

TOWN OF BROME LAKE

Action Plan for a Healthy Lake

2022 2026



LAC-
BROME

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ACTION PLAN FOR A HEALTHY LAKE

Residents of Brome Lake consider the lake to be a great source of pride and a jewel at the heart of their town. It offers magnificent landscapes, exceptional biodiversity and an ideal location to spend quality time. These elements make it a very popular destination for residents as well as for tourists. Its value is truly inestimable.

The lake's quality is very dear to the local population as well as to the Town of Brome Lake. It is this very quality that allows its users to enjoy the lake and all the resources it has to offer.

Over the past several years, however, the Town and its partners have witnessed signs of a slow but worrisome deterioration in the health of the lake and the quality of its waters. High concentrations of contaminants are being found, invasive species are present and multiplying and certain nautical activities are damaging the ecosystems. Low water levels are also a concern during the summer.

Ultimately, these threats could result in serious damage to the health of the lake which would affect both its attractiveness and its use. This would represent a huge loss for the community, for tourism and for biodiversity.

It is within this context that the Town of Brome Lake adopted an overall vision and several measures to be undertaken during the 2022 to 2026 period to protect the health of the lake. This **Action Plan for a Healthy Lake 2022-2026** is both ambitious and rigorous and is based on best practices for the protection of watercourses.

Based on the report and recommendations of the Organisme de bassin versant de la Yamaska (Yamaska watershed organization), mandated by the Town of Brome Lake in 2019 to produce an overall portrait of the lake and its principal threats, this action plan will allow systematic monitoring and rigorous reporting on the health of the lake. This more recent plan is equally based on progress made since 2015 within the framework of the Town of Brome Lake's 2015-2020 Strategic Plan. This plan included numerous measures aimed at minimizing the discharge of wastewater, preventing water contamination, increasing the protection of shores and wetlands, and promoting responsible use of the lake.



Within this process, the Town concluded a fruitful partnership with Renaissance lac Brome. The partnership resulted in the characterization of the shoreline, the plantation of thousands of seedlings on 70 of the most vulnerable shoreline sites as well as the operation of a washing station for pleasure boats to limit the spread of invasive species. In addition, the Town has carried out several measures to reduce the impact of runoff on Douglass Beach and on several roads. It acquired and installed several generators in the pumping stations to control overflows and verified more than 200 septic systems within the riparian strip (15 metres in depth between the shoreline and the adjacent land) around the lake.

At this time, however, the mounting importance of threats to the lake requires the deployment of additional measures to protect its health. Therefore, the implementation of the **Action Plan for a Healthy Lake 2022-2026** is a necessary condition to allow us to continue to enjoy this exceptional jewel, while ensuring its sustainability and its quality which is appreciated and recognized by all. This is a challenge facing the entire community. Achieving these goals will require a collective effort.

Action Plan for a Healthy Lake

**2022
2026**

FRAMEWORK 1. Lake Brome at a Glance

Characteristics of the Lake

Superficial area: 14.57 km²

Water Volume: 87, 134,000 m³

Maximum depth: 12.8 m

Average depth: 6 m

Altitude: 196.7 m above sea level

Location: Town of Brome Lake, Brome-Missisquoi RCM

Tributaries: Quilliams, Durull, Cold (or Coldbrook), Argyll. McLaughlin, Inverness and Pearson watercourses

Function: The lake is the head and the origin of the main branch of the Yamaska River which supplies drinking water to the Town of Bromont.

Characteristics of the Lake Brome Watershed

Superficial area: 185.76 km²

Territorial distribution amongst the municipalities:

West Bolton (43%)

Brome Lake (31%)

South Stukely (18%)

Saint-Étienne-de-Bolton (5%)

Shefford Township (2%)

East-Bolton (0.5%)

Waterloo (0.07%)

Climate: continental humid. Between 1981 and 2010, average maximum temperature of 25.3 °C in July and average minimum temperature of -15.9 °C in January. Since 2019, field observations reveal a decrease of rain and snowfall in the region.

Composition of the territory:

Forest (60%)

Agriculture (13%)

Lacustrine environments (lakes and other fresh water bodies) (9%)

Anthropogenic environments (roads, streets and buildings) (8%)

Wetlands and other wet terrain (6%)

Woodcuts and regeneration (4%)



1. PORTRAIT OF LAKE BROME

The rich biodiversity of lake Brome is ideal for fishing and outdoors enthusiasts. Its breathtaking landscapes charm both residents and tourists, and its size and water quality make it a choice location for sports and nautical activities. The quality of its watershed provides fertile soil for regional agriculture. This richness must be protected.



1.1. Lake Bromes' Riches

1.1.1. Exceptional Biodiversity

The lake Brome watershed presents an exceptional plant and animal biodiversity. Close to 215 species associated with wetlands and aquatic environments have been inventoried since the 1970s. Amongst these are 30 species of fish, 53 species of birds (of which 12 belong to the aquatic bird category), 3 species of reptiles, 2 species of crustaceans, 5 species of molluscs, 64 species of Odonata and 45 plant species.

The watershed is also home to several wetlands. Their presence, size, and nature influence not only its biodiversity but also its hydrology, the local climate, the quality of the water and landscape, and aid in the recharging of the aquifer.

Wetlands thus fulfill six functions which are essential to the quality of life of both the ecosystems and the local population, namely they:

1. filter against pollution;
2. conserve biodiversity;
3. regulate the water level;
4. provide a sunscreen and a natural windbreak;
5. requester carbon; and
6. enhance landscape quality



1.1.2. A Place for the Good Life

Lake Bromes' quality creates a great region to live. Averages of more than 42 new dwellings per year were built between 2016 and 2021 in the Town of Brome Lake. These included single-family and semi-detached homes as well as multi-unit dwellings. A marked acceleration in housing starts was seen in 2021, adding 98 housing units to the Town's inventory. In 2019 and 2020 respectively, only 38 and 39 new housing units were added.



1.1.3. A Source of Pleasure

Renowned for its majestic body of water, lake Brome is very popular with swimmers, canoeists and kayakers as well as with those who practise water skiing, rowing, paddle boarding, sailing, wakeboarding and wake surfing. Motorboats and personal watercraft are also frequent users. Fishing is practised on the lake year-round. In recent years there has been an increase in the number of boats at private docks around the lake, totalling more than 1,200 in 2018.

An active golf course, the Knowlton Golf Club, is also located within the lake Brome watershed.



1.1.4. A Fertile Watershed

Numerous agricultural properties are found within lake Brome's watershed. These accounted for 13% of the total superficial area in 2018. Livestock and pastures, canola and rapeseed crops as well as prairies can be found. To a lesser extent, though not insignificant, the production of corn and other vegetables, undifferentiated agriculture and the cultivation of sorghum wheat and oats can also be found.

1.2. A Richness We Must Protect

Our admiration and our enjoyment of lake Brome are a testament to its great richness. The resulting activities may, however, threaten the health of the lake when carried out without limits or restraints. Ultimately, these activities can seriously harm its ecosystems, its attractiveness and its long-term use. Lake Brome is, therefore, a veritable jewel that must be protected.

This is precisely what prompted the Town of Brome Lake to implement certain measures within its 2015-2020 Strategic Plan. These measures were aimed at limiting lake contamination, curbing the multiplication of invasive species, and ensuring responsible management of the lake. The following table lists some of these measures.

TABLE 1. Measures Taken to Protect the Health of Lake Brome

MEASURES
Maintenance of vegetation in roadside ditches and use of best practices for environmentally friendly maintenance (e.g., lower third method)
Gradual replacement of 100% of generators in the Town's sewer system pumping stations to limit overflows in the event of power outages.
Construction of sedimentation ponds
Verification of more than 200 septic systems on the shoreline of the lake
Support to Renaissance lac Brome for the operation of a boat-washing station from May to October 2020 and 2021
Seeking the opinion of the Environmental Advisory Committee when processing requests for minor variances relating to environmental issues.
Personal visits and free distribution of awareness kits to each new lakefront landowner.
Conclusion of a fruitful partnership with Renaissance lac Brome
Collaboration with l'Organisation du bassin versant de la Yamaska (Yamaska watershed organization) to produce an up-to-date portrait of the lake.

Despite the progress made to date, it is clear that these measures are no longer sufficient to protect the health of the lake. The threats that weigh heavily on lake Brome, such as high concentrations of pollutants, rapid spread of invasive species, growing impact of motorboats on ecosystems and low water levels, require additional measures to be taken in the short, medium and long term.

2. THE THREATS

For the past several years, however, the Town and its partners have witnessed signs of a slow but worrisome deterioration in the health of the lake and the quality of its waters. High concentrations of contaminants are being found, invasive species are present and multiplying and certain nautical activities are damaging the ecosystems. Low water levels are also a concern during the summer.

This situation is concerning. Maintaining the status quo presents a risk to the health of the lake as well as to its long-term use and its attractiveness. Implementation of the **Action Plan for a Healthy Lake 2022-2026** is essential to the protection and the sustainability of this jewel which is so precious to us all.

The aim of the present action plan is to respond to 5 of these threats:

1. phosphorus and cyanobacteria;
2. faecal coliforms;
3. invasive species;
4. recreational use of the lake; and
5. low lake water levels.

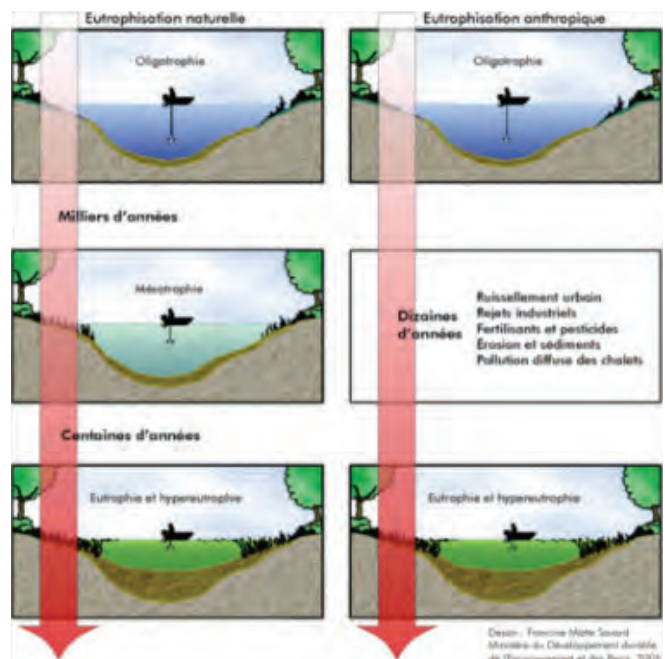
Most of these threats can be avoided through the implementation, by the Town and its partners, of new measures of protection. Responsible behaviour on the part of individuals, businesses, lakefront residents and users must also be adopted.



2.1. Phosphorus and Cyanobacteria

Chemical elements such as phosphorus are essential to plants and algae. On the other hand, too large a quantity can lead to eutrophication of the lake, meaning its transformation into marshland through the accumulation of organic matter. Naturally, this phenomenon occurs over thousands of years but human activities can accelerate this process thus leading to a rapid deterioration of water quality (see **figure 1**). Ultimately, this can threaten the health and sustainability of the lake.

FIGURE 1. Process of Eutrophication Through Natural and Anthropogenic (Human Intervention) Origins

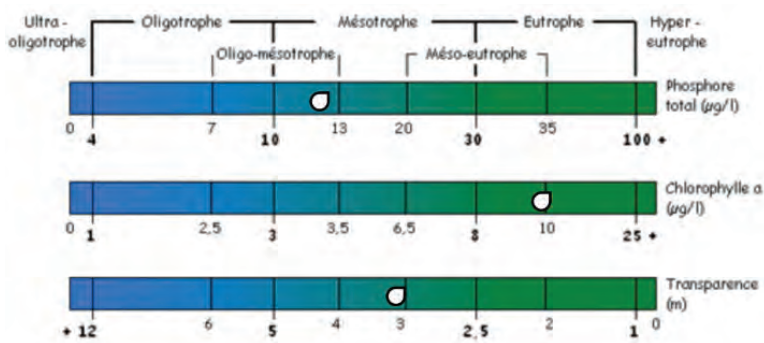


Using the three following indicators, lake Brome has been the subject of analysis to determine its level of eutrophication over the past several years:

1. The total concentration of phosphorus,
2. The level of chlorophyll a and;
3. The water's transparency.

The results allow a diagnosis of the average aging of the lake and prove worrisome (See **Figure 2**). From 2008 to 2021, the average concentration of phosphorus in lake Brome was 12.8µg/l, indicating a mesotrophic state. During the same period, the average chlorophyll level exceeded 10 µg/l, indicating a eutrophic state. This is very worrisome. The average transparency of the water, also from 2008 to 2021, was evaluated at 3 metres in depth, indicating a mesotrophic state. This data was obtained through the average data collected between 2008 and 2021 by the Réseau de surveillance volontaire des lacs (Volunteer Lake Monitoring Network) (environnement.gouv.qc.ca/eau/rsvl/relais/rsvl_details.asp?fiche=278).

FIGURE 2. Eutrophication Level of Lake Brome



The existing amount of phosphorus and the continuing amounts being directed into the lake must be minimized in order to preserve its health. This will limit the proliferation of aquatic plants, algae and cyanobacteria such as blue-green algae, thus resulting in lower levels of chlorophyll and improved water transparency.

FRAMEWORK 2. The Danger of Blue-Green Algae in Lake Brome

High concentrations of chemical elements in a body of water encourage the proliferation of cyanobacteria, commonly known as 'blue-green algae'. Several episodes of cyanobacteria have been seen in the lake since 2006, occurring most frequently in August and September. Douglass Beach has been closed at times due to these blooms.

Climate change will potentially lead to a warming of lake water thus creating ideal conditions for the proliferation of blue-green algae. More frequent episodes may therefore occur over the next few years.

The rapid proliferation of cyanobacteria in lake Brome is of great concern as it diminishes the transparency of the water. It may also eventually form a layer on the surface of the water which could be toxic for the users.

According to experts, diminishing the quantity of phosphorus in the lake constitutes the best strategy to limit the threat of cyanobacteria.

The input of phosphorus to the lake comes principally from Cold (or Coldbrook) and Quilliams watercourses. Although only one of Quilliams stream's phosphorus concentration measurements has exceeded the water quality threshold since 2008, the levels recorded over the past decade remain of concern.

Runoff water contributes significantly to the input of nutrients to the lake. It is also one of its major sources of phosphorus. Surface runoff is increased by creating impermeable soil as well as by the destruction and degeneration of wetlands, banks and riparian strips.

Here are some examples of activities that, by surface runoff, increase the levels of phosphorus in the lake and in the watercourses feeding into it:

- . Use of detergents containing phosphates;
- . Use of fertilizers for lawns and gardens;
- . Use of defective septic systems;
- . Animal waste;
- . Unsustainable agricultural and industrial practices;
- . Sewage overflows; and
- . Certain residential constructions.

The planting and maintenance of vegetated riparian strips and the preservation of wetlands are essential practices in the treatment of runoff. These limit the input of nutrients into the lake and act as filters thereby improving water quality.

The riparian strips prevent the flow of runoff water into the lake. When properly vegetated (the municipal by law requires 15 metres in depth), they have a retention efficiency of 30% to 90% of the phosphorus passing through. Unfortunately, few properties have riparian strips that comply with this standard. Further efforts are therefore required.

Wetlands capture phosphorus and contaminants, such as metals and pesticides, through their root systems and their bacteria. It is therefore essential that they be protected.



A high concentration of faecal coliforms in a lake is a sign of microbial contamination which can affect the quality and aesthetics of the body of water as well as the health of its users.

In general, lake Brome presents low levels of faecal coliforms. The average levels between 2000 and 2019 were around 24 UFC/100 ml. which represents good water quality for recreational use. However, levels above 200 UFC/100 ml (poor quality) have been observed on 4 occasions since 2000. These occurrences forced the closure of Douglass Beach.

Such incidents can prevent users from accessing the lake and necessarily damage its appeal. Should no action be taken, they could even threaten the health of users. It is therefore essential to minimize the sources of contamination.

The five main sources of contamination identified for lake Brome are the following:

1. Agricultural drainage;
2. Poorly constructed or poorly maintained septic systems;
3. High concentration of domestic animals;
4. High concentration of wild animals (e.g., Canada geese); and
5. Municipal sewage system.

Inspecting and repairing defective septic systems are effective ways of limiting the presence of faecal coliforms of human origin.

Special attention should be paid to the consequences of overflows. Overflows are discharges of untreated municipal wastewater directly into the lake or its

tributaries which lead to increased concentrations of faecal coliforms. Wastewater contains high levels of phosphorus thus overflows also contribute to the eutrophication process of the lake.

Power outages can disable sewage pumping stations posing significant risks of overflow, especially during extreme weather events such as the November 2019 storm. The connection of residential rain gutters to the wastewater system increases the amount of water to be treated thereby worsening the situation. Similar situations can occur when the sewage system needs to be shut down due to technical problems.

Sound rainwater management by the Town is essential to avoid such phenomena. Disconnecting rain gutters from the municipal wastewater system and installing generators at each pumping station are very effective solutions for limiting overflows.

2.3. Invasive Species

The health of the lake also depends on the health of its ecosystems. Several invasive and exotic species have been found in the lake Brome basin over the past few years, the most worrisome being the red-spotted crayfish, the Eurasian watermilfoil and the common reed. In addition, the calcium and pH levels of the lake reveal that it could become host to the zebra mussel.

The multiplication of these species poses a threat to the lake's ecosystems, namely to its native species. Recreational uses can also be affected.



Red-Spotted Crayfish

Photo taken from [MFFP, 2022](#)

2.3.1. The Red-Spotted Crayfish

The red-spotted crayfish is found in lake Brome, the Yamaska River and the Coldbrook and Quilliams watercourses. First recorded in the lake in 2011, this species of about 3.5 cm at maturity, seems to have eliminated native crayfish. This particular species causes significant damage to aquatic herbaria, threatening harm to the Bridle Shiner and the Chain Pickerel both of which are endangered species.

The impact of the red-spotted crayfish in lake Brome has not yet been studied but its spread is of significant concern. The population must be educated concerning the ban on transporting live crayfish between bodies of water in order to limit this risk.



Common Reed

Photo taken from [MFFP, 2022](#)

2.3.2. The Common Reed

The common reed is an invasive plant native to Eurasia. Several colonies can be found on the Town's territory, notably in the ditch flowing into Coldbrook at the corner of Pine and Elson streets. They now appear to be spreading along the ditch on Elson Street. Once introduced, it is nearly impossible to eradicate and difficult to control. Its presence has several negative effects on the environment, such as drying out the soil and reducing biodiversity.



Eurasian Watermilfoil
Photo taken from [MELCC, 2022a](#)

2.3.3. Eurasian Watermilfoil

Eurasian watermilfoil populations are mainly found in the south and southwest sector of the lake. They were probably introduced by a watercraft that had not been properly washed or by a seaplane. The use of motorboats may have contributed to their dispersal. The high density of Eurasian watermilfoils can reduce the plant richness of the lake and threaten the health of fish. Additionally, the thick mat formed by the plant can impede swimming, boating, and fishing.

FRAMEWORK 3. **Washing of Watercraft**

In 2020, Renaissance lac Brome acquired a mobile watercraft washing station. This allows the washing of boats prior to entering the lake. It is also an effective tool for education and awareness as it offers a large quantity of information concerning invasive species and the importance of preventing their introduction and spread.

During its first year in service, 888 watercraft, mainly motorized, were washed. The vast majority of the clientele (90%) came from outside of the Brome Lake territory.



Zebra Mussel
Photo taken from [MFFP, 2022a](#)

2.3.4. The Dangers of the Zebra Mussel

The levels of calcium and pH recorded over the past few years testify to the possibility that lake Brome could also become host to the zebra mussel. This species is known for its capacity to attach itself to submerged surfaces. Its presence could carry harmful consequences for the ecosystems as well as for users of the lake, such as:

- . Threaten the survival of the native fresh water mussel;
- . Represent a vector for the transmission of avian diseases;
- . Obstruct hydraulic systems;
- . Foul or damage nautical infrastructures and boats;
- . Injure swimmers with their sharp shells.

Limiting the spread of invasive exotic species in the lake is essential to the protection of its ecosystems as well as to the maintenance of its safe and enjoyable use. In order to combat this threat, control plans, boat-washing stations and awareness campaigns can be very effective.

¹ Government of Québec. (2022). *La moule zébrée (Dreissena polymorpha)*. Ministère des Forêts, de la Faune et des Parcs. Online: <https://mffp.gouv.qc.ca/la-faune/especes/envahissantes/moule-zebre/>.

FRAMEWORK 4. Endangered Species

Combined with the rapid spread of invasive species, human activities are also threatening several native species in the lake Brome watershed. Three species of special status are directly threatened: the wood turtle, the bridle shiner and the chain pickerel. The water snake and pond erythema are also likely to be designated as 'threatened' and 'vulnerable' by the Québec Government. No study has yet determined the direct threats to these species in the lake Brome watershed.



Wood Turtle

Photo taken from [ECCC, 2019](#)

The Wood Turtle

The Wood Turtle is designated as 'vulnerable' in Québec and as 'threatened' in Canada. In the lake Brome watershed, it is mainly present in the Quilliams stream sector. It is above all threatened by agricultural activities, urban areas and changes to its habitat. Although it is the most terrestrial turtle in Québec, the wood turtle also requires an aquatic habitat to carry out its complete cycle. These aquatic habitats need to remain healthy in order to guarantee its protection. This species measures between 18 and 24 cm.



Bridle Shiner

Size: no more than 60 mm

Photo taken from [MFFP, 2022b](#)



Chain Pickerel

Size: from 30 to 50 cm

Photo taken from [MFFP, 2022c](#)

The Bridle Shiner and the Chain Pickerel

The species of greatest concern in the lake Brome watershed is the Bridle Shiner. It is designated as 'vulnerable' in Québec and as in a 'worrisome situation' in Canada. This fish tends to stay near marshland areas and rarely frequents areas without vegetation. The importance of submerged vegetation for the Bridle Shiner is without question, as much for their diet as for their growth and reproduction.

The Chain Pickerel is susceptible to be designated as 'threatened' or 'vulnerable' in Québec. Very common in the Eastern Townships region, this fish prefers rivers, lakes and ponds with warm, calm and shallow water and abundant vegetation. An effective predator, the chain pickerel plays an important role in the lakes and watercourses wildlife balance and helps to control the spread of red-spotted crayfish, an invasive species with harmful effects for the lake and its tributaries.

The main threats to these two species are loss of habitat and elevated water turbidity. Motorized navigation and invasive aquatic species, such as Eurasian watermilfoil and red-spotted crayfish, are the primary causes of herbaria degradation in the areas they frequent. Elevated water turbidity is caused by the abundance of algae, such as cyanobacteria, and suspended sediments. Both these phenomena are amplified by the use of motorized watercraft.

In order to protect these species, minimization of the harmful impacts of motorized navigation and invasive species is necessary.

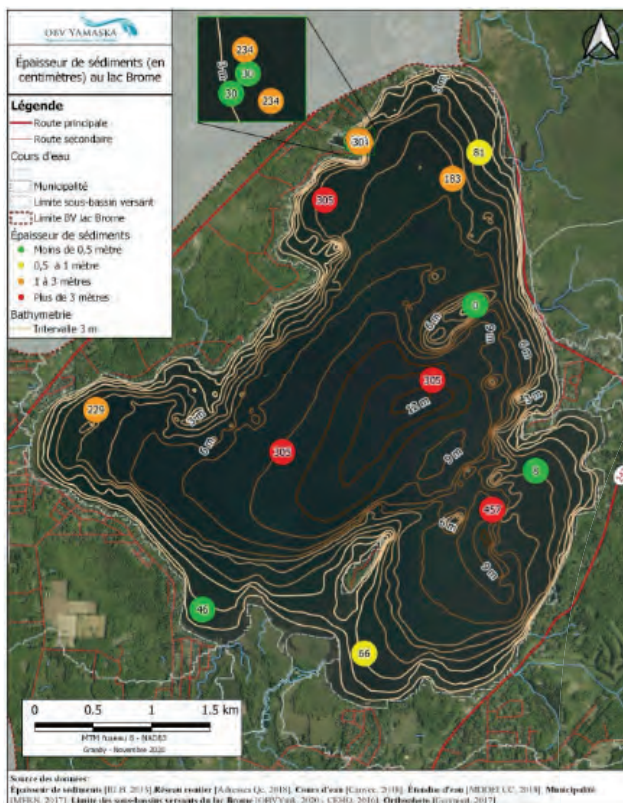
2.4. Recreational Use of the Lake

Many enthusiasts of nautical activities such as fishing, canoeing, kayaking, rowing, sailing and paddle boarding can be found on lake Brome. It is also a popular spot for motorboats and other personal watercraft.

Navigating at high speed close to the shores has a direct impact on the health and quality of the lake. Water agitation caused by motorboats is sufficient to erode the banks. The waves generated stir up the water causing suspension of the sediments, including contaminants and nutrients such as phosphorus accumulated at the bottom of the lake through the years. This deteriorates water quality and can amplify the eutrophication process.

Another underlying problem is brought to light here: the accumulation of sediments on the bottom of the lake. These have accumulated over the years through the combined actions of urban and residential development along the shores as well as industrial, agricultural and forestry activities. In some areas, sediments exceeding 3 metres in depth have been recorded (see map below).

FIGURE 3. Depths of Sediments in Lake Brome



It has been shown that motorboats navigating in waters 3 metres deep or less increase water turbidity up to 20 metres on either side of their wake. This increases the amount of suspended phosphorus in the water by 28% to 55%. One to two days are then required for it to settle once again.

It has been demonstrated that 10 horsepower motorboats can stir up sediment to a depth of about 2 metres, while those with 100 horsepower motors impact sediments down to about 5.5 m (Teknika, 2006). According to another study, the impact depth of boats in 'wake surf' or 'wakeboard' mode is estimated at 5 metres. Proper navigation and control of watercraft are therefore essential to the protection of the lake's health.

Solutions to sediment stirring and shoreline erosion by motorboats are well known. They consist notably of limiting motorized navigation and speed of travel near the shores as well as prohibiting motorized navigation in the areas most at risk. Obviously, the implementation of these solutions depends largely on the knowledge of boating safety rules by users. Awareness is therefore an important key.

User awareness is also necessary in preventing the introduction of invasive species to the lake. The use of watercraft not properly washed can result in the introduction of this type of species. Furthermore, the use of boats in herbaria can contribute to the dispersal of Eurasian watermilfoil. Washing of boats and limitation of navigation in high-risk areas are effective and necessary preventative measures to control the introduction and spread of invasive species in the lake.



2.5. Low Water Levels

Since 2019, the Town, its partners and many users of the lake have noticed a decrease in water levels during the summer. This is a concern to many, as low water levels can pose a threat to flora and fauna, compromise nautical safety on the lake and reduce water supply to the Yamaska River which, in turn, reduces the Town of Bromont's drinking water supply.

According to the Agreement on the Operating Conditions of the Dam at the Outlet of Lake Brome, the Town of Brome Lake must maintain a minimum flow of 0,88 m³/sec at the outlet of the lake in order to ensure a minimum ecological flow to the Yamaska River and its aquatic species.

A water level of 196.9 m is optimal to ensure the health of lake Brome and allow its many uses. Between 2019 and 2021, the average levels recorded in August were 196.82 m and those of September were 196.74 m, a drop of 8 and 16 cm below normal operating levels respectively.

Field observations reveal that the low rainfall and snowfall levels experienced in the region in recent years are largely responsible for the low water levels. The fact of supplying the Town of Bromont's drinking water is not the origin of this problem. The focus should be on climate change, which is altering precipitation patterns across the globe.

Being that this is a fairly recent problem for the lake, studies will be necessary to identify the best solutions. For example, a study of precipitation patterns in the region will need to be carried out to understand the true impacts of climate change on lake levels. Additionally, a feasibility study on the raising of the Foster dam would allow an understanding of its potential contribution to the solution. Note that this dam is the sole water outlet point of the lake and that a difference of 1 cm in the lake level represents approximately 150,000 litres of water. Optimizing lake flow management by electronic means should also be considered.

TABLE 2. Summary of Issues Threatening the Health of Lake Brome

THREATS	IMPACTS	ORIGINS	SOLUTIONS
Phosphorus and cyanobacteria	<ul style="list-style-type: none"> . Premature aging of the lake (eutrophication) . Threat to the health of users . Closure of beaches . Harmful effects to the enjoyment of its users 	<ul style="list-style-type: none"> . Too much nutrient input, including phosphorus, via runoff water . Average warming of water due to climate change . Unsustainable industrial and agricultural practices 	<ul style="list-style-type: none"> . Limit activities which generate phosphorus . Vegetate and preserve the riparian strips . Preserve wetlands . Prevent waterproofing of soil
Faecal coliforms	<ul style="list-style-type: none"> . Health threat to users . Harmful effects to the water quality and the aesthetics of the lake . Closure of beaches 	<ul style="list-style-type: none"> . Agricultural drainage . Defective septic systems . Concentrations of domestic and wild animals . Overflow problems in the municipal wastewater system due to power outages and system maintenance 	<ul style="list-style-type: none"> . Inspect and correct defective septic systems . Install generators in all pumping stations . Develop and enhance green infrastructure and permeable surfaces
Invasive species	<ul style="list-style-type: none"> . Harmful effects to ecosystems . Limits to swimming, boating and fishing 	<ul style="list-style-type: none"> . Agricultural drainage . Defective septic systems . Concentrations of domestic and wild animals . Overflow problems in the municipal wastewater system due to power outages and system maintenance 	<ul style="list-style-type: none"> . Inspect and correct defective septic systems . Install generators in all pumping stations . Develop and enhance green infrastructure and permeable surfaces
Recreational use of the lake	<ul style="list-style-type: none"> . Shoreline erosion . Stirring up of sediments on the bottom of the lake 	<ul style="list-style-type: none"> . Motorboats speeding and navigating too close to the shore . Navigation of boats in shallow waters and in sectors at risk 	<ul style="list-style-type: none"> . Define specific zones for nautical activities which produce strong waves . Limit boat speed and navigation in shallow waters and in sectors at risk
Low water levels	<ul style="list-style-type: none"> . Threat to ecosystems . Limits to recreational activities . Impact on water supply to the Yamaska River . Impact on drinking water supply to the Town of Bromont 	<ul style="list-style-type: none"> . Decrease in precipitation due to climate changes 	<ul style="list-style-type: none"> . Order a projected rainfall study . Conduct a study on the feasibility of raising the Foster dam

3. Means of Action

In the coming years and decades, lake Brome will continue to offer magnificent landscapes, rich ecosystems and an ideal location for good times. The Brome Lake community will always be proud of its precious jewel and tourists will continue to seek out its great riches.

This is the vision of the **Action Plan for a Healthy Lake 2022-2026**. Obviously, its implementation will require the participation and efforts of the entire community. Everyone will need to pitch in!

The plan is inspired by best practices for the protection of water bodies in Québec and is quite ambitious. It will permit systematic monitoring and rigorous reporting on the health of the lake.

The Action Plan consists of 35 measures grouped under 7 main orientations:

1. minimize contamination of the lake by runoff water;
2. minimize wastewater discharges into the lake and watercourses;
3. protect native species and combat invasive species;
4. raise awareness, inform and mobilise lake users;
5. control the lake level in an optimal manner;
6. collect the most up-to-date data on the health of the lake; and
7. work in collaboration with partners concerned by the health of the lake.

The timetable for implementing these measures is established over five years defined as follows:

- . Short term - Actions to be completed by 2024
- . Medium term - Actions to be completed by 2025
- . Long term - Actions to be completed after 2025
- . In continuity

TABLE 3. Main Orientations and Means of Action to Protect the Health of Lake Brome (2022-2026)

ORIENTATION 1: Minimize contamination of the lake by runoff water	
1. Update municipal bylaws concerning riparian strips on the lake, its tributaries and in wetlands	Short term
2. Create a model riparian strip in the new Carke Park	Short term
3. Put mitigation measures into place as part of the restoration of Mill Pond which flows into Coldbrook, as well as sediment management measures upstream	Short term
4. Undertake a diagnostic of runoff waters for businesses occupying a ground surface of more than 1,500 m ² including parking lots and identify mitigation measures to put into place if necessary. Control the enforcement of these measures	Short term
5. Raise awareness amongst residents on the dangers of using fertilisers	Short term
6. Put a program into place encouraging rainwater gardens on private properties	Medium term
7. Put appropriate measures of wetland protection into place based on their ecological value as established by the RCM	Medium term

8. Update the study on concentrations of road salts and others in the lake and its tributaries and the feasibility of employing other methods	Medium term
9. Ensure that problematic riparian strips are vegetated and preserved according to municipal bylaws	In continuity
10. Carry out an annual maintenance program for ditches, weirs and sedimentation basins in collaboration with RAPPEL and the RCM	In continuity
ORIENTATION 2: minimize wastewater discharges into the lake and watercourse	
11. Complete the installation of generators at each pumping station	Short term
12. Install a new telemetry system	Short term
13. Undertake the inspection and characterization of private septic systems. Ensure that the systems are brought up to standards (100 per year) and put a program into place to aid residents in this regard.	In continuity
14. Ensure the disconnection of rain gutters from the municipal wastewater system and the road ditches	In continuity
15. Ensure proper functioning of equipment to collect and treat municipal wastewater	In continuity
ORIENTATION 3: Protect native species and combat invasive species	
16. Operate a washing and decontamination station for motorboats from May to October	Short term
17. Mandate the obligatory washing of boats by municipal bylaw	Short term
18. Install two self-serve washing units for non motorized watercraft, one at Carke Park and the other at Douglass Beach	Short term
19. Ensure a better control of nautical activities, review the location of buoys and the navigational rules and increase the frequency of nautical patrols	Short term
ORIENTATION 4: Raise awareness, inform and mobilise lake users	
20. Produce an audiovisual document for public awareness	Short term
21. Produce a guide of best practices for lakefront residents	Short term
22. Produce a guide of best practices for lake users	Short term
23. Install information panels	Medium term
24. Identify conflicts in the use of different types of watercrafts	Medium term
25. Hold an annual meeting concerning the health of the lake	In continuity
26. Award an annual prize for the best developed and preserved riparian strip	In continuity

ORIENTATION 5: Control the lake level in an optimal manner	
27. Order a projected rainfall study	Medium term
28. Conduct a study on the feasibility of raising the Foster dam	Medium term
29. Optimise the management of the Foster dam using an electronic system	Long term
ORIENTATION 6: Collect the most up-to-date data on the health of the lake	
30. Conduct a study on the characterisation of existing artificial ponds	Medium term
31. Produce an annual dashboard of key indicators and, to this end, partner with a group of specialized researchers.	In continuity
32. Ensure a summer water sampling program of the lake and at the source of its tributaries	In continuity
ORIENTATION 7: Work in collaboration with partners concerned by the health of the lake	
33. Form a working committee in concert with the Organisme du bassin versant Yamaska, Renaissance lac-Brome and municipalites within the watershed to create a joint action plan and hold two annual meetings	Short term
34. Consult with the Québec Ministry of Transport concerning road salts	Medium term
35. Consult with the Ministry of Forests and Wildlife concerning wildlife inventories and sampling	Long term



A COMMUNITY MOBILIZED FOR A HEALTHY LAKE

The community is already mobilizing to protect the riches of lake Brome. More and more residents are ensuring the compliance of their septic systems, planting appropriate vegetation to protect riparian strips and disconnecting their rain gutters from the municipal wastewater system and road ditches. More and more lake users are cleaning their boats before launching, reducing their speed on the lake and limiting their navigation in the sectors most at risk.

The Town of Brome Lake applauds the mobilization of its community and calls on all residents and all lake users to adopt exemplary behaviour to protect the lake. This behaviour will lead us to succeed, together, in preserving the health of our lake.

The following is a non exhaustive list of exemplary behaviours to help protect the health of the lake:

Lakefront Residents	Lake Users
Vegetate a depth of 15 metres in the riparian strip (Municipal bylaw)	Wash watercraft prior to launching
Regularly verify the septic system and repair or replace if defective	Obtain information concerning responsible navigation practices
Disconnect rain gutters from the wastewater system and the road ditches	Obtain information concerning the sectors of the lake considered to be at risk
Limit the use of fertilizers, both chemical and natural	Strictly respect all signage on the lake
Avoid use of detergents and soaps containing phosphates	Limit your speed on the lake, especially within the sectors identified as high risk
Avoid feeding ducks and wading birds (prevent droppings which act as fertilizers)	Limit navigation in sectors at risk
Avoid lighting fires on the shore (the ashes act as fertilizers)	Limit navigation close to the shore
Ensure awareness of lakefront residents and lake users concerning the best practices to respect	



TOWN OF BROME LAKE

**Action Plan
for a Healthy
Lake**

**2022
2026**

LAC-
BROME

