Lake management at the heart of Val-des-Monts development

Executive summary

Introduction

With the multiple benefits provided by lakes on the social, economical and environmental aspects, it is our duty to assure their ecological integrity. By keeping the lakes in good health, the Municipality of Val-des-Monts can benefit from the numerous incomes of tourism, cottagers, property values, fishing and life quality of its population.

The main objective of this document is to provide tools to the Federation of lakes of Val-des-Monts, the lake associations, the Municipality of Val-des-Monts and its population in order to sustain a sound lake management on its territory.

It explains the main problems affecting lakes, as well as the causes and consequences related to them. A list of potential solutions regarding septic systems, water consumption, lakeshore vegetation, erosion control, roads, household products, motorised boats and development control are suggested to the reader.

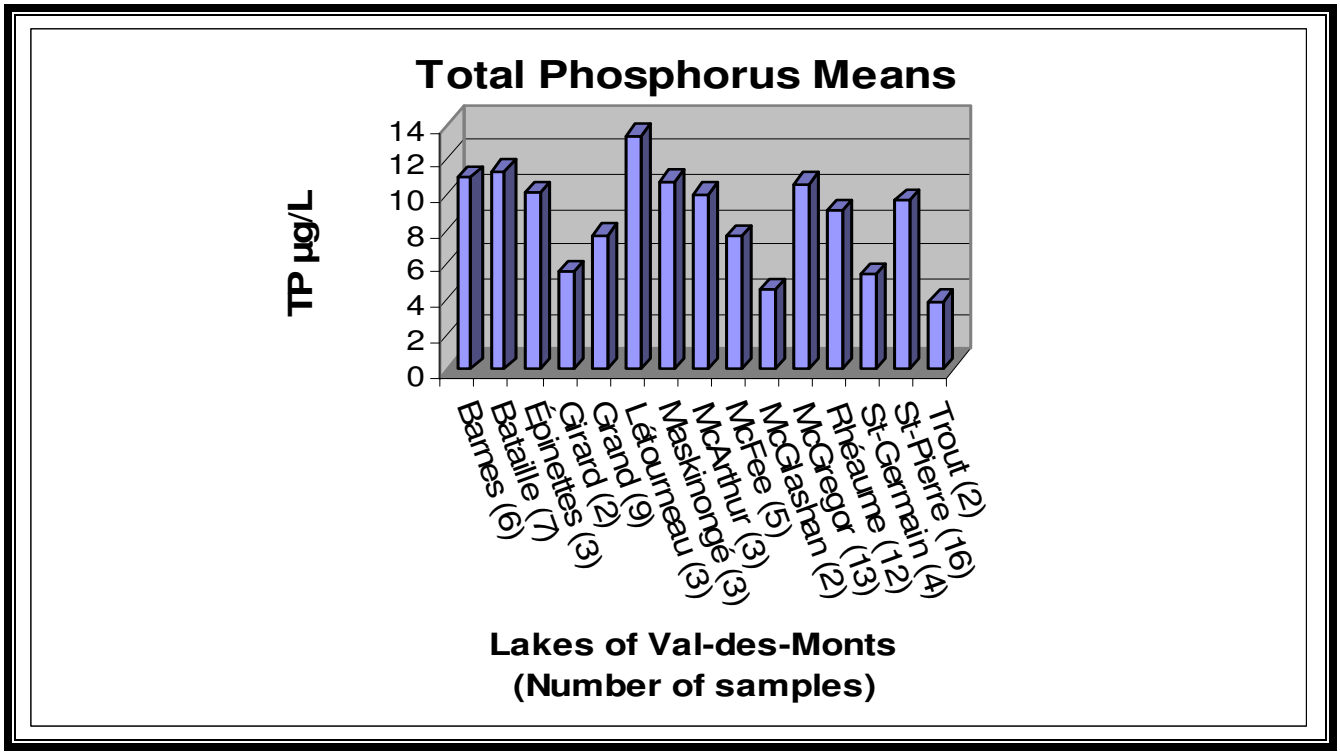
It emphasizes on a Val-des-Monts action plan that advise to use the tool that are lake support capacity models in order to make sure that the right development is done at the right place. Those rely on the best available science and offer a reliable and comprehensive management tool.

The reality of Val-des-Monts lakes

At their natural state, the lakes of Val-des-Monts are oligotrophic (Labelle and Fournier, 2001). In that case, we expect them to have really clear and transparent water (transparency > 4 meters). They should have few aquatic plants. The quantity of nutrients, especially phosphorus, should be restricted. Regarding that last aspect, the natural concentration of Total Phosphorus in the lakes of Val-des-Monts should be around 3 to 6 µg/L (micrograms per litre).

The governments of Canada and Québec suggest not going beyond a concentration of 1.5 times the natural concentration of Total Phosphorus, and also to make sure that this exceeding limit doesn't allow a trophic class change for the lake. So, a maximum increase of 50% is allowed as long as it does not overcome a maximum concentration of 10 µg/L for naturally oligotrophic lakes. If Val-des-Monts lakes are around 3 to 6 µg/L at their natural state, it means that they should not exceed a concentration of 4.5 to 9 µg/L, according to the lake.

It seems that the Total Phosphorus concentration of the lakes of Val-des-Monts is highly variable between them. According to the analysis of the water quality tests done by volunteers of lake associations in Val-des-Monts, several lakes would already be above that acceptable enrichment threshold. The following graph presents the results that we have:



This increase in phosphorus is imputable to several natural and human inputs. In Val-des-Monts, the most important are septic systems, lakeshore deforestation, chemical fertilizers, household products, motorised boats and roads.

The potentially noticeable consequences of enrichment in nutrients are:

- **Increase in aquatic plants quantity;**
- **Proliferation of Eurasian Water milfoil (when already present);**
- **Reduction of water transparency due to a growth of microscopic algae;**
- **Bloom of cyanobacterias (blue-green algae);**
- **Siltation of the bottom of the lake;**
- **Decrease in dissolved oxygen;**
- **Disappearance of the Lake Trout habitat;**
- **Diminished life quality and usages;**
- **Reduction of properties value.**

Means of action

Some solutions exist in order to counter or slow down the effects of eutrophication. The main objective is to act directly at the source, in other words trying to avoid the phosphorus from reaching the lake. We can try to control the consequences and symptoms of enrichment, but we will have to work indefinitely without really solving the problem. Also, if we only attack the symptoms and do not take care of the source of the problem, the situation will only aggravate years after years and the necessary efforts to fight back the symptoms will increase.

When we know that a certain lake has reached or exceeded the acceptable threshold of enrichment (natural concentration + 50%), we should try to stop any other inputs of nutrients from getting to the water.

Lake support capacity models

Lake support capacity models allow giving an approximate, but sufficiently accurate, image of the situation of a lake before any development occurred on his shores. When knowing that natural concentration, we can put it in relation with the actual data of the water quality tests done by the residents of Val-des-Monts. It allows us to see if the lake has reached or exceeded the suggested acceptable threshold.

These lake support capacity models can also allow establishing a sensitivity mark for each lake. This mark is based on the response ability of a lake to additional inputs of nutrients and to the mobility of phosphorus in the soils of its watershed. We assign the mark as follow:

Response	Mobility	
	High	Low
High	Sensitivity **high**	Sensitivity **medium**
Medium	Sensitivity **medium**	Sensitivity **medium**
Low	Sensitivity **medium**	Sensitivity **low**

According to the sensitivity mark and the actual state of the lake, in other words if it has exceeded the acceptable threshold or not, we can set a priority order of intervention for the lakes:

Sensitivity / Threshold	High	Medium	Low
Exceeded	**1st** priority	**1st** priority	**1st** priority
Not exceeded	**2nd** priority	**3rd** priority	**4th** priority

According to the priority order, limits to development and/or restrictive measures more or less severe would apply to any new construction. The main document enumerates the potential measures. While taking into account the rules and bylaws already in place at the Municipality of Val-des-Monts, we could integrate measures on the following aspects that would really rely on the actual and potential situation of lakes in the region:

- **Limits to development;**
- **Type of septic system;**
- **Specific lot assessment;**
- **Building setbacks;**
- **Lot minimum frontage;**
- **Lakeshore vegetation;**
- **Conservation of vegetation on the lot.**

With the desired outcome of getting to that kind of lake management, an action plan is shown in the main document. It also enumerates several recommendations to the Municipality of Val-des-Monts in order to put lakes at the front row of the sustainable development of the territory.

Conclusion

Every lake having a particular and unique situation, we cannot assess a judgement of the whole lakes in Val-des-Monts. Nonetheless, the effects of eutrophication are already perceptible on several lakes of Val-des-Monts and lake support capacity models would allow understanding even more those fragile ecosystems.

In order to avoid that the situation aggravates even more, the elected officials and the population should adopt measures and behaviours that are respectful of their environment. In that case, the key sentence would be:

Let's be preventive before being curative!

Bibliography

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Reference

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