WATER QUALITY MONITORING OF WOLFE LAKE

New ways of looking at our lake water

By Daniel Spitzer

The water quality of Wolfe Lake is tested each year. Along with the conventional way of sampling the water, we now make use of an – innovative – way of looking at our lake waters. By using satellite images and by processing these data we get another perspective of what is happening in our lakes. Here are the findings of 2016.

The water quality was tested by the Water Quality Director on 5 occasions in 2016. The water clarity (Secchi Disk depth) was measured and deep-water samples were taken at sites DP1 and DP3 on May 13, June 11, July 21, August 11 and September 24. The samples were analyzed for total phosphorus (TP) concentration through the Lake Partner Program (Ontario Ministry of the Environment). Deep and shallow-water samples were also taken at several sites by the Rideau Valley Conservation Authority (RVCA). These were analyzed for a number of variables including total phosphorus, total calcium, total nitrogen, E. coli and dissolved oxygen concentration.

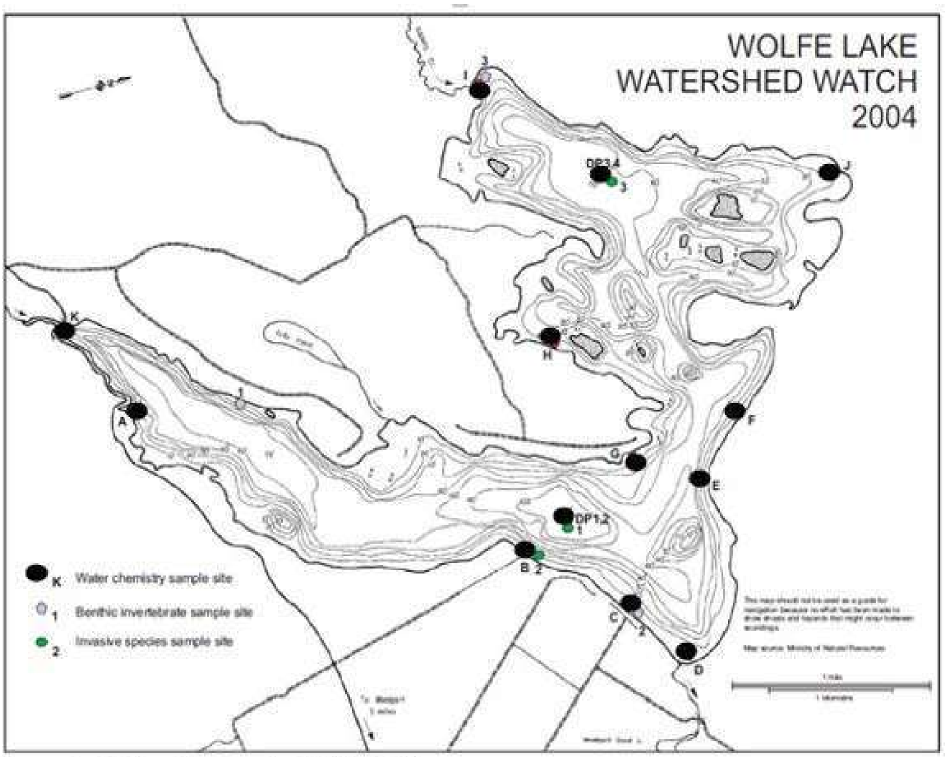


Figure 1. Water Testing in Wolfe Lake

In addition to the sampling, multispectral satellite imagery covering the full body of Wolfe Lake has been acquired and processed over the period April 2013 – November 2016.

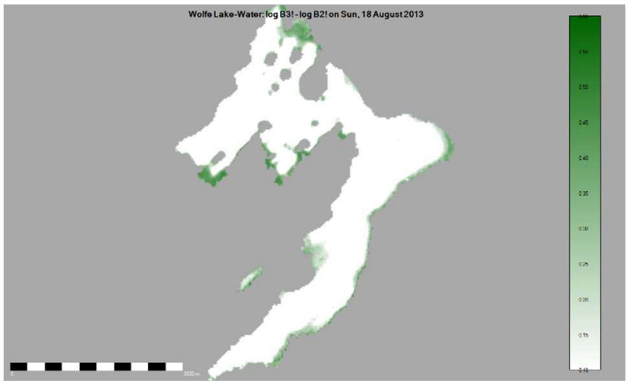
The imagery was analyzed with respect to:

- ESTIMATES OF MACROPHYTE BIOMASS (MOSTLY MILFOILS) ACROSS THE ENTIRE LAKE AS WELL AS ACROSS ITS DELIMITATED AREAS OF INTEREST
- MONITORING THE LAKE WEED GROWING PROCESS IN WEED INFESTED AREAS OF THE LAKE
- MAPPING ALGAE AND SUSPENDED ARTICULATES IN THE WATER BODY OF THE LAKE
- SURFACE TEMPERATURE MAPPING OF THE WATER AS WELL AS OF THE FROZEN SURFACES
- SNOW AND ICE PATTERNS ACROSS THE FROZEN LAKE.
- MONITORING THE THAWING PROCESS OF THE FROZEN LAK

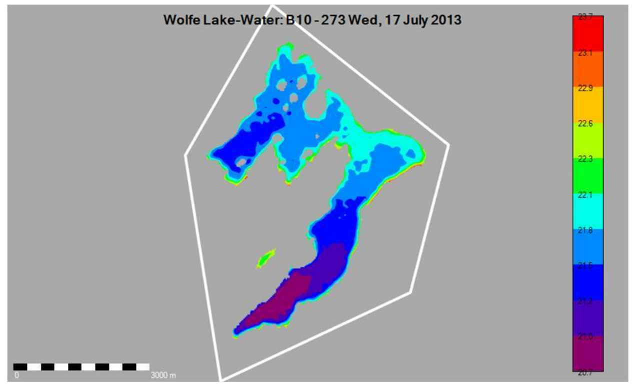
Satellite images provide information

Milfoil growth, water clarity and much more

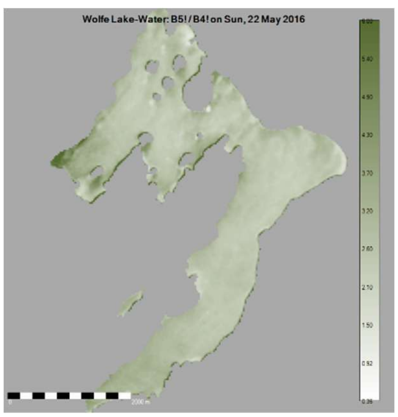
Examples of the satellite imagery displaying milfoil infestation along the shores, patterns of water clarity, water temperature and ice morphology are presented in figures below.



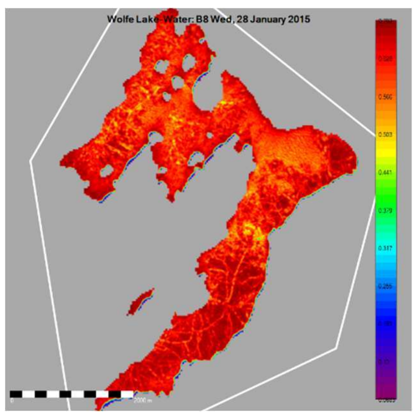
Lake weeds



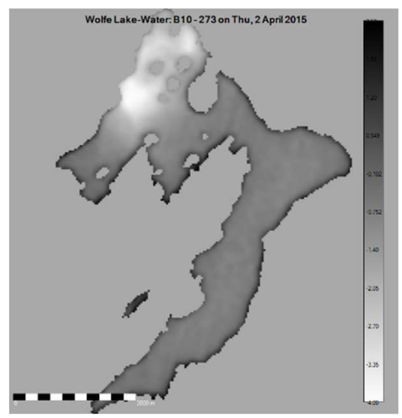
Water temperature



Water clarity



Ice and snow patterns



Thawing lake surface

Concluding, overall results were very comparable to the period on record. In general, the water quality in Wolfe Lake remains excellent, only in a few cases did the nitrogen concentration insignificantly exceed the standards. The E. Coli concentrations were far below the required provincial maximum values.

Water clarity, as expressed by the annual average Secchi Disk depth, seems to have decreased in the past few years. This trend continued also in 2016. A probable cause for the decrease in water clarity over the past few years may be the rapid decline in zebra mussel numbers which has occurred over that time. Remarkably low zebra mussel infestation was observed in 2016.

The average concentrations of nutrients seem to fluctuate over the last years. Since the recorded values are far below the standards, there is no reason to worry.

Finally, it needs to be mentioned that, along with the zebra mussels and Eurasian Milfoil, there is a new invasive species threatening our aquatic environment: the quagga mussels.