# Kearney Watershed Environmental Foundation

# 2019

# Water Quality Monitoring Report

Testing performed by

Stan Walker with assistance from our volunteer Lake Stewards

Report prepared by

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## 1.0 Introduction

### Background information -

### General

In 2014 the University of Waterloo Summit Centre for the Environment (WSCE) partnered with the Kearney Environmental Watershed Foundation (KWEF) to create a lake monitoring program. This lake monitoring program was meant to be a follow up on water testing done by the Town of Kearney several years ago with the Ministry of the Environment and Climate Change.The lakes sampled and tested were Groom/Lynx Lake, Emsdale Lake, Big Clam Lake, Little Clam Lake, Peters Lake, Beaver Lake, Hassard Lake, Perry Lake, Perbcth/Fisher Lake, Mason Lake, Island Lake, Sand Lake, Himbury Lake, Magnetawan Lake, Grass Lake and Loon Lake and two spots on the south branch of the Magnetawan River in the vicinity of the Graphite Mine. Each of these water bodies was sampled in the field and tested at the WSCE lab. The data collected is intended to be part of a long-term monitoring project in order to detect any changes in the quality of the water over time. The long-term goals for this project were to annually sample the lakes in order to identify trends over time. The benefits of long-term water monitoring include detection of positive or negative changes in the data from large annual data sets.

KWEF was created to help preserve the quality of air, water, and terrestrial ecosystems of the Almaguin area ("KWEF," n.d.). Most of the lakes within the Kearney region are part of the Ontario Lake Partner Program. This program monitors total phosphorus concentrations and Secchi depth for Ontario's inland lakes collected by volunteer efforts. For the WSCE/KWEF monitoring program, water composition (pH, DO, and conductivity) was tested in the lab as well as water nutrient levels (total phosphorus, phosphate, nitrate, and nitrite) using specific lab detection methods.

Throughout this report references to the “Town of Kearney” usually are referring to the original town site and if just the word “Kearney” is used we are referring to the original town site and the townships (Bethune, ,Proudfoot, and those parts of Butt and McCraney outside the Algonquin Park boundaries) that were amalgamated in 1979. This municipality of Kearney encompasses 532 square kilometers and has a year round population of approximately 850

All of the 17 water bodies sampled were within the municipality of Kearney with the exception of Magnetawan, Lake which is inside the Park Boundaries. The terrain in the Kearney region which adjoins the western edge of Algonquin Park varies from extensive deposits of sand and gravel or wetland areas along the Magnetawan River to the uplands of Canadian Shield granites (Gartner Lee Water Quality Study, 2002). There is a graphite mine just north of the town which has the potential to impact the water quality of the nearby Magnetawan River. The mine which has been closed for several years was planning to reopen in 2015 and aims to produce one million tonnes of ore and 20,000 tonnes of graphite per year ("The Kearney Mine", n.d.). The dense forest cover has attracted and sustained a large lumbering industry in the past, however water based recreation and tourism have emerged more recently as a source of greater economic growth (Gartner Lee Water Quality Study, 2002). While the town itself is small, tourism and development could impact the watershed .

**Background information – Monitoring Program 2014 - 2018**

In 2014 the report was issued in 2 parts. Students from the university sampled and reported results on 16 lakes and the Magnetawan River. In 2015 students again sampled and issued one combined report on all 16 lakes and the river.

Unfortunately in the spring of 2016 we learned that the University of Waterloo would not be able to participate in any way with the monitoring program. After evaluating our options KWEF decided to continue the program but utilize a commercially available portable field instrument and sensor package that would allow us to measure many of the same parameters that the WSCE lab tests provide. Using the previously selected sampling sites on each lake we gathered data and evaluated the suitability of two different instruments.

In 2017 we had the opportunity to rent a YSI PRO DSS multi-parameter instrument - a new version of one of the instruments we tested the previous year. It had two significant improvements - a depth measurement was recorded with each block of data and the DO sensor used new & improved technology.

We arranged with Near North Labs in North Bay to analyze water samples from the first five lakes for nitrate and ortho-phosphate levels since the multi-parameter instrument wasn't able to measure the low levels found in our lakes. The testing program ran from July10 – Aug 4 The stormy and rainy weather during the summer of 2017 created additional scheduling problems.

In 2018 we continued our WQM program with support from the Kearney Council. The rental period was from July 16 - Aug 13. We utilized the same type of instrument and the same sample sites as previously and took water samples for nitrates & orthophosphates from 5 more lakes.

In 2019 we continued our WQM program again with support from the Kearney Council. The rental period was from July 31 - Aug 29. We utilized the same type of instrument and the same sample sites as in 2018. We did not take water samples for nitrates & orthophosphates from the final 5 lakes. Rather we asked the Town to help fund a Benthic Study of the Magnetawan River near the Ontario Graphite Mine site which they agreed to do. A link to the report on that study is available on our website and copies were provided to the Town.

While we were finalizing the 2019 report in the spring of 2020 Canada underwent a country wide lockdown because of the Covid-19 Pandemic. Because there were no good estimates on the potential duration of the pandemic KWEF cancelled our 2020 WQM program in March to avoid cancellation charges for the rental of our test instrumentation. The Lake Partners Program had sent out the 2020 test kits but then cancelled their 2020 program in April .

## 2.0 Lake Profiles,Maps and Sampling Sites

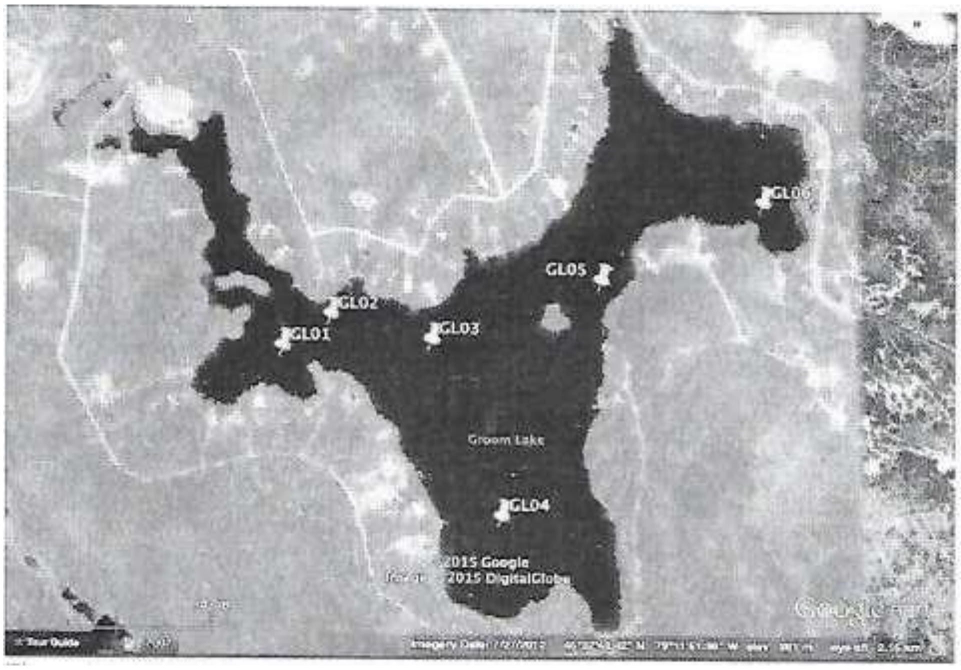
The lake profile information where provided was taken from the Ministry of Natural Resources and Forestry (MNRF) lake Fact sheets, Google Earth, and MBendi information services.

### Groom / Lynx Lake

Groom Lake, also known as Lynx Lake, is located 7 km southeast from the town of Kearney. There were several cottages visible from each sampling point. The lake does not have any surrounding crown land. The largest island is Squirrel Island. The map of the lake showing the sample points and the GPS coordinates for each sample site can be found below.

Groom/Lynx Lake Characteristics

| Surface Area | Mean Depth | Max Depth | Perimeter |
|---|---|---|---|
| 59.4 Ha | 4.9m | 12.5 m | 6.7 km (plus 0.5 km island shoreline) |




Map of Groom/Lynx Lake with sample sites, Retrieved from Google Earth

GPS Coordinates for sample sites at Groom Lake

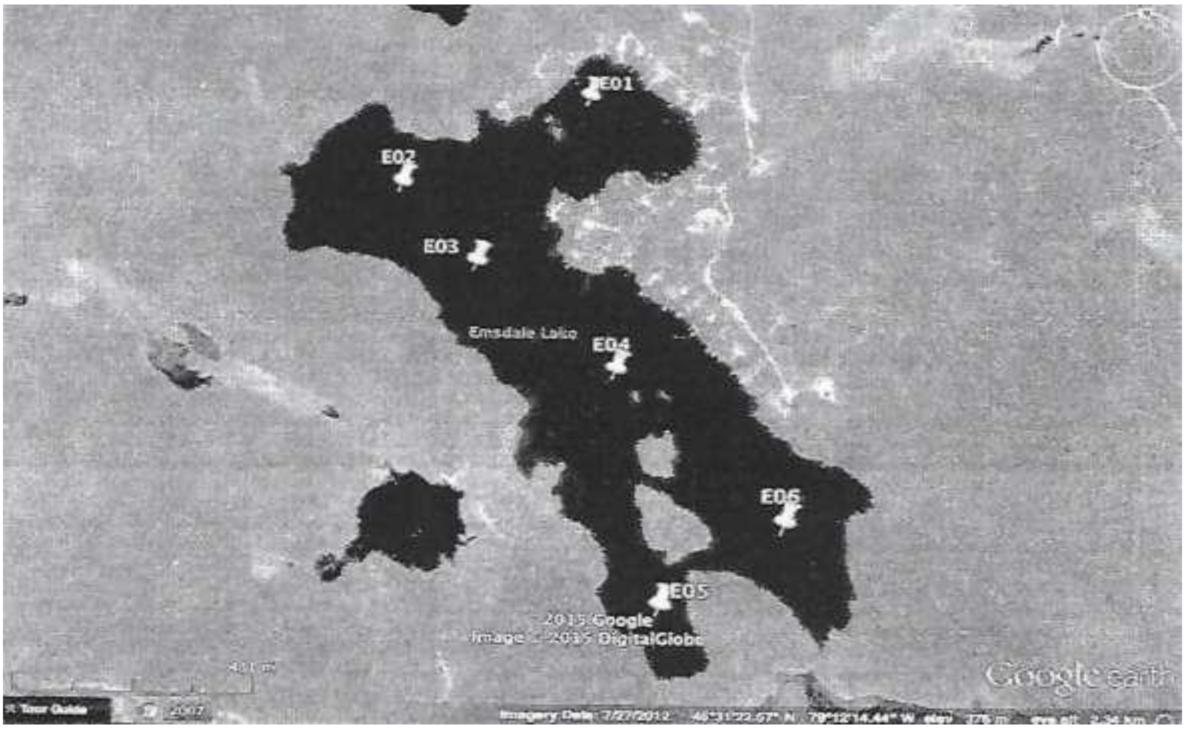
| | | | |
|---|---|---|---|
| GLOI | N 45° 32' 19.1"<br>W 79° II' 24.5" | GL04 | N 45° 32' 7.0"<br>W 79° 1 I' 2.5" |
| GL02 | N 45° 32' 21.4"<br>W 79° 11' 19.7" | GL05 | N 45° 32' 23.9"<br>W 79° 10' 52.7" |
| GL03 | N45"32' 19.6"<br>W 79° 11' 9.6" | GL06 | N 45" 32' 29.5"<br>W 79° 10' 36.5" |

## Emsdale Lake

Emsdale Lake is located 6 km south of Kearney, Ontario. There are a couple of cottages visible from the sampling points. Fifteen percent of the surrounding land is Crown Land. Compared to the other lakes, this lake's water is very clear due to less cottage input and being spring fed. The map of the lake showing the sample sites and the GPS coordinates for each sample site can be found below

Emsdale Lake characteristics (MNRF, 2010).

| Surface Area | Mean Depth | Max Depth | Perimeter |
|---|---|---|---|
| 61 ha | 9m | 22 111 | 5.5 krn (plus 1 km island shoreline) |




GPS Coordinates for sample sites at Emsdale Lake.

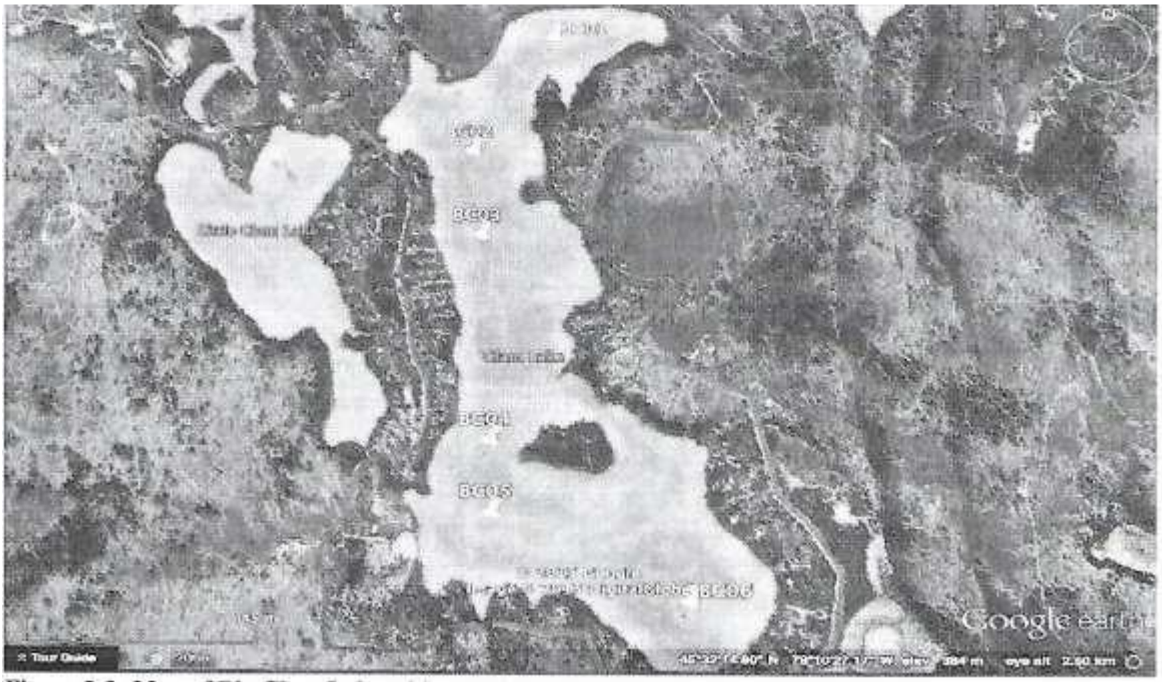
| | | | |
|---|---|---|---|
| EOI | N 45° 31' 17.3"<br>W 79° 11' 50.7" | E04 | N 45° 30' 54.9"<br>W 79°· 11' 45.8" |
| E02 | N 45° 31' 08.7"<br>W79°·12'08.0" | E05 | N 45°· 30' 38.5"<br>W 79° 11' 40.4" |
| E03 | N 45° 31' 02.7"<br>W 79° 11' 59.8" | E06 | N 45°· 30' 44.7"<br>W 79°' 11' 30.0" |

## Big Clam Lake

Big Clam Lake, also known as Clam Lake, is located 11.5 km southeast of Kearney, Ontario. There are a few visible cottages from the lake sample points, the shoreline is moderately developed, and 10% of the surrounding land is Crown Land. Big Clam Lake has one privately owned island known as Prince Edward Island. The map of the sample sites and the GPS coordinates for each sample site can be found below.

Big Clam Lake characteristics (MNRF, 2010).

| Surface Area | Mean Depth | Max Depth | Perimeter |
|---|---|---|---|
| 71 ha | 6111 | 19 m | 6 km (plus 0.5 km island shoreline) |




Map of Big Clam Lake with sample sites, Retrieved from Googlc Earth

GPS Coordinates for sample sites at Big Clam Lake.

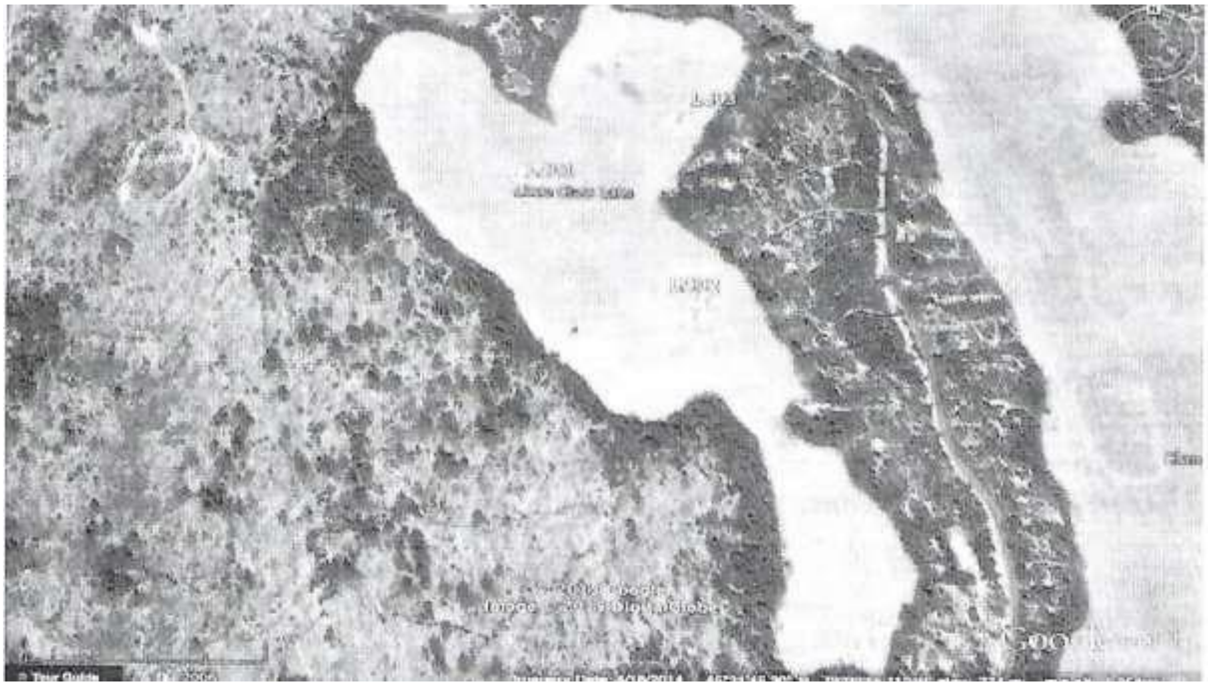
| | | | |
|---|---|---|---|
| BCOI | N 45° 32' 10.3"<br>W 79° 09' 26.3" | BC04 | N 45° 31' 32.5"<br>W 79°09' 32.1" |
| BC02 | N 45° 31' 58.6"<br>W 79° 09' 34.8" | BC05 | N 45° 31' 26.7"<br>W 79°' 09' 31.8" |
| BCO] | N 45° 31' 50.5"<br>W 79° 09' 33.6" | BC06 | N 45° 31' 19.9"<br>W 79° 09' 13.0" |

**Little Clam Lake**

Little Clam Lake is located 7.3 km southeast of Keamey, Ontario. There are a few visible cottages from the sampling points and Bennett's Beehive Cottages are located near sampling point LC03. The surrounding land is not Crown Land, but the lake is near the Upper Raft Lake Conservation Reserve. The lake is relatively shallow as seen below, with the deepest spot near the center of the lake. The map of the sample sites and the GPS coordinates for sample sites can be found below..

Little Clam Lake characteristics (MNRF, 2015).
Surface Area 22 ha Mean Depth 6m Max Depth 16m Perimeter 3km

Map of Little Clam Lake with sample sites, Retrieved from Google Earth



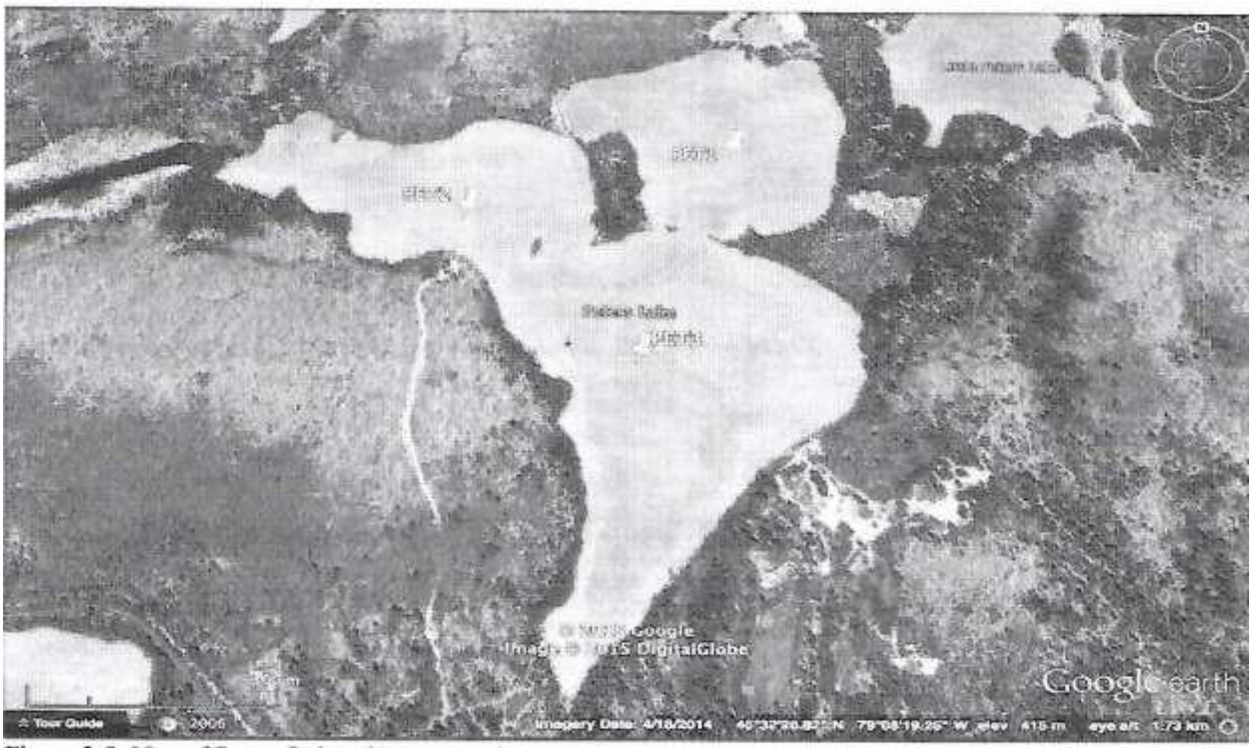
GPS Coordinates for sample sites at Little Clam Lake.

| | |
|---|---|
| LCOI | N 45° 31' 52.0"<br>W 79° 09' 59.6" |
| LC02 | N 45° 31' 46.3"<br>W 79° 09' 50.8" |
| LC03 | N 45° 31' 55.7"<br>W 79° 09' 51.2" |

**Peters Lake**

Peters Lake is located 10.1 km east of Kearney, Ontario. Peters Lake is a small shallow lake and does not have any visible cottages around the sampling points but was accessed through the Toronto District School Board (TDSB) outdoor children's camp called "Camp Kearney." Most of the surrounding land is owned by TDSB and 5% is Crown Land. The map of the sample sites and the GPS coordinates for sample sites can be found below.

Peters Lake characteristics (MNRF, 2010).
Surface Area 48 ha     Mean Depth 4m     Max Depth 13m     Perimeter 5km




Map of Peters Lake with sample sites, Retrieved from Google Earth

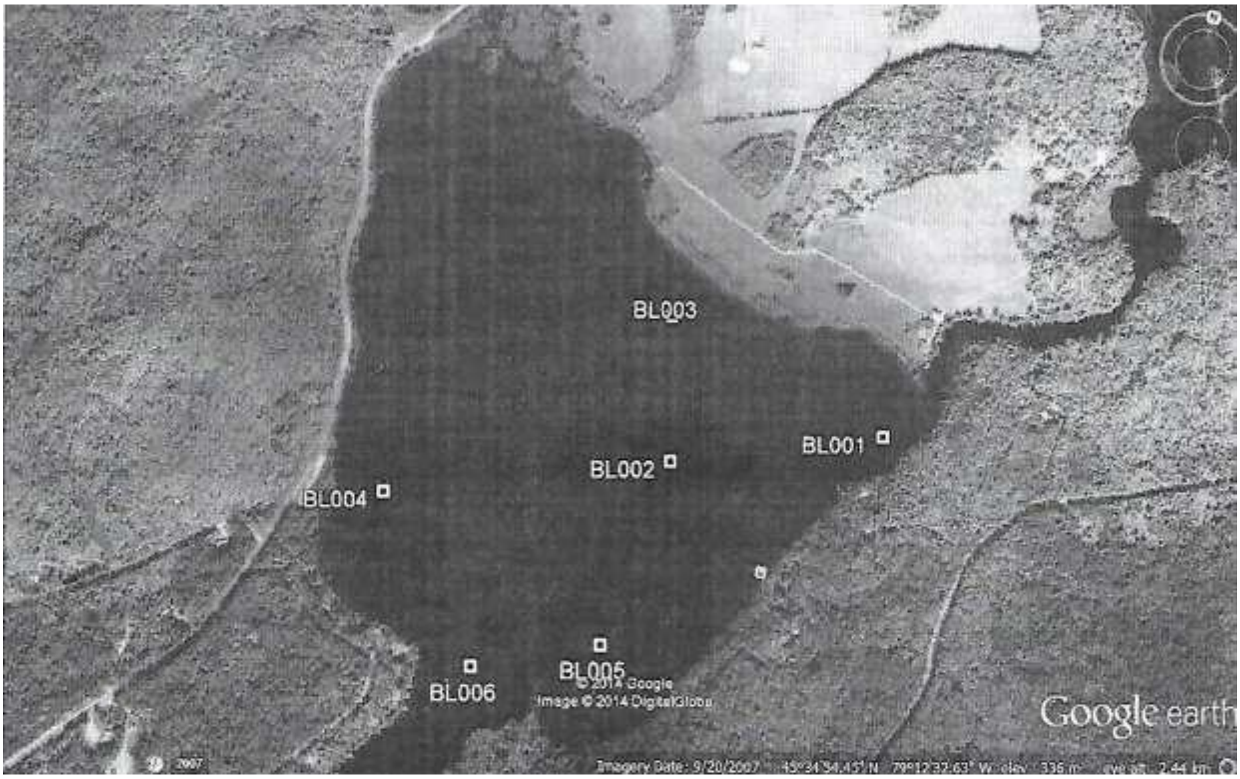
GPS Coordinates for sample sites at Peters Lake.

| | |
|---|---|
| PETI | N 45° 32' 43.6"<br>W 79° 08' 39.5" |
| PET2 | N 45" 32' 39.0"<br>W 79° 08' 58.6" |
| PET3 | N 45° 32' 29.3"<br>W 79° 08' 46.3" |

**Beaver Lake**

Beaver Lake is located 3.2 km north of Keamey. Highway 518 is located close to the lake and there are many visible cottages from each of the sampling sites. The map of the lake showing sample sites and the GPS coordinates for the sample sites can be found below

Beaver Lake characteristics (MNRF, 2015).
Surface Area 13.6 Ha Max Depth 8.0m Perimeter 2.3 km




Map of Beaver Lake with sample sites, Retrieved from Google Earth

GPS Coordinates for sample sites at Beaver Lake

| | | | |
|---|---|---|---|
| BOl | N 45°34' 1.7''<br>W 79° 12' 9.0'' | 804 | N 45° 34' 44.6''<br>W 79° 12' 51.3'' |
| 802 | N 45° 34' 50.8''<br>W 79° 12' 27'' | 805 | N 45° 34' 39.4''<br>W 79° 12' 29.3'' |
| 803 | N 45° 34' 59.4''<br>W 79° 12' 30.3'' | 806 | N 45° 34' 36.2''<br>W 79° 12' 39.9'' |

**Hassard Lake**

Hassard Lake connects to both Beaver and Perry Lake. The lake is beside downtown Kearney, Ontario. Water flows from Beaver Lake into the northern end of Hassard Lake and exits at its southern end into Perry Lake. The surrounding land is developed. There are more lawns and less of a riparian zone visible from the sampling points. The map of the sample sites and the GPS coordinates for the sample sites can be found below.°

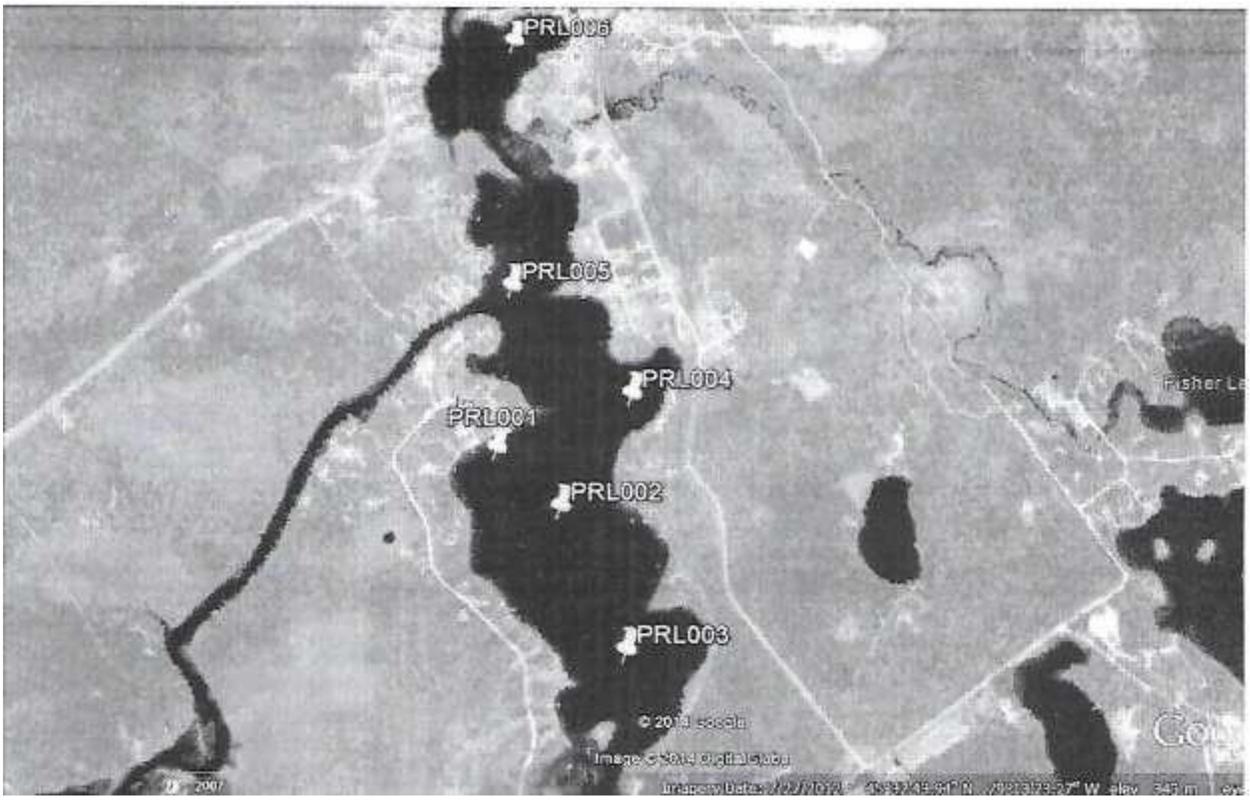

Map of Hassard Lake with sample sites, Retrieved from Google Earth

GPS Coordinates for sample sites at Hassard Lake.

| | | | |
|---|---|---|---|
| H01 | N 45°34' 1.7"<br>W 79° 13' 4.1" | H04 | N 45° 33' 28.7"<br>W 79° 13' 29.7" |
| H02 | N 45° 33' 47.0"<br>W 79° 13' 27.7" | H05 | N 45° 33' 33.1"<br>W 79° 13' 32.6" |
| H03 | N 45° 33' 34.6"<br>W 79° 13' 22.4" | H06 | N 45° 33' 37.8"<br>W 79° 13' 26.7" |

## Perry Lake

Perry Lake is located in downtown Kearney. There is a public dock on Main St. and there are several cottages and homes visible from the sampling points. There is a heavy riparian zone south of the lake. The map of the lake showing the sample sites and the GPS coordinates for the sample sites can be found below.




GPS Coordinates for sample sites at Perry Lake.

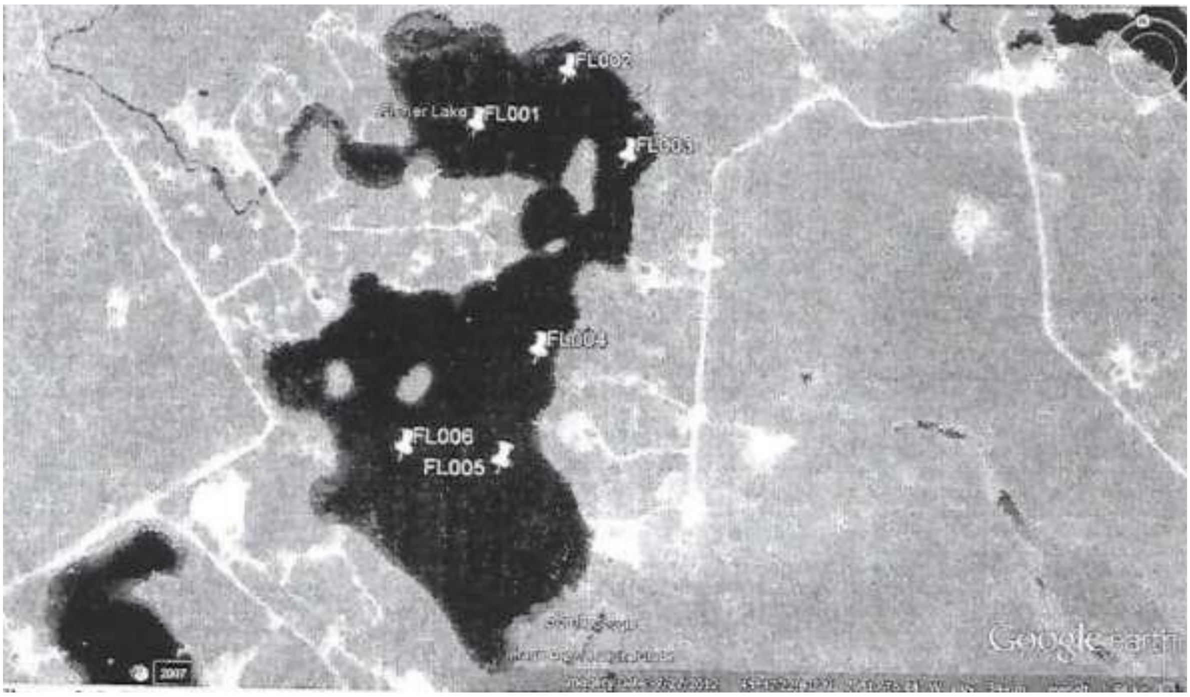
| | | | |
|---|---|---|---|
| POI | N 45° 32' 42.9"<br>W 79° 13' 47.7" | P04 | N 45° 32' 44.9"<br>W 79° 13' 30.9" |
| P02 | N 4Y 32' 36.9"<br>W79° 13' 41.9" | P05 | N 45° 32' 56.2"<br>W 79° 13' 42.0" |
| P03 | N 45° 32' 24.2"<br>W 79° 13' 38.i" | P06 | N45°33' 17.9"<br>W 79° 13' 35.3" |

**Perbeth/Fisher Lake**

Perbeth Lake, also known as Fisher Lake, is located 2.8 km south of Kearney. It is a very shallow lake and has both springs and marshes in the lake. There is no Crown Land around the lake and the riparian zone is currently under construction with new cottages being built. The map of the lake with the sample sites and their GPS coordinates are shown below

Perbeth/Fisher Lake characteristics (MNRF, 2015).

| Surface Area | Mean Depth | Max Depth | Perimeter |
|---|---|---|---|
| 31 Ha | 2m | 4.5 m | 4 km (plus 0.6 km island shoreline) |




Map of Perbeth/Fisher Lake with sample sites, Retrieved from Google Earth

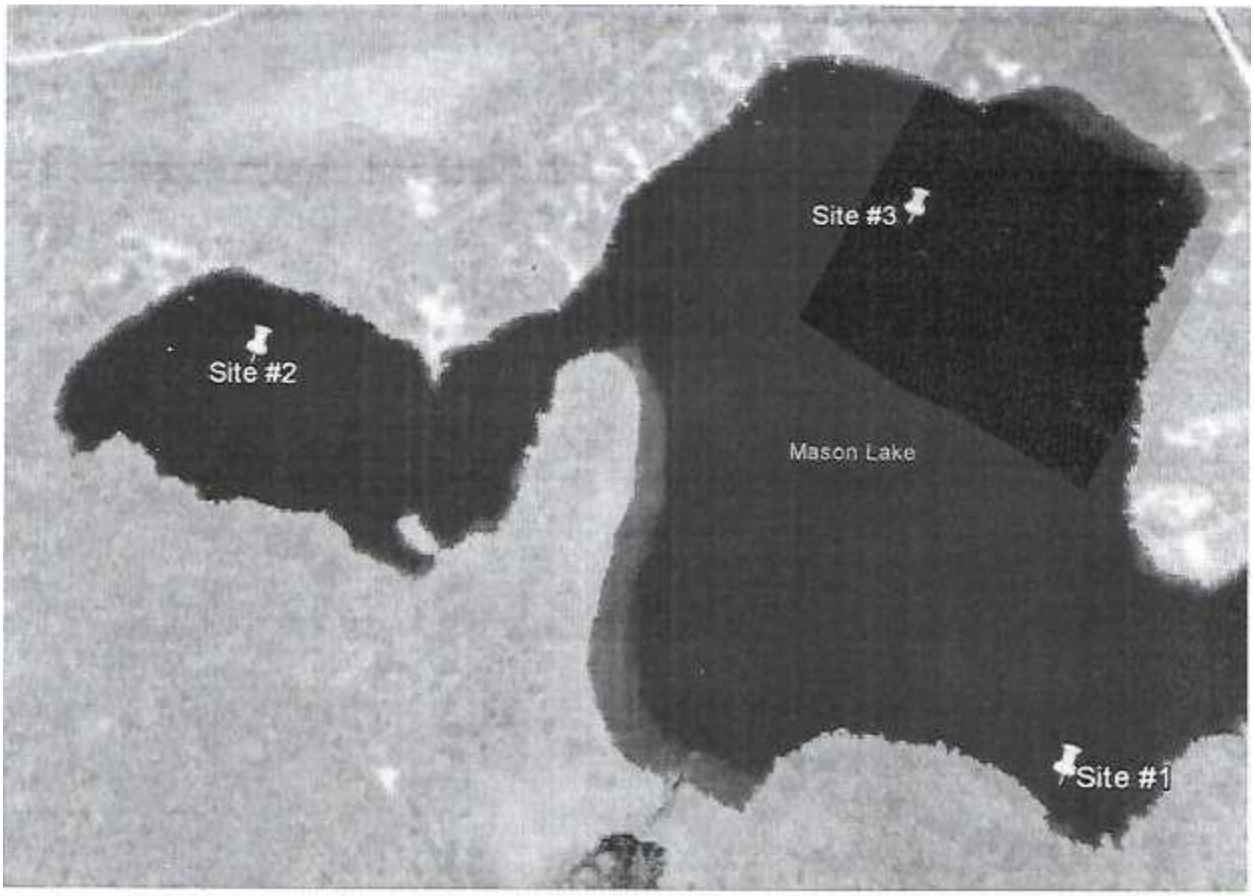
GPS Coordinates for sample sites at Perbeth/Fisher Lake.

| | | | |
|---|---|---|---|
| PFOI | N 45° 32' 34.7"<br>W 79° 12' 22.5" | PF04 | N 45° 32' 22.4"<br>W 79° 12' 12.2" |
| PF02 | N 45° 32' 36.7"<br>W 79° 12' 15.2" | Pf05 | N 45° 32' 17.6"<br>W 79° 12' 25.1" |
| PF03 | N 45° 32' 31.5"<br>VI 79° 12' 12.3" | PF06 | N 45° 32' 19.1"<br>W 79° 12' 31.3" |

Above PF04 coordinates are incorrect we used N 45° 32' 22.7" W 79° 12' 20.8" based on the above map and our lake stewards memory of the location. PF04 would have put us several hundred feet into the bush.

## Mason Lake

Mason Lake has a surface area of only 40 hectares and is the smallest lake sampled in this report. Maximum depth is 14m, mean depth is 6m and perimeter is 4km. This lake is spring-fed on the northwestern side. Mason Lake is moderately developed with private residences without any public access points. A map of the lake and the location of sampling sites including their GPS coordinates are located below.



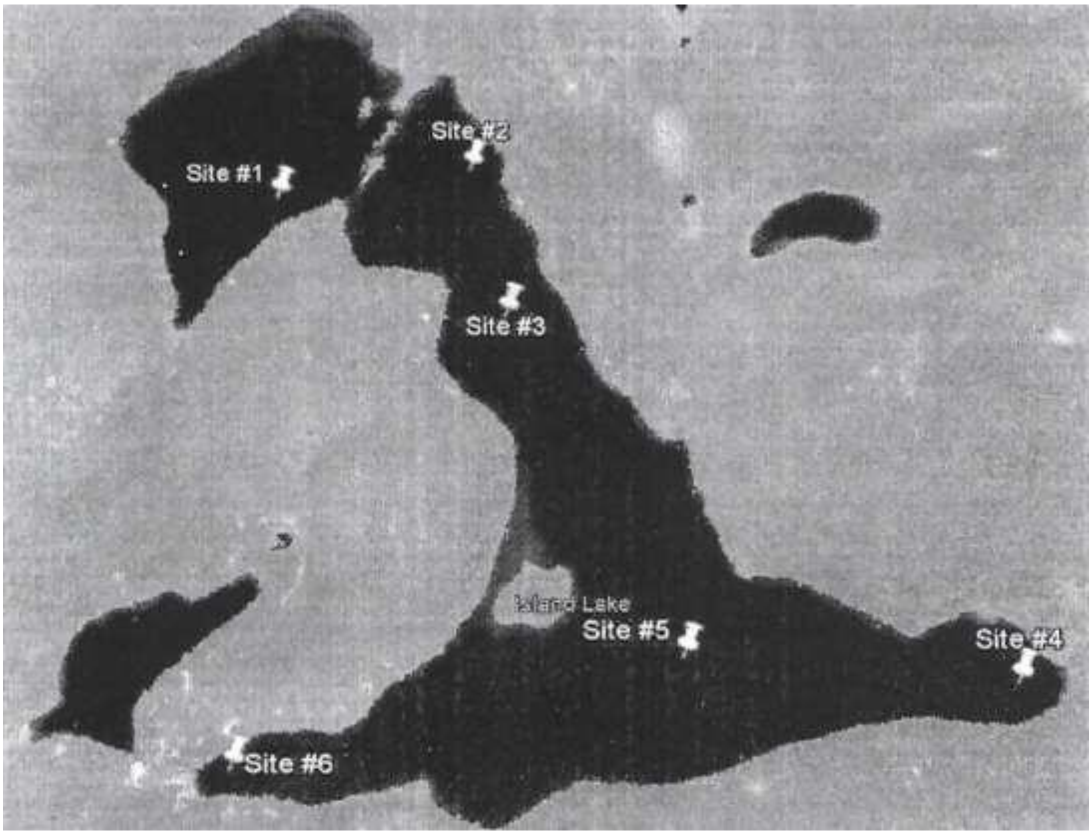

Map of Mason Lake with sample sites, Retrieved from Google Earth

Mason Lake sites and GPS coordinates.

| Site | GPS Co-ordinate |
|---|---|
| Ml | N45°38' l5.9" W079°13'55.4" |
| M2 | N45°38'27.S" W079°14'26.7" |
| M3 | N45°38'32.7" W079°14'OO.8" |

**Island Lake**

Island Lake, previously called Proudfoot Lake, is a medium-sized lake which supports a large diversity of fish species (US EPA, 2012b). There is a public access point at the southwestern tip of Island Lake with a small parking lot and dock for cottagers. There is a moderate amount of development surrounding the lake. Surface area is 130 ha, perimeter is 8.7 km Maximum depth is 29 m and mean depth is 10 m. A map of the lake showing the location of the sampling sites plus a list of their GPS coordinates are located below.




Map of Island Lake with sample sites, Retrieved from Google Earth

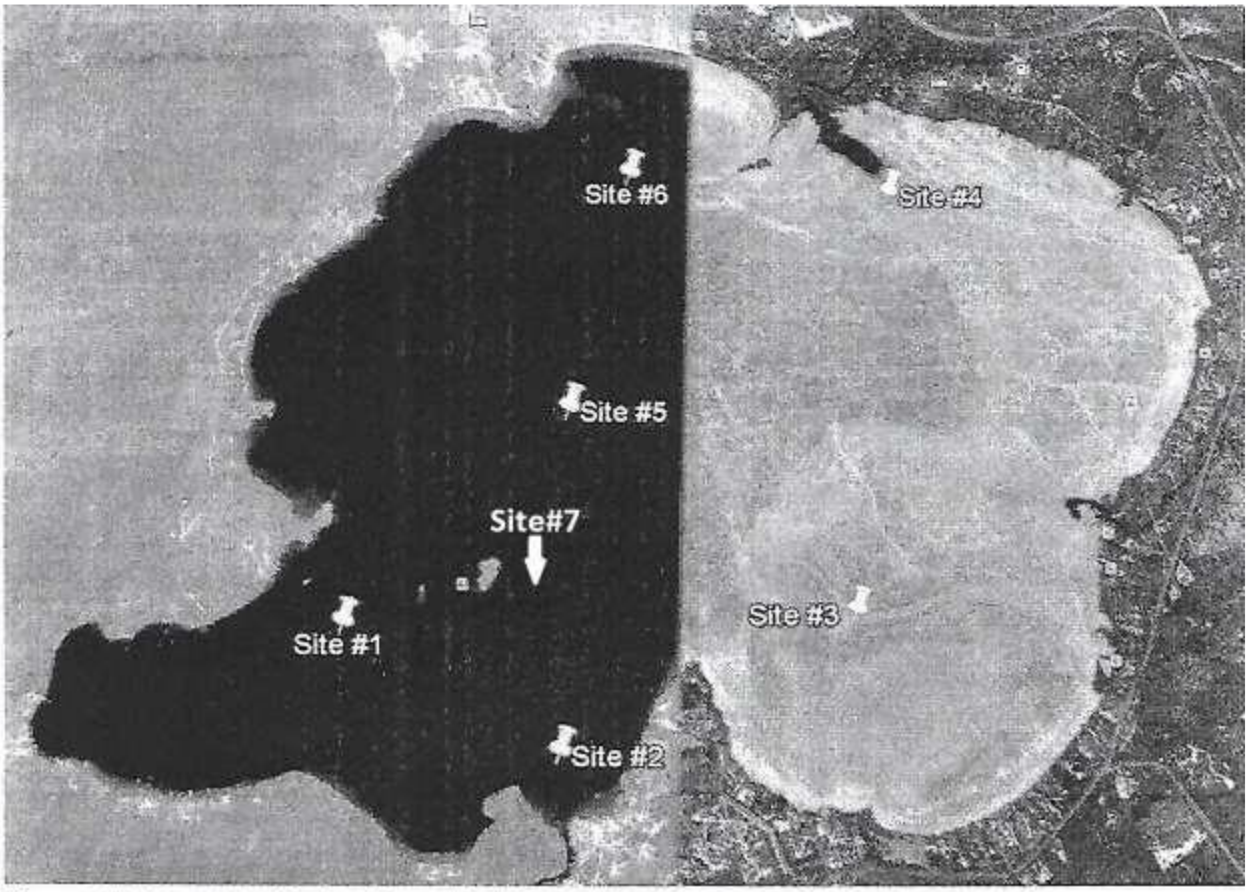
Island Lake sites and coordinates.

| Site | GPS Coordinate | Site | GPS Coordinate |
|---|---|---|---|
| 11 | N45°41’30.6”<br>W079°14’ 52.7” | 14 | N45° 40’ 52.6”<br>W079°14'35.5” |
| 12 | N45°41’33.2”<br>W079°14’ 31.9” | 15 | N45° 40’ 54.9”<br>W079°14'07.6" |
| 13 | N45°41’22.5”<br>W079°14’ 25.0” | 16 | N45° 40’ 47.5”<br>W079°14' 51.0” |

Site I1, I2 & I3 were all listed as being the same. Using the map above as a reference, our lake steward/volunteer took us to the sites as he remembered them and we recorded new coordinates which are reported above.

**Sand Lake**

Sand Lake has a surface area of 580 hectares and is highly developed with approximately 300 cottages and 4 public resorts around its 12.2 km perimeter. It has a maximum depth of 59m and a mean depth of 22m. This lake can be accessed through a public access point. There are sandy beaches along several shores, which appear to be eroding and creating a shallow shoreline. The Magnetawan River flows in through the north side of the lake and exits at the south side. A map of the lake showing the location of sampling sites plus their GPS coordinates are located below.




Map of Sand Lake with sample sites, Retrieved from Google Earth Sand Lake sites and GPS coordinates

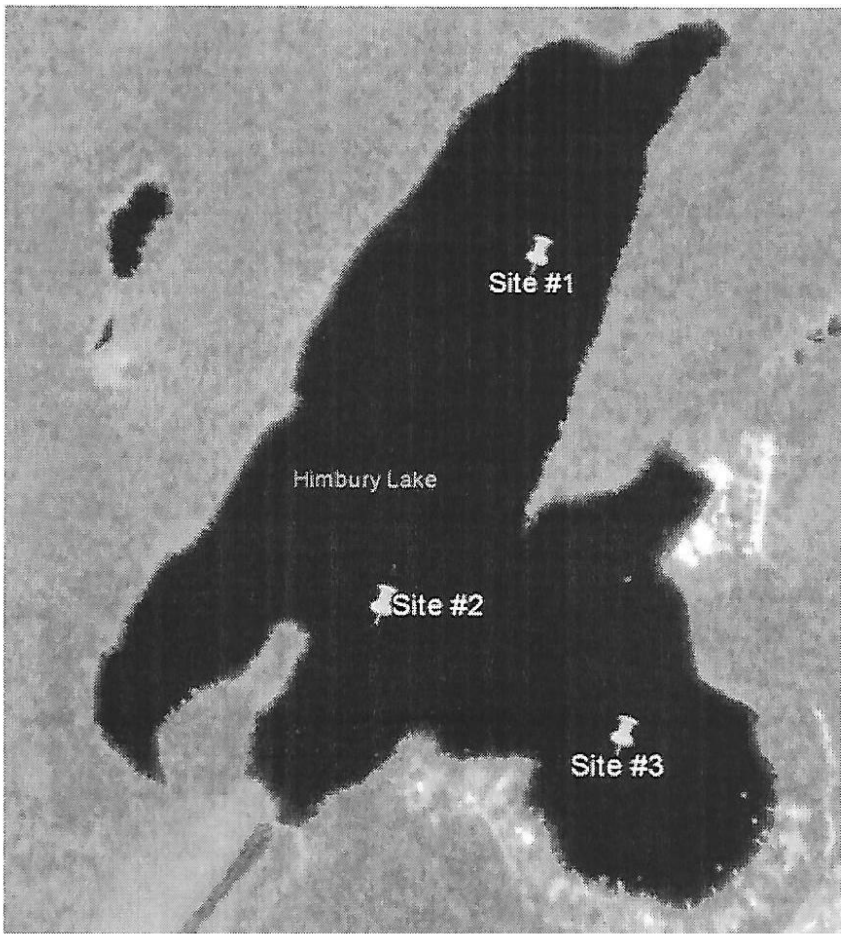
| Site | GPS Co-ordinate | Site | GPS Co-ordinate |
|---|---|---|---|
| S1 | N45°37'12.7" W079°11'09.6" | S4 | N45°37'57.0" W079°09'55.7" |
| S2 | N45°37'09.7" W079°37'09.7" | S5 | N45°37'34.0" W079°10'40.4" |
| S3 | N45°37'13.9" W079°10'01.2" | S6 | N45°38'12.1" W079°10'32.9" |

W

We found S2 coordinates very inaccurate and replaced them with N 45° 37' 04.6" W79° 10'41.4" We had problems with high wind and a dragging anchor while evaluating the second instrument in 2016 and picked Site #7 (N45°37' 17.3" W79° 10' 44.3") because it was deep but more sheltered. We don't anticipate including it as a regular sampling site.

## 2.13 Himbury Lake

Himbury Lake is a small lake with a surface area of 49 hectares. This lake is located southwest of Sand Lake reached through a short portage between the two lakes. Much of the development on this lake is on the western side and the northern bay of the lake is surrounded by undeveloped Crown Land
This lake is spring fed on the northern side.



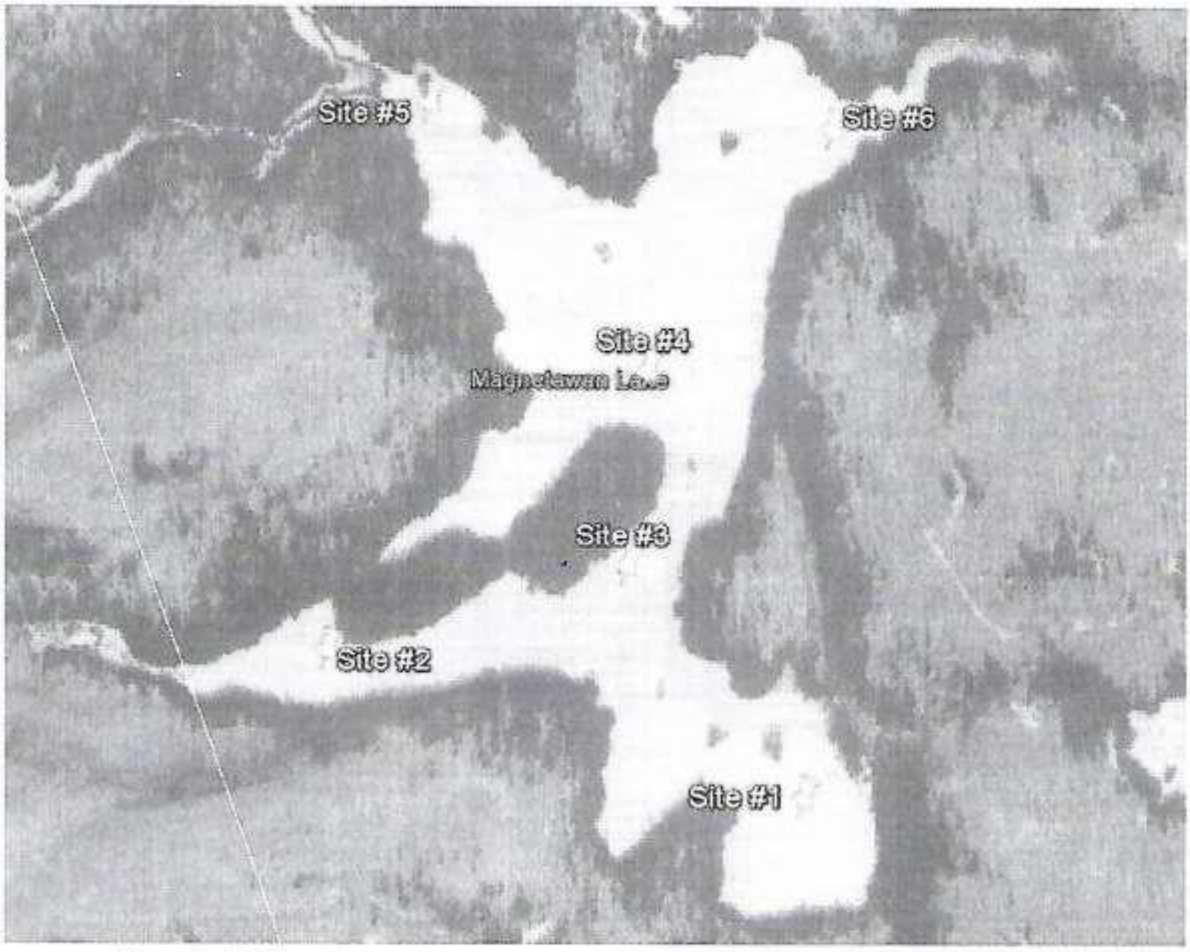

Map of Himbury lake showing sampling sites – retrieved from Google Earth.

GPS Co-ordinates for sample sites listed below.

| Site | GPS Co-ordinate |
|---|---|
| H1 | N45°36'31.7" W079°12'12.7" |
| H2 | N45°36'15.4" W079°12'18.5" |
| H3 | N45°36'11.4" W079°12'03.4" |

**Magnetawan Lake**

Magnetawan Lake is located outside of Kearney and is situated inside the western boundary of Algonquin Provincial Park. This lake is the headwaters for the Magnetawan River and is surrounded by protected land. There are four campsites located around Magnetawan lake. A map of the lake showing the location of the sampling sites plus a list of their GPS coordinates are located below.

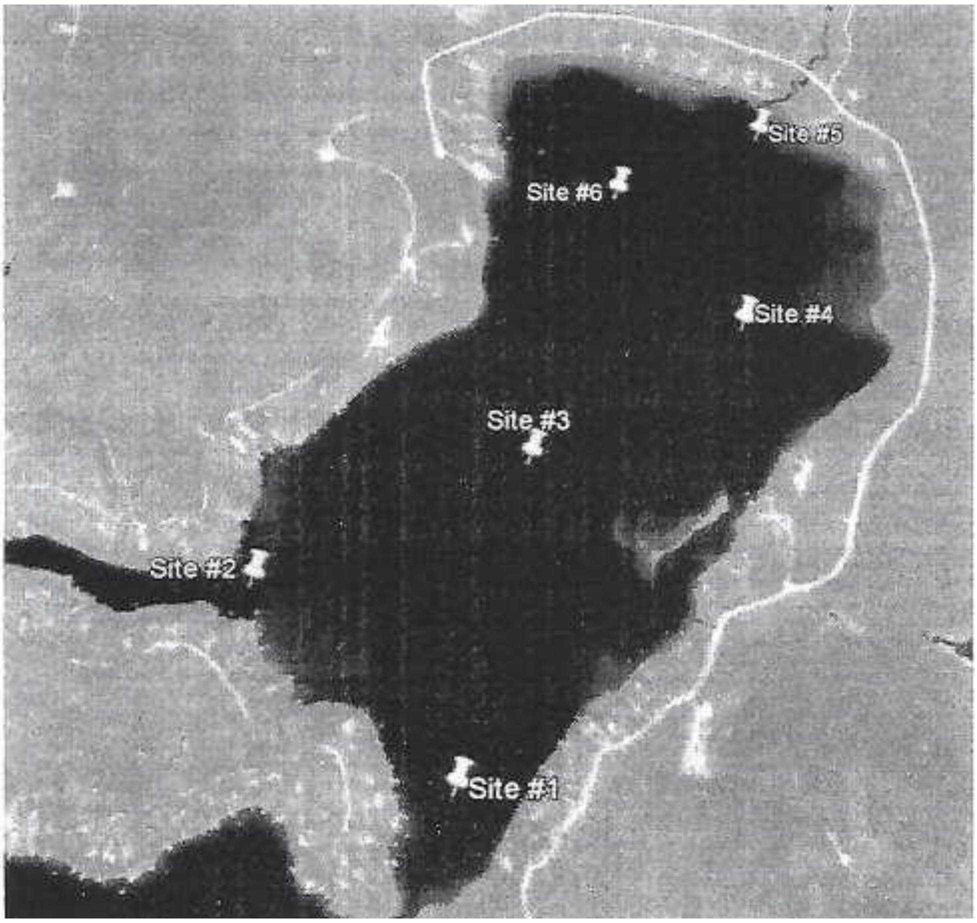



Map of Magnetawan Lake with sample sites, Retrieved from Coogle Earth Magenetewan Lake sites and GPS Coordinates

| Site | GPS Co-ordinate | Site | GPS Co-ordinate |
|---|---|---|---|
| MWl | N45° 39' 23.4"<br>W078°59'04.2" | MW4 | N45° 39' 47.7<br>W078° 59' l5.4" |
| MW2 | N45° 39' 32.9"<br>W078° 59'39.3" | MWS | N45° 40' 02.1"<br>W078° 59' 32.0" |
| MW3 | N45°39' 37.4"<br>W078°59' 16.9" | MW6 | N45°40' 0.07"<br>W078° 59' l.5" |

## Grass Lake

Grass Lake is a medium-sized lake with a surface area of 138 hectares, maximum depth of 37m, mean depth of 11 and a perimeter of 6.4km. This lake is developed with cottages located around the entire perimeter. Grass Lake is connected by a channel to Loon Lake where there is a dam that controls water levels. A map of the lake and the location of sampling sites plus a list of their GPS coordinates are located below.



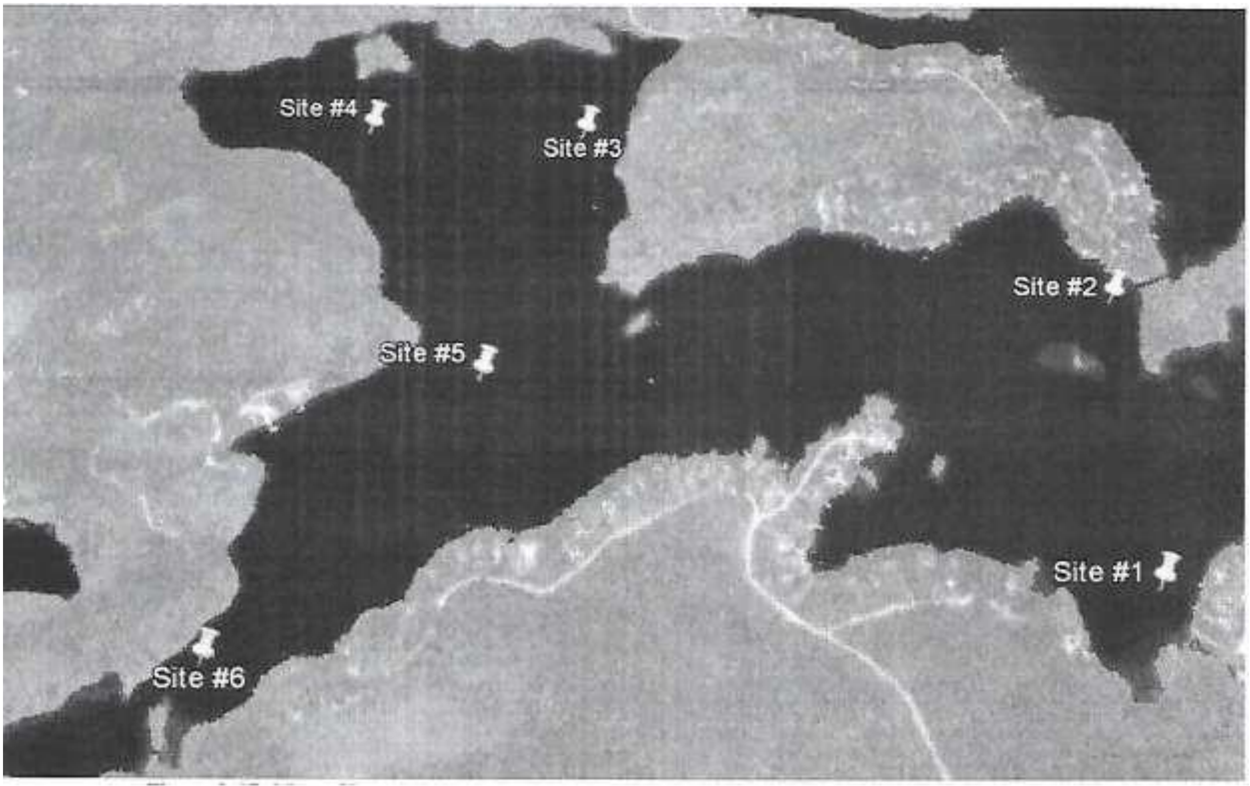

Map of Grass Lake with sample sites, Retrieved from Google Earth

Grass Lake Sites and Coordinates

| Site | GPS Co-ordinate | Site | GPS Co-ordinate |
|---|---|---|---|
| Gl | N45° 40' 20.9"<br>W79° 12' 20.6" | G4 | N45° 40' 52.7"<br>W79° 11' 56.0" |
| G2 | N45° 40' 33.S"<br>W79° 12' 38.9" | GS | N45° 41' 08.7"<br>W79° 11' 53.7" |
| G3 | N45° 40' 42.6"<br>W79° 12' l5.4" | G6 | N45° 41' 03.2"<br>W79° 12' 07.8" |

**Loon Lake**

Loon Lake has a surface area of 156 hectares, maximum depth of 26.2m, mean depth of 7.1 m and a perimeter of 8.0 km. There is high development along the entire shoreline of this lake. There is a dam operated by the Ministry of Natural Resources that controls water levels in this lake. A map of the lake with the location of sampling sites plus their GPS coordinates are located below



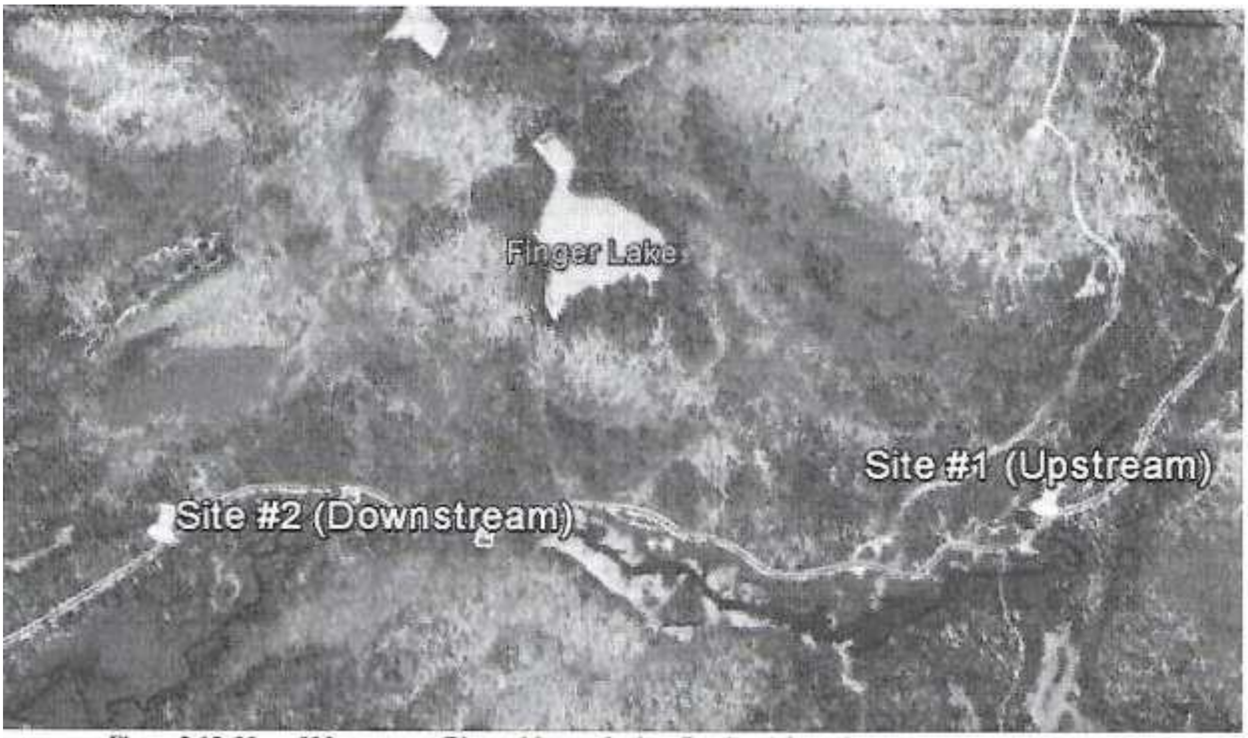

Map of Loon Lake with sample sites, Retrieved from Google Earth

Loon Lake sites and coordinates

| Site | GPS Coordinate | Site | GPS Coordinate |
|---|---|---|---|
| Ll | N45° 39' 53.1"<br>W79° 12' 27 .5" | L4 | N45° 40' 23.4"<br>W79° 13' 38.0" |
| L2 | N 45° 40' 12.0"<br>W79° 12' 29.6" | LS | N45° 40' O5.3"<br>W79° 12' 29.6" |
| L3 | N45° 40 '23.4"<br>W79° 13' 17.9" | L6 | N45° 39' 47.1"<br>W79° 13' 44.2" |

## 2.17 Magnetawan River

The Magnetawan River is 175 km long and one tributary originates in Algonquin Provincial Park at Magnetawan Lake. The river runs westward and exits into Georgian Bay linking many of the lakes sampled in this report. The sample site MRI is on a tributary that also rises in Algonquin Park passes close to the Kearney Graphite Mine and joins the Magnetawan River just below our sample site MR3. The MR1 sample site is upstream of the mine site and provides us with normal background reading levels. The second site, MR2, was selected about 1.6 km downstream from MRl and the decommissioned graphite mine. There were water quality concerns about mining effluent and tailings leakage. The MR2 sampling site is used to monitor this concern. A map of the river with the location of these two sampling sites plus their GPS coordinates are located below. Map and coordinates for MR3 are on the next page.




Map of Magnetawan River with sample sites, Retrieved from Google Earth

Magnetawan River sites and coordinates

| Site | GPS Co-ordinate |
|---|---|
| MRI | N45° 42' 40.3"<br>W79° 04' 07.S" |
| MR2 | N45° 42' 36.7"<br>W79° 05' 20.6" |

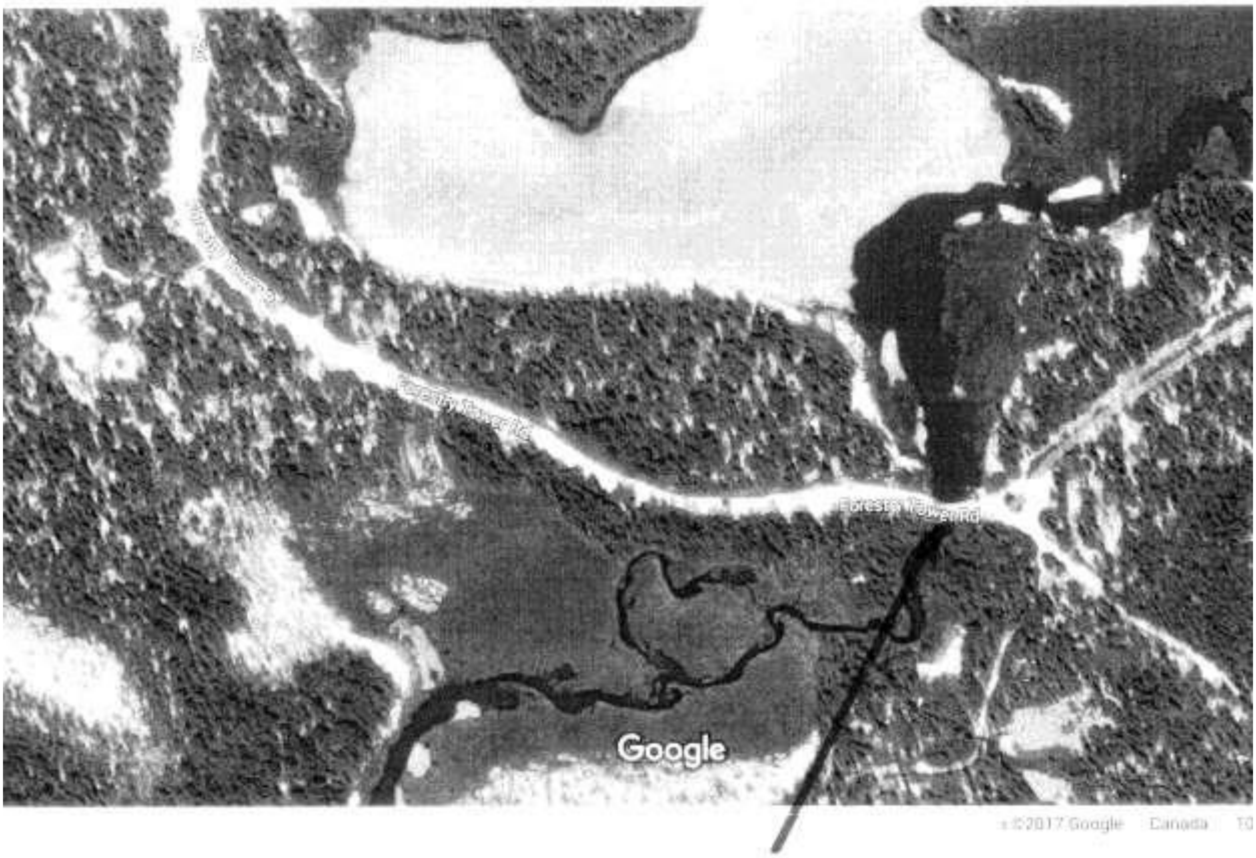
### 2.17 Magnetawan River (additional sampling points shown on pages 21-23)

We added a third site in 2016 on the Magnetawan River several kilometers below MR2. This additional monitoring point was picked to see how much the pH and conductivity readings were reduced. The site on the river is easily accessed from a bridge over the river. The map of the river with the location of sampling site plus the GPS coordinates are located below.


Map of Magnetawan River with third sample site MR3

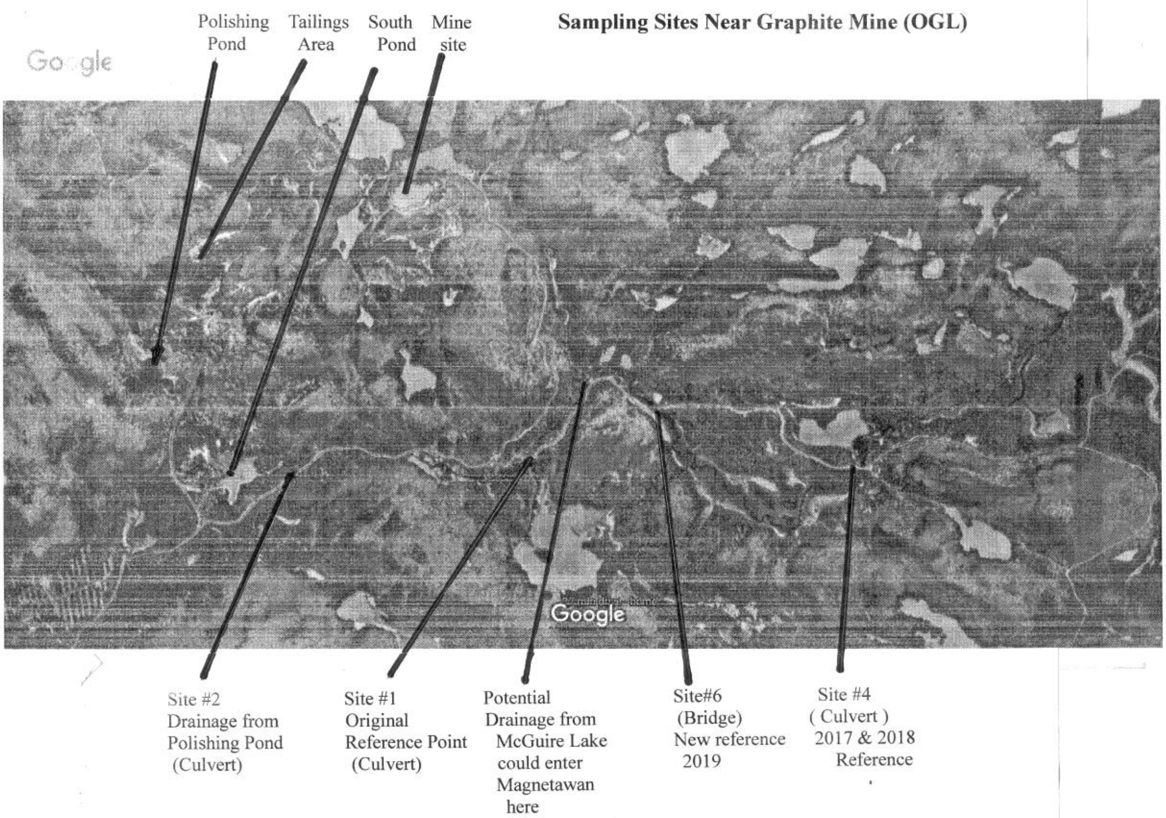
Site #3 GPS coordinates N 45° 40’ 12.0” W 79° 07’ 46.3

We added two additional sites on the Magnetawan River in 2017. To be sure we were well away from any ground water influences from the mine site we added MR4 which was above MR1 at a culvert on the Forestry Tower Rd that goes to the Magnetawan Lake (N 45 42’ 35” -79 02’ 26”). This was well above the mine site where water from Charlie’s Lake and the headwaters of the Magnetawan River cross the road. Flow is from left-right when you are inbound to Magnetawan Lake. MR5 is at the down river side of the bridge on Hwy #518 where the Magnetawan River crosses just before it enters Sand Lake and was added out of interest to see if the pH and conductivity levels had dropped to background levels this far from the minesite. In late 2018 we had taken readings at site MR6 (45.713574 -79.057769) see map below and continued using this site as our main reference site in 2019. When the Benthic Study was done in 2019 the control/reference site for the study was just upstream of this bridge over the Magnetawan.




Site #4
Magnetawan River

**Sampling Sites Near Graphite Mine (OGL)**




Site #5 Magnetawan River

**Map of location of Site#5 – Hwy 518 crosses Magnetawan just before the river enters Sand Lake.**

## 3.0 Measurement Methodology

The DO, pH, Conductivity, Turbidity and temperature readings were taken by the YSI PRODSS multi-parameter field instrument on site. The cable connecting the sensor package to the readout unit was marked off in meter intervals. We located the sample sites on the lake using a Magellan eXplorist 310 GPS handheld receiver using the co-ordinates provided in the 2016 reports. Errors in the co-ordinates recorded in 2014/2015 have been corrected. The co-ordinates are entered prior to arriving at the lake..

When we arrived at each sample site we verified the depth of water with a depth finder, and if the volunteer was able to hold the boat on station we didn't use an anchor to avoid stirring up the mud on the bottom. We lowered the sensor package into the water at the surface, waited for the readings to stabilize then took the initial set of readings by pressing the "take sample" button on the instrument. The data is recorded in the memory of the hand held display unit. After that the sensor package was lowered a meter at a time using the markings on the cable as a depth reference. At each depth we would wait for the readings to stabilize before recording the readings. If this was the designated deep spot we would continue down for at least 20 meters or until we approached the bottom. If this was a non- deep spot this year we took readings until we had crossed through and were at least a couple of meters below the thermocline or were within a meter of the bottom. All the readings for that particular site on the lake were kept in the same file in the memory of the display unit.

This year we continued to only do a profile on one deep spot per lake to keep our time on the lake to about 90 - 120 minutes if there were six sample sites. On the other sites we still did a profile but generally just down to 5-7 meters if water depth permitted. Each evening the data collected that day was uploaded from the instrument into a spreadsheet on a personal computer.

The YSI ProDSS worked well. The depth measurement capability is essential if there is only one person performing the logging. The instrument was calibrated both times at Hoskins Scientific before we picked them up and we were provided with standard solutions so that we could check the calibration. We checked both instruments at the start, during the test program and before the instrument was returned to be sure the unit was still calibrated.

We also try to take at least one Secchi disc reading on each lake. We are aware that there can be quite a variation in Secchi disc readings caused by amount of sunlight, wave action and what the individual observer considers a "visible" disc. Secchi readings are also taken by the Lake Partners volunteers throughout the summer and should be similar to our readings. We have continued to include some information copied from the Environment Canada website regarding rainfall and pH.

### Measured Parameters and Water Quality Standards

The parameters measured were chosen by the community partners because of their ability to indicate the health of a lake (WHO, 20 II; EPA, 2012). Guidelines describing appropriate or safe levels for measured parameters were found in the MOECC's Provincial Water Quality Objectives (PWQO) and the World Health Organization's (WHO) Guidelines for Drinking-Water Quality (MOECC, 1994; WHO 2011). PWQO measure the aquatic toxicity, bioaccumulation, and mutagenicity of a water source in order to identify the quality of water for human recreation purposes and overall health of the lake (MOECC, 1994). In order to maintain the PWQO, the water quality of lakes in Ontario should be monitored regularly and compared to appropriate standards.

### Temperature

The temperature of a water source can directly affect many of the physical, biological, and chemical factors of aquatic organisms (Environment Canada, 2013). If the temperature rises above the tolerance for a specific organism it can lead to detrimental effects (Environment Canada, 2013). Temperature can also affect other parameters within the water, such as, dissolved oxygen. High water temperatures can decrease oxygen levels and increase algal growth, while low water temperatures can increase oxygen levels (CCME, 2011).

Preferred Temperature Range for Adult Freshwater Fish (Deg. Celsius)

| Name | Range | Limit | Name | Range | Limit |
|---|---|---|---|---|---|
| Atlantic Salmon | 12-16 | 23 | Lake Trout | 9-13 | 23 |
| Chinook Salmon | 12-16 | 25 | Lake Whitefish | 11-15 | 26 |
| Coho Salmon | 12-16 | 25 | Pink Salmon | 13-17 | 24 |
| Rainbow Trout | 12-20 | 26 | Brook Trout | 13-17 | 24 |
| Northern Pike | 17-21 | 32 | Brown Trout | 15-18 | 24 |
| Walleye | 19-23 | 31 | Yellow Perch | 20-24 | 31 |
| Black Crappie | 21-25 | 32 | White Sucker | 22-26 | 31 |
| Small Mouth Bass | 20-26 | 35 | Muskellunge | 22-26 | 33 |
| Freshwater Drum | 24-28 | 32 | White Bass | 28-32 | 36 |

| | | | | | |
|---|---|---|---|---|---|
| Pumpkinseed | 22-30 | 35 | Rock Bass | 25-29 | 36 |
| Bluegill | 24-30 | 35 | Brown Bullhead | 26-30 | 36 |
| Bowfin | 28-32 | 35 | White Perch | 26-30 | 36 |
| Common Carp | 28-32 | 35 | Largemouth Bass | 26-30 | 36 |

The material above was taken from a poster published by Fisheries & Oceans Canada, Consevation Ontario and Ontario Ministry of Natural Resources.

The “Limit” in the table above is actually Upper Lethal Limit – all temperatures are in degrees Celsius

**Secchi Disc**

Secchi discs are used to provide a visual measure of water clarity and optical depth (CCME, 2011). A secchi disc is lowered into the body of watcr in a shaded location; the best time of day to sample sec chi depth is midday (CClYlE, 2011). The deeper the secchi disc reading is, the clearer the lake. The CCME recommends that secchi measurements should be made every two weeks between June and October, if possible. Secchi depth provides an idea of how turbid the water is. High turbidity can be caused by soil erosion, waste discharge, urban runoff and excessive algal growth (EPA, 2012). The Provincial Water Quality Guidelines states that if the water body is for recreational use, and the bottom is not visible, the water should have a secchi reading of at least 1.2 m (MOECC, 1994).

**4.0 Dissolved Oxygen**

Dissolved oxygen (DO) is present in water due to photosynthetic activity and diffusion (CCME, 1993). The DO concentration is dependent on the temperature and atmospheric pressure within the water (CCME, 2011). Fast moving water will have higher dissolved oxygen due to the mixing of water with air (CCME, 1993). Oxygen is required for basic life processes. Higher levels can better support some sensitive lake species and is used as an indicator of water quality. The presence of agriculture, industry and deforestation can lower dissolved oxygen levels, because runoff from these sources can react with oxygen through decomposition reactions (CCME, 1993). Recommended levels for cold-water systems are no lower than 9.5 *mg/L* (CCME, 1993).

**Dissolved Oxygen requirements for various fish Species**

The following information was taken from the following website : http://www.fondriest.com/environmental-measurements/parameters/water-quality/dissolved-oxygen

Coldwater fish like trout and salmon are most affected by low dissolved oxygen levels. The mean DO level for adult salmonids is 6.5 mg/L, and the minimum is 4 mg/L . These fish generally attempt to avoid areas where dissolved oxygen is less than 5 mg/L and will begin to die if exposed to DO levels less than 3 mg/L for more than a couple days . For salmon and trout eggs, dissolved oxygen levels below 11 mg/L will delay their hatching, and below 8 mg/L will impair their growth and lower their survival rates. When dissolved oxygen falls below 6 mg/L (considered normal for most other fish), the vast majority of trout and salmon eggs will die.

**Bluegill, Largemouth Bass, White Perch, and Yellow Perch** are considered warm water fish and depend on dissolved oxygen levels above 5 mg/L. They will avoid areas where DO levels are below 3 mg/L, but generally do not begin to suffer fatalities due to oxygen depletion until levels fall below 2 mg/L. The mean DO levels should remain near 5.5 mg/L for optimum growth and survival .

**Walleye** also prefer levels over 5 mg/L, though they can survive at 2 mg/L DO levels for a short time. **Muskie** need levels over 3 mg/L for both adults and eggs . **Carp** are hardier, and while they can enjoy dissolved oxygen levels above 5 mg/L, they easily tolerate levels below 2 mg/L and can survive at levels below 1 mg/L .

The freshwater fish most tolerant to DO levels include fathead minnows and northern pike. **Northern pike** can survive at dissolved oxygen concentrations as low as 0.1 mg/L for several days, and at 1.5 mg/L for an infinite amount of time**. Fathead minnows** can survive at 1 mg/L for an extended period with only minimal effects on reproduction and growth.

As for bottom-dwelling microbes, DO changes don't bother them much. If all the oxygen at their water level gets used up, bacteria will start using nitrate to decompose organic matter, a process known as denitrification. If all of the nitrogen is spent, they will begin reducing sulfate [17]. If organic matter accumulates faster than it decomposes, sediment at the bottom of a lake simply becomes enriched by the organic material.

## Conductivity

Conductivity is a measure of the ability of water to conduct electricity. This parameter is affected by the number ions that are dissolved in the water (EPA, 2012).lf a lake were to have a high amount of inorganic solids, the water would be more conductive whereas if the lake were to have more amounts of organic solids it would be less conductive (EPA, 2012). The conductivity for lake water should be below 500 micro Siemens/centimeter. If a lake were to have a higher conductivity than the suggested limit, the water may not be suitable for living organisms (EPA, 2012).

## pH

The pH of a solution is a measure of the concentration of H+ ions. The pH has a scale from 0-14, where a pH below 7 is acidic and a pH above 7 is basic. A pH of7 is considered to be neutral (Environment Canada, 2013). Water that has a pH from 6.5-9 is suitable for aquatic organisms (Environment Canada, 2013). The organisms that are most sensitive to extreme changes in pH are young fish and benthic invertebrates. The pH of a water body can be altered by acid rain, wastewater discharges and drainage from coniferous forests (Environment Canada, 2013).

## Nitrate

Nitrate is an essential nutrient for plants, however in excess can be considered a contaminate (EPA, 2012). When nitrate is in excess it can accelerate eutrophication by causing increases in plant growth and changing the types of organisms found in the water. High nitrate levels can also lower the dissolved oxygen level and increase temperature (EPA, 2012). Sources of nitrate contamination are wastewater treatment plants, failing septic systems, runoff from fertilized lawns and manure storage sites. The natural level of nitrate in freshwater is commonly less than 1 mg/L, however, in effluent of some wastewater treatment plants nitrate levels can be 30 mg/L (EPA, 2012). Health Canada states that the maximum nitrate level allowable in drinking water is 45 mg/L (Health Canada, 2012).

## Nitrite

Nitrite is usually found in minimal concentrations, but it can be damaging. The concentration increases with chloro-aminated waters, which is a result of waste water treatment (WHO, 2011).

Nitrite quickly converts to nitrate when exposed to oxygen, which is part of the reason why nitrite is found in such low levels (Health Canada, 2011). It is naturally present due to the nitrogen cycle, but it can be present in higher levels due to agriculture, fertilizers, waste, and industry input (Health Canada, 2012). Infants are more susceptible to health risks from increased nitrite levels, but the common health concern related to nitrite is methemoglobinemia, which impairs the ability of blood cells to bind with oxygen (Health Canada, 2012). The maximum acceptable nitrite concentration in drinking water is 3 mg/L (Health Canada, 2012)

**Phosphate**

Phosphate (orthophosphate) is an inorganic form of phosphorus and an essential nutrient. Aquatic plants use orthophosphate and convert it to organic phosphate for their tissue (EPA, 2012). Phosphate tests measure only the orthophosphate form of phosphorus. Phosphate stimulates the growth of plankton and aquatic plants to provide food for fish. However, human or animal waste, industrial effluents and fertilizer runoff (Oram, n.d.) can provide excess phosphate conditions causing large growth bursts of undesirable organisms and accelerated eutrophication disrupting aquatic ecosystems. (Oram, n.d.). Human consumption of phosphorous has not been found to be a threat to human health, therefore there is no "acceptable" levels for phosphate in drinking water. However, excessive plant growth due to high phosphorous levels can occur at concentrations above 0.03 mg/L (Fleming & Fraser, 1999).

**Total Phosphorus**

Total phosphorous is the measure of all forms of phosphorous, including organic, inorganic and poly (EPA, 2012). Phosphorus occurs naturally in rocks and mineral deposits as poly-phosphorous but higher levels can occur as a result of agricultural runoff (CCME, 2011). Phosphorus is a limiting nutrient in freshwater and too much can be harmful resulting in algal blooms and eutrophication (CCME, 2012). Canadian guidelines provide 'trigger ranges' indicating the health of the system according to the total phosphorous level (CCME, 2004). The table below displays these ranges for different trophic systems. The lakes in this study are typically oligotrophic, not exceeding a level of 10 ug/L.

Canadian total phosphorous trigger ranges (CCME, 2004).

| Trophic Status | Total Phosphorous (ug/L) |
|---|---|
| Ultra-oligotrophic | < 4 |
| Oligotrophic | 4 - 10 |
| Mesotrophic | 10 -- 20 |
| Meso-eutrophic | 20 – 35 |
| Eutrophic | .35 - 100 |
| Hyper-eutrophic | > 100 |

## 5.0 Results

The following tables show the data for temperature, dissolved oxygen (DO), conductivity, pH, turbidity obtained at that specific depth at that site on that specific lake. The depth was chosen as the point where the temperature was approx. 4 degrees lower than the surface temperature which is the area where WSCE had previously taken their water samples.

Next year (2020) we hope to be able to include both temperature and rainfall data for the sampling period and for the whole year. We will try to measure rainfall pH periodically as well. Rainfall in our area can be quite acidic (4 - 4.5) as well.

Further on in the results section we have included an example for each lake of the readings obtained at one meter intervals at one of the deep spots on that lake.

TP (Total Phosporous) levels, Calcium readings and Secchi readings for our lakes were obtained from the Lake Partners Program operated by the MOECC in Dorset when available.

## Beaver Lake

| Beaver<br>Sampling site | Date Time<br>D/M/Y HH:MM | Temp<br>C | SpCond<br>uS | DO<br>mg/L | Depth<br>meters | pH |
|---|---|---|---|---|---|---|
| Site-1 | 8/13/19 13:40 | 19.3 | 34.1 | 2.66 | 5.5 | 6.13 |
| Site-2 | 14:05 | 19.7 | 35.1 | 4.34 | 5.3 | 6.80 |
| Site-3 | 14:20 | 22.9 | 34.8 | 8.75 | 2.0 | 7.11 |
| Site-4 | 14:30 | 23.5 | 35 | 8.73 | 2.5 | 7.17 |
| Site-5 | 14:37 | 22.9 | 35.2 | 8.65 | 2.5 | 7.14 |
| Site-6 | 14.42 | 22.2 | 35.5 | 8.60 | 3.5 | 7.14 |

## Big Clam Lake

| Big Clam-1<br>Sampling site | Date Time<br>D/M/Y HH:MM | Temp<br>C | SpCond<br>uS | DO<br>mg/L | Depth<br>meters | pH | Secchi<br>meters |
|---|---|---|---|---|---|---|---|
| Site-1 | 8/25/19 11:33 | 16.5 | 22.9 | 10.9 | 4.9 | 7.09 | 5.0 |
| Site-2 | 11:12 | 17.5 | 22.3 | 11.9 | 4.7 | 7.09 | |
| Site-3 | 10:54 | 17.8 | 21.8 | 11.2 | 4.8 | 7.02 | |
| Site-4 | 10:35 | 17.7 | 22.7 | 11.1 | 4.8 | 7.14 | |
| Site-5 | 10:18 | 17.8 | 22.7 | 11.3 | 4.8 | 7.06 | |
| Site-6 | 9:54 | 18.2 | 22.7 | 11.5 | 4.7 | 6.93 | |

## Emsdale Lake

| Emsdale-1<br>Sampling site | Date Time<br>D/M/Y HH:MM | Temp<br>C | SpCond<br>uS | DO<br>mg/L | Depth<br>meters | pH |
|---|---|---|---|---|---|---|
| Site-1 | 8/7/19 10:13 | 20.2 | 21.1 | 12.06 | 5.0 | 7.14 |
| Site-2 | 10.29 | 20.9 | 21.3 | 11.29 | 5.1 | 7.18 |
| Site-3 | 10.45 | 20.3 | 21.5 | 11.27 | 5.0 | 7.21 |
| Site-4 | 11.02 | 20.6 | 21.4 | 11.27 | 5.0 | 7.22 |
| Site-5 | 11.27 | 20.5 | 21.3 | 10.74 | 5.0 | 7.15 |
| Site-6 | 11.38 | 20.9 | 21.6 | 11.10 | 5,0 | 7.25 |

## Fisher / Perbeth Lake

Fisher/Perbeth-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/12/19 8:56 | 22.0 | 27.6 | 9.11 | 1.5 | 7.10 |
| Site-2 | 9.06 | 21.9 | 28.1 | 8.90 | 1.5 | 7.33 |
| Site-3 | 9.14 | 21.8 | 27.4 | 9.01 | 1.9 | 7.19 |
| Site-4 | 9:26 | 21.3 | 34.2 | 5.49 | 3.2 | 6.57 |
| Site-5 | 9:37 | 21.0 | 37.7 | 4.32 | 3.5 | 6.59 |
| Site-6 | 9.49 | 21.9 | 30.9 | 7.94 | 2.9 | 6.94 |

## Grass Lake

Grass-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/16/19 10:06 | 15.4 | 16.9 | 11.58 | 6.0 | 7.24 |
| Site-2 | 9.58 | 21.5 | 17.2 | 8.9 | 5.4 | 7.31 |
| Site-3 | 9.41 | 17.3 | 17.0 | 11.57 | 6.0 | 7.35 |
| Site-4 | 10.15 | 17.2 | 17.0 | 11.25 | 6.0 | 7.31 |
| Site-5 | 10:23 | 21.6 | 17.3 | 8.92 | 5.0 | 7.29 |
| Site-6 | 9.23 | 18.1 | 16.8 | 11.86 | 5.9 | 7.28 |

## Groom/Lynx Lake

Groom-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH | Secchi |
|---|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | | meters |
| Site-1 | 8/6/19 13:16 | 23.5 | 23.6 | 8.00 | 2.5 | 7.1 | 2.8 bot |
| Site-2 | 13:23 | 23.6 | 23.9 | 7.96 | 3.5 | 6.97 | 4.3 |
| Site-3 | 13.34 | 20.9 | 27.0 | 4.43 | 4.0 | 6.51 | 4.3 |
| Site-4 | 13:50 | 18.9 | 27.4 | 4.36 | 4.4 | 6.42 | 4.3 |
| Site-5 | 14.01 | 21.8 | 27.4 | 6.08 | 3.4 | 6.70 | 4.3 |
| Site-6 | 14.09 | 23.4 | 24.9 | 7.59 | 3.5 | 6.83 | 3.8 |

## Hassard Lake

Hassard -1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/13/19 14:56 | 22.7 | 39.1 | 9.85 | 2.0 | 7.2 |
| Site-2 | 15:37 | 19.0 | 41.0 | 5.84 | 5.0 | 6.5 |
| Site-3 | 15:28 | 22.7 | 38.0 | 8.55 | 2.5 | 7.0 |
| Site-4 | 15.22 | 23.2 | 37.9 | 8.55 | 2.5 | 7.1 |
| Site-5 | 15:19 | 19.9 | 37.7 | 7.95 | 4.0 | 7.0 |
| Site-6 | 15:09 | 19.8 | 35.3 | 7.95 | 4.0 | 7.0 |

## Himbury Lake

Himbury-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH | Secchi |
|---|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | | meters |
| Site-1 | 8/12/19 13:39 | 17.1 | 20.5 | 13.11 | 5.4 | 7.10 | 4.0 |
| Site-2 | 14.12 | 18.8 | 20.6 | 12.24 | 5.4 | 7.29 | |
| Site-3 | 14:39 | 18.1 | 20.7 | 11.53 | 5.4 | 7.23 | |
| | | | | | .. | | |

## Island Lake

Island-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/15/19 10:10 | 17.0 | 18.5 | 13.0 | 5.4 | 7.13 |
| Site-2 | 10:27 | 17.7 | 19.8 | 10.1 | 6.4 | 7.20 |
| Site-3 | 10.36 | 17.3 | 19.2 | 10.98 | 6.4 | 7.24 |
| Site-4 | 10:50 | 17.3 | 19.3 | 10.76 | 6.3 | 7.18 |
| Site-5 | 11.01 | 18.5 | 19.4 | 10.57 | 6.2 | 7.22 |
| Site-6 | 11.11 | 16.3 | 19.7 | 11.17 | 6.4 | 7.03 |

## Little Clam Lake

| Little Clam Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/26/19 9:12 | 17.1 | 23.2 | 11.71 | 5.9 | 7.17 |
| Site-2 | 9:24 | 17.1 | 22.8 | 8.72 | 6.0 | 7.03 |
| Site-3 | 9.03 | 21.8 | 21.6 | 8.69 | 2.9 | 7.10 |

## Loon Lake

| Loon-1 Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/9/19 9:12 | 19.8 | 17.5 | 9.84 | 5.5 | 7.03 |
| Site-2 | 9:20 | 18.5 | 17.6 | 10.20 | 5.8 | 6.93 |
| Site-3 | 9:30 | 17.7 | 17.3 | 11.61 | 5.7 | 7.04 |
| Site-4 | 9:40 | 18.7 | 17.1 | 12.12 | 5.4 | 7.09 |
| Site-5 | 9.53 | 19.0 | 17.2 | 12.01 | 5.4 | 7.12 |
| Site-6 | 10.04 | 19.4 | 17.9 | 9.94 | 5.4 | 6.95 |

## Magnetawan Lake – not sampled in 2019

Magnetawan Lake

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH | Secchi |
|---|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | | meters |
| Site-1 | | | | | | | |
| Site-2 | | | | | | | |
| Site-3 | | | | | | | |
| Site-4 | | | | | | | |
| Site-5 | | | | | | | |
| Site-6 | | | | | | | |

## Magnetawan River

Magnetawan River

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH | |
|---|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | | |
| Site-1 | 8/27/19 10.22 | 17.9 | 32.6 | 7.60 | .1 | 6.73 | |
| Site-2 | | | | | | | Dried up |
| Site-3 | 9:34 | 13.4 | 67.2 | 8.96 | .9 | 6.64 | |
| Site-4 | | | | | | | |
| Site-6 | 16:56 | 17.3 | 42.6 | 8.13 | .1 | 6.53 | |

## Mason Lake

Mason-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/14/19 9:32 | 17.6 | 18.7 | 9.83 | 4.0 | 6.97 |
| Site-2 | 9:44 | 16.8 | 20.6 | 6.93 | 3.9 | 6.77 |
| Site-3 | 9:18 | 18.8 | 18.5 | 11.0 | 3.8 | 6.91 |

## Perry Lake

Perry Lake

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/14/19 13.07 | 19.0 | 35.4 | 10.34 | 4.4 | 7.35 |
| Site-2 | 13:17 | 17.0 | 34.8 | 11.03 | 4.6 | 7.3 |
| Site-3 | 13:26 | 15.4 | 35.6 | 9.33 | 4.9 | 7.18 |
| Site-4 | 13.39 | 19.2 | 36.1 | 10.09 | 4.4 | 7.23 |
| Site-5 | 13.50 | 20.0 | 37.7 | 9.14 | 4.0 | 7.17 |
| Site-6 | 14:01 | 19.3 | 45.5 | 3.42 | 4.8 | 6.83 |

## Peters Lake

Peter-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH |
|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | |
| Site-1 | 8/13/19 9:29 | 21.8 | 17.5 | 7.83 | 1.1 | 6.72 |
| Site-2 | 9.41 | 22.0 | 17.9 | 7.84 | 3.3 | 6.83 |
| Site-3 | 9.48 | 13.8 | 19.7 | 11.37 | 5.0 | 6.83 |

## Sand Lake

Sand-1

| Sampling site | Date Time | Temp | SpCond | DO | Depth | pH | |
|---|---|---|---|---|---|---|---|
| | D/M/Y HH:MM | C | uS | mg/L | meters | | |
| Site-1 | 8/9/19 13.47 | 19.7 | 30.5 | 8.64 | 5.2 | 7.14 | |
| Site-2 | 14:01 | 18.7 | 29.7 | 8.73 | 5.6 | 6.94 | |
| Site-3 | 14:14 | 20.7 | 31.1 | 8.61 | 5.5 | 7.17 | 3.5 |
| Site-4 | 14:26 | 23.3 | 32.0 | 8.60 | 3.8 | 7.26 | |
| Site-5 | 13.35 | 20.2 | 30.8 | 8.58 | 5.1 | 7.14 | |
| Site-6 | 13:28 | 23,5 | 35.1 | 6.11 | 1.7 | 7.19 | |

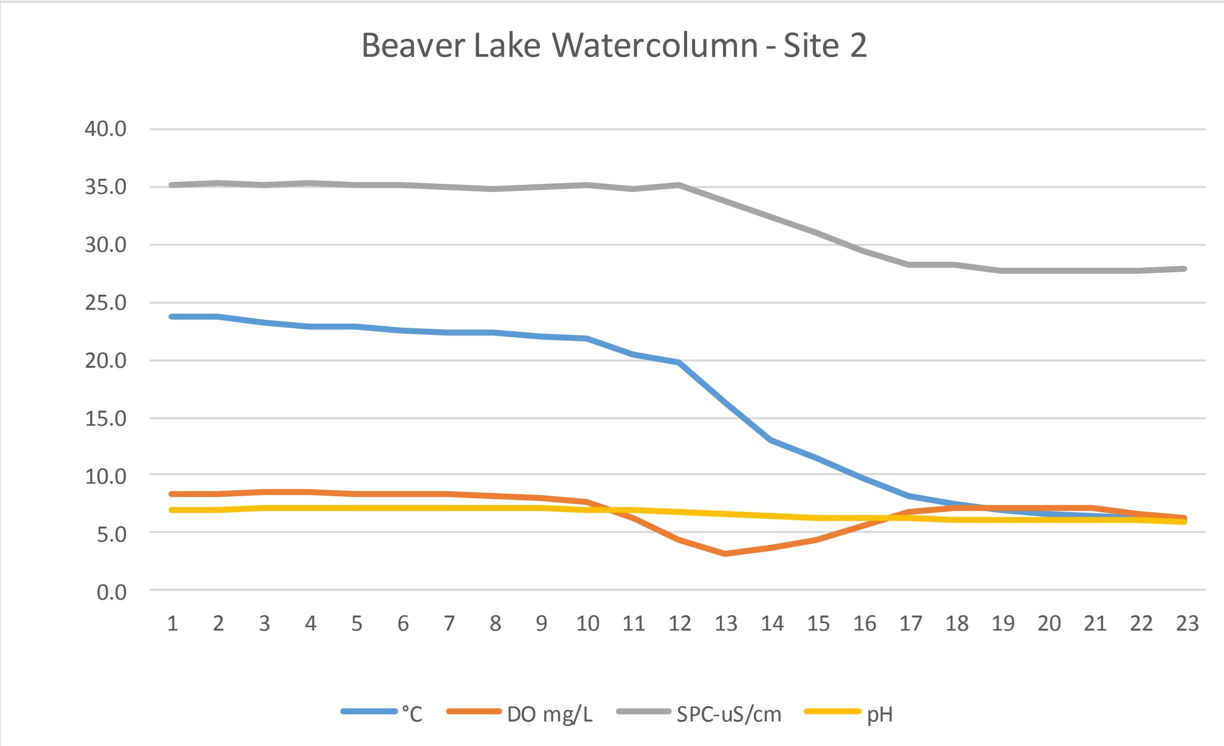
## Water column profiles for each lake

We have included an example for each lake of the readings obtained at one meter intervals at one of the deep spots on each lake and we have graphed the readings this year. We also found some interesting information on the DO and temperature requirements for various fresh water fish species which has been included in section 4.3

You will notice that in some lakes the temperature in the lake really starts to drop between 4 - 6 meters and the DO increases. Above that depth the temperature and DO is fairly uniform due to mixing by wind, waves etc. Between 4 and 7 meters the DO is higher than at the surface mainly because the colder water will absorb more oxygen. Based on the secchi disc readings sunlight can penetrate down to these depths so that photosynthesis can occur and oxygen is produced as a by product. Decomposition of plant material etc. at the lower depths consumes oxygen which is not being replenished on an ongoing basis.

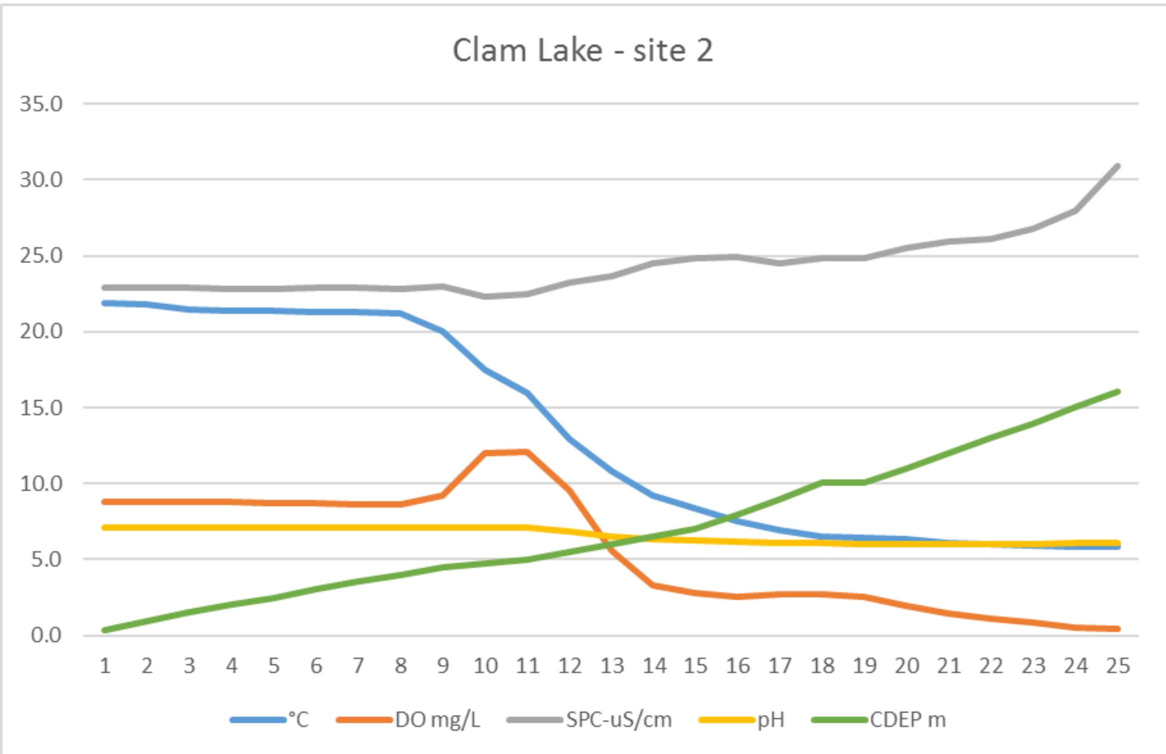
Beaver Lake Site 2

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 23.7 | 8.32 | 35.2 | 6.98 | 0.3 |
| 23.7 | 8.40 | 35.4 | 7.02 | 0.3 |
| 23.3 | 8.48 | 35.2 | 7.08 | 1.0 |
| 22.9 | 8.46 | 35.3 | 7.08 | 1.5 |
| 22.8 | 8.44 | 35.2 | 7.12 | 2.0 |
| 22.5 | 8.35 | 35.2 | 7.14 | 2.4 |
| 22.4 | 8.32 | 35.0 | 7.15 | 2.9 |
| 22.3 | 8.25 | 34.9 | 7.13 | 3.4 |
| 22.0 | 7.96 | 35.0 | 7.1 | 3.9 |
| 21.8 | 7.67 | 35.1 | 7.04 | 4.4 |
| 20.4 | 6.33 | 34.9 | 6.95 | 4.9 |
| 19.7 | 4.34 | 35.1 | 6.8 | 5.3 |
| 16.3 | 3.10 | 33.8 | 6.6 | 5.9 |
| 13.0 | 3.76 | 32.4 | 6.42 | 7.0 |
| 11.4 | 4.29 | 31.1 | 6.35 | 8.0 |
| 9.7 | 5.67 | 29.4 | 6.29 | 9.0 |
| 8.2 | 6.86 | 28.3 | 6.26 | 10.0 |
| 7.5 | 7.15 | 28.2 | 6.19 | 11.0 |
| 7.0 | 7.15 | 27.8 | 6.16 | 12.0 |
| 6.6 | 7.13 | 27.8 | 6.13 | 13.0 |
| 6.4 | 7.07 | 27.7 | 6.1 | 14.0 |
| 6.2 | 6.68 | 27.8 | 6.04 | 15.0 |
| 6.1 | 6.27 | 27.9 | 6.01 | 16.0 |



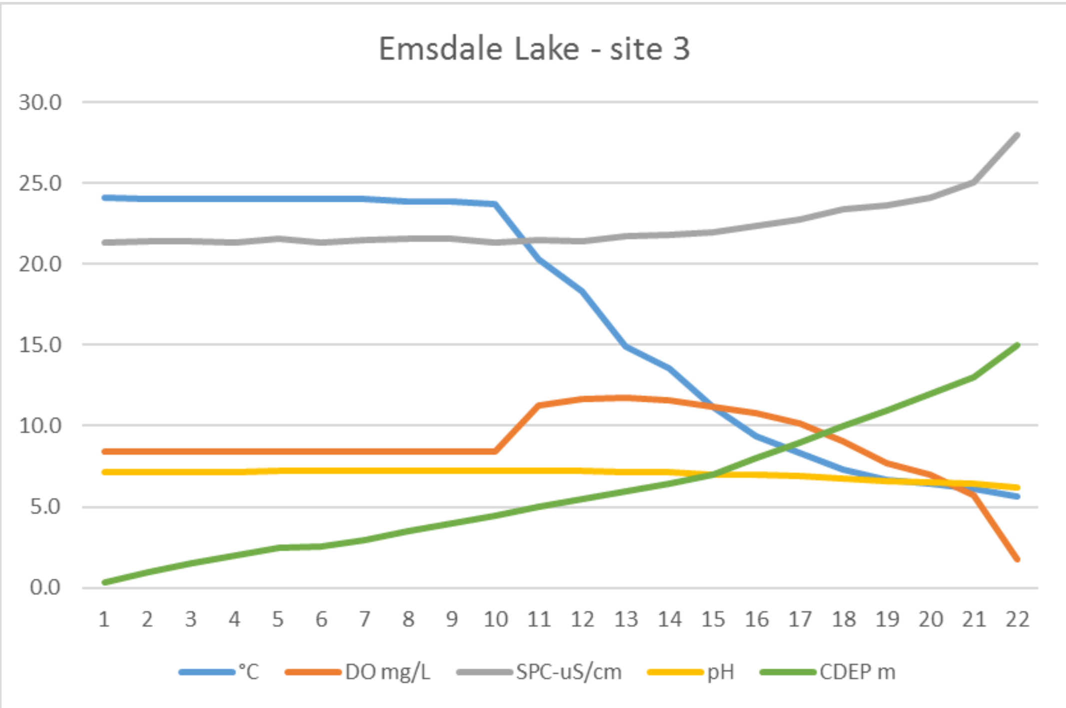
Big Clam Lake Site 2

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 21.9 | 8.76 | 22.9 | 7.13 | 0.3 |
| 21.8 | 8.77 | 22.9 | 7.13 | 1.0 |
| 21.5 | 8.78 | 22.9 | 7.13 | 1.5 |
| 21.4 | 8.76 | 22.8 | 7.14 | 2.0 |
| 21.4 | 8.74 | 22.8 | 7.13 | 2.5 |
| 21.3 | 8.67 | 22.9 | 7.13 | 3.0 |
| 21.3 | 8.66 | 22.9 | 7.13 | 3.5 |
| 21.2 | 8.65 | 22.8 | 7.13 | 4.0 |
| 20.0 | 9.17 | 23 | 7.12 | 4.5 |
| 17.5 | 11.99 | 22.3 | 7.09 | 4.7 |
| 16.0 | 12.06 | 22.5 | 7.08 | 5.0 |
| 12.9 | 9.53 | 23.2 | 6.88 | 5.5 |
| 10.8 | 5.60 | 23.7 | 6.51 | 6.0 |
| 9.2 | 3.30 | 24.5 | 6.31 | 6.5 |
| 8.4 | 2.78 | 24.8 | 6.24 | 7.0 |
| 7.5 | 2.56 | 24.9 | 6.17 | 8.0 |
| 6.9 | 2.71 | 24.5 | 6.11 | 9.0 |
| 6.5 | 2.68 | 24.8 | 6.06 | 10.0 |
| 6.4 | 2.57 | 24.8 | 6.04 | 10.0 |
| 6.3 | 1.92 | 25.5 | 6.03 | 11.0 |
| 6.1 | 1.46 | 25.9 | 6.02 | 12.0 |
| 6.0 | 1.11 | 26.1 | 6.02 | 13.0 |
| 5.9 | 0.82 | 26.8 | 6.02 | 14.0 |
| 5.8 | 0.50 | 28 | 6.05 | 15.0 |
| 5.8 | 0.42 | 30.9 | 6.06 | 16.0 |



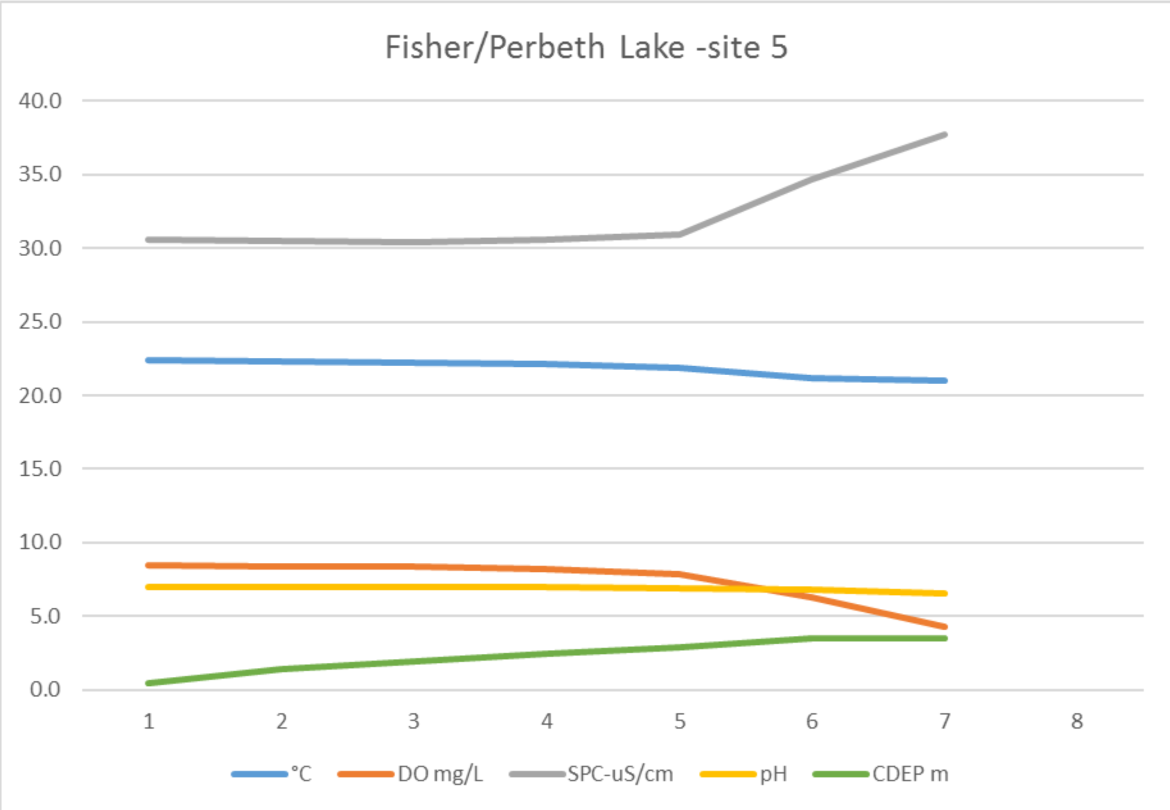
Emsdale Lake – Site 3

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 24.1 | 8.41 | 21.3 | 7.17 | 0.3 |
| 24.0 | 8.43 | 21.4 | 7.18 | 1.0 |
| 24.0 | 8.44 | 21.4 | 7.18 | 1.5 |
| 24.0 | 8.45 | 21.3 | 7.18 | 2.0 |
| 24.0 | 8.45 | 21.6 | 7.19 | 2.5 |
| 24.0 | 8.45 | 21.3 | 7.20 | 2.5 |
| 24.0 | 8.44 | 21.5 | 7.19 | 3.0 |
| 23.9 | 8.43 | 21.6 | 7.21 | 3.5 |
| 23.9 | 8.43 | 21.6 | 7.20 | 4.0 |
| 23.7 | 8.45 | 21.3 | 7.19 | 4.5 |
| 20.3 | 11.27 | 21.5 | 7.21 | 5.0 |
| 18.3 | 11.69 | 21.4 | 7.19 | 5.5 |
| 14.9 | 11.77 | 21.7 | 7.15 | 6.0 |
| 13.6 | 11.58 | 21.8 | 7.12 | 6.5 |
| 11.2 | 11.18 | 22.0 | 7.01 | 7.0 |
| 9.4 | 10.81 | 22.4 | 6.95 | 8.0 |
| 8.3 | 10.12 | 22.8 | 6.88 | 9.0 |
| 7.3 | 9.04 | 23.4 | 6.75 | 10.0 |
| 6.7 | 7.71 | 23.6 | 6.58 | 11.0 |
| 6.4 | 7.02 | 24.1 | 6.52 | 12.0 |
| 6.1 | 5.75 | 25.1 | 6.43 | 13.0 |
| 5.6 | 1.73 | 28.0 | 6.20 | 15.0 |



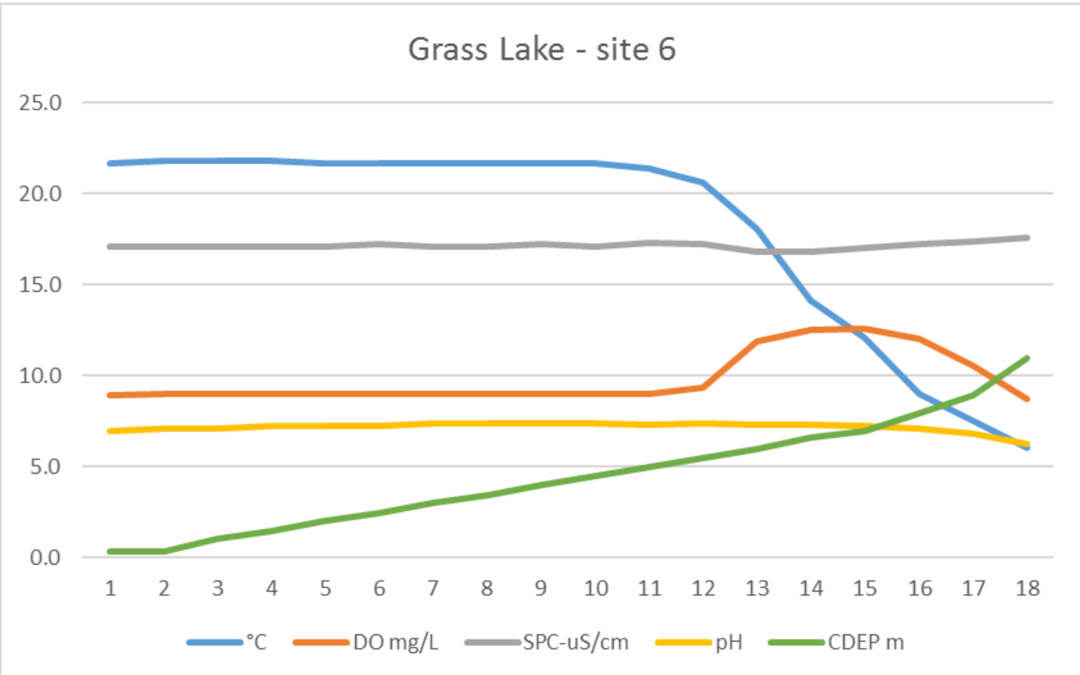
Fisher / Perbeth Lake Site 5

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 22.4 | 8.43 | 30.6 | 6.99 | 0.47 |
| 22.3 | 8.39 | 30.5 | 6.98 | 1.44 |
| 22.2 | 8.37 | 30.4 | 6.97 | 1.90 |
| 22.1 | 8.19 | 30.6 | 6.96 | 2.44 |
| 21.9 | 7.87 | 30.9 | 6.94 | 2.94 |
| 21.2 | 6.33 | 34.7 | 6.8 | 3.47 |
| 21.0 | 4.32 | 37.7 | 6.59 | 3.51 |



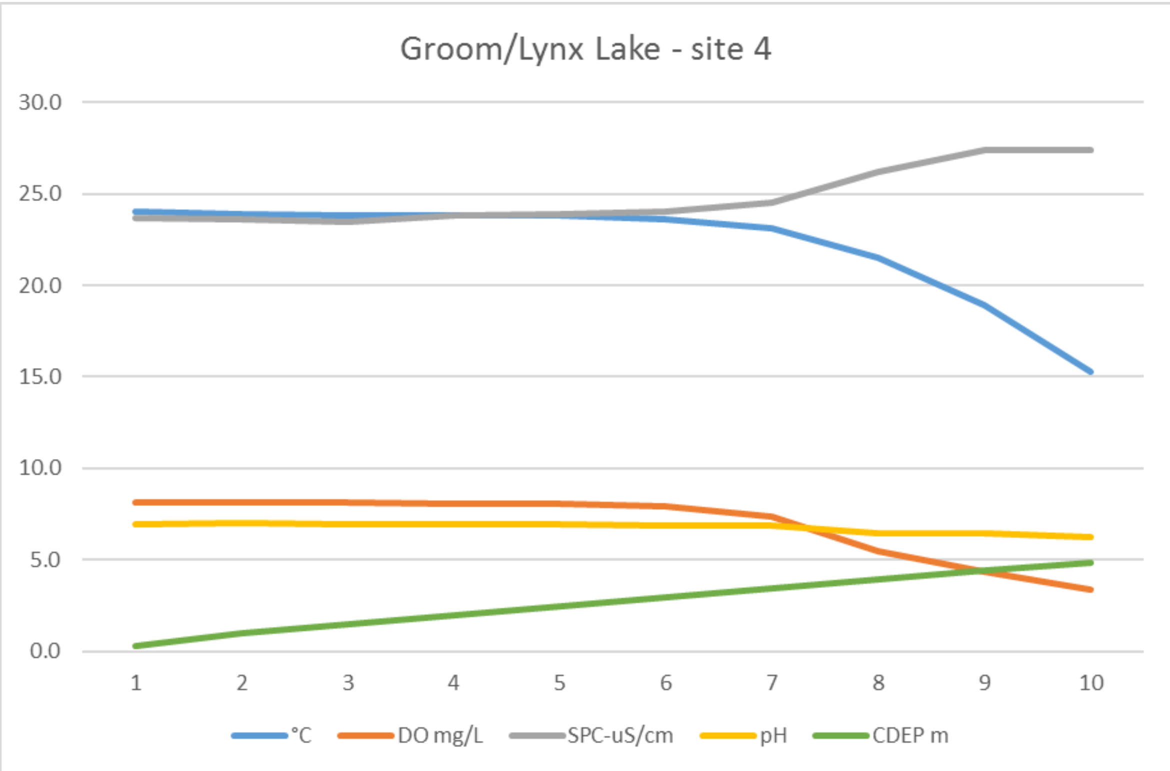
Grass Lake Site 6

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 21.7 | 8.92 | 17.1 | 6.98 | 0.34 |
| 21.8 | 8.96 | 17.1 | 7.07 | 0.35 |
| 21.8 | 8.97 | 17.1 | 7.06 | 1.00 |
| 21.8 | 9.01 | 17.1 | 7.23 | 1.46 |
| 21.7 | 9.00 | 17.1 | 7.23 | 2.04 |
| 21.7 | 9.01 | 17.2 | 7.26 | 2.46 |
| 21.7 | 9.00 | 17.1 | 7.35 | 3.00 |
| 21.7 | 9.00 | 17.1 | 7.34 | 3.45 |
| 21.7 | 8.99 | 17.2 | 7.34 | 3.99 |
| 21.7 | 8.99 | 17.1 | 7.36 | 4.49 |
| 21.4 | 8.98 | 17.3 | 7.32 | 5.01 |
| 20.6 | 9.32 | 17.2 | 7.34 | 5.45 |
| 18.1 | 11.86 | 16.8 | 7.28 | 5.93 |
| 14.1 | 12.54 | 16.8 | 7.27 | 6.57 |
| 12.1 | 12.61 | 17.0 | 7.23 | 6.95 |
| 9.0 | 12.05 | 17.2 | 7.10 | 7.92 |
| 7.5 | 10.55 | 17.4 | 6.83 | 8.91 |
| 6.0 | 8.73 | 17.6 | 6.25 | 10.94 |



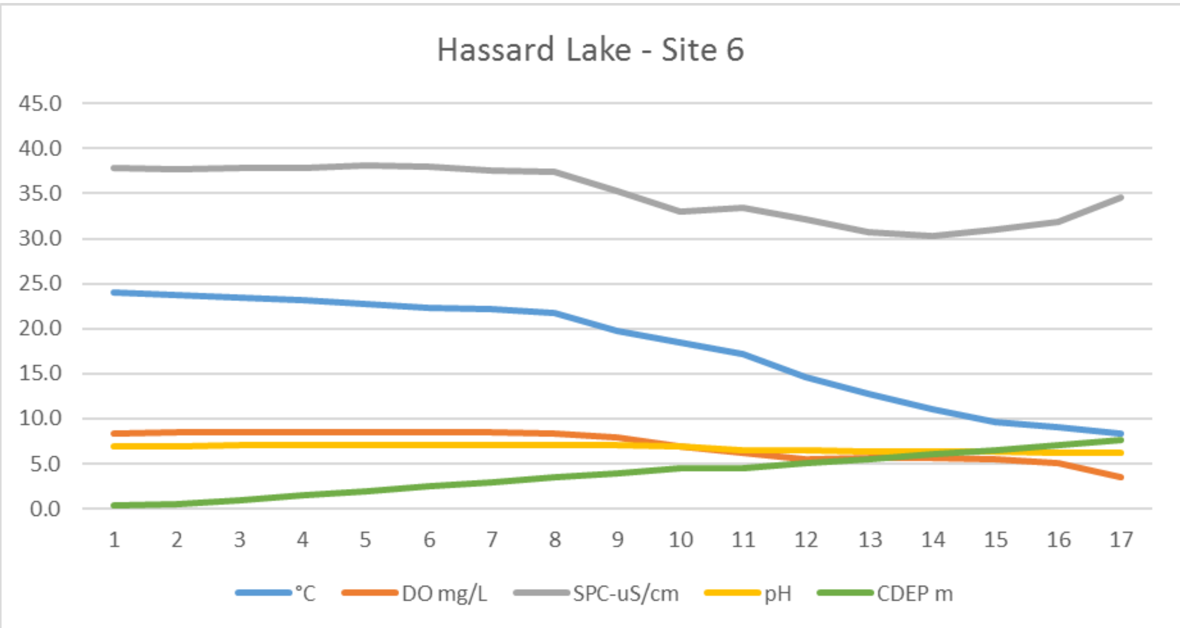
Groom / Lynx Lake Site 4

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 24.0 | 8.14 | 23.7 | 6.95 | 0.32 |
| 23.9 | 8.13 | 23.6 | 6.98 | 0.99 |
| 23.8 | 8.12 | 23.5 | 6.95 | 1.49 |
| 23.8 | 8.08 | 23.8 | 6.96 | 1.97 |
| 23.8 | 8.04 | 23.9 | 6.93 | 2.48 |
| 23.6 | 7.91 | 24.0 | 6.9 | 2.95 |
| 23.1 | 7.38 | 24.5 | 6.88 | 3.46 |
| 21.5 | 5.49 | 26.2 | 6.46 | 3.90 |
| 18.9 | 4.36 | 27.4 | 6.42 | 4.44 |
| 15.3 | 3.35 | 27.4 | 6.26 | 4.85 |



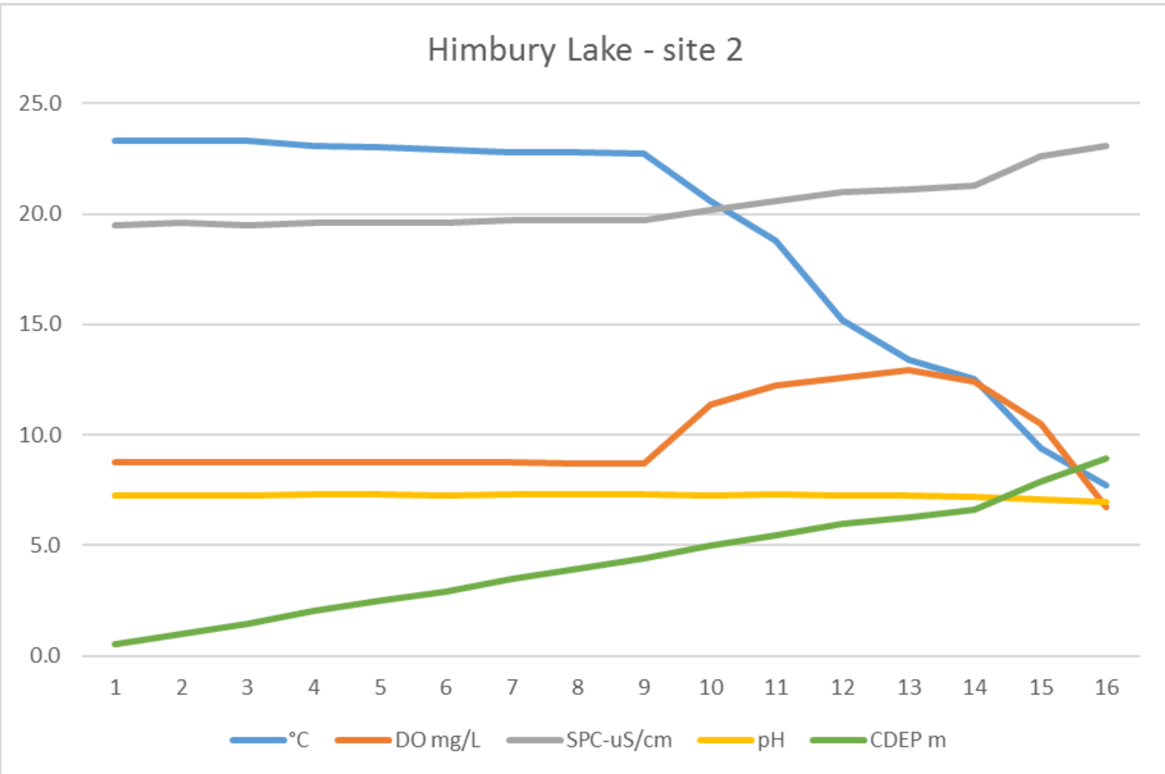
Hassard Lake Site 6

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 24.0 | 8.29 | 37.9 | 6.95 | 0.4 |
| 23.7 | 8.44 | 37.7 | 6.98 | 0.5 |
| 23.5 | 8.50 | 37.8 | 7.02 | 1.0 |
| 23.2 | 8.48 | 37.9 | 7.04 | 1.5 |
| 22.8 | 8.48 | 38.1 | 7.07 | 2.0 |
| 22.3 | 8.44 | 38.0 | 7.07 | 2.5 |
| 22.1 | 8.45 | 37.5 | 7.05 | 3.0 |
| 21.8 | 8.37 | 37.4 | 7.05 | 3.5 |
| 19.8 | 7.95 | 35.3 | 7.02 | 4.0 |
| 18.4 | 6.88 | 33.0 | 6.92 | 4.5 |
| 17.2 | 6.28 | 33.4 | 6.53 | 4.5 |
| 14.6 | 5.54 | 32.1 | 6.46 | 5.0 |
| 12.7 | 5.57 | 30.7 | 6.42 | 5.5 |
| 11.0 | 5.60 | 30.3 | 6.36 | 6.0 |
| 9.7 | 5.53 | 31.0 | 6.3 | 6.5 |
| 9.1 | 5.01 | 31.9 | 6.24 | 7.0 |
| 8.3 | 3.47 | 34.5 | 6.15 | 7.7 |



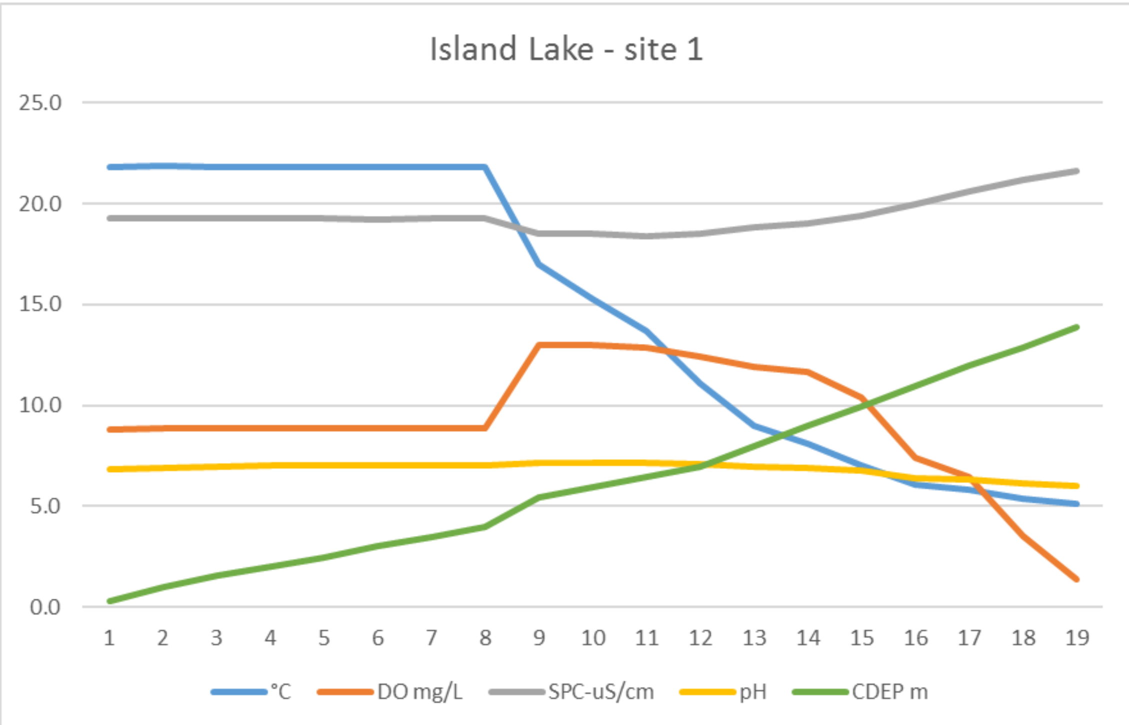
Himbury Lake Site 2

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 23.3 | 8.75 | 19.5 | 7.23 | 0.55 |
| 23.3 | 8.76 | 19.6 | 7.23 | 0.99 |
| 23.3 | 8.77 | 19.5 | 7.27 | 1.49 |
| 23.1 | 8.77 | 19.6 | 7.29 | 2.03 |
| 23.0 | 8.76 | 19.6 | 7.29 | 2.51 |
| 22.9 | 8.75 | 19.6 | 7.28 | 2.91 |
| 22.8 | 8.75 | 19.7 | 7.3 | 3.47 |
| 22.8 | 8.70 | 19.7 | 7.31 | 3.95 |
| 22.7 | 8.70 | 19.7 | 7.3 | 4.42 |
| 20.6 | 11.35 | 20.2 | 7.28 | 4.99 |
| 18.8 | 12.24 | 20.6 | 7.29 | 5.43 |
| 15.2 | 12.61 | 21.0 | 7.28 | 5.97 |
| 13.4 | 12.93 | 21.1 | 7.28 | 6.29 |
| 12.5 | 12.43 | 21.3 | 7.22 | 6.60 |
| 9.4 | 10.51 | 22.6 | 7.11 | 7.90 |
| 7.7 | 6.71 | 23.1 | 6.95 | 8.91 |



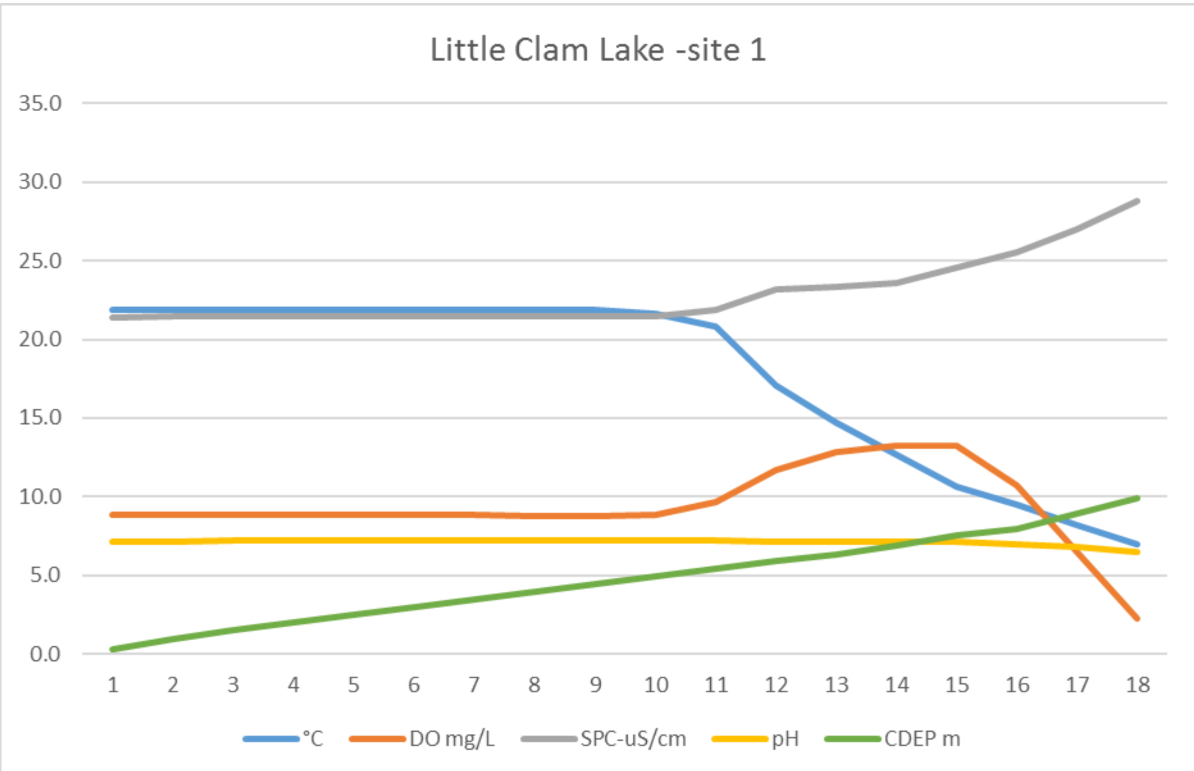
Island Lake Site 1

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 21.8 | 8.83 | 19.3 | 6.83 | 0.3 |
| 21.9 | 8.88 | 19.3 | 6.93 | 1.0 |
| 21.8 | 8.89 | 19.3 | 6.97 | 1.6 |
| 21.8 | 8.89 | 19.3 | 7.01 | 2.0 |
| 21.8 | 8.89 | 19.3 | 7.01 | 2.4 |
| 21.8 | 8.88 | 19.2 | 7.02 | 3.0 |
| 21.8 | 8.88 | 19.3 | 7.03 | 3.5 |
| 21.8 | 8.87 | 19.3 | 7.04 | 4.0 |
| 17.0 | 12.99 | 18.5 | 7.13 | 5.4 |
| 15.3 | 12.98 | 18.5 | 7.14 | 6.0 |
| 13.7 | 12.87 | 18.4 | 7.15 | 6.4 |
| 11.1 | 12.45 | 18.5 | 7.08 | 6.9 |
| 9.0 | 11.94 | 18.8 | 6.98 | 8.0 |
| 8.1 | 11.63 | 19.0 | 6.93 | 9.0 |
| 7.0 | 10.36 | 19.4 | 6.76 | 10.0 |
| 6.1 | 7.42 | 20.0 | 6.42 | 10.9 |
| 5.8 | 6.45 | 20.6 | 6.33 | 12.0 |
| 5.4 | 3.56 | 21.2 | 6.12 | 12.9 |
| 5.1 | 1.36 | 21.6 | 6.03 | 13.9 |



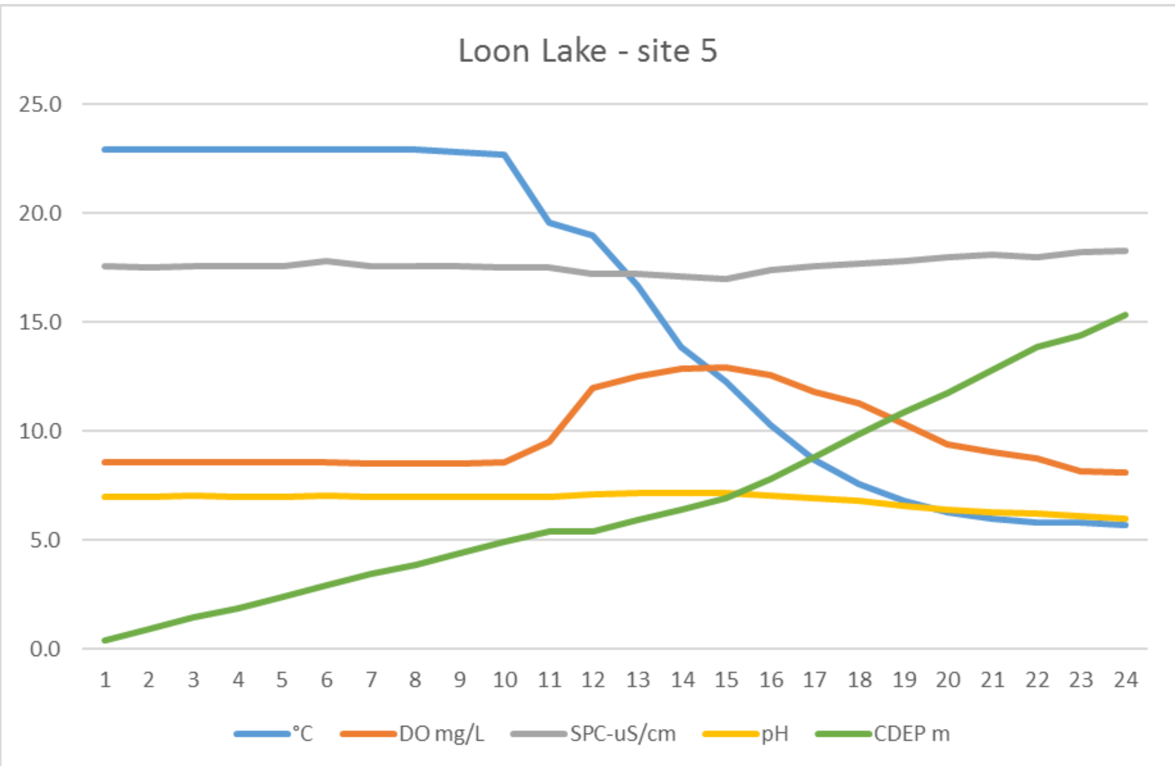
Little Clam Lake – Site 1

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 21.9 | 8.83 | 21.4 | 7.16 | 0.3 |
| 21.9 | 8.82 | 21.5 | 7.16 | 1.0 |
| 21.9 | 8.82 | 21.5 | 7.18 | 1.5 |
| 21.9 | 8.82 | 21.5 | 7.19 | 2.0 |
| 21.9 | 8.82 | 21.5 | 7.19 | 2.5 |
| 21.9 | 8.81 | 21.5 | 7.2 | 3.0 |
| 21.9 | 8.81 | 21.5 | 7.2 | 3.4 |
| 21.9 | 8.80 | 21.5 | 7.18 | 3.9 |
| 21.9 | 8.80 | 21.5 | 7.2 | 4.4 |
| 21.6 | 8.87 | 21.5 | 7.19 | 4.9 |
| 20.8 | 9.70 | 21.9 | 7.19 | 5.4 |
| 17.1 | 11.71 | 23.2 | 7.17 | 5.9 |
| 14.7 | 12.80 | 23.3 | 7.16 | 6.4 |
| 12.7 | 13.21 | 23.6 | 7.14 | 6.9 |
| 10.6 | 13.25 | 24.6 | 7.12 | 7.6 |
| 9.5 | 10.75 | 25.5 | 6.98 | 8.0 |
| 8.2 | 6.51 | 27.0 | 6.8 | 8.9 |
| 7.0 | 2.24 | 28.8 | 6.46 | 9.9 |



Loon L:ake Site 3

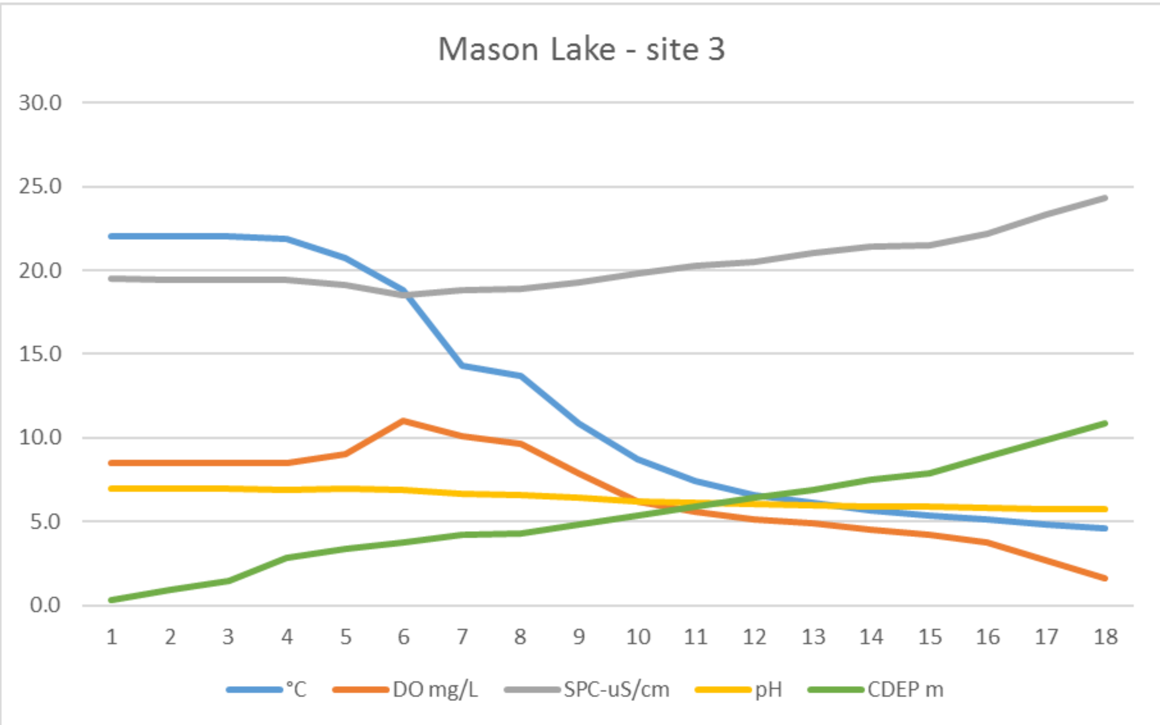
| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 22.9 | 8.57 | 17.6 | 6.99 | 0.4 |
| 22.9 | 8.57 | 17.5 | 6.97 | 1.0 |
| 22.9 | 8.57 | 17.6 | 7.04 | 1.5 |
| 22.9 | 8.57 | 17.6 | 7.01 | 1.9 |
| 22.9 | 8.56 | 17.6 | 7.02 | 2.4 |
| 22.9 | 8.56 | 17.8 | 7.03 | 2.9 |
| 22.9 | 8.55 | 17.6 | 7.02 | 3.4 |
| 22.9 | 8.54 | 17.6 | 7.02 | 3.9 |
| 22.8 | 8.53 | 17.6 | 7.00 | 4.4 |
| 22.7 | 8.58 | 17.5 | 6.99 | 4.9 |
| 19.6 | 9.54 | 17.5 | 7.00 | 5.4 |
| 19.0 | 12.01 | 17.2 | 7.12 | 5.4 |
| 16.7 | 12.51 | 17.2 | 7.15 | 5.9 |
| 13.9 | 12.89 | 17.1 | 7.17 | 6.4 |
| 12.3 | 12.96 | 17.0 | 7.16 | 6.9 |
| 10.3 | 12.60 | 17.4 | 7.06 | 7.8 |
| 8.7 | 11.80 | 17.6 | 6.95 | 8.8 |
| 7.6 | 11.26 | 17.7 | 6.81 | 9.9 |
| 6.8 | 10.32 | 17.8 | 6.61 | 10.9 |
| 6.3 | 9.38 | 18.0 | 6.42 | 11.8 |
| 6.0 | 9.07 | 18.1 | 6.30 | 12.8 |
| 5.8 | 8.74 | 18.0 | 6.21 | 13.8 |
| 5.8 | 8.18 | 18.2 | 6.10 | 14.4 |
| 5.7 | 8.11 | 18.3 | 5.99 | 15.3 |



Magnetawan Lake Site 4 – no sample data in 2019

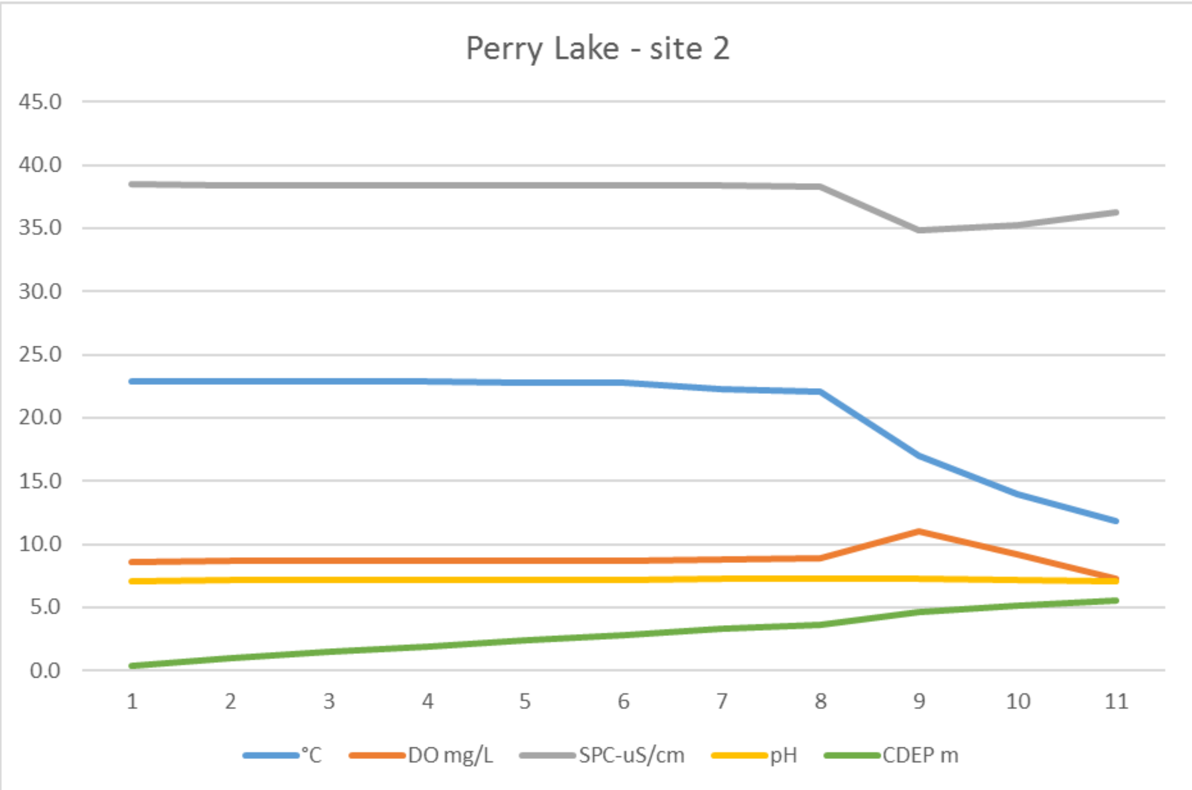
Mason Lake Site 3

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 22.0 | 8.51 | 19.5 | 6.98 | 0.3 |
| 22.0 | 8.51 | 19.4 | 6.98 | 0.9 |
| 22.0 | 8.51 | 19.4 | 6.96 | 1.5 |
| 21.9 | 8.50 | 19.4 | 6.92 | 2.9 |
| 20.7 | 9.04 | 19.1 | 6.94 | 3.4 |
| 18.8 | 10.99 | 18.5 | 6.91 | 3.8 |
| 14.3 | 10.13 | 18.8 | 6.68 | 4.2 |
| 13.7 | 9.66 | 18.9 | 6.61 | 4.3 |
| 10.9 | 7.85 | 19.3 | 6.42 | 4.9 |
| 8.7 | 6.21 | 19.8 | 6.23 | 5.4 |
| 7.4 | 5.57 | 20.3 | 6.14 | 5.9 |
| 6.6 | 5.15 | 20.5 | 6.05 | 6.4 |
| 6.1 | 4.87 | 21.0 | 5.96 | 6.9 |
| 5.7 | 4.52 | 21.4 | 5.90 | 7.5 |
| 5.4 | 4.22 | 21.5 | 5.87 | 7.9 |
| 5.1 | 3.79 | 22.2 | 5.83 | 8.8 |
| 4.8 | 2.70 | 23.3 | 5.77 | 9.8 |
| 4.6 | 1.58 | 24.3 | 5.75 | 10.9 |



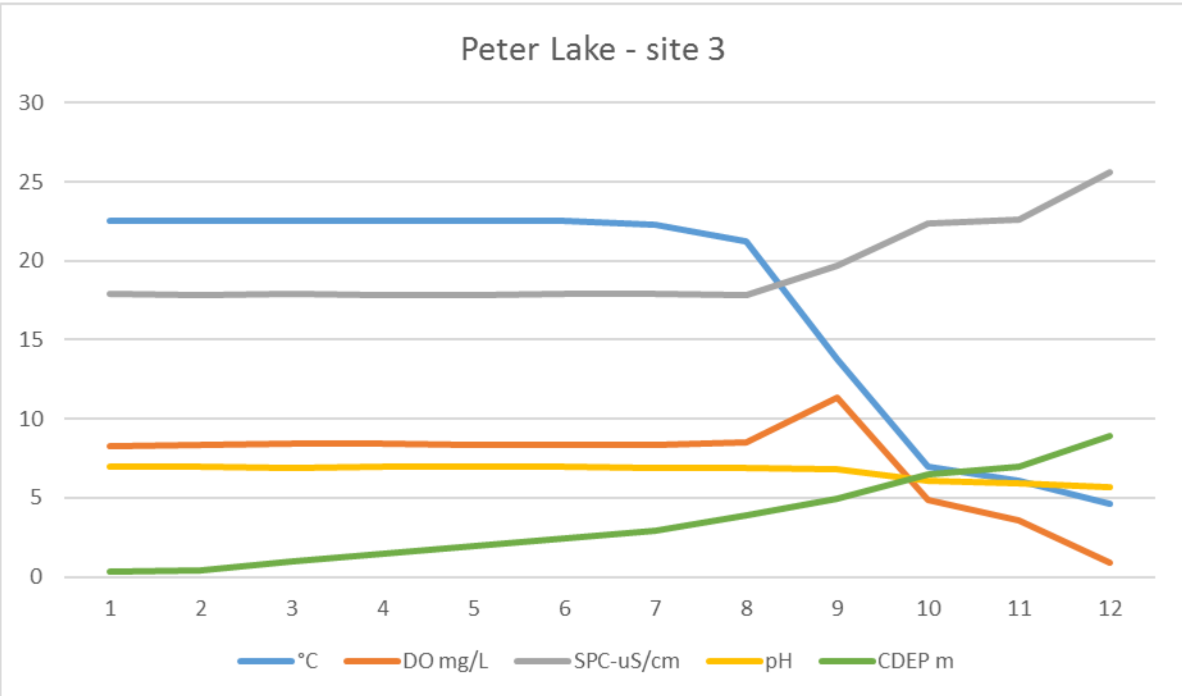
Perry Lake Site 2

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 22.9 | 8.61 | 38.5 | 7.09 | 0.361 |
| 22.9 | 8.68 | 38.4 | 7.13 | 0.9 |
| 22.9 | 8.69 | 38.4 | 7.15 | 1.5 |
| 22.9 | 8.70 | 38.4 | 7.16 | 1.9 |
| 22.8 | 8.69 | 38.4 | 7.19 | 2.4 |
| 22.8 | 8.70 | 38.4 | 7.21 | 2.8 |
| 22.3 | 8.78 | 38.4 | 7.23 | 3.4 |
| 22.1 | 8.84 | 38.3 | 7.24 | 3.6 |
| 17.0 | 11.03 | 34.8 | 7.26 | 4.6 |
| 14.0 | 9.18 | 35.2 | 7.17 | 5.1 |
| 11.8 | 7.22 | 36.3 | 7.02 | 5.5 |



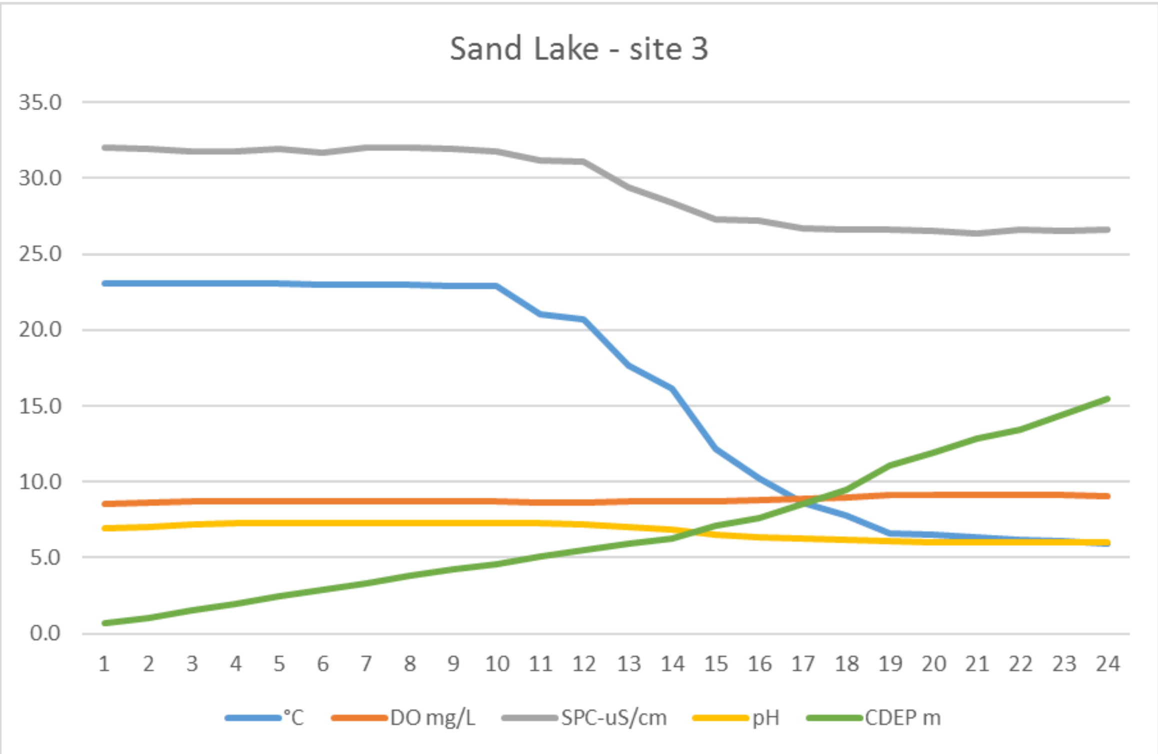
Peter Lake Site 2

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 22.5 | 8.28 | 17.9 | 6.94 | 0.3 |
| 22.5 | 8.39 | 17.8 | 6.94 | 0.4 |
| 22.5 | 8.40 | 17.9 | 6.92 | 1.0 |
| 22.5 | 8.40 | 17.8 | 6.94 | 1.5 |
| 22.5 | 8.39 | 17.8 | 6.95 | 2.0 |
| 22.5 | 8.38 | 17.9 | 6.95 | 2.5 |
| 22.3 | 8.32 | 17.9 | 6.93 | 3.0 |
| 21.2 | 8.50 | 17.8 | 6.89 | 3.9 |
| 13.8 | 11.37 | 19.7 | 6.83 | 5.0 |
| 7.0 | 4.90 | 22.4 | 6.11 | 6.5 |
| 6.1 | 3.56 | 22.6 | 5.96 | 6.9 |
| 4.6 | 0.90 | 25.6 | 5.68 | 8.9 |



Sand Lake Site 5

| °C | DO mg/L | SPC-uS/cm | pH | CDEP m |
|---|---|---|---|---|
| 23.1 | 8.55 | 32.0 | 6.96 | 0.7 |
| 23.1 | 8.63 | 31.9 | 7.05 | 1.0 |
| 23.1 | 8.67 | 31.8 | 7.21 | 1.5 |
| 23.1 | 8.68 | 31.8 | 7.28 | 2.0 |
| 23.1 | 8.68 | 31.9 | 7.27 | 2.4 |
| 23.0 | 8.68 | 31.7 | 7.29 | 2.9 |
| 23.0 | 8.68 | 32.0 | 7.29 | 3.3 |
| 23.0 | 8.68 | 32.0 | 7.29 | 3.8 |
| 22.9 | 8.68 | 31.9 | 7.29 | 4.2 |
| 22.9 | 8.67 | 31.8 | 7.29 | 4.6 |
| 21.0 | 8.63 | 31.2 | 7.23 | 5.1 |
| 20.7 | 8.61 | 31.1 | 7.17 | 5.5 |
| 17.7 | 8.67 | 29.4 | 7.03 | 5.9 |
| 16.1 | 8.69 | 28.4 | 6.85 | 6.3 |
| 12.2 | 8.70 | 27.3 | 6.47 | 7.1 |
| 10.2 | 8.81 | 27.2 | 6.35 | 7.6 |
| 8.6 | 8.91 | 26.7 | 6.26 | 8.5 |
| 7.8 | 8.94 | 26.6 | 6.18 | 9.5 |
| 6.6 | 9.11 | 26.6 | 6.08 | 11.1 |
| 6.5 | 9.12 | 26.5 | 6.04 | 11.9 |
| 6.3 | 9.12 | 26.4 | 6.01 | 12.8 |
| 6.2 | 9.10 | 26.6 | 6.00 | 13.4 |
| 6.1 | 9.10 | 26.5 | 5.96 | 14.5 |
| 5.9 | 9.08 | 26.6 | 5.97 | 15.5 |



**Nitrate & Ortho-phosphate Results**

As previously mentioned, we didn't continue our baseline study on Nitrates and Ortho-phosphates in the remaining 5 lakes in the Kearney watershed in 2019. We did 5 lakes in 2017 – Perry, Hassard, Beaver, Groom/Lynx and Fisher and 5 in 2018 –Sand, Himbury, Grass, Loon & Big Clam in 2018. We had an opportunity to do a Benthic Study on the mine site in 2019 and asked the Town to help fund that and skipped completing the orthophosphate baseline study on the remaining 5 lakes (Mason, Island, Peter, Emsdale & Little Clam) until 2020. Because of Covid- 19 everything has been put off until 2021.

# Total Phosphorous, Secchi and Calcium Data
# Made available by the
# Dorset Environmental Science Centre
# Lake Partner Program
# from
# Water Samples & Secchi Data
# Collected by Kearney Watershed LP Volunteers
# Lab Analysis Performed by DESC

## Canadian total phosphorous trigger ranges (CCME, 2004)

| **Trophic Status** | **Total Phosphorous** |
|---|---|
| **(ug/L) Ultra-oligotrophic** | **< 4** |
| **Oligotrophic** | **4 - 10** |
| **Mesotrophic** | **10 -- 20** |
| **Meso-eutrophic** | **20 – 35** |
| **Eutrophic** | **.35 - 100** |
| **Hyper-eutrophic** | **> 100** |

** **Most of the lakes on the shield will be Oligotrophic****

## Calcium Level Ranges in Watershed Lakes

**Taken from Muskoka Watershed Report**

| | |
|---|---|
| **>2.0 mg/L** | **lake is not under stress** |
| **1-5 – 2.0 mg/L** | **lake is vulnerable** |
| **< 1.5 mg/L** | **lake is under stress** |

**Generally Daphnia die when calcium levels are < 1.5 mg/L**

**Total Phosphorous Data 2019 - (ug/L)**

| Lake Name | Township | STN | Site ID | Date | TP1 | TP2 |
|---|---|---|---|---|---|---|
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 30-05-04 | 6.9 | 6.7 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 06-06-05 | 4.6 | 5.2 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 27-05-06 | 6.3 | 4.9 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 26-05-07 | 4.8 | 4.4 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 31-05-08 | 4.9 | 3.8 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 06-06-09 | 4.7 | 5.1 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 24-05-10 | 5.6 | 5.2 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 05-06-11 | 7.6 | 6.6 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 05-06-12 | 5.4 | 5.6 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 25-05-19 | 6.4 | 6.8 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 06-06-14 | 5.6 | 5.6 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 26-05-15 | 55.4 | 44.8 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 02-06-16 | 4.8 | 4.8 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 23-05-17 | 7.6 | 8 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 01-06-04 | 13.5 | 13.3 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 03-06-05 | 5.5 | 6.8 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 06-06-06 | 7 | 5.6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 11-06-07 | 5.2 | 5.4 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 24-05-09 | 6.8 | 8.2 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 13-06-10 | 4.4 | 4.6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 22-05-11 | 8.4 | 8.6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 29-05-12 | 6.2 | 5.6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 27-05-13 | 5.2 | 6.4 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 10-06-14 | 8.8 | 8.6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 11-07-16 | 3.4 | 4 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 14-06-17 | 10 | 11.8 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 15-06-18 | 9.8 | 9.6 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 25-05-04 | 5.3 | 4.5 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 21-05-05 | 3.3 | 3.7 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 24-05-06 | 3.9 | 3.7 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 03-06-07 | 3.2 | 3.2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 08-06-08 | 3.7 | 4.3 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 15-05-09 | 9.4 | 5.5 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 10-05-10 | 3.6 | 3.2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 08-05-11 | 6.2 | 5.8 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 11-05-12 | 3.4 | 3.4 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 17-05-13 | 5 | 6 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 19-05-14 | 5.4 | 5.8 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 09-05-15 | 10.6 | 11.4 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 18-05-16 | 3.4 | 4 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 21-05-18 | 6.4 | 8.2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 22-06-19 | 3.6 | 5.2 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 22-05-04 | 7 | 5.2 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 22-05-05 | 3 | 4 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 19-06-06 | 7 | 9 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 30-06-07 | 5.6 | 6.5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 01-07-08 | 4.9 | 3.2 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 09-06-09 | 4 | 4.3 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 04-07-10 | 4.4 | 6.8 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 03-07-11 | 4.6 | 4.8 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 09-07-12 | 3.6 | 4.4 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 17-07-13 | 4.4 | 7.6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 30-06-14 | 3.2 | 3.4 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 26-06-15 | 4.2 | 3.4 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 19-07-16 | 3.2 | 3.2 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 09-07-17 | 3.4 | 4.2 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 09-08-18 | 6.4 | 6.2 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 22-07-19 | 6.4 | 7 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 28-05-04 | 7.5 | 6.8 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 08-05-05 | 6.4 | 6.4 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 09-05-06 | 8.3 | 7.7 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 12-05-07 | 6.8 | 7.6 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 11-05-08 | 6.2 | 8.2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 18-05-09 | 9.6 | 8.5 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 01-06-10 | 5 | 5.2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 27-05-11 | 8.4 | 10.8 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 20-05-12 | 7 | 6.8 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 20-05-13 | 9.6 | 8 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 26-05-14 | 7 | 7.2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 18-05-15 | 13.4 | 14.4 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 22-05-16 | 7.6 | 8.2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 15-05-17 | 5.4 | 5.6 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 20-05-18 | 9.8 | 9.2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 19-05-19 | 6.8 | 6 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 29-05-04 | 8.1 | 7.6 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 05-06-05 | 5.9 | 7.1 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 28-05-06 | 7.6 | 7.4 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 26-05-07 | 6.3 | 6.8 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 31-05-08 | 7.7 | 8.3 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 06-06-09 | 6.5 | 10.4 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 24-05-10 | 6.6 | 6.4 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 05-06-11 | 8.4 | 7.4 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 31-05-12 | 5.6 | 5.2 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 25-05-19 | 10.8 | 11 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 09-06-14 | 10.4 | 17.2 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 26-05-15 | 7.2 | 8.6 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 02-06-16 | 6.4 | 7.8 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 23-05-17 | 9.2 | 9.6 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 20-05-02 | 10 | 10.1 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 19-05-03 | 10.1 | 13 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 24-05-04 | 11.1 | 10.5 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 22-05-05 | 8.8 | 10.2 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 23-05-06 | 11.5 | 9.3 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 18-05-07 | 7.1 | 4.8 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 19-05-08 | 8.5 | 9.5 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 15-05-09 | 17.9 | 14.1 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 24-05-10 | 5 | 10.4 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 21-05-11 | 9.6 | 14.4 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 20-05-12 | 4.6 | 5.2 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 19-05-13 | 7.2 | 6.2 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 18-05-14 | 6.2 | 6 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 17-05-15 | 7.4 | 7.2 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 22-05-16 | 3.4 | 3.6 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 22-05-17 | 5.2 | 5.4 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 04-07-18 | 5.6 | 6 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 24-05-03 | 3.9 | 3.7 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 29-05-05 | 3.1 | 2.9 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 20-05-10 | 4.6 | 4.4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 21-05-11 | 4.8 | 4.8 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 07-05-12 | 4.6 | 4.8 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 20-05-13 | 3.8 | 4.2 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 27-05-14 | 4 | 5.2 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 14-05-15 | 4.6 | 4.2 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 24-05-16 | 4.2 | 3.6 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 28-05-17 | 3.6 | 4 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 02-06-18 | 14.6 | 6.4 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 27-05-19 | 7 | 5.2 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 01-06-04 | 8.2 | 9.6 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 17-05-07 | 5.8 | 5.7 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 28-05-08 | 3.2 | 4.2 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 22-05-09 | 6.8 | 6.1 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 21-05-10 | 9.2 | 5.8 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 30-06-11 | 4 | 3.8 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 31-05-12 | 4 | 3.2 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 05-06-13 | 4.6 | 4.4 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 30-05-14 | 3.2 | 3 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 02-06-15 | 4 | 3.8 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 31-05-16 | 3 | 3 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 07-06-17 | 3.6 | 3.6 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 03-06-18 | 3 | 4.2 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 03-06-19 | 4.2 | 4.2 |
| LONG LAKE (OLIPHANT) | PROUDFOOT | 2792 | 1 | 02-07-02 | 3.4 | 3.7 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 11-05-04 | 8.8 | 7.9 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 11-06-05 | 7.5 | 6.9 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 03-05-06 | 7.9 | 8.5 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 01-05-07 | 7.4 | 7.8 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 20-06-10 | 5 | 5 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 12-05-11 | 10.4 | 6.8 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 09-06-12 | 4.8 | 5.2 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 26-05-13 | 6.6 | 6.8 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 19-05-14 | 7.4 | 6.4 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 14-06-15 | 5.6 | 5.8 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 23-05-16 | 4.8 | 4.8 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 14-06-17 | 5.2 | 5.6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 26-05-18 | 8 | 6.6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 19-06-19 | 7.8 | 5.8 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 22-05-05 | 5.5 | 5.8 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 23-05-09 | 7.8 | 8 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 20-05-12 | 9.2 | 8.4 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 01-07-13 | 10.8 | 10.2 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 19-05-16 | 8.4 | 14 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 26-06-18 | 7.4 | 8 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 20-05-19 | 7.4 | 7.8 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 23-05-04 | 6 | 6.2 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 21-05-05 | 6.6 | 5.3 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 16-06-06 | 10.5 | 8.4 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 29-05-07 | 6.2 | 6.2 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 28-05-08 | 7 | 5.4 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 16-06-09 | 6.2 | 5.6 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 29-07-10 | 4.2 | 4.6 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 21-05-11 | 7.2 | 6.6 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 28-04-12 | 6.8 | 6.8 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 05-05-13 | 6.6 | 8.6 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 11-05-14 | 7.2 | 8.2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| PERRY LAKE | BETHUNE | 4324 | 1 | 30-04-15 | 9 | 9.8 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 31-05-16 | 16.8 | 14.4 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 19-05-04 | 5.4 | 5.1 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 22-05-07 | 20.8 | 14.4 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 13-05-08 | 17.7 | 17.2 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 11-05-09 | 16.1 | 9.9 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 04-05-10 | 11.6 | 9.8 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 09-05-11 | 6.2 | 17.6 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 14-05-12 | 11.6 | 8.4 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 06-05-13 | 6.8 | 6.4 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 08-05-14 | 7.6 | 8.2 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 16-05-05 | 5.6 | 6.9 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 18-05-09 | 2.8 | 2.9 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 28-06-10 | 5.2 | 5.8 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 25-05-11 | 4 | 4.4 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 09-06-12 | 2.8 | 2.8 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 23-05-13 | 3.6 | 3.4 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 06-06-14 | 6.6 | 8.4 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 20-05-15 | 5.2 | 7.4 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 30-05-16 | 3.4 | 4.6 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 28-05-17 | 4.2 | 5 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 24-05-18 | 3.4 | 3 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 03-07-19 | 6.6 | 5.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 20-05-02 | 7.5 | 18.9 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 17-05-03 | 9.6 | 4.3 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 24-05-04 | 7.1 | 7.1 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 22-05-05 | 5.1 | 5.1 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 12-06-06 | 5.6 | 5 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 20-05-07 | 5.4 | 5.8 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 24-05-08 | 7 | 10.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 06-06-09 | 7.9 | 8.4 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 06-05-10 | 5.6 | 5.4 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 29-05-11 | 6.8 | 7 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 24-05-12 | 4.8 | 5.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 10-06-13 | 8 | 7.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 20-06-14 | 5.6 | 5.4 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 07-06-15 | 12 | 12.4 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 23-05-16 | 5.4 | 5.4 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 22-05-17 | 6.4 | 6.8 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 21-05-18 | 6.4 | 5.8 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 18-05-19 | 6.8 | 7 |
| SAND LAKE | PROUDFOOT | 4776 | 2 | 16-05-17 | 6 | 6 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 03-07-05 | 10 | 8.4 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 18-05-09 | 12.2 | 12.3 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 05-06-10 | 8.6 | 9.4 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 12-06-11 | 9 | 9.4 |

Secchi Disk Readings

| Lake Name | Township | STN | Site ID | Year | Avg (m) | Readings |
|---|---|---|---|---|---|---|
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2005 | 3.5 | 7 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2006 | 3.4 | 8 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2007 | 5.4 | 5 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2008 | 3.5 | 9 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2009 | 3.8 | 4 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2010 | 4.3 | 7 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2011 | 4 | 8 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2018 | 2.8 | 3 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 2019 | 3.2 | 5 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 2014 | 2.9 | 6 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 2015 | 3.1 | 10 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 2016 | 3.8 | 6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2004 | 5.4 | 9 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2005 | 5 | 10 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2006 | 5.1 | 10 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2009 | 4.6 | 9 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2010 | 5.1 | 8 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2011 | 4.2 | 11 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2012 | 5.2 | 6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2013 | 5.1 | 11 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2015 | 4.5 | 9 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 2016 | 4 | 10 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2004 | 7.1 | 6 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2005 | 7 | 5 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2006 | 6.3 | 4 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2007 | 6.7 | 3 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2009 | 6.3 | 10 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2010 | 7 | 8 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2011 | 6 | 10 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2012 | 6.6 | 7 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2013 | 6.5 | 7 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2014 | 5.6 | 7 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2015 | 5.8 | 7 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2016 | 6.1 | 6 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2017 | 5.5 | 6 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 2019 | 6.5 | 3 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2004 | 3 | 3 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2005 | 5.6 | 7 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2006 | 4.6 | 7 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2008 | 5.2 | 6 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2009 | 5.9 | 9 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2010 | 5.9 | 5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2011 | 6.4 | 5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2013 | 6.5 | 6 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2015 | 5.9 | 6 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2016 | 5.8 | 6 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2017 | 4.1 | 5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2018 | 4.4 | 3 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 2019 | 5.1 | 4 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2004 | 3 | 10 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2006 | 2.7 | 13 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2007 | 2.7 | 14 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2008 | 2.4 | 12 |

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|---|---|---|---|---|---|---|
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2009 | 2.6 | 12 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2010 | 3 | 12 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2011 | 3.3 | 10 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2012 | 4.3 | 10 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2013 | 3.6 | 11 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2014 | 3.2 | 11 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2015 | 3.4 | 11 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2016 | 4 | 10 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2017 | 3.4 | 11 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2018 | 3.4 | 10 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 2019 | 3.8 | 10 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2004 | 3.5 | 1 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2005 | 3 | 8 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2006 | 2.8 | 8 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2007 | 4.7 | 5 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2008 | 2.9 | 9 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2009 | 3.4 | 4 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2010 | 3.5 | 7 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2011 | 3.3 | 8 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2018 | 2.6 | 3 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 2019 | 2.5 | 5 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 2014 | 2.5 | 6 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 2015 | 2.7 | 10 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 2016 | 3.3 | 6 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 1998 | 4.4 | 7 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 1999 | 4.3 | 7 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2000 | 4.9 | 7 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2001 | 5.4 | 7 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2002 | 4.8 | 10 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2003 | 4.2 | 2 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2004 | 4.5 | 8 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2005 | 5 | 6 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2006 | 4.3 | 8 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2007 | 5 | 7 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2008 | 6 | 6 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2009 | 4.5 | 5 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2010 | 5.2 | 5 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2011 | 4.4 | 3 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2012 | 5.4 | 5 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2013 | 4.7 | 4 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2014 | 6.1 | 4 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2015 | 5.8 | 7 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2016 | 6 | 4 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 2017 | 5.6 | 5 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2005 | 6.4 | 4 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2010 | 7.6 | 8 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2011 | 7.3 | 10 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2012 | 7.7 | 9 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2013 | 6.9 | 7 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2014 | 6 | 9 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2015 | 6.3 | 9 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2016 | 6.4 | 5 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2017 | 6 | 7 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2018 | 6.2 | 6 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 2019 | 5.4 | 5 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2004 | 6.1 | 9 |

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|---|---|---|---|---|---|---|
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2007 | 5.6 | 8 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2010 | 4.1 | 10 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2011 | 4.8 | 5 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2012 | 4.8 | 4 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2013 | 5.6 | 3 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2014 | 4.6 | 4 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 2016 | 5.3 | 30 |
| LONG LAKE (OLIPHANT) | PROUDFOOT | 2792 | 1 | 2002 | 5.5 | 1 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2004 | 3.1 | 6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2005 | 4 | 6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2006 | 2.7 | 8 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2007 | 3.3 | 7 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2010 | 6.4 | 3 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2011 | 3 | 5 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2013 | 3.4 | 6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2014 | 3.2 | 5 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2015 | 2.9 | 4 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2016 | 3.4 | 14 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2017 | 2.5 | 7 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2018 | 3.1 | 10 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 2019 | 2.9 | 3 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 2009 | 2.7 | 6 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 2011 | 3.6 | 8 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 2012 | 3.9 | 6 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 2018 | 3 | 2 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2007 | 3.7 | 5 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2008 | 2.7 | 5 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2009 | 3 | 5 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2010 | 5 | 5 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2011 | 4 | 9 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2012 | 4.2 | 7 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2013 | 3.6 | 5 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2014 | 2.8 | 8 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2015 | 2.9 | 5 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 2016 | 3.6 | 18 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 2007 | 3.5 | 5 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 2008 | 3.5 | 7 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 2009 | 3.5 | 12 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 2013 | 4 | 10 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2009 | 6.1 | 5 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2010 | 6.7 | 5 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2011 | 6.5 | 7 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2012 | 6.4 | 6 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2013 | 6.5 | 7 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2014 | 5.9 | 5 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2016 | 6.6 | 7 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2017 | 5.2 | 5 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2018 | 5.2 | 4 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 2019 | 6 | 7 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2002 | 5 | 1 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2003 | 6 | 6 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2004 | 5.3 | 8 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2005 | 5.6 | 7 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2006 | 4.6 | 6 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2007 | 4.9 | 15 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2008 | 4.9 | 14 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2009 | 4.6 | 12 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2010 | 5.1 | 14 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2011 | 5 | 14 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2012 | 5.1 | 11 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2013 | 5 | 11 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2014 | 4.4 | 10 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2015 | 4.6 | 23 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2016 | 4.4 | 12 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2017 | 4.9 | 7 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2018 | 3.2 | 12 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 2019 | 3.4 | 10 |
| SAND LAKE | PROUDFOOT | 4776 | 2 | 2017 | 2.3 | 1 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 2005 | 4.1 | 1 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 2009 | 4.3 | 1 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 2010 | 3 | 5 |

**Calcium Data**

| Lake Name | Township | STN | Site ID | Date | Calcium (mg/L) |
|---|---|---|---|---|---|
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 04-09-08 | 18 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 06-06-09 | 2.6 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 24-05-10 | 3.2 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 05-06-11 | 2.7 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 05-06-12 | 3.4 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 1 | 25-05-19 | 2.7 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 06-06-14 | 13.4 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 26-05-15 | 3.3 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 02-06-16 | 2.8 |
| BEAVER LAKE (BETHUNE) | BETHUNE | 1700 | 2 | 23-05-17 | 3.3 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 24-05-09 | 1.8 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 13-06-10 | 1.6 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 22-05-11 | 1.8 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 29-05-12 | 2 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 27-05-13 | 1.7 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 10-06-14 | 20.9 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 11-07-16 | 1.9 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 14-06-17 | 1.9 |
| CLAM LAKE (BIG CLAM) | BETHUNE | 870 | 1 | 15-06-18 | 1.9 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 18-09-08 | 2.1 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 15-05-09 | 1.8 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 10-05-10 | 1.9 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 08-05-11 | 1.9 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 11-05-12 | 2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 17-05-13 | 1.7 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 19-05-14 | 2.2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 09-05-15 | 2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 18-05-16 | 2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 21-05-18 | 2.2 |
| EMSDALE LAKE (ISLAND) | BETHUNE | 1384 | 1 | 27-06-19 | 1.9 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 29-10-08 | 1.5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 09-06-09 | 1.3 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 04-07-10 | 1.3 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 03-07-11 | 1.5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 09-07-12 | 1.7 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 17-07-13 | 1.5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 30-06-14 | 1.8 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 26-06-15 | 1.6 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 19-07-16 | 1.5 |
| GRASS LAKE (SWEENY) | PROUDFOOT | 1739 | 1 | 09-07-17 | 1.4 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 11-05-08 | 2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 18-05-09 | 1.6 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 01-06-10 | 1.7 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 27-05-11 | 1.6 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 20-05-12 | 2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 20-05-13 | 1.7 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 26-05-14 | 2 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 18-05-15 | 1.5 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 22-05-16 | 1.9 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 15-05-17 | 1.8 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 20-05-18 | 1.9 |
| GROOM LAKE (LYNX) | BETHUNE | 1779 | 1 | 19-05-19 | 1.5 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 06-06-09 | 2.5 |

| | | | | | |
|---|---|---|---|---|---|
| HASSARD LAKE | BETHUNE | 1893 | 1 | 24-05-10 | 3.4 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 05-06-11 | 2.7 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 31-05-12 | 3.4 |
| HASSARD LAKE | BETHUNE | 1893 | 1 | 25-05-19 | 2.6 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 09-06-14 | 3.5 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 26-05-15 | 3 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 02-06-16 | 2.8 |
| HASSARD LAKE | BETHUNE | 1893 | 2 | 23-05-17 | 3.1 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 19-05-08 | 2.3 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 15-05-09 | 1.8 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 24-05-10 | 2.2 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 20-05-12 | 2.3 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 19-05-13 | 1.9 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 18-05-14 | 2.3 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 17-05-15 | 1.8 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 22-05-16 | 2.2 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 22-05-17 | 2.1 |
| HIMBURY LAKE (ROCK) | PROUDFOOT | 1983 | 1 | 04-07-18 | 1.6 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 20-05-10 | 1.9 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 07-05-12 | 1.9 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 20-05-13 | 1.5 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 27-05-14 | 2 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 14-05-15 | 1.7 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 24-05-16 | 2 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 28-05-17 | 1.8 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 02-06-18 | 1.7 |
| ISLAND LAKE (PROUDFOOT) | PROUDFOOT | 2112 | 1 | 27-05-19 | 1.8 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 04-09-08 | 1.8 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 22-05-09 | 1.5 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 21-05-10 | 1.5 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 30-06-11 | 1.8 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 31-05-12 | 1.7 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 05-06-13 | 1.4 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 30-05-14 | 2 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 02-06-15 | 1.9 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 31-05-16 | 1.9 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 07-06-17 | 1.7 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 03-06-18 | 1.9 |
| LITTLE CLAM LAKE | BETHUNE | 2610 | 1 | 03-06-19 | 1.6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 20-06-10 | 1.7 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 12-05-11 | 1.5 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 09-06-12 | 2 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 26-05-13 | 1.6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 19-05-14 | 2 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 14-06-15 | 1.6 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 23-05-16 | 1.9 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 14-06-17 | 1.7 |
| MASON LAKE | PROUDFOOT | 3039 | 1 | 26-05-18 | 1.8 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 23-05-09 | 1.7 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 20-05-12 | 2.2 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 01-07-13 | 2.3 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 19-05-16 | 2.1 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 26-06-18 | 2.4 |
| PERBETH LAKE (FISHER) | BETHUNE | 4312 | 1 | 20-05-19 | 2.1 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 16-06-09 | 2.6 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 28-04-12 | 3.2 |

| | | | | | |
|---|---|---|---|---|---|
| PERRY LAKE | BETHUNE | 4324 | 1 | 05-05-13 | 2.7 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 11-05-14 | 3.4 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 30-04-15 | 3 |
| PERRY LAKE | BETHUNE | 4324 | 1 | 31-05-16 | 3.1 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 13-05-08 | 2.3 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 04-05-10 | 1.5 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 09-05-11 | 1.6 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 14-05-12 | 1.8 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 06-05-13 | 1.4 |
| PETERS LAKE | BETHUNE | 4335 | 1 | 08-05-14 | 2 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 18-05-09 | 1.4 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 28-06-10 | 1.6 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 25-05-11 | 1.5 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 09-06-12 | 1.7 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 23-05-13 | 1.4 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 06-06-14 | 1.9 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 20-05-15 | 1.7 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 30-05-16 | 1.6 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 28-05-17 | 1.5 |
| PEVENSEY LAKE (LOON) | PROUDFOOT | 4340 | 1 | 24-05-18 | 1.6 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 06-06-09 | 2.6 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 06-05-10 | 4.3 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 29-05-11 | 2.6 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 24-05-12 | 3.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 20-06-14 | 3.3 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 23-05-16 | 3.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 22-05-17 | 3.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 21-05-18 | 3.2 |
| SAND LAKE | PROUDFOOT | 4776 | 1 | 18-05-19 | 2.6 |
| WOODROW LAKE (SANDY) | BETHUNE | 892 | 1 | 05-06-10 | 1.9 |

## 6.0 Comments & Notes

**System accuracy for the following sensors**

| | | |
|---|---|---|
| Dissolved Oxygen | 0-20 mg/L range | +/- 1% of reading or .1 mg/L if greater |
| Temperature | | +/- .2 deg C |
| Conductivity | | +/- 0.5 % of reading or .001mS/cm " |
| pH | | +/- .2 units |
| Barometer | | +/- 1.5 mmHg |
| Depth | | 20m or greater cable +/- .04m |
| Turbidity | | .3 FNU or +/- 2% of reading if greater |

Please note that values were often reported to 2 decimal places to show variations but actual accuracy should be taken into consideration when looking at individual readings.

The specification data sheets for the instrument is included in the Appendix

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# 8-0 Appendix

## YSI Instrument Specifications

SPECIFICATIONS

DOCUMENT #W83-04

YSI a xylem brand

### YSI ProDSS Multiparameter Sampling Instrument

**Portable digital sampling system for the measurement of pH, ORP, dissolved oxygen (optical-based sensor), conductivity, turbidity, temperature, depth and more.**

Designed for use in applications such as surface water, groundwater, coastal waters, aquaculture, and wastewater, the rugged and reliable ProDSS allows for measurement of up to 19 parameters. The ProDSS features digital smart sensors that are automatically recognized by the instrument when connected. A backlit color display, large memory, convenient calibration procedures, rechargeable battery, and powerful PC data management program (KorDSS) make the ProDSS user friendly. The optional GPS function, wide selection of sensors, and varying cable options and lengths allow for complete customization of the ProDSS. Mil-spec (military spec) connectors and a waterproof (IP-67), rubber over-molded case ensures durability to provide years of sampling even in the harshest field conditions.

- Single cable design with lengths up to 100 meters
- User-replaceable cables provide versatility, reduce down time and reduce overall cost of ownership
- 4 port cables feature user-replaceable sensors; universal ports can accept any 4 sensors; optional depth sensor available
- ODO/CT probe and cable assemblies feature integral (built-in) optical DO and conductivity sensors; rugged ODO sensor cap with 2-year warranty is pre-installed on new assemblies
- Long-life rechargeable lithium-ion battery to power handheld and sensors
- Color display and backlit keypad allow for sampling in all lighting conditions
- Digital smart sensors are automatically recognized by the instrument and store calibration data
- Large memory (> 100,000 data sets) with extensive site list and Data ID tag capabilities
- KorDSS, a powerful PC data management program, is included with the instrument
- USB On-The-Go connector for PC connection, recharging/powering the ProDSS and connecting directly to a USB stick
- Global Positioning System (GPS) (optional)
- Rugged, waterproof case (IP-67 rated) with rubber over-mold and metal, military-spec (MS) cable connectors as well as rugged titanium sensors
- Multiple languages in handheld and KorDSS: English, Spanish, Portuguese, French, German, Italian, Japanese, Norwegian, Chinese (simplified and traditional), Korean, and Thai
- Warranty: 3-year instrument; 2-year cable assembly and sensors; 1-year pH and pH/ORP sensor modules; 6-months ammonium, nitrate and chloride sensor modules.


Parameters:
Dissolved Oxygen (Optical)
Turbidity
pH
ORP/Redox
Conductivity
Specific Conductance
Salinity
Total Dissolved Solids (TDS)
Resistivity
Seawater Density
Total Suspended Solids (TSS)
Depth
GPS Coordinates
Ammonium
Ammonia
Chloride
Nitrate
Temperature
Barometric Pressure

YSI.com/ProDSS

## ProDSS General Specifications

| | | |
|---|---|---|
| Size | Instrument:<br>4 port bulkhead with sensor guard, no depth:<br>4 port bulkhead with sensor guard, with depth:<br>ODO/CT assembly with sensor guard: | 8.3 cm width x 21.6 cm length x 5.6 cm depth (3.27 in x 8.5 in x 2.21 in)<br>42.82 cm (16.86 in) length and 4.75 cm (1.87 in) outer diameter<br>45.36 cm (17.86 in) length and 4.75 cm (1.87 in) outer diameter<br>26.14 cm (10.29 in) length and 2.46 cm (0.97 in) outer diameter |
| Handheld weight with batteries | 567 grams (1.25 lbs) | |
| Power | Rechargeable lithium-ion battery pack provides ~48 hours with the handheld only and ~20 hours with the handheld, 4 port cable and 4 smart sensors; battery recharge time is ~9 hours with the AC power adapter<br>The instrument can also be powered via AC or external power pack through the USB port | |
| Instrument operating temperature | 0 to 50 °C (32 to 122 °F) | |
| Instrument storage temperature | 0 to 45 °C (32 to 113 °F) with battery installed; 0 to 60 °C (32 to 140 °F) without battery installed | |
| Display | Color, LCD graphic display; 3.9 cm width x 6.5 cm height | |
| USB port | Built-in micro USB On-The-Go port for PC connection, recharging/powering the ProDSS and connecting directly to a USB stick | |
| Cables | ProDSS 4 port, ProDSS ODO/CT, and ProODO field cables available in 1, 4, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 meters; ProDSS 4 port cables feature an optional depth sensor; ProOBOD cable assemblies are also compatible | |
| Sensor ports | 4 port cables feature universal sensor ports that can accept any ProDSS sensor; other compatible cables feature integral sensors | |
| Warranty | 3-year instrument; 2-year bulkhead, cable assembly, sensors, and extended warranty ODO sensor cap (627180); 1-year pH and pH/ORP sensor modules, ODO sensor caps, and Li-ion battery pack; 6-months ammonium, nitrate, and chloride sensor modules | |
| Memory | > 100,000 data sets | |
| Logging modes | Single point or continuous with autostable feature | |
| GLP compliance | Yes; 400 detailed GLP records can be stored and are available to view, download, and print. | |
| Languages | English, Spanish, German, French, Italian, Norwegian, Portuguese, Japanese, Chinese (Simplified & Traditional), Korean, Thai | |
| Certifications | CEC, CE; RoHS; IP-67; WEEE; FCC; UN Part III, Section 38.3, Test methods for lithium-ion batteries (Class 9) | |
| GPS | Optional internal GPS; coordinates are stored with measurement data and site lists | |
| Sites and data ID | 100 user-defined sites and 100 user-defined data ID tags; site pictures can be sent to the handheld via KorDSS | |

## ProDSS System Specifications (Instrument, Sensor, and Cable)

| Sensor/Parameter | Range | Accuracy | Resolution | Units |
|---|---|---|---|---|
| Temperature | -5 to 70 °C (temperature compensation range for DO mg/L measurement: -5 to 50 °C) | ±0.2 °C | 0.1 °C or 0.1 °F (user selectable) | °C, °F, K |
| pH | 0 to 14 pH units | ±0.2 pH units | 0.01 pH units | pH, pH mV |
| ORP | -1999 to 1999 mV | ±20 mV | 0.1 mV | mV |
| Dissolved Oxygen | 0 to 500%, 0 to 50 mg/L | 0 to 200%: ±1% of reading or 1% saturation, whichever is greater<br>200 to 500%: ±8% of reading<br>0 to 20 mg/L: ±0.1 mg/L or 1% of reading, whichever is greater<br>20 to 50 mg/L: ±8% of reading | 0.01 mg/L and 0.1%, or 0.1 mg/L and 1% (user selectable) | % saturation, % saturation local, mg/L, ppm |
| Barometer | 375 to 825 mmHg | ±1.5 mmHg from 0 to 50 °C | 0.1 mmHg | mmHg, inHg, mbar, psi, kPa, atm |
| Conductivity | 0 to 200 mS/cm | 0 - 100 mS/cm: ±0.5% of reading or .001 mS/cm, whichever is greater<br>100 - 200 mS/cm: ±1.0% of reading | 0.001, 0.01 or 0.1 µS/cm (range dependent) | µS/cm, mS/cm |
| Specific Conductance* | 0 to 200 mS/cm | 0 - 100 mS/cm: ±0.5% of reading or .001 mS/cm, whichever is greater<br>100 - 200 mS/cm: ±1.0% of reading<br>User selectable reference temperature (15 to 25 °C; default 25 °C) and compensation coefficient (0 to 4%/°C; default 1.91%) | 0.001, 0.01, 0.1 mS/cm | µS/cm or mS/cm |
| Salinity* | 0 to 70 ppt | ±1.0% of reading or ±0.1 ppt, whichever is greater | 0.01 ppt | ppt or PSU |
| Total Dissolved Solids (TDS)* | 0 to 100 g/L | Calculated from specific conductance and a user-selectable TDS multiplier (0.30 to 1.00; default 0.65) | 0.001, 0.01, 0.1 g/L | mg/L, g/L, kg/L |
| Resistivity* | 0 to 2 Mohms | ±0.1% Full Scale | 0.001, 0.01, 0.1 ohms | ohm-cm, kohm-cm, Mohm-cm |
| Seawater Density* | 0.0 to 50.0 sigma, sigma T | - | 0.1 sigma or sigma T | Sigma, Sigma T |
| Turbidity | 0 to 4000 FNU | 0 to 999 FNU: 0.3 FNU or ±2% of reading, whichever is greater<br>1000 to 4000 FNU: ±5% of reading | 0.1 FNU | FNU, NTU |
| Total Suspended Solids (TSS)* | - | User correlated from turbidity field measurements and lab TSS measurements from grab samples | 0.01, 0.1 mg/L | mg/L |
| Ammonium** | 0 to 200 mg/L $NH_4$-N | ±10% of reading or 2 mg/L, whichever is greater | 0.01 mg/L | $NH_4$-N mg/L, $NH_4$-N mV |
| Ammonia* | 0 to 200 mg/L $NH_3$-N | - | 0.01 mg/L | $NH_3$-N mg/L |
| Chloride** | 0 to 18000 mg/L Cl | ±15% of reading or 5 mg/L, whichever is greater | 0.01 mg/L | Cl mg/L, Cl mV |
| Nitrate** | 0 to 200 mg/L $NO_3$-N | ±10% of reading or 2 mg/L, whichever is greater | 0.01 mg/L | $NO_3$-N mg/L, $NO_3$-N mV |
| Depth | 0 to 328 feet (0 to 100 m) | ±0.013 ft (±0.004 m) for 1, 4, and 10 m cables<br>±0.13 ft (±0.04 m) for cables 20 m and longer | 0.001 m or 0.01 ft | m, ft |

*Derived/calculated parameter **Freshwater only, 20 m maximum depth