon lakes, but the risk of cyanotoxin exposure was low. Two potential bloom formers/toxin producer species of the cyanobacteria group were identified.

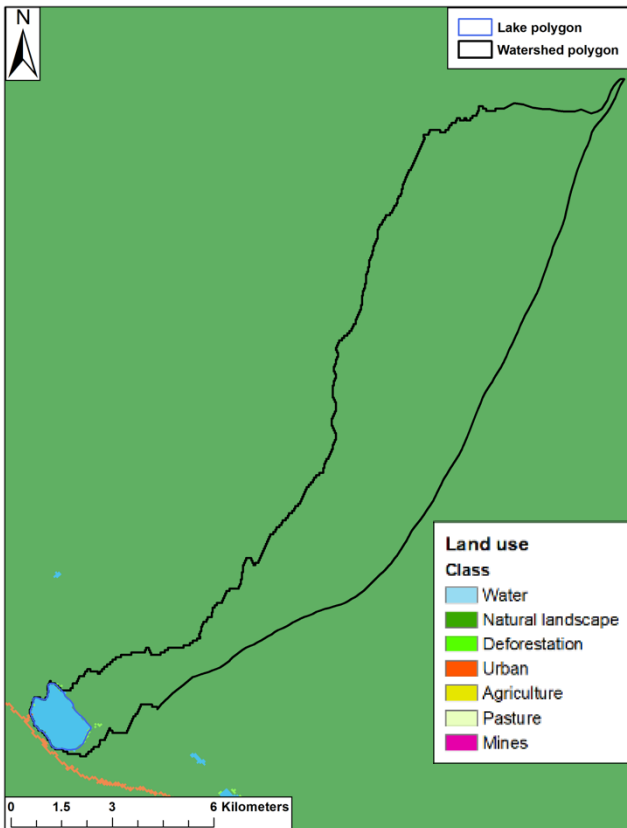


Figure 3. Watershed and land use around Gravel Lake (pond). Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

Gravel Lake (pond) was not analyzed for pesticides.

### Pharmaceuticals

Gravel Lake (pond) was not analyzed for pharmaceuticals.

### Industrial chemicals

Gravel Lake (pond) was not analyzed for industrial chemicals.

### Fecal coliforms

Fecal coliforms were detected in Gravel Lake (pond), both from the littoral sampling site near Klondike highway and from the middle of the lake.

## Change over time

The longest core retrieved from Gravel Lake (pond) was 41 cm long (Figure 4a). The analysis of diatom assemblage from the top and the bottom of the core revealed a temporal dissimilarity of 0.47 (Figure 4b).

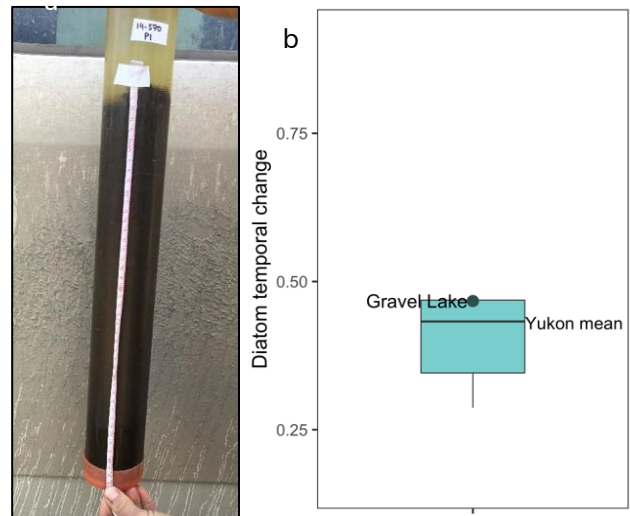


Figure 4. a) The longest sediment core retrieved from Gravel Lake. b) Mean ( $\pm$  Standard error) of diatom temporal change between the bottom and the top of the core. Gravel Lake (pond) value is indicated with a green point.

## Temperature & dissolved oxygen

A shallow basin (0.9 m depth) prevented stratification from occurring in Gravel Lake (pond). The average temperature was 15.3°C on the day of sampling. Dissolved oxygen had an average value of 121.73%, indicating the lake is well oxygenated despite its high trophic status (Figure 5b). Since only surface measurements were taken, temperature and oxygen profiles are not available.

*The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.*

# Jackfish Lake

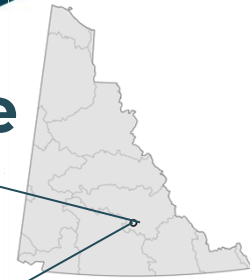


Figure 1. Jackfish Lake and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

<b>LAKE SURFACE AREA</b>	<b>WATERSHED AREA</b>
1.14 km <sup>2</sup>	76.78 km <sup>2</sup>
<b>MAXIMUM DEPTH</b>	<b>POPULATION</b>
21 m	7
<b>AVERAGE DEPTH</b>	<b>ELEVATION</b>
5.3 m	797 m
<b>SAMPLING DATE</b>	<b>AREA FOREST FIRES 2014-2019</b>
2019-07-18	0 km <sup>2</sup>

### Location

Jackfish Lake is located in central Yukon, 10 km south of Ross River. It lies on the south side of the Robert Campbell Highway. The lake coordinates are 61°56'06.0"N 132°31'18.7"W.

### Land Use

88.5% of Jackfish Lake's 76.78 km<sup>2</sup> watershed is natural. 10.4% is composed of water (including the lake itself). Urban land composes 1.0% of the watershed, and the remaining <0.1% is comprised of mines (Figure 3).

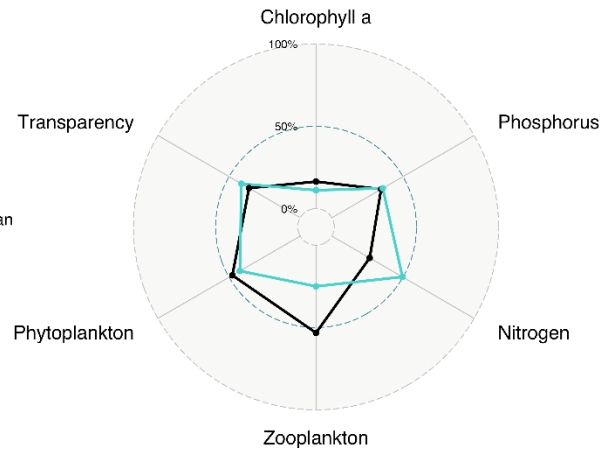


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (shown in black) in comparison with Jackfish Lake (shown in blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 6.6 m. The color value was of 4.03 mg/L Pt. Dissolved organic carbon had a value of 9.17 mg/L.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (14.10 µg/L) and total nitrogen (0.43 mg/L) values in Jackfish Lake were similar to the Yukon mean. Chlorophyll a (1.49 µg/L) was also below the Yukon mean (Figure 2). According to the Canadian water quality guidelines for the protection of aquatic life, Jackfish Lake is mesotrophic.

### Food chain health

Three zooplankton species and 21 phytoplankton species were identified in Jackfish Lake, which is below Yukon's average (Figure 2). Cyanobacteria concentration indicated a low risk of exposure to cyanotoxins, but no potential bloom formers / toxin producer species of the cyanobacteria group were identified.



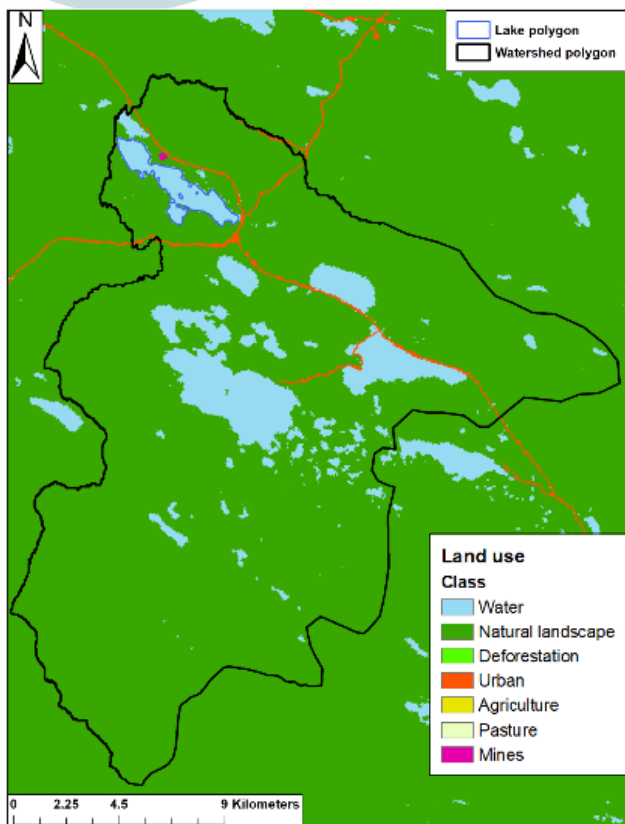


Figure 3. Immediate watershed and land use around Jackfish Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

No pesticides, insecticides or herbicides were found in Jackfish Lake.

### Pharmaceuticals

44 ng/L of Azithromycin, a pharmaceutical antibiotic was found from the sampling site near the lake deepest point.

### Industrial chemicals

No industrial chemicals were detected.

### Fecal coliforms

Fecal coliforms were detected in Jackfish Lake, from the littoral sampling site located on the south shore of the lake. However, the fecal bacteria detected were not of the *E. coli* species and no fecal coliforms were found from the sampling site near the deepest point of the lake.

## Change over time

The longest core retrieved from Jackfish Lake was 55 cm long. The bottom of the core was dated to 1868 (Figure 4a). The analysis of diatom assemblage from the top and the bottom of the core revealed a temporal dissimilarity of 0.92, which is the highest across all Yukon sampled lakes (Figure 4b).

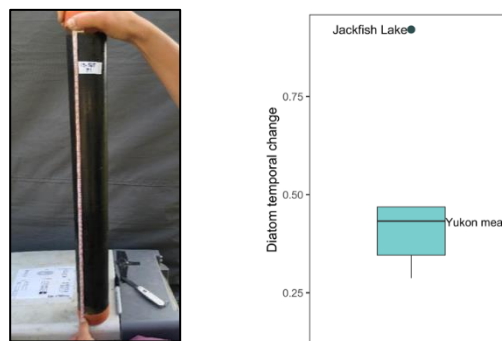


Figure 4. a) The longest sediment core retrieved from Jackfish Lake. b) Mean ( $\pm$  Standard error) of diatom temporal change between the bottom and the top of the core. Jackfish Lake value is indicated with a green point.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 5.9m and a hypolimnion at 8.6m on July 18, 2019. The dissolved oxygen was 110% at the surface of the lake, but reduced to 0.4% in the hypolimnion after reaching a peak ( $\sim$ 225%) near the thermocline.

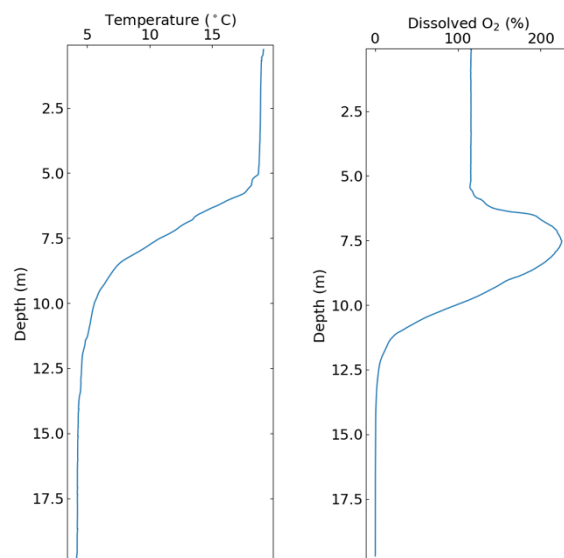


Figure 4. a) Temperature ( $^{\circ}$ C) and b) Dissolved oxygen (%) as measured in Jackfish Lake. Figures from Fradette, 2021.

# Little Salmon Lake

Chu Cho



Figure 1. Little Salmon Lake (Chu Cho) and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

<b>LAKE SURFACE AREA</b>	<b>WATERSHED AREA</b>
59.31 km <sup>2</sup>	2449.32 km <sup>2</sup>
<b>MAXIMUM DEPTH</b>	<b>POPULATION</b>
150 m	4
<b>AVERAGE DEPTH</b>	<b>ELEVATION</b>
61.6 m	518 m
<b>SAMPLING DATE</b>	<b>AREA FOREST FIRES 2014-2019</b>
2019-07-21	0 km <sup>2</sup>

### Location

Little Salmon Lake is located in central Yukon, about 101 km east of Carmacks, on the south side of the Robert Campbell Highway.

### Land Use

95.7% of Little Salmon Lake's 2449.32 km<sup>2</sup> watershed is natural. 4.1% is composed of water (including the lake itself). The remaining 0.2% of the watershed is comprised of forest loss, urbanized land or mines (Figure 3).

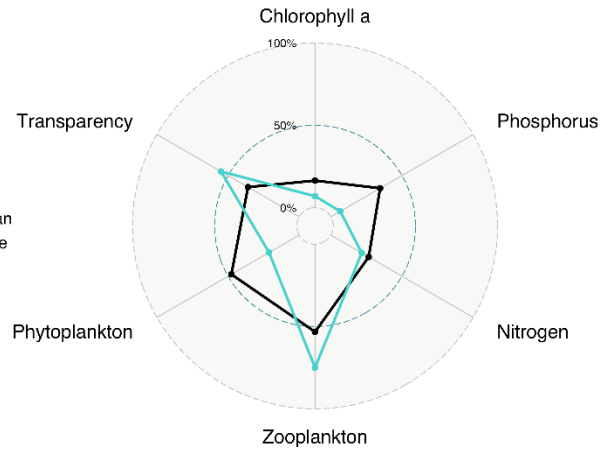


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (shown in black) in comparison with Little Salmon Lake (shown in blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 8.4m the day of the sampling. The color value was of 5.63 mg/L Pt. Dissolved organic carbon had a value of 2.30 mg/L.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (7.55 µg/L) and total nitrogen (0.20 mg/L) values in Little Salmon Lake were lower than the Yukon mean (Figure 2). Chlorophyll a (1.09 µg/L) was also below average. According to the Canadian water quality guidelines for the protection of aquatic life, Little Salmon Lake is oligotrophic.

### Food chain health

Five zooplankton species were identified in Little Salmon Lake, which is above the Yukon average. However, phytoplankton diversity was below the Yukon average, with 13 species identified (Figure 2). Cyanobacteria concentration indicated a low risk of exposure to cyanotoxins, and two potentially bloom former / toxin producer species of the cyanobacteria group were identified.

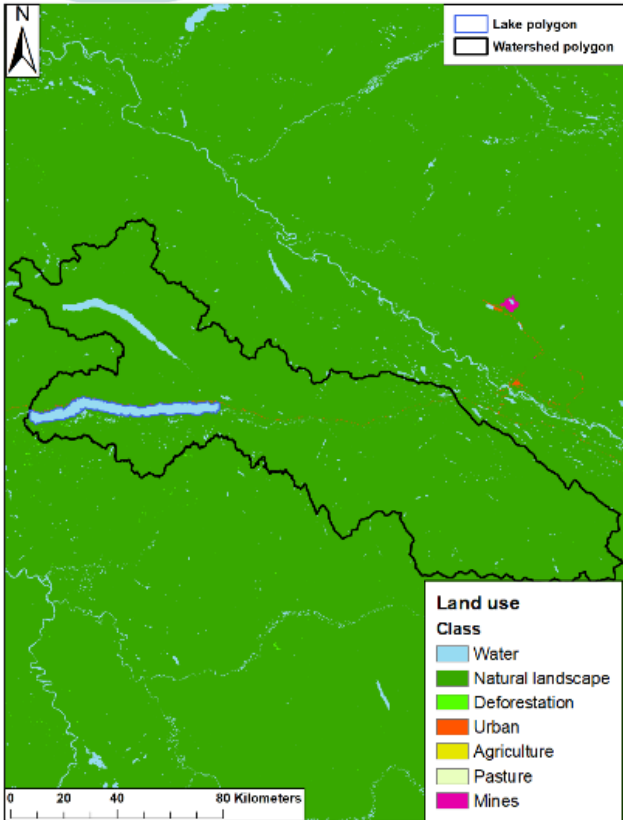


Figure 3. Immediate watershed and land use around Little Salmon Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

Little Salmon Lake was not analyzed for pesticides.

### Pharmaceuticals

Little Salmon Lake was not analyzed for pharmaceuticals.

### Industrial chemicals

Little Salmon Lake was not analyzed for industrial chemicals.

### Fecal coliforms

Fecal coliforms, including bacteria from the *E.coli* species were detected from the littoral sampling site on the north-west shore of Little Salmon Lake, but were not detected from the index site near the deepest point of the lake.

## Change over time

Sediment cores were retrieved from Little Salmon Lake, but were not analyzed due to their short length.



Figure 4. The longest sediment core retrieved from Little Salmon Lake was 12 cm long.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 9.2 m and a hypolimnion at 11.4 m on the sampling day (Figure 5a). The oxygen remained elevated throughout the profile, with minimal values around 96% of oxygen at the bottom of the lake (Figure 5b).

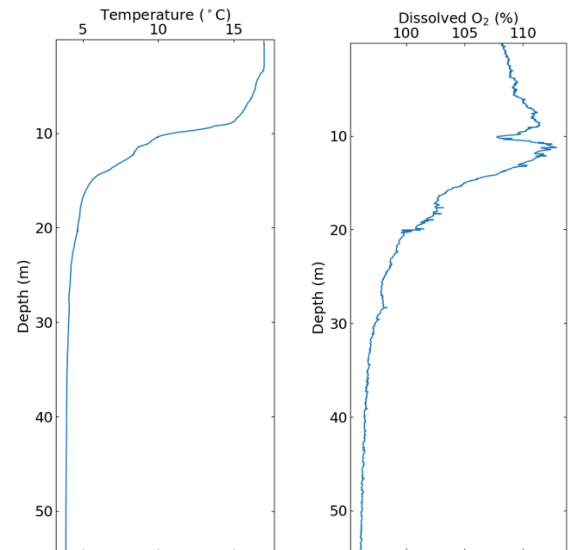


Figure 5. a) Temperature (°C) and b) Dissolved oxygen (%) as measured in Little Salmon Lake. Figures from Fradette, 2021.

# Minto Lake



Figure 1. Minto Lake and immediate watershed delineated in black. Adapted from Fradette, 2021.

## Lake and watershed information

<b>LAKE SURFACE AREA</b>	<b>WATERSHED AREA</b>
3.99 km <sup>2</sup>	82.48 km <sup>2</sup>
<b>MAXIMUM DEPTH</b>	<b>POPULATION</b>
34 m	0
<b>AVERAGE DEPTH</b>	<b>ELEVATION</b>
17.8 m	680 m
<b>SAMPLING DATE</b>	<b>AREA FOREST FIRES 2014-2019</b>
2019-07-24	0 km <sup>2</sup>

### Location

Minto Lake is located in central Yukon, about 10 km northwest of the community of Mayo. It is accessible via mining roads and located at 63°41'08.3"N 136°09'42.1"W.

### Land Use

95.05% of Minto Lake's 82.48 km<sup>2</sup> watershed is natural. 4.9% is composed of water (including the lake itself). The remaining 0.05% of the watershed is comprised of forest loss or urbanized land (Figure 3).

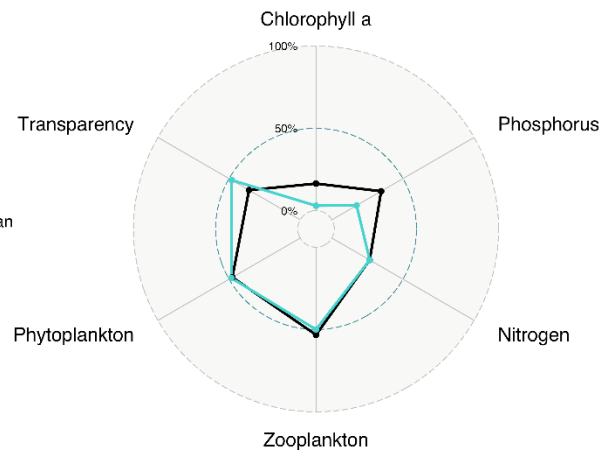


Figure 2. Relative values (rescaled from 0% to 100%) of water quality variables from the mean of all Yukon lakes that were sampled (shown in black) in comparison with Minto Lake (shown in blue).

The results in this report should be interpreted with caution as they represent data collected during a single sampling event. This means that all water quality variables were measured only once during the summer of 2019, and at a single location, for each lake (with the exception of bacteria). For more information on methods please refer to the summary report.

## Aquatic ecosystem health

### Water color and transparency

Secchi disk depth was measured at 7.5 m. The color value was of 10.60 mg/L Pt. Dissolved organic carbon had a value of 4.32 mg/L.

### Chlorophyll a, nutrients and trophic status

Total phosphorus (9.97 µg/L) value in Minto Lake was lower than the Yukon mean (Figure 2). Whereas chlorophyll a (0.71 µg/L) was also below average. According to the Canadian water quality guidelines for the protection of aquatic life Minto Lake is oligotrophic. Total nitrogen value from this lake was discarded due to poor data quality.

### Food chain health

Four zooplankton and 23 phytoplankton species were identified in Minto Lake, which is the same as Yukon's average (Figure 2). Cyanobacteria concentration indicated a low risk of exposure to cyanotoxins and no potential bloom former / toxin producer species of the



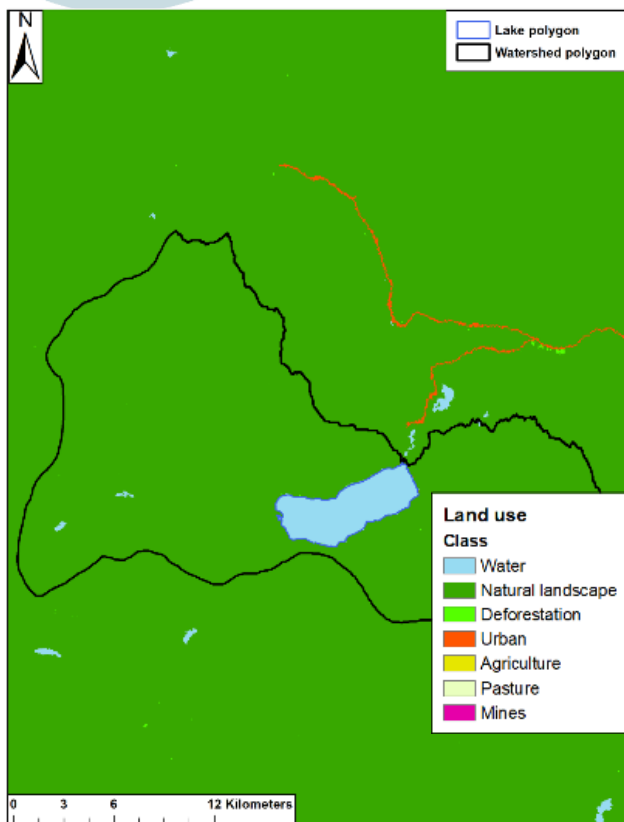


Figure 3. Immediate watershed and land use around Minto Lake. Figure from Fradette, 2021.

## Did we find contaminants?

### Pesticides

No pesticides, insecticides or herbicides were found in Minto Lake.

### Pharmaceuticals

No pharmaceutical products were reported in Minto Lake.

### Industrial chemicals

6 ng/L of Tris(2-chloroethyl) Phosphate (TCEP), a flame retardant was found in the Minto lake.

### Fecal coliforms

Fecal coliforms were detected in Minto Lake, both from the littoral sampling site located at the northeast corner of the lake and at the index site near the deepest point of the lake. However, the fecal bacteria detected were not of the *E. coli* species.

## Change over time

Sediment cores were retrieved from Minto Lake, but have not yet been analysed for total metals, diatoms or zooplankton cladoceran temporal changes. The longest core was 40 cm.



Figure 4. The second-longest sediment core from Minto Lake was 37.5 cm. The longest core picture was lost.

## Temperature & dissolved oxygen

The temperature profile shows a thermocline at 7.3 m and a hypolimnion at 9.8 m on the sampling day (Figure 5a). Dissolved oxygen had a value of 104% at the surface, but reduced to 63% in the hypolimnion (Figure 5b).

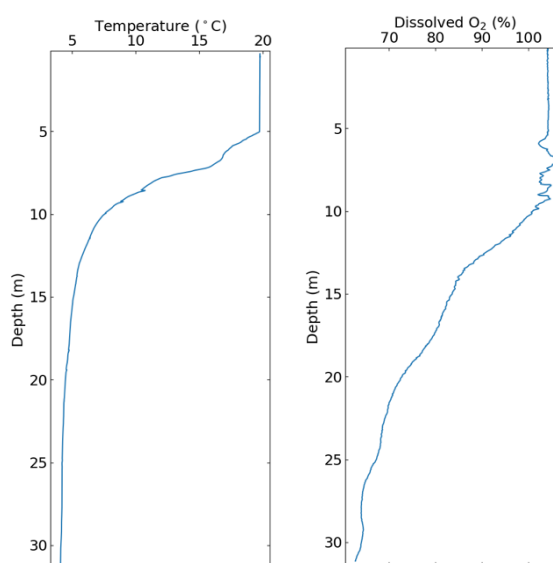


Figure 5. a) Temperature (°C) and b) Dissolved oxygen (%) as measured in Minto Lake. Figures from Fradette, 2021.