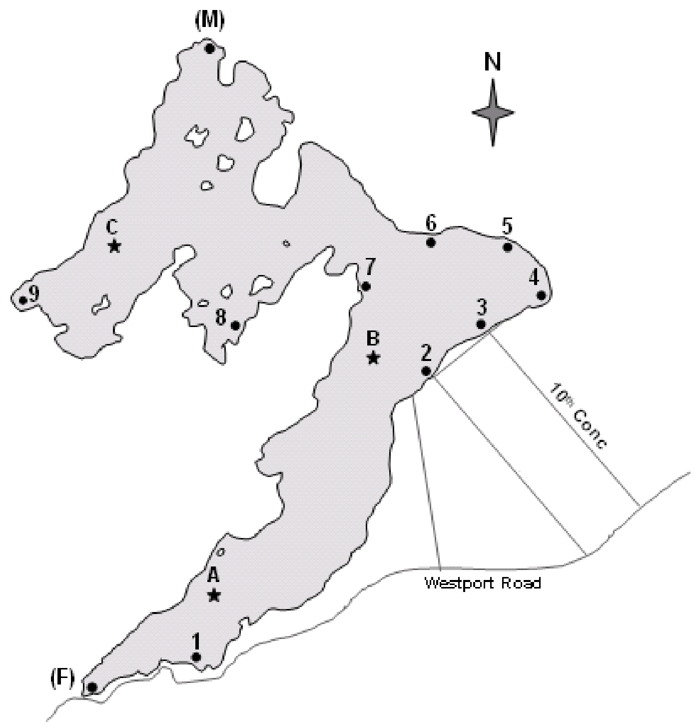
Water Quality 2011

Water Chemistry

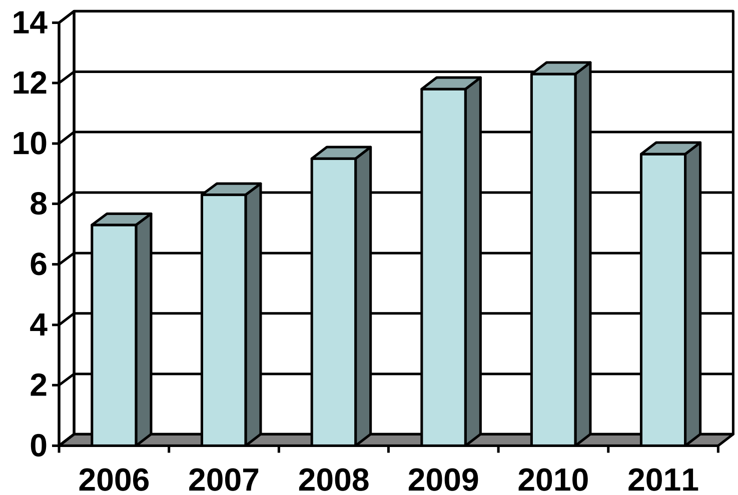
Water quality was tested on 6 occasions in 2011. Deep-water samples, taken at sites B and C on May 28, June 27, July 25, August 29, September 14 and October 07, were analyzed for total phosphorus (TP) concentration through the Lake Partner Program with the Ontario Ministry of the Environment. The Rideau Valley Conservation Authority (RVCA) also took deep and shallow-water samples at several sites. These were analyzed for a number of variables including TP, E. coli and dissolved oxygen concentration. The laboratory results from the Lake Partner Program with M.O.E. are summarized in Table 1 and those from the RVCA in Table 2.



Date	B		C	
	Sample #1	Sample #2	Sample #1	Sample #2
May 28	10.6	9.2	8.2	7.4
June 27	8.2	9.0	9.6	9.8
July 25	9.6	7.2	9.6	9.2
August 29	10.0	10.4	10.0	12.8
September 14	10.2	9.6	9.4	10.0
October 07	9.2	9.6	8.0	7.4

Table 2: TP Concentration, µg/L (RVCA Data)						
	Site					
Date	**B**	**C**	**4**	**9**	**(F)**	**(M)**
June 14	10	7	7	7	14	7
July 25	7	7	NA	9	10	8
Oct 7	9	10	NA	NA	NA	NA

Error!FIGURE 1
Deep Water Total Phosphorus Concentration (July), µg/L



Interpretation of Results

Total Phosphorus. The 2011 data you will see that there was only a single instance of elevated total phosphorus (TP) in Wolfe Lake that was above the Provincial Water Quality Objective (PWQO) of 20 micrograms/litre (µg/l). This occurred in early May and is likely due to the mixed effect of the lake at that time, subsequent samples were all below the PWQO. Total Kjeldahl Nitrogen (TKN) is the other parameter used to indicated nutrient enrichment; all samples were below RVCA's guideline of 500µg/l. E. coli samples were taken at shoreline sites 4,9,F and M twice throughout the summer months, all samples were below the PWQO of 100 colony forming units (CFU)/100ml, indicating that bacterial contamination is not presently an issue at these sites. Please note that site 4 was only sampled once due to equipment error. There was no significant change in calcium concentrations (Ca) or dissolved organic carbon (DOC).

It is worth repeating that phosphorus is the main nutrient for algal growth in our lake. We can do very little to control the phosphorus that enters our lake from natural sources such as streams, rainwater runoff or rainfall itself. We can however reduce the amount that comes directly and indirectly from human sources.

Ways of reducing the amount of phosphorus and nitrogen that we add to the lake include:
- Keeping tree clearing to a minimum, since trees and their root systems reduce rainwater runoff. If you wish to improve your view of the lake, trim some branches from the existing trees instead of cutting them down. If your cottage is in an open area, consider planting some trees or shrubs around it.
- Don't have lawns. Let the natural vegetation grow in order to reduce runoff. If you must have a lawn, don't use fertilizer or herbicides and leave a wide buffer strip of long grass or natural vegetation at the water edge.
- Make sure that your septic/wastewater system is working properly. If the ground around it is wet and spongy, you can be certain that that this water will find its way back into the lake.
- Use washing machines and dishwashers sparingly and use only liquid detergents, since they have 1/3 the phosphate content of powders. Better yet, use phosphate-free soap, shampoo and detergent.

Water Clarity

Secchi disc readings taken last summer remained consistent and were well over the minimum depth of 2m recommended by the PWQO. It has been noted before that in non-zebra mussel infested lakes, this measurement normally gives a good inverse correlation with TP concentrations (i.e., the greater the water clarity, the lower the TP), with a reading of 5 m being the standard for "excellent" clarity. There can be little doubt however that the extreme water clarity over the past 3 years is due to filtration by zebra mussels. As a result, Secchi disc readings can be misleading and therefore have not been included in this report.

Zebra Mussels

The good news is that zebra mussel numbers seem to have remained no greater than in 2009. As outlined in previous newsletters, this ecological balance point occurs when they have filtered the water to the point that there is not enough plankton available to support further expansion in reproduction.

Eurasian Watermilfoil

Eurasian watermilfoil (EWM) is a submerged aquatic plant that poses a serious threat to our lake's native aquatic plants and the animals that depend on these diverse ecosystems. Since it is not native to Ontario or Canada, EWM has very few natural predators. EWM is an invasive aquatic plant that has become widespread throughout North America, including many lakes and water systems in Southern Ontario. Millions of dollars are spent every year on this continent on physical and chemical management techniques to control nuisance populations of milfoil. Many of these methods are expensive, provide only temporary results and may have negative impacts on the surrounding ecosystem.

In addition to physical and chemical management, biological control of EWM using the milfoil weevil (*Euhrychiopsis lecontei*) has been tried throughout the United States since the 1990s and has received growing interest in Ontario. This insect is native to North America, feeds specifically on milfoil and is commercially available as a biological control agent.

Growth occurs early in the growing season once water temperatures reach 10ºC. Upon reaching the surface, the milfoil stem branches profusely, blocking available sunlight to other submersed plants underneath the canopy. This growth habit often results in dense monocultures of Eurasian watermilfoil. EWM typically grows in lakes in depths of one to four metres, although it has been found in areas up to 10 metres in depth. Depth range is limited by wave action and competition in shallow water, and typically by water clarity in deeper waters. In general, low-density sediments with approximately 20% organic matter are sufficient for milfoil.

The plant forms thick underwater stands of tangled stems and vast mats of vegetation at the water's surface. It can shade and crowd out native plants and become so thick that the larger fish cannot swim through the tangled mats. When EWM mats get well established, channels are needed to allow access from the shoreline out into deeper water areas. Although there are native water-milfoil species in North America EWM remains alive over the winter and starts growing earlier in the season than native water milfoils. In spring and summer, EWM can grow up to two inches a day. When EWM plant growth reaches the surface of the lake, the plant will continue to grow and can form a canopy over the surface of the lake often making the area nearly impassable with a boat. This canopy can also shade out native plants. Excessive growth affects recreational use by interfering with swimming, fishing, and boating and reducing the aesthetics of the lake.

EWM has recently established itself in Wolfe Lake and has begun to present the problems described above. As a result, at the 13 Aug 2011 Annual General meeting of the Association, a committee of three directors was established to investigate and recommend responses to the infestation. The committee (Paul Thompson, Gord Moore and Duncan MacDougall) determined that two possibilities to deal with the infestation were harvesting or the use of herbicides. Both these methods are expensive, provide only temporary results and have negative impacts on the surrounding ecosystem. Research did reveal that biological control of EWM has been successfully utilized. EnviroScience is the exclusive provider of the Milfoil Solution®, a biological control for invasive EWM that utilizes a native beetle, the milfoil weevil.

EWM Pilot Project

Our Association project to deal with the infestation has already begun. Committee members surveyed our lake for base line infestation information and twelve areas were identified as having some degree of infestation, six of those being moderate to heavier. The board of directors has authorized the committee to continue by contracting with EnviroScience Inc. for the introduction of a limited number of milfoil weevils in a 1-year pilot project.

An independent advisor has visited the lake and selected a pilot study and a control site. Our aim is for a more comprehensive infestation survey and weevil introduction at the pilot site to take place in late spring or early summer (2012). The committee will monitor progress and hopefully be able to report via the new and improved web site.
A full report from EnviroScience will be due in the fall. Our hope is that weevil activity during 2012 will result in a noticeable reduction of EWM infestation at the pilot site in comparison with the control site. If the pilot project yields satisfactory results it may be possible to embark on a much larger project requiring the cooperation and participation (financially and otherwise) of a large number of our members and other lake property owners. On June 1. 2012 the committee verified that a naturally occurring population of weevils is active in Wolfe Lake and that augmentation of that population could / should result in the desired results.

Budget

The cost of our pilot project is limited to about $7,500. The estimate for a full-scale weevil project cost was substantially greater than first anticipated due to more wide spread infestation than at first believed. Based on the initial Lake Association volunteer survey, EnviroScience Inc. projected that it could cost as much as $186,130 (includes $21,413.21 HST) to supply, stock, monitor and report on the 140,000 weevils that may be necessary to address the total infestation. Obviously considerable thought and significant fundraising would be required to undertake such a project.

Paul Thompson