

HIGHLIGHTS OF '05 WATER QUALITY TESTING PROGRAM

PHOSPHORUS

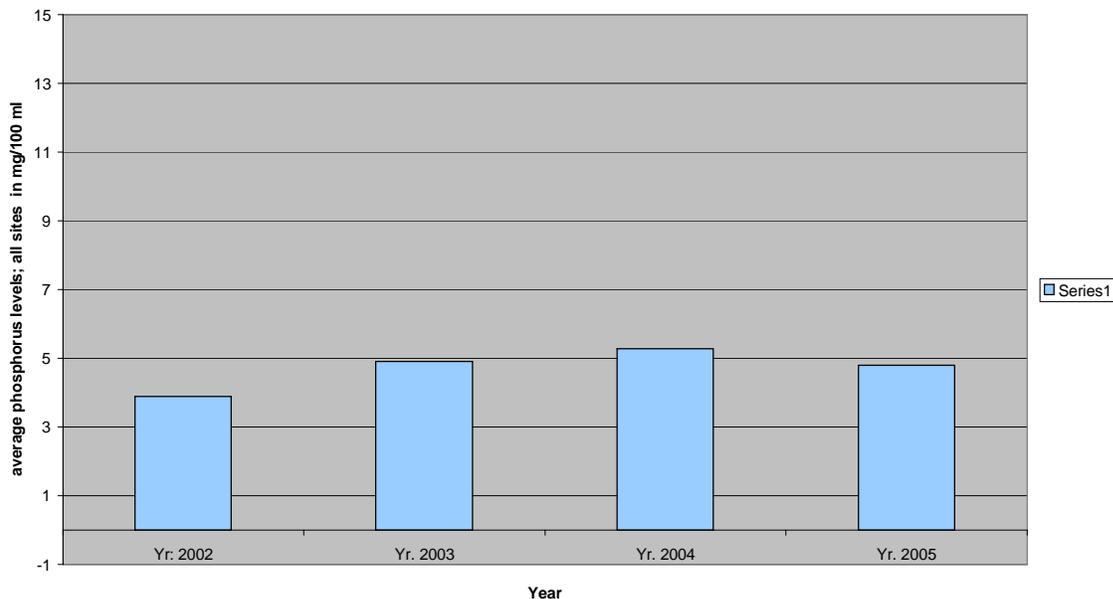
Average Phosphorus Levels '05

Many Lake of Bays residents were concerned this summer with the appearance of algal blooms in the water and particularly with the statement those blooms might be making regarding the water quality and general health of the Lake. People love to hate algae and algal blooms, considering them to be harbingers of reduced water quality, but ... the relationship between algae, algal blooms and water quality is complicated.

Algae are photosynthetic organisms that occur in most habitats. They are the primary producers of organic matter at the base of the food chain, and, in proper balance, are a valuable and critical part of a healthy aquatic environment. Algal blooms, on the other hand, are rapid and excessive growths of algae that deplete oxygen and out-compete other species. Aquatic animals (fish and invertebrates) then die, creating more phosphate for algae, intensifying the original problem and ultimately culminating in eutrophication. The development of algal blooms depends on different factors, including flow, turbidity, light, temperature and nutrient loads, including nitrogen and phosphorus, but the most significant factor, and the limiting factor (i.e. the one that MUST be present) is phosphorus. Therefore, conclusion that tends to be drawn from the presence of algal blooms is phosphorus levels are considerably elevated.

Well take a look at the 2005 phosphorus results for Lake of Bays!

Lake of Bays: Comparative Annual Phosphorus Levels - aggregate



This table clearly shows that, notwithstanding the abundance of algal blooms in 2005 (and they were reported every where: Little Trading Bay, Trading Bay, Haystack Bay, Ten Mile Bay, Clovelly, South Portage, Whisky Bay, Menominee Bay, Point Ideal, Bona Vista, out in the main channels of the lake everywhere!), **phosphorus levels in Lake of Bays for 2005 were perceptibly lower than in 2004 and 2003**, years in which algal blooms were **not** reported.

These results confirm the scientific findings that show that the presence of phosphorus cannot be relied on as the sole rationale for sporadic or individual algal blooms. Under the right conditions, non-eutrophic lakes (i.e. lakes without elevated phosphorus) can present algal blooms. These conditions include:

- high temperatures (a prevalent condition in '05)
- little wind (a prevalent condition in '05)
- the right kind of algae species

So, LOBA's water quality testing program is pleased to report that the algal blooms of '05 are **not** precursors to apocalyptic changes in water quality (nothing to be alarmed about; our phosphorus levels are where they should be). That said, no one should be complacent; maintaining these levels in the face of development pressures on the lake is going to require **all of us** to manage our sewage and waste water, eliminate fertilizers and protect our shorelines with vegetation.

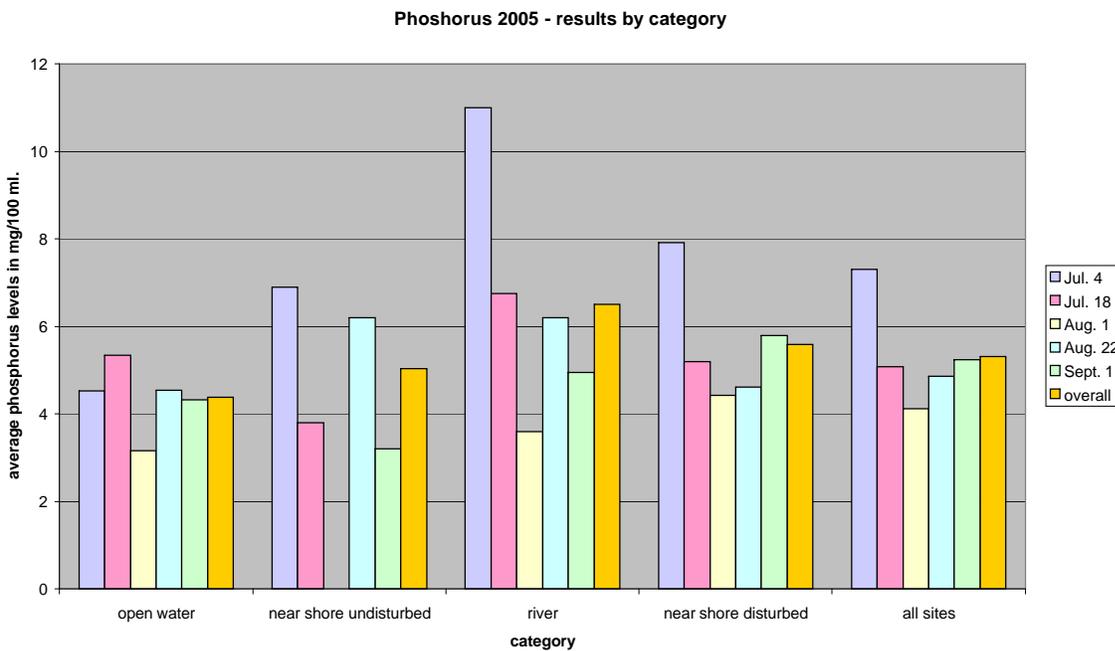
Phosphorus Results by Category

LOBA's water quality monitoring program has quite deliberately organized its sites into different categories for the express purpose of trying to monitor and understand the impacts of different factors affecting the chemical, physical and biological indicators of water quality and health. Site categories are as follows:

- Deep water: These are open water sites in the middle of the bays and channels that provide a reasonable indication of the lake's background levels of the indicator being sampled. Open water sites are not directly impacted on by shoreline activities (human, mammal), and the input waters from the source rivers are well-mixed, providing us with a good base reading.
- Near shore undisturbed: These sites are 1 metre off shore on selected pieces of shoreline that are in a natural state and well removed from human activity. Our standard (although it is getting harder and harder to meet) is a nearshore undisturbed site that is 500 ft from the nearest altered shoreline/shoreline residence. These sites also provide a background reading of sorts - not necessarily the same as the deep water sites given the presence of shoreline bird and animal activity, but the results can certainly be used as a pre-human activity reading.
- Rivers: When we first started the water quality testing program we included the river mouth readings from the Oxtongue and the Hollow Rivers with all the other sample results, BUT ... river chemistry is very different from lake chemistry and so we continue to monitor the flow out of the rivers, but on a stand-alone basis.
- Near shore disturbed: These are the sites deliberately selected because they are immediately offshore from significant human activity - cottage clusters, the Dorset community etc. Obviously we are very interested in these readings relative to the open water and near shore undisturbed numbers because they provide an measure of the extent of the impact of land-based human activity on water quality.

The findings for 2005 by category are presented below, by testing date and averaged for the sampling season. There is a lot of information in the bar chart, but the highlights are as follows:

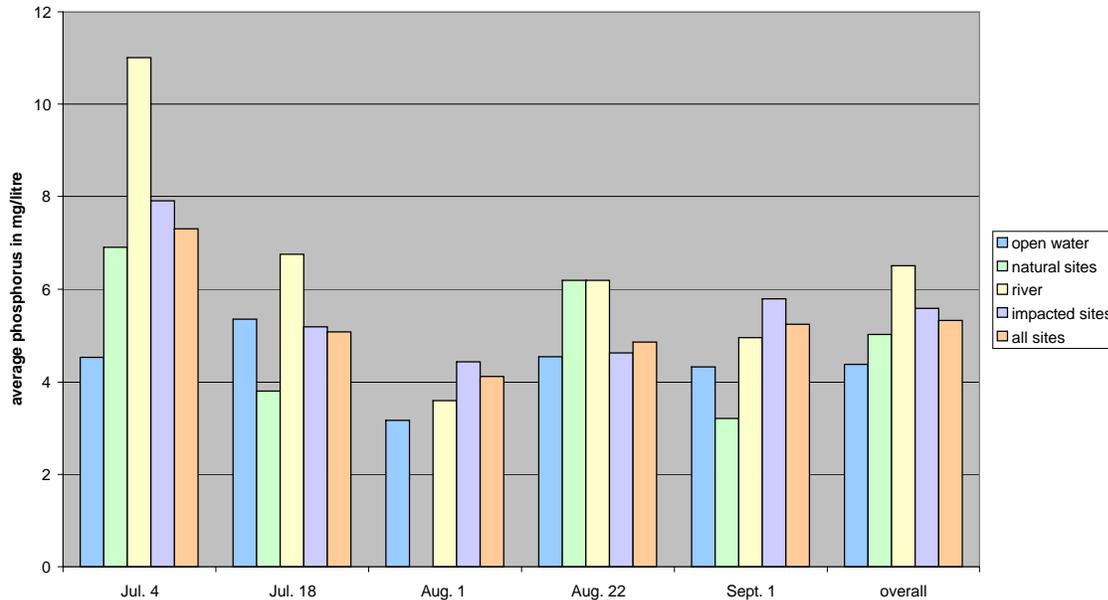
- Open water sites consistently show the lowest phosphorus levels (to be expected)
- The river numbers are higher than the other categories - to a large degree because of the differences between river and lake chemistry. However, we will be pursuing this in greater depth over the summer of '06
- Near shore disturbed sites show numbers higher than near shore undisturbed (to be expected) but these are not alarmingly higher
- July 4th is consistently higher across all categories except open water as a result of rainfall in the days preceding the testing. This is a powerful indicator of the impact between storm water runoff and phosphorus levels.
- Other than July 4th, with average phosphorus readings generally around 5 mg. per litre, we are pleased with the phosphorus levels



Phosphorus Results by Date

The information contained in the chart below is the same information as above, but it is presented differently to provide a better visual of the average '05 levels by sampling category. This graph very clearly shows the season's average for each of open water, near shore undisturbed, river, near shore disturbed and all sites averaged together.

2005 Phosphorus Levels by Testing Date



These results show that the open water sites generate the lowest phosphorus readings, providing a background level that then serves as the platform from which to evaluate impacted water. Our near shore undisturbed sites show some impact from land-based activity (probably dominantly bird, animal and storm water runoff) but we are pleased with how low those numbers are. The chart is presented with a large scale but the difference in mg / litre between open water and near shore undisturbed is only .65. The high river numbers are interesting (not alarming given the dynamics of river chemistry, but interesting) and we will be focusing some attention on them in 06. Near shore disturbed sites (disturbed via human activity) show higher phosphorus numbers but at less than 6 mg/litre, we are not alarmed. That said, the message continues to be:

Land-based human activity does impact the phosphorus levels in our lake. Our goal, as responsible stewards of our lake and its watershed should be to minimize that impact through sound stewardship practices including:

- proactive septic system management
- enhancement of vegetation along the shoreline to maintain that critical buffer between land
- proactive planning of pathways to the shoreline to reduce erosion
- use of natural ground cover that doesn't require nutrient loading

We are very lucky on Lake of Bays; our water generally is in good health. Let's keep it that way!