
The Muskoka Watershed
REPORT CARD

Background Report #2

**Our Water – Swimability (Nutrient
Enrichment)**



Muskoka

WATERSHED COUNCIL

July 2004

**OUR WATER
SWIMABILITY – NUTRIENT ENRICHMENT**

Indicator	Are We Happy?	Trend
Maintaining lakes that do not have nuisance algae blooms.		

Why are we concerned about eutrophication?

Eutrophication is a condition in an aquatic ecosystem where high nutrient concentrations, such as phosphorus, stimulate blooms or excessive growth of algae. The tracking of phosphorus enrichment for a set of lakes distributed throughout the watersheds of Muskoka will provide an indication of enrichment over time.

Algae grow in fresh water lakes, ponds and wetlands. They occur naturally and are generally so small that they are invisible to the casual observer. When conditions are favourable, the number of algae increases dramatically and the resultant mass becomes easy to see. This condition is called an algae bloom. Blooms detract from the recreational enjoyment of a waterbody and cloud the water blocking sunlight and causing underwater plants to die. Because these plants provide food and shelter for aquatic creatures, spawning and nursery habitat is destroyed and waterfowl have less to eat. When the algae die and decompose, oxygen is also used up. Dissolved oxygen in the water is essential to most organisms living in the water, such as fish. In some situations, blue-green algae may develop. Certain forms of blue-green algae are toxic to humans and pose a significant health risk.

Historic records indicate that algae blooms have been experienced on inland lakes and on Georgian Bay in the past. Concern arises when nuisance algae blooms occur more frequently as a result of increases in nutrient loading. In recent years, algae blooms have been experienced on Peninsula Lake, Long Lake (Bala), and Brandy Lake. Blue-green algae were also reported in one bay of Skeleton Lake last summer.

Every inland lake, or major bay on Georgian Bay, is unique and reacts differently to environmental stress. With over 17,400 species of algae, each of which flourish in different situations, reliable predictive models that provide a cause and effect relationship do not exist. For these reasons, each bloom occurrence must be considered unique, and specific investigation is required to understand the cause of the bloom and to recommend remedial action, if required.

Although there is a general lack of understanding about algae, and blue-green algae in particular, scientists have determined that there is a direct statistical relationship between increases in algae blooms and increases in phosphorus loading. It was for this reason that Muskoka has monitored phosphorus on inland lakes and several bays on Georgian Bay for over twenty years and limits development on lakes where monitoring and computer modeling indicate that it is necessary.

Current state

The District Municipality of Muskoka has monitored total phosphorus on 152 lakes across Muskoka for over twenty years, which provides a good long-term data set to evaluate trends in phosphorus levels. The Ministry of the Environment recommends that human sources of phosphorus be limited to a 50% increase in load over the undeveloped level. Table 1 provides an analysis of the breakdown of lakes by level of enrichment.

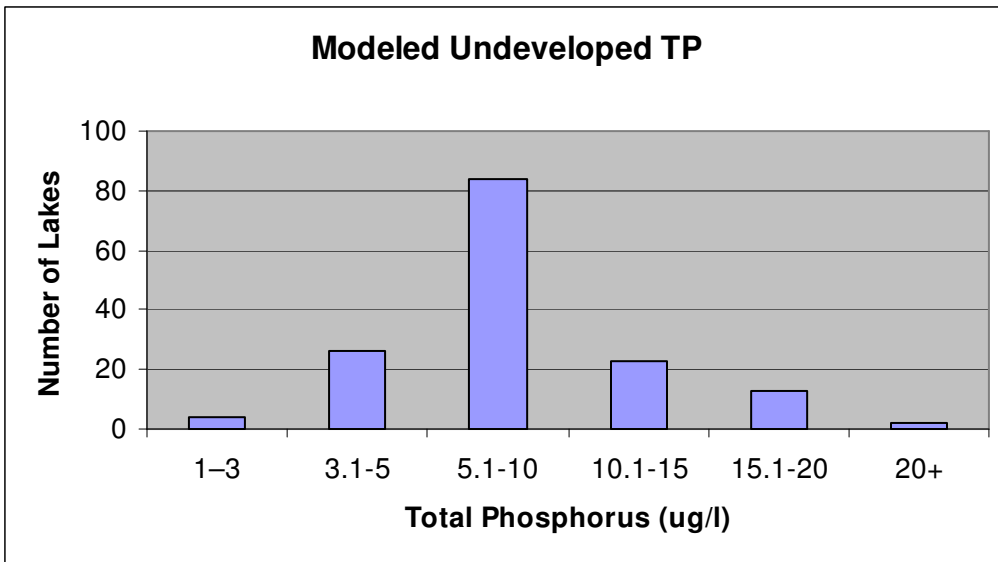
**Table 1
Enrichment of Lakes**

% Increase in Total Phosphorus over Undeveloped Levels	# of Lakes	% of Lakes	Cumulative % of Lakes
UD* + 0%	19	12.50	12.50
UD* + 9.9%	50	32.89	45.39
UD* + 19.9%	27	17.76	63.16
UD* + 29.9%	14	9.21	72.37
UD* + 39.9%	13	8.55	80.92
UD* + 49.9%	7	4.61	85.53
UD* + 59.9%	6	3.95	89.47
UD* + 69.9%	4	2.63	92.11
UD* + 79.9%	1	0.66	92.76
UD* + 89.9%	3	1.97	94.74
UD* + 99.9%	0	0.00	94.74
UD* + 100+ %	8	5.26	100.00
Total # of Lakes	152		
85.5 % of lakes < UD +50%			
14.5 % of lakes > UD +50%			

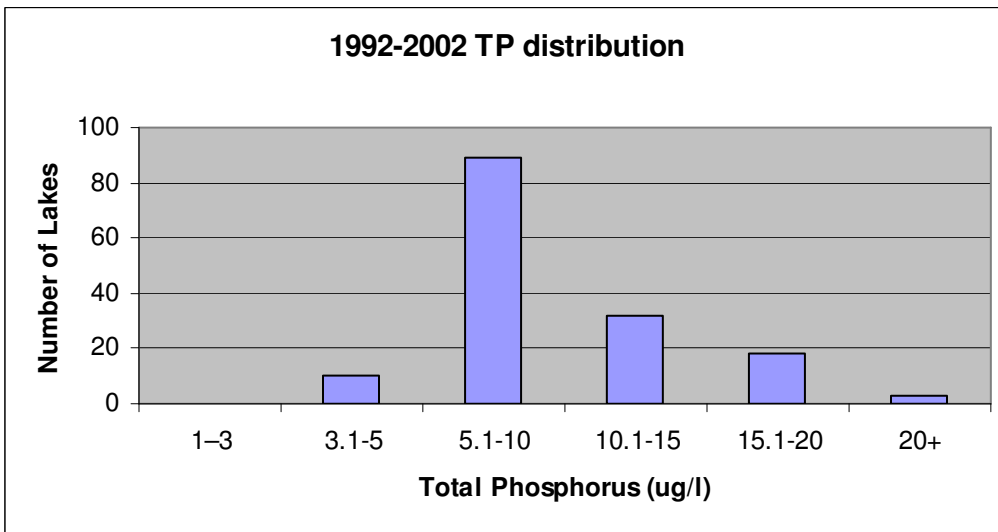
* UD – Undeveloped Level

Although the general water quality of most lakes in Muskoka is very good, an analysis of the change in phosphorus levels since European settlement indicates slight enrichment. Graphs 1a and 1b illustrate historic and recent monitoring data and a comparison of the two graphs indicates a slight shift to the right or to more enriched levels.

**Graph 1a
Modeled Undeveloped Total Phosphorus**



**Graph 1b
1992 – 2002 Total Phosphorus Distribution**



What are the stresses?

There are two primary sources of phosphorus over which people have control. The first is phosphorus in human waste, either from septic systems or from municipal treatment facilities. Based on the District of Muskoka water quality model, a faulty septic system or one that does

not benefit from a well-vegetated environment with soil that can adsorb nutrient will input up to .6 kg/person/year into a lake. The second is the removal of native, deep-rooted shoreline vegetation thereby allowing additional nutrient and soil particles to wash into the waterbody.

What action can be taken?

Activities that can be undertaken by individuals:

1. Ensure that private waste disposal systems are functioning properly and meet current standards.
2. Plant a shoreline vegetative buffer using native species.
3. Do not wash boats in the lake.
4. Do not bathe in the lake.



Activities that can be undertaken by municipalities:

1. Muskoka has built, and will continue to build as required, tertiary sewage treatment plants with enhanced phosphorus removal capabilities to reduce the amount of phosphorus from human waste entering our recreational waters.
2. Encourage the retention of shoreline vegetation through the planning and development approval process.
3. Require all septic systems to be set back 30 metres from the high water mark of all waterbodies.
4. Continue and improve septic re-inspection programs.
5. Provide proper sanitary facilities at all public beaches.

Activities that can be undertaken by senior levels of government:

1. Provincial legislation is required that will allow a more thorough septic re-inspection program to be undertaken.
2. Provincial regulation governing the distance a septic system must be setback from surface water should be amended to read 30 metres.
3. Federal legislation is required that will require both gray and black water to be pumped out at regulated facilities.



References

1. District Municipality of Muskoka, Water Quality Monitoring Program.