

HEALTH OF LAKES – ALSCE-GORE

2023

We carried out the surveys according to the RSVL protocol (voluntary lake monitoring network) which we are part of.

The results of sampling last summer took into consideration the state of the lake levels at Lake Solar and Lake Caroline during the summer, due to work carried out on the dams at each end of Lake Solar (including one east between Lake Caroline and Solar), and then the Lake Barron dam. There was some disturbance, therefore we determined that the movement of sediments had a negative impact on the quality of the lake. However, since the data is not that different from that of 2022, we can believe that the impact is temporary and possibly not significant in the medium term.

The municipality began work by lowering the level of Lac Solar from the dam at the end of Chemin des Pionniers during the week of May 15th. On June 1st, we cleared the debris (branches, sand, stones) in preparation for repairing the buttresses. Despite some delays related to rain, work on this dam (Pionniers) was completed on June 22nd.

Rain delayed the start of work at Lake Caroline, but it began in mid-July and finished at the end of August. Then they then completed the work upstream, at Barron Lake.

Thank you to the riverside residents and others who helped clear the banks of debris accumulated over more than 50 years.

There are two fundamental measures to qualify the health of a lake:

1. Characterization of plants – observation of the aquatic ecosystem;
2. Assessment of water quality through periodic sampling, with analysis carried out via the RSVL (Voluntary Lake Monitoring Network) of which we are a part.

1. CHARACTERIZATION OF PLANTS

Aquatic plants are plants visible to the naked eye, which have leaves, a stem, roots and real vessels. Aquatic plants are generally rooted in the sediments of the littoral zone of water bodies. Aquatic plants should not be confused with algae which lack true leaves, stems and roots.

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Aquatic plants are essential to the health of the aquatic ecosystem. It is therefore completely normal, and even necessary, to have aquatic plants in your lake. On the other hand, a high density of aquatic plants can reveal excessive nutrient inputs which can cause premature eutrophication of the lake.

Invasive Aquatic Species (AIS) are invasive species of animals or plants. This category includes plants native to Quebec that can, in certain circumstances, invade bodies of water. Exotic species (EAEE) are a category of EAE coming from remote, therefore exotic, regions.

A common point brings together the majority of aquatic plants: their proliferation is favored by the supply of sediments and nutrients to bodies of water.

RESULTS

- Solar and Caroline Lakes had a “normal” and constant presence of aquatic plants while Evans Lake presented a greater abundance than last year. The high lake level didn’t help this fact – which is why Gore replaced the spillway culvert near the fire access on Sherritt Road.
- No Eurasian Watermilfoil was found in our lakes, nor was it seen in any other lakes in Gore.

CONCLUSION

- Let's continue our efforts to clean boats before putting them into the water and prevent access to boats coming from elsewhere.

2. WATER QUALITY

The assessment of the water quality of a lake must be done in the deepest zone, called the pit. We can assess the general aging state of a lake (eutrophication) over a long period with certain data. Other data helps us assess water quality.

Although it must be done over a long period, by analyzing the concentration of total phosphorus and chlorophyll, then measuring the transparency of the water, we can assess the level of eutrophication of the lake.

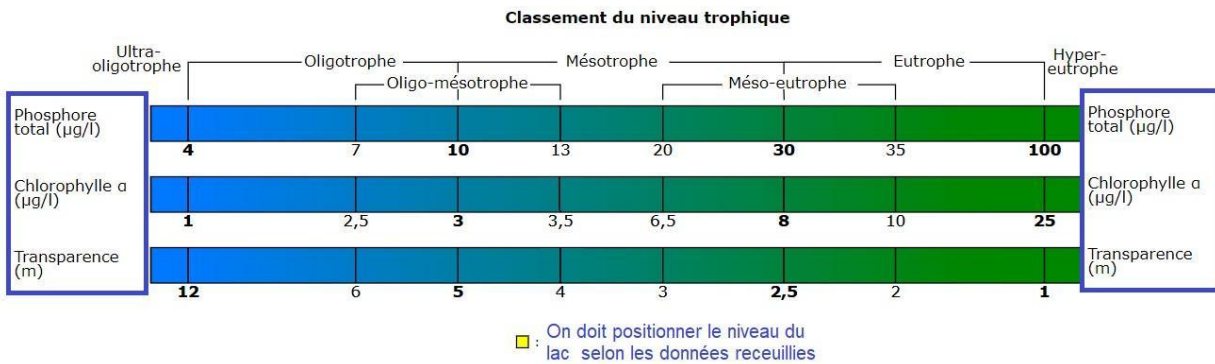
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In addition to measuring the **Transparency** of the water, the RSVL protocol measures 3 elements to determine the health of a lake: the concentration of **phosphorus**, the concentration of chlorophyll (microscopic algae in suspension), and the level of **DOC** (dissolved organic carbon).

Observations

We are waiting for the final analysis to be provided to us by the Ministry of the Environment via 'Relais', but here is the table used to evaluate the lakes.



Notes

Please note that several of the definitions provided come from RAPPEL, Water Protection Solidarity Cooperative. The Grouping of Associations for the Protection of the Environment of Lakes and Watersheds (RAPPEL) was born in 1997 from a desire of lake associations to come together in order to better protect their respective bodies of water.

Reference : <https://rappel.gc.ca/boite-a-outils>

Water quality – continued

Total phosphorus

Although phosphorus is one of the essential nutrients for plants, it is by limiting the quantities of phosphorus released into waterways that we can control the growth of algae and aquatic plants. Total phosphorus is the measurement of all forms of phosphorus in water. It is measured in µg/l or micrograms per liter (1,000 times less than one mg/l)

- Solar Lake presented total phosphorus concentrations between 6.1 and 7.2 (µg/l) this year versus 5.2 and 6.3 last year, therefore HIGHER

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- At Lake Caroline, levels INCREASED during the summer, going from 6.4 to 7.8 ending higher than last summer, but while the lake water level was low.
- Lake Evans phosphorus levels are still VERY HIGH between 11.7 and 11.4, even if the levels are slightly lower than last summer (between 14.7 and 12.4)

Chlorophyll

Chlorophyll A is a pigment present in all organisms that carry out photosynthesis, including microscopic algae suspended in water (phytoplankton). Because chlorophyll is directly linked to the quantity of algae suspended in the water (phytoplankton), and linked to the level of phosphorus, its concentration is measured to determine the trophic level of a lake. Chlorophyll Concentration is measured in mg/l or milligrams per liter

- Lake Solar presented chlorophyll concentrations between 3.4 and 4.27 ($\mu\text{g/l}$) this year versus 3 and 4 last year, therefore very slightly higher.
- At Lake Caroline, the chlorophyll concentration increased from 3 to almost 5 during the summer. Levels remained closer to 3 last summer, going from 2.6 to 3.5, back down to 3.3, therefore HIGHER.
- Lake Evans surprised us with a level between 4.0 and 12.8 during the summer, in Constant PROGRESSION. These are much HIGHER levels than last summer.

Dissolved Organic Carbon

Dissolved organic carbon (DOC) comes from the decomposition of organisms in wetlands and organic soils. It is strongly associated with the presence of humic acids, which are responsible for the yellowish or brownish coloring of water. DOC therefore influences the transparency of water: the higher its concentration in a body of water, the less transparent the water is. It is often lower at the beginning of summer and increases with temperature. The Concentration of dissolved organic carbon is also measured in mg/l or milligrams per liter

- At Solar Lake, the DOC level was between 4.2 and 5.6 this year and INCREASED during the summer while last summer, it dropped in August. TO MONITOR
- At Lake Caroline, levels were also INCREASED during the summer, going from 4.3 to 5.9 vs. 4.4 to 5.6 last year. Not so bad considering the low level of the lake in July and August. TO MONITOR
- And at Evans Lake, the level was between 4.6 and 5.7 (in August only) this year, a little lower than last summer (between 4.9 and 6.1)

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Transparency

The measure of transparency of water is in fact the depth to which light penetrates. Measured in a lake pit using a Secchi disk, transparency is influenced by the abundance of dissolved organic compounds and suspended matter that color the water or make it cloudy.

Suspended solids (SS) are small particles which can remain in the water for a certain period of time and can come from soil erosion in the watershed, residential and municipal discharges or others. These are soil particles, decaying organic matter and phytoplankton, composed of microalgae and photosynthetic bacteria called cyanobacteria.

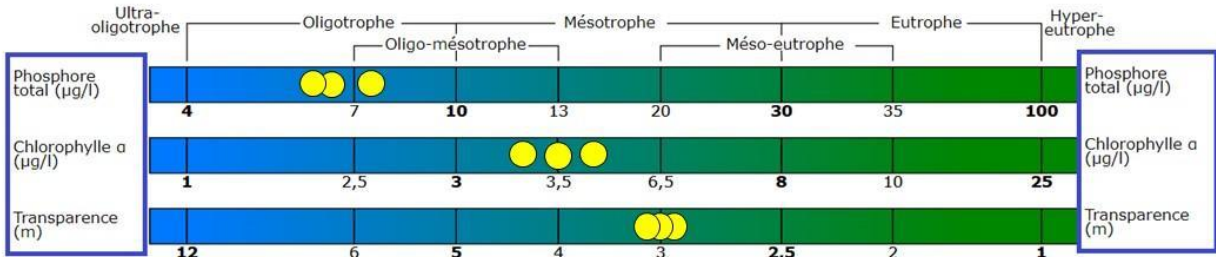
- At Solar Lake, the transparency depth is similar to other years, around 3 meters. The lower level was taken when the water level was lower. Note that the transparency was almost one (1m) meter more in 2021!
- At Lake Caroline, we took measurements before and while the level was low, so the variation is extreme (3.5m vs 2.1m). Otherwise the trends are similar to Lake Solar i.e. the transparency was much better in 2021.
- And at Lake Evans although the transparency is only 2m, it is a rather stable level compared to previous years.

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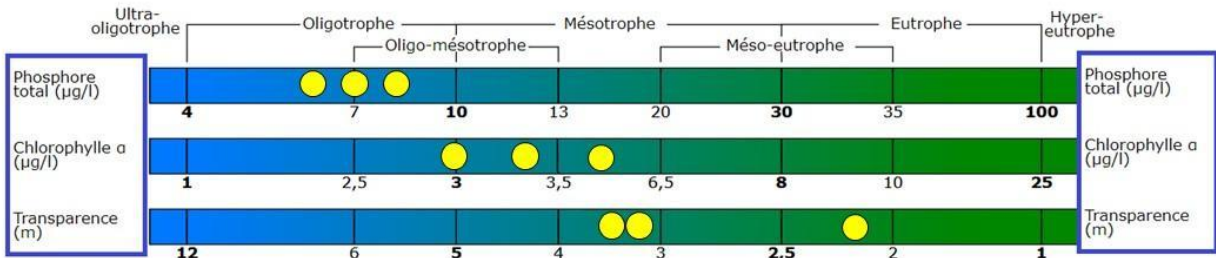
LAC SOLAR

Données physicochimiques - Été 2023
Classement du niveau trophique



LAC CAROLINE

Données physicochimiques - Été 2023
Classement du niveau trophique



LAC EVANS

Données physicochimiques - Été 2023
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