Saving Lake Winnipeg
By Dr Reese Halter

Glacial Lake Winnipeg is a magnificent reminder that massive sheets of ice several kilometers thick smothered the northern half of North America only 20,000 years ago. The tenth biggest lake in the world is in trouble and denizens of Alberta, Saskatchewan, Manitoba, North Dakota, South Dakota, Montana and Minnesota need to work together to fix it.

Lake Winnipeg is the second largest watershed in Canada. Five and a half million people depend on the health of this water body. Economically, it is a powerhouse supporting a $100 million a year tourism industry and $25 million a year fisheries. In addition, Lake Winnipeg makes up the third largest water reservoir in the world and provides Manitoba Hydro with about $500 million of revenue a year.

Lake Winnipeg occupies almost four percent of the province of Manitoba. The Red and Winnipeg Rivers feed into its southerly end while the Saskatchewan River enters the northwestern part of the lake. The lake flows north through Nelson House finally emptying into Hudson's Bay.

The southern portion of the lake is shallower and traditionally the water was rather murky. The northern part of the lake is significantly larger, deeper and its waters are clear.

Southern Lake Winnipeg is a prized destination in the summertime for cottagers. It is also an international destination for sailors. As a matter of fact, two Pan American Games held their sailing competitions at the Gimli Yacht Club.

Biologically, the lake is fascinating and it supports myriad aquatic life. Aquatic plants support the base of the food chain enabling fish and crustaceans to prosper. Phosphorus is the limiting element determining plant growth in all fresh water lakes. If phosphorus is added to a lake, algae proliferate or blooms. The problem, however, is that the type of algae - a blue-green more correctly known as cyanobacteria – is deleterious to lakes.

From 1900 to 1960 the levels of phosphorus in Lake Winnipeg have naturally fluctuated. Since the 1960s the levels of phosphorus have dramatically risen.

When phosphorus is added into a lake blue-green algae blooms; it's a process called eutrophication. Currently, Lake Winnipeg, affectionately known as Canada's sixth Great Lake, is the most eutrophic lake in the world.

Many biological changes occur in eutrophic lakes. Blue-green algae requires a tremendous amount of oxygen which it draws, slowly at first, from the water. And as the bloom increases in size it takes a lot more oxygen from the water. In a healthy and vibrant lake all plants, fish and crustaceans require oxygen too, which incidentally decreases towards the bottom of the lake.

As air temperature begins to drop in late August and early September blue-green algae dies and huge mats sink to the bottom of the lake and begin to decompose. Decomposition requires oxygen.

During the wintertime when ice forms on a lake the oxygen content naturally decreases due to demands by fish and other animal life. Also aquatic plants are inactive and not able to add oxygen into the water. Decomposing algal blooms consume precious oxygen necessary to sustain all life under an ice-cover.

In the late 1980s Lake Winnipeg's northern end began to develop massive blue-green algal blooms. By the early 2000s smaller blooms began to appear at the southern end. In 2005 a blue-green algal bloom covered the entire lake: it was visible from outer space. In addition to robbing oxygen from the water those blooms produce neuro-toxins and some are more potent than cobra venom.

In 2001 the Lake Winnipeg Research Consortium was formed. A team of multi-disciplinary scientists quickly identified and quantified the sources of phosphorus.

The Red River is carrying about 7,716 tons (7,000 tonnes) per year or half the incoming phosphorus from agriculture and wastewaters in North Dakota, South Dakota, Minnesota and Montana. The Saskatchewan River is carrying phosphorus from Alberta and Saskatchewan while the Winnipeg River is adding it from Minnesota and Ontario.

The city of Winnipeg's sewage treatment plant does not remove nutrients from wastewaters which drain directly into Lake Winnipeg. Furthermore, thousands of cottages at the southern end of the lake have old and leaky septic systems adding more phosphorus into the

lake.

Many modern cottages have dishwashers. Some dishwasher soap like Cascade and Electrosol contain phosphorus, and phosphorus-enriched wastewaters are leaking into in the lake.

In addition, many homes in Calgary, Edmonton, Saskatoon, Regina, Winnipeg, Fargo, Moorehead and Grand Forks regularly use phosphorus fertilizers on their lawns. The phosphorus is running into the rivers which eventually drain into Lake Winnipeg.

So what can be done about this human-induced problem on Lake Winnipeg?

Everyone in this vast watershed can play an important part and help solve this problem. Do not use dishwasher soap that contains any phosphorus – make sure you read the label before buying soap. Reconsider applying fertilizers to your lawn, most of it runs off into streams and rivers and it's winding up in Lake Winnipeg feeding this algal bloom.

Farmers must not add tonnes of manure to frozen soils near streams or rivers. They need to ensure that when manure is applied to the soils that a buffer of trees, preferably a forest, can help absorb some of the incoming nutrients. They must refrain from adding manure to land with slopes because concentrated nutrients runoff into waterways.

The city of Winnipeg must follow Calgary's leadership and construct a tertiary treatment facility to remove nutrients like phosphorus from its wastewaters.

If we stop adding phosphorus into Lake Winnipeg we can reverse eutrophication.

A couple decades ago Lake Erie was eutrophic. Canadian and U.S. lawmakers banned phosphorus from laundry detergents. It took about a decade or so but eutrophication was reversed in Lake Erie.

If we all lend a hand, we can restore the majesty of glacial Lake Winnipeg.