

What's to Become of Swan Lake and Swan Lake Park?

by Fred Peters

In 2020, with a little help from their Friends, Markham Council recognized the need to address some critical issues in Swan Lake Park.

Defining the Future for Swan Lake and Swan Lake Park

Council asked staff to report back in 2021 on two important topics: 1) a park improvement program and 2) the establishment of long term water quality guidelines for Swan Lake.

Critical to defining a park improvement program or setting water quality goals is to first clarify the community role for the park and lake.

The original objective for Swan Lake Park, set out by the developers in 1993 and accepted by Markham officials at that time, was for Swan Lake Park to provide a naturalized setting with play areas that could support a wildlife habitat and possibly serve as a base for children's nature camps. Swan Lake was to support community use for water based sports, sports fishing and ice skating.



Many of the park objectives have been realized but the objectives for Swan Lake were not, and due to the current poor water quality, could not be supported today.

Natural Spaces, Wildlife Places

Markham manages Swan Lake Park as a "Natural Spaces, Wildlife Places" park.

But what does this mean? Is this to be a naturalized area with minimal human interaction,



or is human interaction to be encouraged through nature camps etc.?

Are we to be passive in support of natural wildlife or should we be helping to improve and sustain the habitat through some of the approaches employed by the Toronto and Region Conservation Authority (TRCA)?

Community and Water Quality Goals for Swan Lake

Scientists categorize water quality environments into trophic states. Swan Lake has consistently been categorized as a hypereutrophic lake, the lowest quality and highest risk category. The lower quality levels of eutrophic and hypereutrophic are not environmentally stable.

Lake Conditions and Community Options Associated with Trophic States

If the community objective is to encourage paddle sports and sport fishing in Swan Lake, then a program to improve the water quality to the mesotrophic category needs to be considered. The city's current program is targeted to maintain a eutrophic category, an environmentally unstable aquatic environment with minimal options for community engagement.

Stabilizing Swan Lake at the mesotrophic level is, however, a challenging objective. Details on the water quality issues in Swan Lake and possible solutions are outlined in our report "A Pathway to Sustainable Water Quality in Swan Lake," available on our website at www.friendsofswanlakepark.ca

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TROPHIC STATE	AQUATIC ENVIRONMENT	COMMUNITY OPTIONS
Oligotrophic	Lack of plant nutrients keep productivity low, lake contains oxygen at all depths, clear water.	Swimming, paddle sports, wide range of fish options.
Mesotrophic	Moderate plant productivity, lower levels may lack oxygen in summer, moderately clear water and warm water fisheries only.	Paddle sports, swimming possible if monitored, good range of fish options.
Eutrophic	Contains excess nutrients, blue-green algae dominate during summer, algae scums are probable at times, lower levels lack oxygen in summer, poor transparency, rooted aquatic plant problems may be evident.	No swimming, paddle sports possible, limited range of fish options.
Hypereutrophic	Algal scums dominate in summer, cyanobacteria, few aquatic plants, no oxygen in lower levels, fish kills possible in summer and under winter ice.	No human interaction, potential health risk for humans and small animals.

Concerns about Phoslock

The Phoslock treatment planned for spring of 2021 is an essential first step towards containing the deteriorating water quality issues in Swan Lake. There are two fundamental concerns about relying on a continual Phoslock treatment program. First, it is expensive. Each treatment, required every 3 - 5 years, would cost in excess of \$100,000. Secondly, it only directly treats phosphorus. Phoslock can have an indirect impact on nitrogen levels but has no impact on chloride or low oxygen levels.

Naturalized Options

A stable aquatic plant environment can be a major contributor to improving the quality of the water. More aquatic plants throughout the lake or in areas such as Turtle Inlet could help in sustaining oxygen levels, as would adding equipment such as bubblers to directly add oxygen. Fountains can be helpful but it would take more than one to have a meaningful impact.

Circulating Water Through the North Channel

Swan Lake is a stagnant pond. There are no natural surface level inflows or outflows. Removing water from the lake and returning it to the lake, oxygen enhanced, with possibly fewer nutrients could provide a natural enhancement to the water quality in the lake and reduce the dependency on future chemical treatments. This could be accomplished by recycling lake water

through the North Channel, a dry channel along the north end of Swan Lake that serves to drain stormwater from the north end of the park.



The Friends of Swan Lake Park have engaged Dr. Barbara Siembida-Lösch to provide a review of what can be done to address the issues of high nitrogen and chloride levels in the lake and suggestions on approaches that have worked elsewhere to improve oxygen levels. Dr. Siembida-Lösch is a senior scientist with the Centre for Water and Wastewater Management at Fleming College. We are encouraging the City of Markham to build upon her work by engaging Ducks Unlimited and the TRCA to identify naturalization approaches that will complement the on-going Phoslock treatment program and lead to a sustainable and cost effective long term solution for water quality in Swan Lake. □