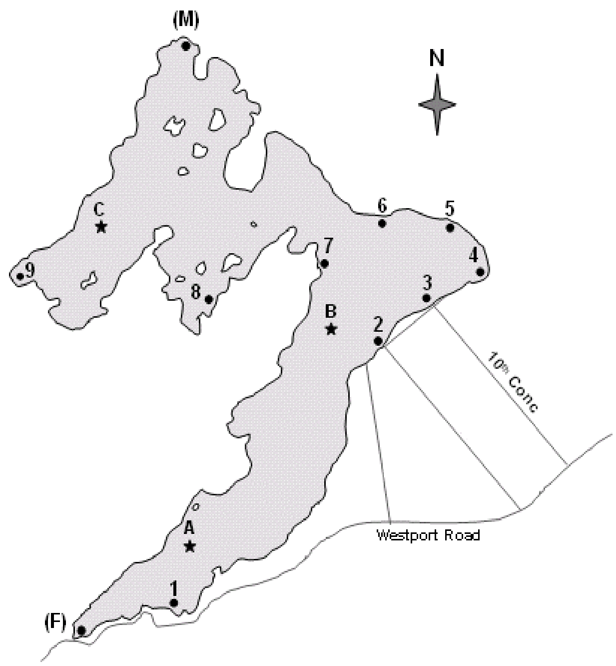
Water Quality 2010

Water Chemistry

Water quality was tested on 6 occasions in 2010. Deep-water samples taken at sites B and C on May 24, June 29 and August 9 were analyzed for total phosphorus (TP) concentration through the Lake Partner Program (Ministry of the Environment). Deep- and shallow-water samples were also taken at several sites by the Rideau Valley Conservation Authority (RVCA) on July 7, August 10 and October 4. These were analyzed for a number of variables including TP, E. coli and dissolved oxygen concentration. The laboratory results from the Lake Partner Program are summarized in Table 1 and those from the RVCA in Table 2.



Sampling Sites for Water Testing in Wolfe Lake
(to reduce laboratory costs, samples are not taken at every site in any given year)

Table 1: TP Concentration, µg/L (Lake Partner Program Data)

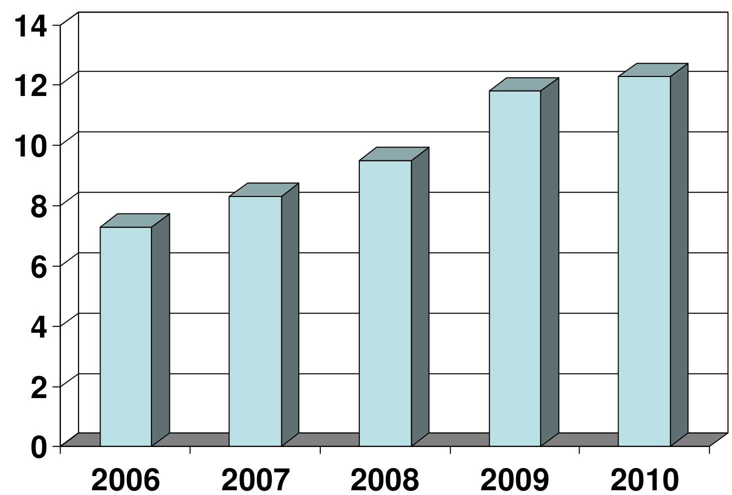
Date	Site			
	B		C	
	Sample #1	Sample #2	Sample #1	Sample #2
May 24	8.4	8.4	8.0	8.4
June 29	13.4	17.8	11.2	---

August 9	11.0	10.6	10.6	11.8

Table 2: TP Concentration, µg/L (RVCA Data)

	Site					
Date	**B**	**C**	**4**	**9**	**(F)**	**(M)**
July 7	12	11	11	27	18	13
August 10	12	11	9	9	9	8
October 4	10	7				

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



Interpretation of Results

Total Phosphorus. The unusually high TP concentration (17.8 µg/L) for sample #2 at deep-water site C, taken on June 29th, differs enough from sample #1 at that site and at site B that it may have been a clerical error, or may have been contaminated in handling. However, even if one excludes this sample, last summer's deep-water samples analyzed through the Lake Partner Program still averaged 12.3 µg/L and ranged between 8.2 and 13.4 µg/L. When one looks at the shallow-water samples analyzed through the RVCA (Table 2), the July 7 values at sites 9 (Barr's Creek) and (F) (Fermoy) were also very high, but normal on August 10. These 2 sites are the main sources for water inflow into the lake and, since it was raining heavily on the day that the July sample was taken, it is probable that these 2 readings reflect upstream rainwater runoff.

Since phosphorus is the main nutrient for algal growth in our lake, these results are somewhat disturbing since they indicate that deep-water phosphorus concentrations have been rising steadily over the past 5 years (see Figure 1) and were higher last year than since 1996. 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.

Additional chemical results. E. coli concentrations at sites (F) and 4 were slightly elevated on July 7 but well within the safe limit. When re-tested on August 10, concentrations at these sites were undetectable. The average total nitrogen concentration was slightly lower last year than in 2009 and dissolved calcium concentration averaged 26.5 mg/L. Unfortunately this level of calcium is almost ideal for zebra mussel reproduction.

Water Clarity

Most Secchi disc readings taken last summer were more than 7 m. 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 they are not included in this report.

Zebra Mussels

The good news is that zebra mussel numbers seem to have peaked in Wolfe Lake. From observation of underwater rocks at our shore and from anecdotal reports on other parts of the lake, adult numbers in 2010 appeared to be no greater than in 2009 (some cottagers even thought that there might have been fewer). 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.

History. Zebra mussel larvae were first detected in our lake in a water sample taken in the summer of 2004. The first adults started appearing in the summer of 2006. In the spring of 2007, your lake association put out a number of monitoring stations (submerged 12" x 12" concrete patio pads) at various parts of the lake. By mid-summer the number of adults attached to them was in the hundreds and by the end of the summer it was over 1,000 per pad. 2008 was an even more prolific year but by 2009 increases in numbers began to diminish. If reproduction rates have indeed finally peaked, we may see a slight decrease in numbers, but the fact remains that zebra mussels are now a part of our lake's ecology that we will have to live with.

It will be a number of years before the true ecological impact of this extremely rapid addition of an invading species becomes apparent in a lake that has been evolving over several centuries. Immediate effects that we are aware of include changes in water clarity, water odour, fish patterns, the appearance of new aquatic vegetation, clogged water intakes, and cuts and abrasions to swimmers and waders who have brushed against or stepped on their razor-sharp shells.

Duncan MacDougall