

## Improving water quality of Lac Waterloo

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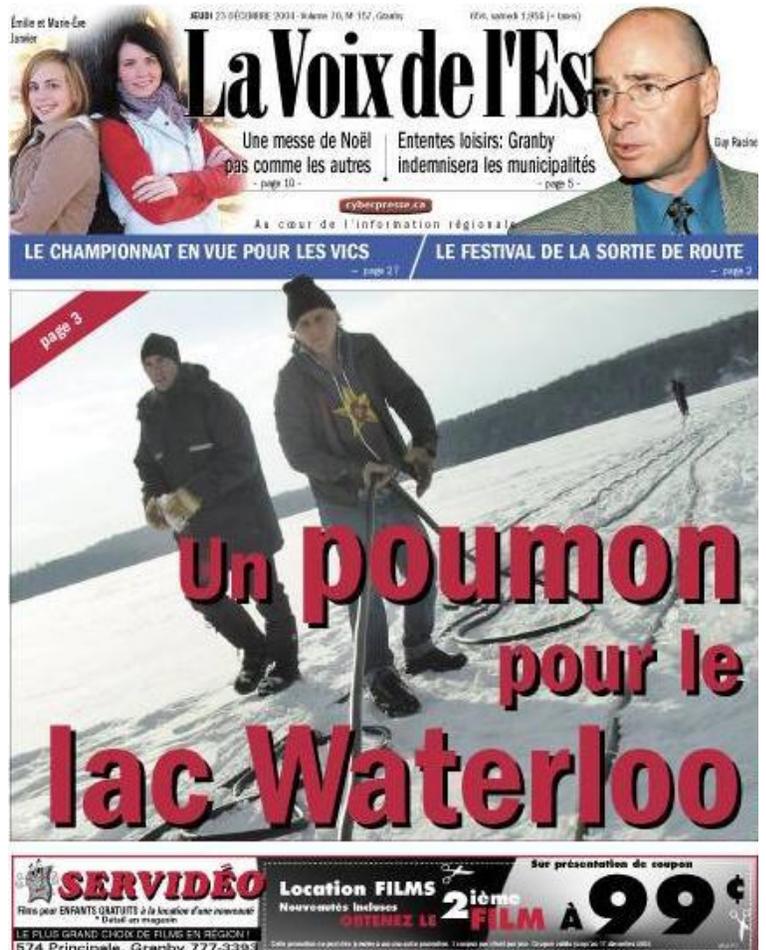
“Our objective is to encourage the re-establishment of the natural processes which will make it possible to restore and improving water quality of the Lake Waterloo with a minimum of human interventions”, explains Mario Paris, president of Canadianpond.ca Products Ltd., who was chosen by the elected officials of the municipality of Waterloo to install an aeration system in the large Québec lake.

Waterloo lake has a surface area of over 1.5 square kilometres and is located in the Eastern Townships region of Québec between Sherbrooke and Montréal. For years, the water quality of the lake has been deteriorating due to the poor environmental practices of factories and the industries surrounding the lake. While many of these large polluters have since closed down or improved discharge practices and there has been a steady increase in the human population bordering the lake. This has brought in another potential source for pollutants as one or two negligent citizens can easily discharge harmful fertilizers, chemicals or pollutants into a lake often without even being aware of it. The past industrial activities and the current population growth have resulted in a steady decline of the lake water quality.

The water quality has resulted in some serious problems. In both 1996 and 1997 there was a devastating loss of Perch in the lake and between 1996 and 2004 there have been ever expanding algae blooms which have forced the town to close beaches early and restrict access to the lake, this shows how far the eutrophication of the lake has progressed. A once lovely lake was at risk of being turned into a dangerous basin of inhospitable cyanobacteria.

The solutions to restore the health of the lake:

- Throughout the watershed, it will be necessary for all private citizens and commercial and industrial tenants to reduce their use of materials containing phosphorus, such as fertilizers and feeds
- It is necessary to increase the level of dissolved oxygen rate in the water and to re-establish a healthy natural bacterial count in order to restore the balance of the ecosystem there and eliminate the problems of algae, fish deaths and sediment accumulation.





With these two solutions now defined the installation of an aeration system was approved. With the lake being so large the appropriate sized aeration system was no small installation and for municipal budget considerations it was decided to implement the aeration system in phases over a period of years. Each phase of the aeration project will introduce localized aeration via disc diffusers or lengths of Bubble Tubing™ depending on benthic conditions.

The first phase was the placement of 16 high-density aeration discs in a central location with a long length of diffusion Bubble Tubing™ close to the public beach. Because aeration tends to leave open waters, care is taken to only run the main aerators' 16 discs during the winter so the large open hole in the ice can easily be identified and restricted by a barrier to ensure public safety. Aeration discs produce massive water movement and even in frigid temperatures ice will not freeze over where an aeration disc is active even when, as in this case, the depth of the lake is over 17 feet. Bubble Tubing™, however, produces much slower rising bubbles and may only thin the ice and not leave open waters. For this reason, all Bubble Tubing™ will be shut off during winter so there is no risk to the public. The six sections of Bubble Tubing™ will be operational only from spring to fall. Only the 16 diffusion discs in Phase 1 will function year-round.

This is not the first time The Town of Waterloo has used aeration in an attempt at restoring water quality. From 1975 to 1979, the lake was equipped with an aeration system and environmental studies registered a reduction of up to 52 % of inorganic phosphorus, a reduction which was helped by the naturally present beneficial algae and bacteria which was strengthened with the additional oxygen in the lake. The system, unfortunately was inefficient: the single large 15 HP compressor consumed enormous amounts of electricity costing upwards of 5000 dollars per year and the diffusion tubing was a lead-lined plastic pipe which has since been deemed too environmentally dangerous. The new system will use a unique Canadian Bubble Tubing™ which has 48 times more perforations per foot than previous generations of diffusion tubing and contains no metals, instead using safe silica sand as a ballast to keep it weighted on the lake bed. To increase efficiency and decrease electrical costs many smaller compressors will be used. Today's modern compressors are designed for performance and the combined electrical draw of the 8 compressors to be used in Waterloo Lake will be much less than the single old-fashioned compressor that had been operating during the 70's.

The objective for the Town of Waterloo is to stop the accumulation of organic sediments that are building up in the lake and reverse the process of eutrophication which has been steadily accelerating. With the addition of aeration the lake will gradually become deeper and cleaner, the negative species of algae will disappear and the fish and beneficial aquatic creatures will be more numerous and dynamic. The mixing and circulating action of the aerators will greatly reduce the occurrences of stagnating water pockets in the nooks and bays of the lake which have typically been the home to mosquitoes and the cause of odours.

By choosing aeration for this large lake, the mayor and councillors have taken a positive and proactive approach in dealing with one of their most important resources and attractions. Plans are being evaluated that include adding fountains close to the main bridge which will not only help with the water quality but will also be a beautiful addition and source of pride for the residents of the town. Throughout Canada more attention is being paid to the environment and constructive ways to deal with pollution and endangered aquatic systems and the aeration of the lake in the Town of Waterloo is one example of how a town's progressive thinking can help focus all residents' attention on taking responsibility for their future stake in their natural surroundings.

On December 23, 2004, the first phase of the Lake Waterloo aeration system was installed. A project of this scale requires approval from the Department of the Environment and it was only in December that approval was granted. The Town of Waterloo was anxious to have the first phase operating for the winter to get the cleansing process started so it was decided to install all the tubing and diffuser discs even though the ice had frozen over. Using a jigger, which is used in Northern communities to run fishing lines under the ice, the installation team threaded over 5000 feet of tubing under 8 inches of ice and placed the

diffusion air stations in position. The picture above is from the front cover of the local newspaper. There was much curiosity expressed during the two-day installation and small groups of nearby homeowners gathered to watch and ask questions.

Mario Paris, president of Canadianpond.ca Products Ltd. is also shown with the bright orange jigger used to run ropes under large expanses of ice. The jigger is placed in a hole in the ice and a simple mechanical crawling gear is manually activated by tugging on a rope attached to the jigger. The jigger travels in a straight line and can cover 100 feet in about 5 minutes. The orange color allows the jigger to easily be seen under the ice and the crawling gear also emits a metallic clicking sound to find the jigger if there is snow cover. When the jigger is in the desired location a hole is cut in the ice with a chainsaw and the jigger is removed. The rope is then tied to the tubing which is then threaded under the ice. The diffusion discs are attached to one end of the tubing and the other end is attached to the compressor. While it is often preferable to complete such an installation in summer months it is not always possible.

The hole in the ice over one diffusion assembly is approximately 50 feet in diameter. This single assembly has four discs on a self-sinking base and can circulate approximately 16,000 gallons per minute. The incredible movement of this action leaves a crown of bubbling wake on the surface and it is impossible for ice to form. A barrier of trees was planted around the open holes in the ice to identify the danger for walkers, skiers and snowmobiles.

ACTUALITÉS

## Une bouffée d'oxygène!

### Le système d'aération du lac Waterloo prend forme

**WATERLOO**

Le système d'aération du lac Waterloo a finalement pris forme hier. Au coût de 240 000\$, le procédé qui se fera en plusieurs étapes devrait permettre l'assainissement des eaux d'ici quelques années.

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Le projet revendiqué par les Amis du bassin versant prévoit l'aménagement de six systèmes d'aérateurs à des endroits stratégiques dans le lac d'ici l'été 2005. «On devrait poser les cinq autres au printemps. Ceux-là ne fonctionneront pas durant l'hiver, contrairement à celui qu'on met aujourd'hui (hier)», explique l'administrateur des Amis du bassin versant, Claude Tétrault.

Au cours de la journée d'hier, les travailleurs devaient installer 5000 pieds de tuyaux autocollants afin que l'aérateur soit fonctionnel le plus tôt possible. «On s'attend à mettre le système en marche ce soir», explique le président de la compagnie de Knowlton Produits Etangs.ca Liée, Mario Paris.

Les tuyaux relient un compresseur d'air installé sur la rive à une station de diffusion placée au fond du lac. «Le diffuseur qu'on pose aujourd'hui s'en va au centre du lac, au fond de l'eau. Le compresseur va envoyer de l'air par les tuyaux et le diffuseur va échapper des bulles microscopiques d'oxygène qui vont créer un courant.»

Le système encore peu utilisé au Québec devrait permettre une circulation de l'eau là où s'entassent des algues et des résidus de toutes sortes. «À des endroits il y a jusqu'à 27 pieds de cochonneries, c'est certain que c'est un long processus de nettoyage.»

photo Janick Marois

Bien emmitouflés, les travailleurs ont installé 5000 pieds de tuyaux autocollants afin de faire fonctionner le nouvel aérateur dans le lac Waterloo.

«Si tout va bien, on devrait faire fonctionner le tout ce soir», a expliqué hier Mario Paris, en sortant le jigger de l'eau, appareil servant à diriger les 5000 pieds de tuyaux sous la glace.

#### Une baignade à l'horizon?

Il faudra toutefois être patient car le processus de nettoyage du lac waterlois pourrait prendre quelques années. La baignade n'est donc pas encore prévue pour l'été prochain. «Ça va venir, mais c'est qu'il y a un méchant cocktail au fond du lac: les bactéries sont euphoriques en ce moment», ajoute M. Tétrault en rappelant que les citoyens devront faire leur part s'ils veulent revoir le fond de leur lac. «Il faut combiner ça avec un reboisement, moins de pesticides, donc une aide de la population est importante pour que ça aille plus rapidement.»

#### Attention aux esprits aventureux

Ceux et celles qui prévoient une petite balade sur le lac gelé devront être prudents. À l'endroit où sera placé le diffuseur, la glace sera plus fine, voire absente.

«On a demandé à la compagnie Produits Etangs.ca d'installer des sapins au milieu du lac parce qu'ils sont biodégradables, contrairement à une clôture», explique le maire Paul Masse.

En tout, entre 20 et 25 sapins démarqueront la zone à risque afin d'éviter les accidents.

photo Janick Marois