

Environmental Study of Lac Mercier

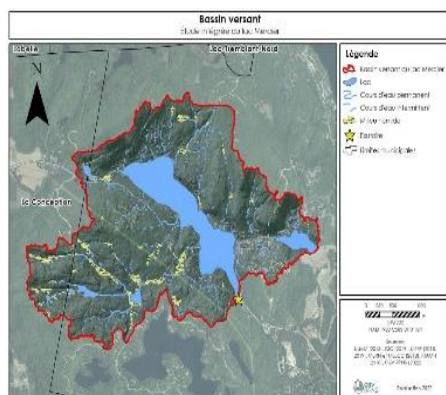
Ordered by the Board of directors of ALM from the
OBV-RPNS¹

Executive Summary of the Study
(Phase 1 of the ALM Five-Year Plan 2021-2026)

INTRODUCTION

As part of the implementation of its 2021-2026 Five-Year Plan, the Board of Directors (“**Board**”) of the Association du Lac Mercier (“**ALM**”), together with the City of Mont-Tremblant (“**City**”), has mandated the “**OBV-RPNS**” organization to carry out an environmental study (“**the Study**”) of the **Watershed** and Lac Mercier (“**Lake**”) to find out about the state of health of the Lake and identify, in this 1st Phase, the issues and threats that await us in order to take the appropriate actions to ensure the environmental protection of the Lake and the well-being of its residents. This 1st Phase will be followed by the establishment of priorities and the preparation of an **Action Plan** aimed at countering these threats. The 3rd Phase will consist of the implementation of this Action Plan. Below is a summary of the Study. *(The full study can be viewed by clicking the LINK to Footnote 1).*

PORTRAIT OF THE WATERSHED



Watershed - A watershed is a portion of territory from which all the precipitation is collected and carried to the same place (in our case, the lake). The area of our watershed is 11.75 km², of which 1.23 km² is occupied by our lake (Figure 4). Note that: i) the waters of Lac Moore flow into the lake via underground pipes, and ii) the rainwater from the Village flows into the filtering marsh before reaching the lake. These strong inflows of rainwater from the village core constitute a Weakness for our lake (Art. 3.3)

• **Attention** : The Lac Moore and the Village sectors are more likely to be sources of sediments that reach the hydrographic network through runoff (Figure 13). The artificial filtering marsh (near the Village) requires regular maintenance and, if poorly maintained, constitutes a threat to our Lake, since it will not fulfill its functions of filtering the waters of the Village. The study detected a water quality problem at the outfall (Art.3.4 and Table 15).

Tributaries - A tributary is a watercourse that empties into a lake. Our watershed has four permanent tributaries (“**T**”) to the lake. Three of them were sampled as part of the study. Water quality criteria were exceeded at the Tributaries (Art. 4.3.3). The percentages of the total surface area of the Lake watershed drained by tributaries T1, T2 and T3 are 7%, 3% and 31% respectively (See map p. 16.).

Wetlands - Wetlands represent 4% of the watershed of our lake. It is little (Art. 3.4).

- **Attention** : T1 and T3 cross wetland complexes, which could have an impact on the quality of the water arriving at the lake, particularly in terms of phosphorus concentrations. By reference, wetlands should represent at least **6%** of the watershed to support the biodiversity present. We are below this minimum threshold.
- **Attention** : The drainage ratio is slightly high and poses a threat. Our Lake is thus likely to be naturally enriched in Phosphorus (Art. 3.3).

Real estate developments and recreational tourism - A large part of the watershed is made up of unused spaces.

- **Attention** : Real estate development (residential and touristic) is an important issue around the lake, as is the presence of paths near the lake (road, P’tit Train du Nord linear park). The lake is not immune to intense real estate development (Figure 10, Table 15 and Art. 3.5.1).
- **Attention** : The accentuated development (resorts, recreational tourism) and the fact that the City promotes the Village and the Lake as a “tourist attraction” constitute a weakness and an anthropogenic pressure on our Lake (Art. 3.5.2).

Municipal beach – The City is continuing its municipal beach redevelopment project.

- **Attention** : The beach redevelopment project could have a significant impact on traffic to the lake if the City were to allow access to a large number of users and/or without establishing a communication and awareness program on standards of

¹ https://www.rpns.ca/wp-content/uploads/2022/04/Etude_integree_Mercier_2022_VF.pdf - OBV-RSBV – LACtion Report.

conduct. and regulation of uses of the Lake (navigation zones, protection of the environment and property of local residents, peace of mind, safety, etc.) (Art. 3.5.2 and Table 15).

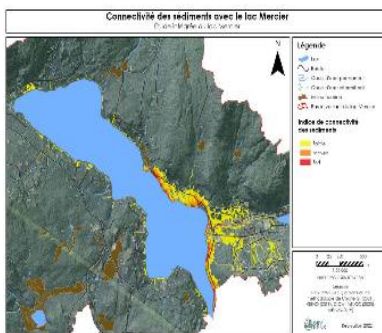
Runoff and basins – In its watershed, several streams, permanent and temporary, flow into the lake (see also Portrait of Lac Mercier below on this subject).

- **Attention** : All around the Lake, runoff brings sediments to the Lake (Figure 12 - yellow, orange and red zones) (Art. 3.6).
- **Attention** : All around the Lake, the stream retention basins are insufficient and/or not cleaned, causing runoff, accumulation and the heaping up of significant sediments as they exit into the Lake. Several reports of erosion/runoff sites have been detected all around the lake (Art. 3.6).

Positives Points

- **Positive Points** : Local residents have set up a strong, committed, resilient and representative Association, in place for more than thirty years (Art. 3.5.1).
- **Positive Points** : The regulatory revision for the overhaul of the city's urban plan (Art. 3.5.2).

LAC MERCIER PORTRAIT



Lake morphology: Lake area: 1.23 km² | 7.54 km perimeter | Altitude of 226 meters / sea level | Catchment area of 11.75 km² | Maximum length of 2.5 km | Maximum depth of 34.9m | Average depth of 12.8m | Volume of 15,762,000 m³ | 2.35-year renewal time².

- **Attention** : There are 3 main types of sources of erosion and runoff: (1) sites with visible traces of runoff and/or erosion (mainly on unpaved roads, the sides of paved roads and devegetated sites) ; (2) sites with a steep slope, little vegetation or along a ditch or road; and (3) problematic culverts, particularly due to mild to severe sediment accumulation and/or signs of erosion around the infrastructure (Figures 14 and 15 and art. 3.6).

Qualification of the Lake : The lake is qualified as oligotrophic (**Excellent**). The data analyzed show slight variations over the years without however changing the trophic level of the lake. **Warning**: these data were taken only in the deep zone of the lake (trough of the lake), free of aquatic plants. They therefore do not take into account potential symptoms of eutrophication that could occur in the coastal zone.

PHOSPHORUS and FECAL COLIFORMS (p. 48) :



12 stations were sampled (Figure 25), with the objective of identifying the potential inputs of contaminants to the Lake, by measuring the concentrations of "phosphorus", "faecal coliforms" and to assess the "water quality" of the three tributaries of the lake (Figures 26, 27 and 27 and Appendix 3).

- **Attention** : Higher concentrations were observed in the Tributaries. High conductivity and slightly higher phosphorus concentrations at the outlet of the filtering marsh and exceedances of water quality criteria for certain sectors. Several exceedances were observed for faecal coliforms in some Tributaries but no exceedances in bays.

² i.e. the time the water spends in the Lake before being completely renewed - in other words, a drop of water resides approximately 2.35 years in the Lake before approaching the outlet of the Lake.



Swimming and Presence of Faecal Coliforms - For bathing water, a typical Faecal Coliform check must provide a result of less than 200 CFU / 100ml for the water to be considered suitable for swimming.

- **Attention** : Several exceedances of this criterion were detected: out of a total of 21 samples taken from the tributaries, 10 exceeded the critical threshold of 200 CFU/100 ml, with a value reaching 1400 CFU/100 ml of water in tributary T3 on June 21, 2021. We need to address this situation.

Suspended matter (MES): MES are very fine particles suspended in water. They are found in natural form in bodies of water and they cloud the water.

- **Attention** : Based on the measurements taken at the tributaries, there does not seem to be a sediment supply problem, subject to the accumulation of sediments in the discharges from the watershed (Figure 33).

Conductivity and de-icing salts - The City uses de-icing salts to counter ice on roads in winter.

- **Attention** : The spreading of road salt near the lake increases the conductivity of the lake and constitutes an issue (Art. 4.3.3.3). The values measured at the lake turned out to be high, which could indicate an effect of excessive use of road salts around the lake. The City should take action on this.

Transparency: **Good news**: The transparency of the Lake does not seem to have diminished (Figure 35). It was 6.83 m in June 2021 and 7.3 m in August 2021 for an average depth of 7 m.

Dissolved Oxygen (DO): Oxygen (DO) in the Lake is essential for the respiration of fish and other aquatic organisms.

- **Good news**, the samples did not reveal any DO deficit at the bottom of the lake (Figure 15 and Art. 4.3.3.6).

pH (Hydrogen potential): The measurement of the pH makes it possible to visualize the acidity or the alkalinity of the water according to the concentration of the hydrogen ions. For reference, a pH of 7 indicates neutral water. A pH below 7 means acidic water and a pH above 7 means basic water. **Good news**, the pH measured at the lake was between 6.18 and 8.2, revealing no acidity problem at the lake and therefore no problem at this level on the ecosystem of the lake.

Turbidity (cloudy water): Turbidity is defined as the measure of the more or less cloudy appearance of the water. It is contrary to clarity and is influenced by the presence of suspended matter (SS) in the water, such as plankton, organic and inorganic matter, etc. From a purely aesthetic point of view, turbidity should be less than 50 NTU in order to protect waters used for recreational purposes. **Good news**: The measurements taken at the lake, all depths combined, varied between 0.56 NTU and 1.25 NTU, while the surface average was 0.54 NTU. These values are low and similar to the value of 0.50 NTU measured in 2018.

PERIPHYTON: Periphyton is a community of microscopic organisms (bacteria, phytoplankton, etc.) and detritus fixed together that accumulates on the various submerged substrates of a lake such as rocks, branches, dock pillars and even aquatic plants. Its growth is influenced by phosphorus concentrations. Periphyton thickness was not measured as part of the 2021 study.

- **Attention : Concerning results**: On the other hand, the data from 2015, 2016 and 2018 showed that 10 of the 13 sites experienced an increase in the average thickness of periphyton during this period (Figure 43).
- 11 of the 13 sites measured in 2018 have an average thickness above 2 mm (with a value above 4 mm).
- A periphyton thickness of 2 mm to 4 mm could indicate an increase in the probability of degradation of the Lake, hence an important problem to be managed on our Lake: phosphorus (Art. 4.4 and Figure 15).

Phytoplankton: No cyanobacteria were observed during the 2021 outings.

- **Attention** : However, an accumulation of microalgae at the beginning of June 2021 between stations B2 and T3 downstream and three observations of blooms of cyanobacteria in the littoral zone of the Lake were reported by local residents (Art. 4.5).

Aquatic plants and algae: The potential macrophyte growth zone in Lac Mercier extends from the shore to a depth of approximately 6 m (Figure 44). The littoral zone of 6 meters represents 26% (0.32 km²) of the area of the lake. The last inventory of the lake's aquatic grass beds was carried out in 2020 by the OBV-RPNS. 26 species have been listed.

- **Good news**: With the exception of Eurasian watermilfoil (AEM), no problems have been identified with aquatic plants. Let's take a look at the issue represented by AEMs.

EURASIAN WATERMILFOIL (EW) :



The EW is a perennial invasive exotic aquatic plant that can grow up to 6 meters and can be found up to 10 meters deep. Near the surface of the water, they branch and may continue to grow horizontally and produce emergent flower spikes. The EW then forms a dense canopy on the surface of the water.

The EW reproduces mainly by the fragmentation of its stems, which occurs naturally from mid-July until September. A small stem fragment can take root and form a new plant.

The new sites observed on our lake since 2017 have their sources in this way. They probably spread when small boats (SUP, Canoe, Pedalo, Kayak, fishing, etc.) or swimmers cut a stem.



Figure 46 : Colonies de Myriophylle à épis (2017, 2020, 2021)

Attention : The practice of nautical activities (boats of all kinds, fishing, and swimming) in the grass beds by users of the lake can contribute to the fragmentation of the stems. Any other material launched at the access ramp, if not washed, can carry stem fragments from other sources of contaminated water bodies.

Attention : Presence of EW detected in 2003. In the summer of 2021, the City carried out a complete inventory of EW colonies (see Figures 45 and 46). The presence of new colonies of EW has been observed all around the lake and an increase since 2017 (Figure 15 and Art. 4.4).

The largest colonies of EW are located northeast of the lake. The colony considered the densest in the lake, listed in 2017 on the small island of rocks in front of the municipal beach, was not seen during the inventories of 2020 and 2021.

It is very unlikely that such a dense colony of EW disappears naturally over such a short period of time (Art. 4.6 and Figure 15). It is also likely that their cutting, trampling or removal may have caused the appearance of new shoots all around the lake.

- **Attention** : Listed colonies might not be the only ones. Residents indicated the presence of other sites. It is also very likely that some of them could not be listed (visibility, depth, etc.).

Riparian strips:

- **Attention** : No data could be traced on the compliance of the riparian strips within the framework of the study (Art. 4.8). However, it was noted that some riparian strips did not appear to be compliant. An inventory of riparian strips is planned by the City in the Lake during the summer of 2022.

Septic systems:

- **Attention** : No inspections were carried out as part of the study. The last data collection by the city dates back to 2012. This will resume over the next three years. In the meantime, the City is monitoring the emptying. This lack of compliance data from skeptical facilities is a **weakness** and a challenge (Figure 15 and Art. 4.9).

Pleasure activities:

- **Attention** : Many boaters share the Lake: Kayaks, swimmers, paddle boards, canoes and motorboats. Everyone must learn to share the body of water in order to ensure the safety of users, their well-being and peace of mind and the protection of the environment.
- There are no official boating regulations at the Lake, except that the City, ALM and ASRT have each developed their own separate voluntary codes of boating courtesy. The Sûreté du Québec ensures compliance with nautical regulations through its punctual presence on the lake.
- The increased traffic on the lake, the lack of knowledge of the rules of conduct and the failure to comply with instructions (riparian strips) constitute an environmental and conflict of use, tranquility and safety issue (Art. 4.10 and Table 15).



CONCLUSIONS OF THE ALM BOARD OF DIRECTORS

2ND PHASE: ACTION PLAN

The environmental study of Lac Mercier carried out by the OBV-RPNS, supported by the members of the Committee made up of residents of the lake and city officials, was the first PHASE of the five-year environmental plan that the ALM Board of Directors wanted to undertake as part of the pursuit of its mission and the protection of the environment of the Lake and its watershed.

The 2nd PHASE that is beginning is the establishment of an Action Plan that will be deployed over the next five (5) years to deal with the issues and threats. The Members of the ALM will be consulted and involved in the implementation of this Plan, as will the essential intervention of the City and the MRC des Laurentides.

An Environmental and Social Responsibility Committee whose mission is to minimize the environmental footprint of residents and users of the Lake will be formed for this purpose to support the members of the Council. The City and the MRC des Laurentides will be invited to participate. An awareness and education program on eco-responsible practices will be developed, implemented and communicated in order to highlight the environmental responsibility of residents and users of the Lake.

We would appreciate your comments and assistance and do not hesitate to indicate your interest in participating in this Committee or in formulating your ideas.

Thank you for taking the time to read this summary and the Study.

ALM Board of Directors