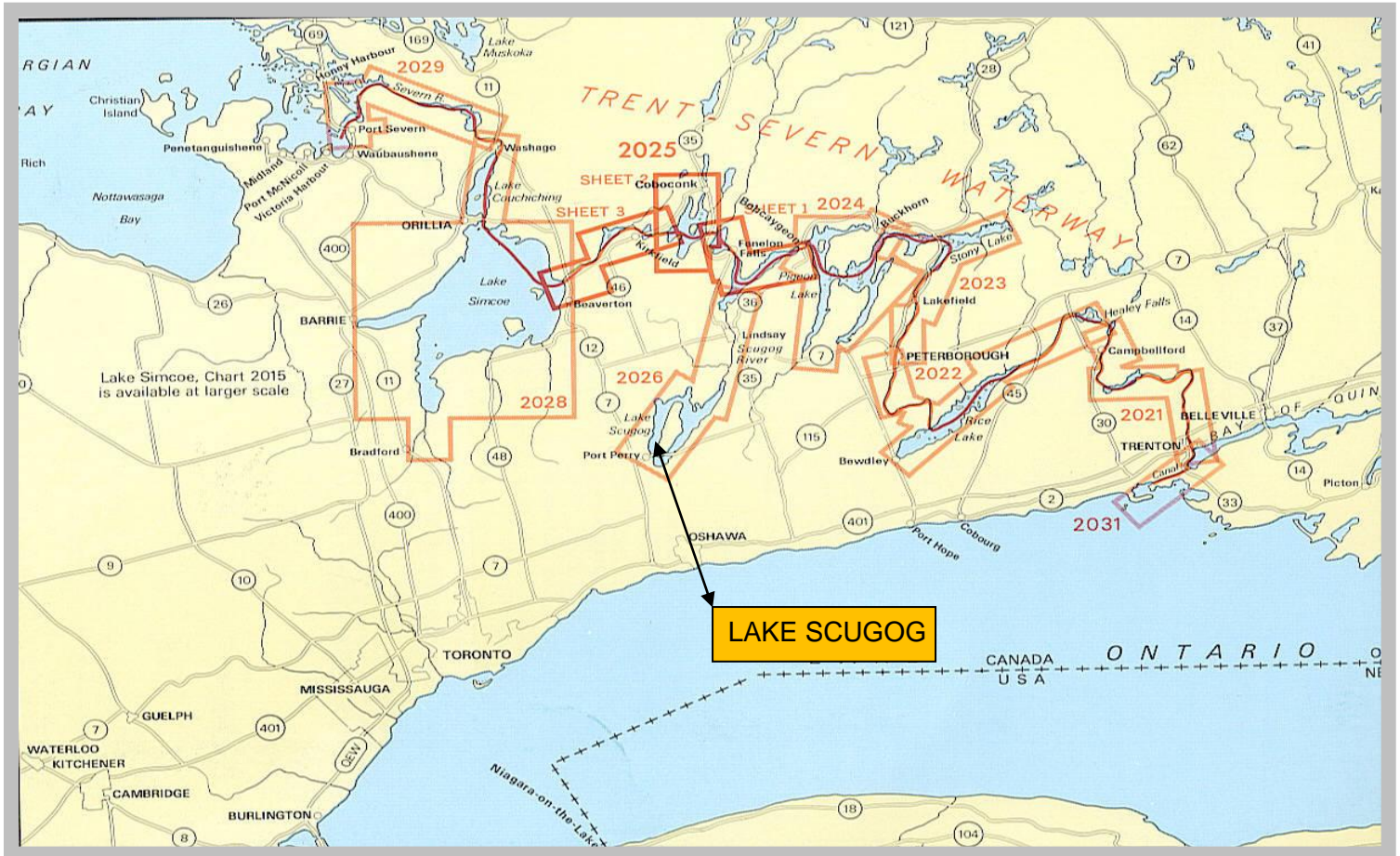


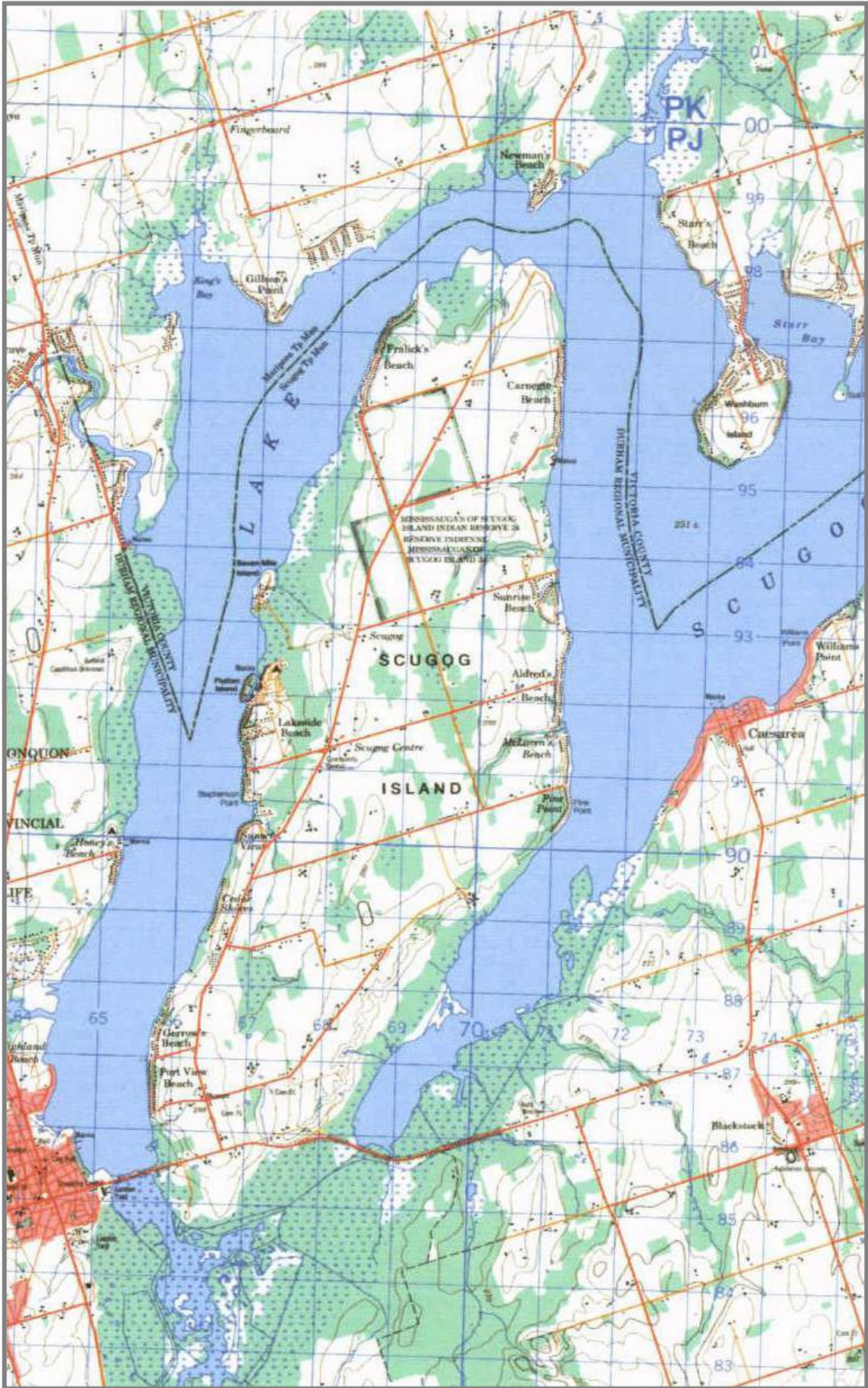
A Proposal for Improving Lake Scugog's Ecological Health



Map courtesy of: Trent-Severn Waterway



Scugog Lake Stewards Inc.
December 2012





A Proposal for Improving Lake Scugog's Ecological Health

Table of Contents

Executive Summary	Page 4
An Overview of Remedial Actions to Date	Page 5
Current Threats to the Entire Lake – Invasive Hybrid Eurasian Water Milfoil	Page 6
Eurasian Water Milfoil (EWM) Characteristics	Page 7
Current Threats to the Port Perry Shoreline and Near-shore Channel	Page 8
What Needs To Be Done	Page 10
The Economic Importance Improving Lake Scugog's Ecological Health	Page 12
History of Scugog Lake Stewards Inc.	Page 14
Appendix A - Photographs Illustrating the Ecological Problems	
Appendix B - Letters from partners, organizations and concerned citizens.	

* * *

A Proposal for Improving Lake Scugog's Ecological Health

Executive Summary

The goal of the Scugog Lake Stewards is to "Protect and improve the health of Lake Scugog."

We find there is broad agreement that Lake Scugog is rapidly becoming a lake in crisis. A severe aquatic 'weed' problem has been developing throughout the lake for several years now. One of the areas where this problem is most noticeable is off-shore from Port Perry, the Township of Scugog's largest urban centre. Shallow water depth in the Port Perry area is also an issue.

Lake Scugog is not just the most significant natural resource in Scugog Township, it is also one of the township's key economic resources. The declining health of Lake Scugog is having a negative impact on nature, recreational opportunities, the local economy and the ability of people to enjoy the lake, be they tourists or local residents.

With regard to Port Perry, all agree that this picturesque, historic town does not have a viable future if it fronts on a shallow, smelly body of water that is obviously unhealthy.

We believe the problems are:

- 1. The proliferation of invasive hybrid Eurasian water milfoil throughout the lake;**
- 2. Shallow water depths in the Port Perry area, including the channel; and**
- 3. An excess of new algal growth in the Port Perry area and beyond.**

For solutions, we are proposing:

- 1. The broad use of milfoil weevils as a natural bio-control throughout the lake;**
- 2. Some harvesting and skimming of milfoil with mechanical equipment; and**
- 3. Dredging selected areas of the lake near Port Perry to increase water depths.**

We have many partners and supporters, including the Township of Scugog, local business groups, charitable organizations and members of the community. We all stand to lose if the lake is not ecologically healthy.

It is a situation that urgently needs to be addressed. But before the Scugog Lake Stewards or anyone else can do anything, the understanding and co-operation of Ontario Waterways is required.

We therefore request Ontario Waterways to look closely at the needs of Lake Scugog and grant the necessary regulatory easing to allow positive environmental improvements to happen.

An Overview of Remedial Actions to Date

Lake Scugog's current average depth is only four feet, yet it has always been a very healthy lake supporting diverse fish and waterfowl species as well as a large human population living around its shores. A survey conducted with funds from the MNR in 2007 showed that out of 2,217 shoreline properties, only 410 had natural shorelines. Since then, the activities of the Scugog Lake Stewards and Kawartha Conservation have helped to greatly increase the number of shoreline properties with natural buffer strips.

The 2007 survey also spurred a decision by the Region of Durham and Township of Scugog to develop the Lake Scugog Environmental Management Plan. Kawartha Conservation conducted scientific research over several years to quantify nutrient loading levels and determine the sources. The management plan was made public in 2010, along with associated implementation plans. This past December (2012), a new Storm Water Management Plan for 'old' Port Perry was presented to the public. For several years there have also been extensive educational programs and financial incentives for landowners and agriculture, initiated by the municipality and Region through Kawartha Conservation, to institute best practices for managing nutrient runoff.

In addition, the Region and Township have just finalized a Class Environmental Assessment to improve the Port Perry Wastewater Treatment Plant. (This plant is situated on the Nonquon River which flows into Lake Scugog.) The plan is to have this facility exceed Ontario Ministry of the Environment standards for both phosphorus and nitrogen. The redeveloped facility will also provide treatment for private wastewater system septage.

The purpose of this work is to specifically reduce the amount of phosphorus and nitrogen nutrients that are yearly added to Lake Scugog which spur on algal and aquatic plant growth. There will, however, be an inevitable lag in time between the institution of nutrient reduction practices and an overall improvement in the health of Lake Scugog.

In 2009, federal infrastructure funding was used to create an exceptional, people-friendly waterfront in Port Perry. Unfortunately, the water depth adjacent to these shoreline improvements is very shallow and unattractive. These problems have the potential to impede further improvement of the waterfront area, including finding a commercial partner to help improve an historic old mill which is right on the waterfront. This mill predates a major fire in 1884 and is a strong reminder of the railroad that used to pass at its base along the waterfront.

Water depth is also an issue for the local marina and the operations of a cruise boat used for sightseeing.

The Township of Scugog and local citizens view Lake Scugog as an environmental 'gem'. Our activities and real estate values revolve around it. We must keep it healthy.

* * *

Current Threats to the Entire Lake – Invasive Hybrid Eurasian Water Milfoil

In June 2006, people began seeing aquatic plants in Lake Scugog that did not exhibit the same characteristics as the milfoil they had seen before. While we have witnessed varying degrees of Eurasian water milfoil (EWM) (*Myriophyllum spicatum*) in the lake since it was first introduced in the 1960s, this plant was different. It seemed much more aggressive, with red flower heads held above the water and extremely thick growth below. (See photos in Appendix A) Problems with the overwhelming resurgence of this plant in following years spurred on the Stewards' interest in finding a species-specific solution.

Our research led to us developing an interest in a native biological control - milfoil weevils (*Euhrychiopsis lecontei*). We visited Puslinch Lake (near Cambridge, Ontario) which at that time was the only lake in Canada where people had tried introducing large numbers of milfoil weevils to fight a profound water milfoil problem. This experiment was a dramatic success. (See YouTube video: "Cambridge Ontario: New Story on Milfoil Weevils in Puslinch Lake.")

Therefore, in 2009, under the guidance of Dr. Eric Sager of Trent University, the Scugog Lake Stewards implanted milfoil weevils into a northern area of Lake Scugog. We created a test site and a control site to judge the effect of milfoil weevil use in the lake. Since then, scientifically controlled research, paid for by the Lake Stewards and carried out by Dr. Sager and biologists from EnviroScience Consultants Inc., continued yearly. The results of this bio-control in the study area (and spreading to the north with the prevailing currents) have been positive and encouraging,

Initially, there were concerns about predation by fish, but given the performance of the milfoil weevils in the study area, this does not appear to be a significant risk.

While this research was occurring, Kyle Borrowman of Trent University was developing his graduate thesis with Dr. Sager on The Ecology of Milfoil Weevils in Ontario Lakes and Their Relationships With Different Variants of Eurasian Water Milfoil. His thesis provided valuable additional scientific information. (It was largely funded by the Ontario Invasive Species Centre in Sault Ste. Marie, which was affiliated with MNR at the time.)

The Kawartha Lake Stewards (KLSA), from the watersheds to the north of Lake Scugog, were experiencing the same aquatic plant problems and had funds from the Ontario Trillium Foundation to produce an aquatic plants manual which is posted on their website. (See klsa.wordpress.com) Separately KSLA funded Mr. Borrowman to produce a handbook about milfoil weevils based on his research which is now posted on their website. (See "Weevil Guide" on that same site to see the entire brochure.)

Mr. Borrowman's research was 'cutting edge' because part of the research entailed conducting DNA testing on milfoil samples from a wide range of Ontario lakes. Through that research it was determined that, what seemed to be a different type of milfoil to the Scugog Lake Stewards in 2006, was actually a new hybrid of native northern water milfoil (*Myriophyllum sibiricum*) and Eurasian water milfoil.

(See the following PowerPoint slide from a recent presentation to the Ontario Invasive Plants Council by Mr. Borrowman, Dr. Sager and Ryan Thum of Grand Valley State University, U.S.A.)

You will see on this slide/map that some lakes had milfoil that tested as variants of Eurasian water milfoil, others had both standard EWM and variants, but Lake Scugog tested as having homogeneous hybrid milfoil. The new research using DNA testing showed that what was being seen was not just an aberration that occurs within the parental taxa, but a genuine varietal on its own. This has great importance to Ontario Waterways because this hybrid is now distributed throughout the Kawartha Lakes and the Trent-Severn system.

* * *

Eurasian Water Milfoil (EWM) Characteristics

All EWM variants are perennial and begin new growth almost as soon as the ice is out on the lake in the spring and their growth lasts longer than most aquatic plants in the fall. This allows them to out shade and out grow competing native species. They reproduce new plants from broken pieces of parent plants. This not only occurs from mechanical separations but also naturally as part of their growth cycle. This allows dispersal and thick growth to occur quickly throughout lakes, especially down-current. Even dried bits of EWM can re-grow when re-hydrated.

Hybrids of invasive plants are often:

- **More aggressive and invasive, growing in thicker stands which eliminate competition;**
- **More resistant to chemical controls and exhibiting greater ecological tolerance;**
- **More fecund and fast growing; and**
- **In this specific case, have thicker, stronger stems which hold the plants more erect at the surface and cause greater problems for boaters.**

As noted in the research by Kyle Borrowman on Eurasian water milfoil (EWM),

“EWM can alter many aspects of an aquatic ecosystem. It can reduce oxygen exchange and deplete the level of available dissolved oxygen in the water needed for a healthy lake. It may increase water temperatures, sedimentation and the loading rates of nutrients. It can cause a decrease in biodiversity by taking over areas once populated by native plant species. Reduced drainage and increased flooding are also negative effects that may occur when populations are very high.”

Kyle Borrowman, from The milfoil weevil: a control method for invasive milfoil in the Kawarthas, 2011.

* * *

Current Threats to the Port Perry Shoreline and Near-shore Channel

1. Silt from storm water runoff continues to cause reduced water depth:

A large volume of storm water runoff from the older neighbourhoods of Port Perry drains directly into Lake Scugog. Over the years, this has been a major contributor to the deposition of silt and sediment in Port Perry Bay and beyond. New storm water plans have been developed to address this situation, but remediation is expensive and complicated by the urban structures and historic nature of the town. As a result, silt and sand are still being deposited in large deltas at the mouths of some of the storm water outlets.

Core testing of sediment by Kawartha Conservation has indicated high levels of nutrients, but generally acceptable levels of other pollutants.

One interesting note is that large boats navigating in this naturally shallow part of the lake are creating areas that are now excessively shallow, while deepening other areas (i.e. the channels they are navigating in.) If larger craft, and even smaller craft are to continue operating in the future from the local marina and municipal boat launch, not to mention the Woodman cruise vessel which operates from the Queen Street Pier, an increase in water depth is essential in these areas.

2. Rapid decrease in environmental health of the Port Perry shoreline because of milfoil and consequent filamentous algal blooms:

Several of the photos that are attached to this report show what people now see when they visit the Port Perry waterfront or bring their children to play at the waterfront playground. Underneath the highly visible layer of algae on the surface is a thick growth of milfoil. This area, which was very species-rich up until 2005, is now oxygen depleted and basically a 'dead zone.'

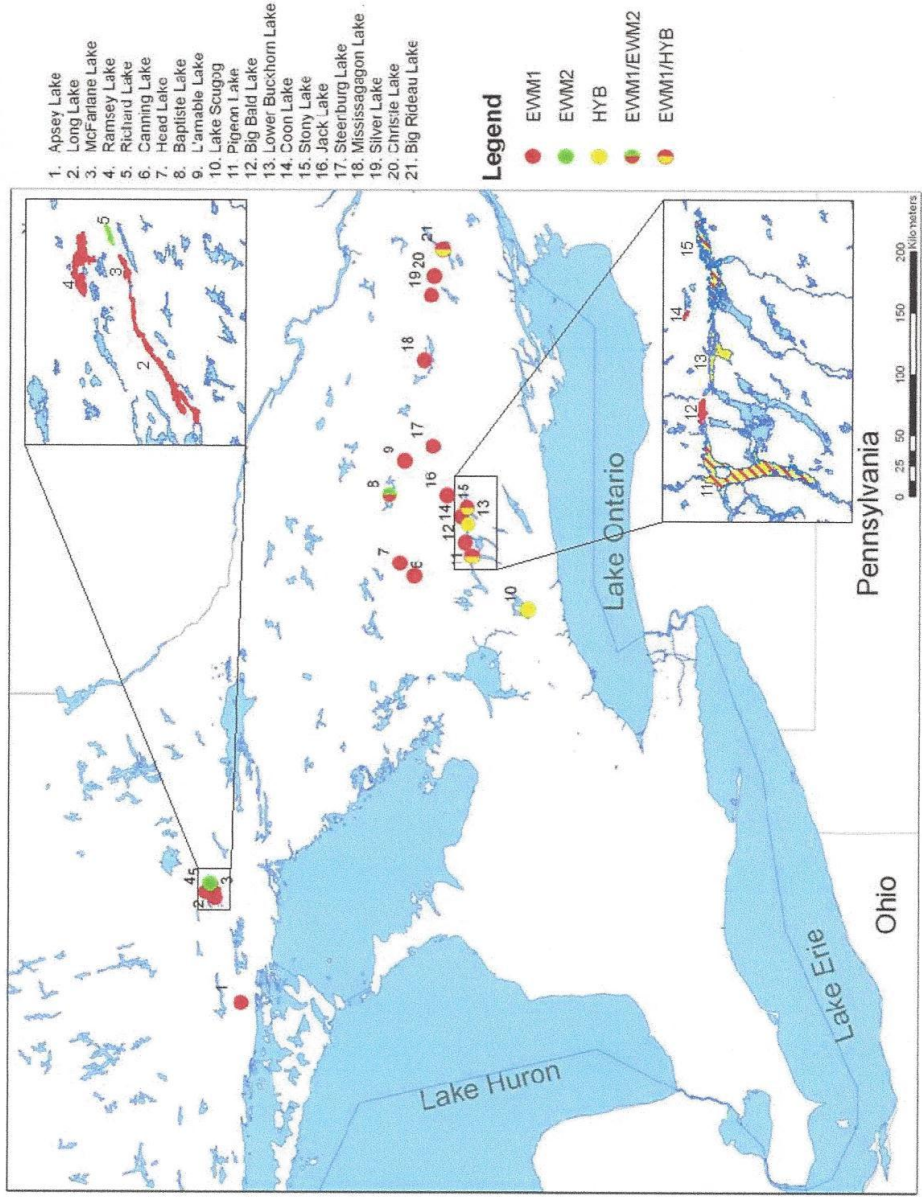
Just over 18% of new phosphorus loading in Lake Scugog each year comes from urban runoff, even though urban areas comprise just over 3.5% of the watershed. Much of this nutrient enters the lake through storm water outlets and streams along the shoreline of Port Perry, while some is direct runoff.

Now that the local waters off Port Perry are jammed with recurring hybrid milfoil, this nutrient-laden storm water runoff is blocked by the 'weed' beds when it enters the lake. Its velocity is diminished and, consequently, its load of nutrient laden silt and sand is deposited close to shore thus encouraging algal blooms.

This is compounded by the fact that, as the weeds decompose each year, they release the nutrients they've absorbed (adding to the next year's weed problem) while their biomass settles to the bottom and further decreases the lake depth.

Climate change is also having a negative impact on water depth in the lake. The increased number of long, dry, hot periods in summer reduces water run-in from all the feeder streams

Results



and springs to a trickle. This type of weather also increases the rate of evaporation from the surface of this large but shallow, warm-water lake, thus dropping the water level to troublesome depths in many areas. Since Lake Scugog has no reservoir lake to refill it, it must rely entirely on water from its own watershed. When rains do come after droughty periods, it is often extremely heavy, overwhelming mitigation measures for storm water improvement.

Because of recent climate anomalies there has been less snow melt and therefore less water in the spring freshets to move dissolved nutrients out of the lake north through the Scugog River.

In short, the Scugog Lake Stewards believe that the conditions found in Port Perry Bay and beyond are not only bad from a human perspective, but environmentally unhealthy as well.

* * *

What Needs To Be Done

We must have ‘tools’ to deal with the milfoil problem in the entire lake, as well as the near-shore problems in the Port Perry area, and we must have authority to use them.

There is no one solution to all these problems. We therefore suggest a combination of remedial actions.

Milfoil weevils - The first action is to allow the use of native milfoil weevils on a broad basis in the lake. Weevils have proven to be a natural, species-specific solution for controlling and eliminating not only Eurasian water milfoil, but also the new hybrid that is now found in Lake Scugog.

We would like to increase the numbers of milfoil weevils by implanting them in multiple areas in the lake where conditions are the worst. The weevils are native and non-invasive. They also will work well in Scugog’s shallow waters. However, they are best used in relatively quiet areas which do not have a lot of boat traffic. Also, because weevils exit the lake each year before winter, adjacent shorelines must provide suitable naturalized buffer edges to be viable overwintering sites.

Weevils are expensive to purchase and install, and expand their total numbers slowly - generally in the direction of the current. They are a good, natural solution for hybrid water milfoil, but they are also long-term and not a “quick fix.”

According to Dr. Sager, weevils from our own lake might be used as a nurse crop to develop the populations for additional stocking.

Harvesting the Milfoil – This is a short-term maintenance solution for specific areas and for specific events. Harvesting equipment might also be used to carry out surface skimming throughout the season to eliminate unsightly floating weed debris that may root elsewhere. The minimum operating water depth for harvester/skimmer equipment is 18 inches and

therefore it is not a technique that can be used in near-shore areas. Skimming would help in areas near docks, but would not work in areas where the plants are rooted. It would also not be effective for algae removal if it is interlocked with aquatic plants.

Harvesting removes considerable biomass that might otherwise be recycled into nutrients and sediment. But for that, the work must be carried out late in the season, after the water temperature drops below 55 degrees Fahrenheit and milfoil growth stops.

During the growing season, milfoil can grow back from its large root at a rate of 3 cm to 7 cm per day, so harvesting is only a quick fix during this period. Harvesting also removes the upper growth of all native plant species and creatures such as small fish and milfoil weevils hidden in the stands of 'weeds'. (For this reason, areas that have been stocked with milfoil weevils would never be considered for harvesting.)

Dredging – Scientific analysis of suitable dredging locations and solutions should be examined as a long-term solution for lake depth issues along the Port Perry shoreline. Select shallow dredging (about 1 to 1 ½ ft. deep) in near shore areas could also remove the nutrient-laden top layer of sediment and enable a fresh start based on the proposed new storm water solutions. Ideas such as engineered wetlands and/or diked containment ponds should be examined and considered as solutions for the dredged material as well as for long-term treatment of runoff from several of the sewersheds in downtown Port Perry.

Dredging to create a deep channel for recreational watercraft would also be beneficial to local fish populations.

Herbicides – The Scugog Lake Stewards are not in favour of using herbicides as they are not species-specific and encourage greater hybrid tolerance.

* * *

The Economic importance Improving Lake Scugog's Ecological Health

Below are excerpts from letters we have received from organizations and businesses that have been, and will continue to be, deeply affected by the issues identified above should we not have any authority to act to improve environmental conditions in Lake Scugog. They are our partners and our friends. They share our desire to be good stewards of the lake.

From **Julie Curran, President, Scugog Chamber of Commerce.**

“Scugog Township is hoping to attract a Hotelier to the Port Perry waterfront in the near future. Attracting this significant investor to our township would be far easier with a clean, healthy lake. With water quickly becoming the “new gold”, a healthy Lake Scugog is vital to our community and to our region. As stewards of nature, we must have the means to ensure the sustainability of natural resources in our own backyard.”

From **Kenna Kozak, Executive Director/General Manager of the Port Perry Business Improvement Association.**

“First Impressions” is a program that our business association participated in with Ontario Ministry of Agriculture, Food and Rural Affairs a few years back. It examines visitors’ first impressions of an area. This past season, with its excessive weed challenges, gave visitors a very poor first impression when they visit our ‘million dollar’ water front.”

From **Brett Puckrin, Chair the Township of Scugog Economic Advisory Committee.**

“The Township of Scugog is positioning itself as a “Greenbelt Community” capitalizing on its quality of life. A key component of promoting this quality of life is a township that is both environmentally responsible and economically vibrant ... The aesthetic appeal of the lake is lost when the surface is a floating mass of weeds ...”

From **Carolyn Hall of Royal LePage Frank Real Estate, representing the local realtors:**

“A survey was handed out a recent realtor’s Breakfast Club meeting to get an overall view of the impact of the problem (additional weed/algae) as it affects real estate values and sales in our area.”

“The responses in the completed surveys were remarkably consistent. One hundred percent of the participants felt there was a significant weed/algae problem, and all had heard negative comments about it from potential buyers.”

From **Betty Penny, Scugog Island Cruises, Port Perry** regarding current EWM problems.

“A solution needs to be provided as each year the situation progressively gets worse with weeds that are invading all areas of the lake. We have been in operations for 10 years and have noticed that the water levels are getting significantly lower. Adequate water levels need

to be maintained as this impacts on our operations. It causes damage to our props and motors when levels are too low.

We have invested a million dollars of personal funds in our business which provides employment for 12 to 15 staff each year. We bring in thousands of visitors each year, both local and international, for a cruise on the lake”

From Carol Gonder, Festival Administrator, Dragon Boat Festival

“Cyclical increases in the size and density of the weed beds continues to impact the operation of both the dragon boats and the safety boats. We are concerned that continued increases in weed density will at some point compromise the safety of participants in the festival.”

And the last of our quotes, from **Michael Fowler, President, Rotary Club of Port Perry.**

“The Directors of the Port Perry Rotary Club have received a recommendation from our Aquarama Chair that we seriously consider dropping the Aquarama event. A couple of years ago we had to cancel the event at the last minute due to the low water level and weeds issues. This year, we had to run the event on a dramatically reduced course, causing the riders to run much too close to a concrete wall along the shore. All of these problems are due to the inability to lay out a course deeper in the lake that is free of the weeds. John MacKay (Port Perry Marina), who loans us his personal watercrafts and lays out the course for the club, is in danger of having serious damage done to his expensive equipment by the weed intake.”

Other letters from businesses, organizations and individuals addressed to us on this issue are available upon request.

Given the ecological state of the lake and the effects it is having on people and businesses in our region and township, we look forward to meeting with you to work on this issue.

Regards,

Barbara Karthein,
President
Board of Directors
Scugog Lake Stewards Inc.
181 Perry Street, Port Perry, Ontario L9L 1A7
www.scugoglakestewards.com
(905) 985-0958

* * *

History of Scugog Lake Stewards Inc.

In 1997-98, a survey was taken of shoreline conditions around Lake Scugog. Because the results indicated that there was a decreasing number of properties with natural, habitat diverse shorelines, a group of volunteers, called the Scugog Shores Millennium Committee, was formed in 1998 to try to reverse that trend.

The committee raised significant funds from a wide range of sources: the Ontario Trillium Foundation, EcoAction Canada, Ducks Unlimited Canada, the Ontario MNR, the Federal department of Fisheries and Oceans, Trent-Severn Waterway, Scugog Township, independent foundations and individual donors. Those funds were used to test seven different ecologically diverse shoreline erosion and ice protection methods and also to build a popular walking trail and very diverse area of native trees, shrubs, flowers and grasses. These later became two new parks: Joe Fowler Park and Baagwating Park. Both are located just south of Port Perry's main street and pier. Pictures taken in these parks still are featured in tourist literature for both the Township and the Region.

The purpose of this work was to not only to act as a continuing educational opportunity to teach the benefits of natural shorelines, but to also stem a difficult erosion problem.

In 2003, the group incorporated as a charitable organization under the name Scugog Lake Stewards Inc.

Over and above the construction of these two projects, Scugog Lake Stewards have worked on the development of the Lake Scugog Environmental Management Plan, the improvement of the Port Perry wastewater facility, pursued research and education regarding aquatic plants and storm water management. The Scugog Lake Stewards have also conducted septic system workshops and conferences, held tree plantings, shoreline erosion projects and much more.

The Scugog Lake Stewards are managed by a ten-member board of directors with assistance and advice from a science consultant with Kawartha Conservation. We have a large membership composed of individuals and local businesses.

President, Barbara Karthein
Secretary, Sandra Mayr
Past President, Jamie Ross
 Rebecca Clark, Director
 Yvonne Storm, Director
 Bill Lishman, Director Emeritus

Vice-President, Chris Hall
Treasurer, Tom Phipps
 Lee Beacock, Director
 Carolyn Hall, Director
 Garry Wice, Director

Dr. Alex Shulyarenko, Science Consultant

Appendix A - Photographs Illustrating the Ecological Problems

Appendix B - Letters from Partners, concerned organizations and citizens.