



Mississippi Valley Conservation

*State of the Lake  
Environment Report  
December 2003  
Kishkebus Lake*



# Kishkebus Lake

**Kishkebus Lake is located in the Township of North Frontenac. Kishkebus Lake is situated 268 metres above sea level. The lakes perimeter is 4.9 km and the deepest point is 32.9 metres. Kishkebus Lake once supported a cold water fishery, in particular Lake Trout. There is no development on the lake as it is situated in Bon Echo Provincial Park.**

Limited water quality data is available for Kishkebus Lake. Comprehensive testing in 1998 and 2003 through Mississippi Valley Conservation's (MVC) *Watershed Watch Program* provides for a 5 year comparison between water quality conditions as they exist now. Continuing to collect this data is extremely important and will become valuable with each year that passes; the data will provide a general picture of water quality conditions.

In general, the water quality in Kishkebus Lake remains very good. There is one sampling station on the lake at the deepest point. You will find graphs which follow, that water clarity, as measured by Secchi Disk readings, were observed as very good. The average for 2003 is 4.73 metres, compared to 5 years ago, when the average was 3.7 metres. Thus indicating that Kishkebus Lake is a moderately enriched (some nutrients) or mesotrophic lake.

Directly related to water clarity is the amount of nutrients, in particular phosphorus, entering the lake. The Provincial Objective for phosphorus levels in cold water lakes is 10 micrograms per litre (ug/L). In 2003, the mean for the euphotic zone (depth at which sunlight can penetrate or two times the secchi disk depth) was 7.33 ug/L. The mean for the samples taken one metre off the bottom was also 5.67 ug/L. Five years ago, the average phosphorus level was 10.0 ug/L in the euphotic zone and 13.4 ug/L one metre off the bottom of the lake, both at and above the Provincial Objective. Kishkebus Lake decreased its average phosphorus levels, putting it well below the Provincial Objective for 2003.

Chlorophyll *a* is a measure of the algal density in the lake. The average chlorophyll *a* density for the sampling stations was 2.43 ug/L. Thus, indicating a moderate algal density for Kishkebus Lake in 2003. In 1998, chlorophyll *a* levels were lower at 1.8 ug/L. Thus indicating

that Kishkebus Lake is a moderately enriched (some nutrients) or mesotrophic lake.

Lake trout require more pristine environmental conditions than most native fish species. Therefore, lake trout can act as an environmental barometer. The dissolved oxygen (DO) and temperature profiles conducted in July and September of 2003 at the sampling station indicate sufficient optimal habitat is present to support lake trout in Kishkebus Lake. The DO and temperature data, measured at the sampling station, indicate adequate levels for the cold water fishery, from the 5 metre level to the bottom for most of the ice-out season.

Plants and animals are a direct reflection of their environment. The most critical time of year for conducting dissolved oxygen and temperature profiles is after August 31. Profiles are generally conducted at this time of year and at the deepest point in the lake. Aquatic vegetation and algae that has grown over the summer, has died off and settled on the bottom, using the available oxygen necessary to sustain aquatic life in the lower portion of the lake or the hypolimnion.

Kishkebus Lake is fortunate to be part of Bon Echo Provincial Park. However, users of Kishkebus Lake need to adopt a stewardship approach to limit the amount of nutrients entering the lake. Every effort should be made to reduce nutrient loading into the lake from land use activities. Because lake trout are very sensitive to changes in their environment, we all have a responsibility to preserve this most precious resource for future generations, so they may catch lake trout in Kishkebus Lake. There are helpful tips throughout this report to help reduce your impact on Kishkebus Lake. Additional water quality data, current and historic, is available for Kishkebus Lake and many other lakes in the Mississippi Valley watershed. Contact MVC for more information.

## FIVE EASY STEPS TO IMPROVE WATER QUALITY



1. Build at least 30 metres away from the shoreline.
2. Keep your lot well treed and preserve or replant native vegetation along the shoreline.
3. Pump out your septic tank every three to five years.
4. Reduce water use and use phosphate free soaps and detergents.
5. Keep the size of your lawn to a minimum; do not use fertilizers, herbicides or pesticides.

LOW PHOSPHORUS LIFESTYLE	Amount of Phosphorus (grams)	HIGH PHOSPHORUS LIFESTYLE	Amount of Phosphorus (grams)
Human waste	535	Human waste	535
No dishwasher	0	Dishwasher using powdered detergent once per day	650
No fertilizer	0	Lawn fertilized once/year	1960
Trees not cut down	20	Lot cleared of trees	30
Uses phosphate-free products	20	Uses products with phosphate	180
<b>TOTAL</b>	<b>575 grams</b>	<b>TOTAL</b>	<b>3355 grams</b>

## How Does Kishkebus Lake Measure Up?

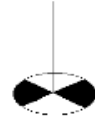
### 1976 – 2003 Water Quality Results

Sample Year [Various Stations]	Secchi Disk Depth [Metres]	Total Phosphorus Euphotic Zone [Micrograms/Litre]	Total Phosphorus 1 Metre off Bottom [Micrograms/Litre]	Chlorophyll <i>a</i> Composite [Micrograms/Litre]
**1976	4.2	8.0		2.2
*1998	3.7	10.0	13.4	1.8
*2003	4.73	7.33	5.67	2.43
n	3	3	2	3
Minimum	3.7	7.33	5.67	1.80
Maximum	4.7	10.0	13.40	2.4
Mean	4.2	8.4	9.5	2.1
Standard Deviation	0.51507281	1.389112426	5.465935419	0.318799833

\*Mean based on less than 6 measurements    \*\*Includes Recreational Lakes Program Data  
Chlorophyll-a data prior to 1985 has been adjusted to reflect new lab procedures  
in filtering resulting in an increase in chl<sub>a</sub> concentrations by 35%

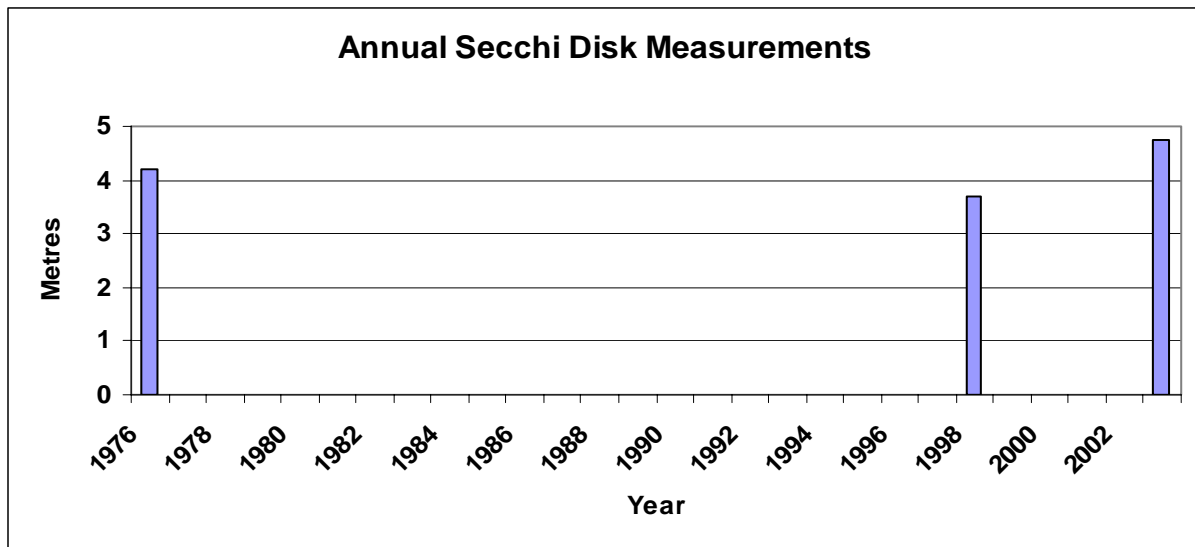
**Interpreting Secchi Disc Readings:**

A Secchi disk is a black and white coloured disk used to determine water clarity. The disk is lowered into the water. The point, at which you can no longer distinguish the black and white, is called the Secchi depth.



**The higher the Secchi Disk measurement the clearer your lake is.**

<b>INTERPRETING YOUR SECCHI DISC RESULTS</b>	
<b>Secchi Reading</b>	<b>Lake Nutrient Status</b>
Over 5 metres	Oligotrophic - unenriched, few nutrients
3.0 to 4.9 metres	Mesotrophic – moderately enriched, some nutrients
Less than 2.9 metres	Eutrophic – enriched, higher levels of nutrients



**How to protect or restore a shoreline depends on the conditions of the site and the energy and resources of the owner.**

**There are four main strategies to choose from:**

**① PRESERVATION**

When purchasing a lakefront property, a natural shoreline is retained and access to the lake is designed to avoid shoreline damage.

**③ ENHANCEMENT**

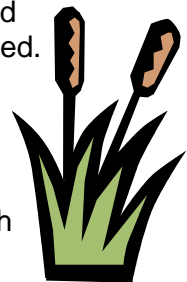
Native species are planted and non-native species are removed.

**② NATURALIZATION**

Degraded shorelines are left alone to return to their natural state.

**④ RESTORATION**

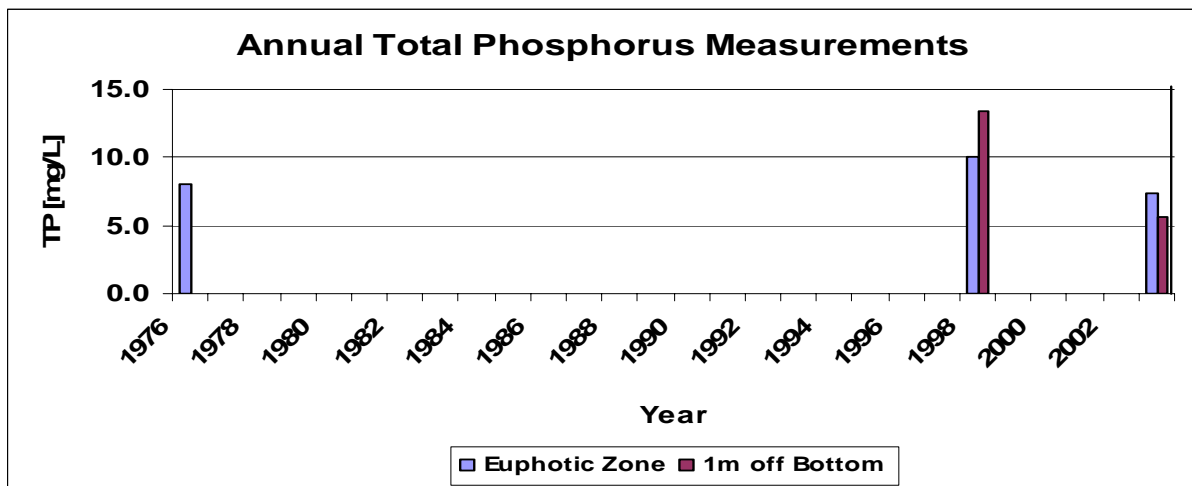
Cleared areas are planted with native species.



### Interpreting Total Phosphorus Results:

Phosphorus is the nutrient that controls the growth of algae in most Ontario lakes. For this reason any increase in phosphorus in the lake will increase the quantity of algae that can grow. High levels of phosphorus can lead to algal blooms and in some cases affect the habitat of cold water fish such as lake trout. A general guideline exists to characterize your lake based on the total phosphorus that is measured.

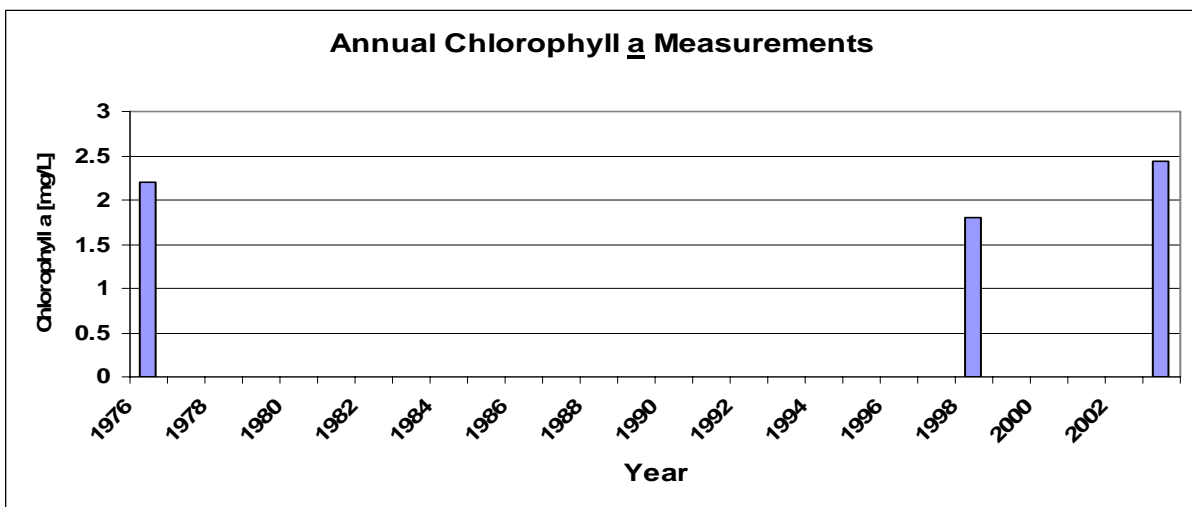
INTERPRETING YOUR TOTAL PHOSPHORUS RESULTS	
Total Phosphorus	Lake Nutrient Status
10ug/L or less	Oligotrophic - unenriched, few nutrients
11 to 20ug/L	Mesotrophic - moderately enriched, some nutrients
21ug/L or more	Eutrophic - enriched, higher levels of nutrients



### Evaluating your Chlorophyll a Results:

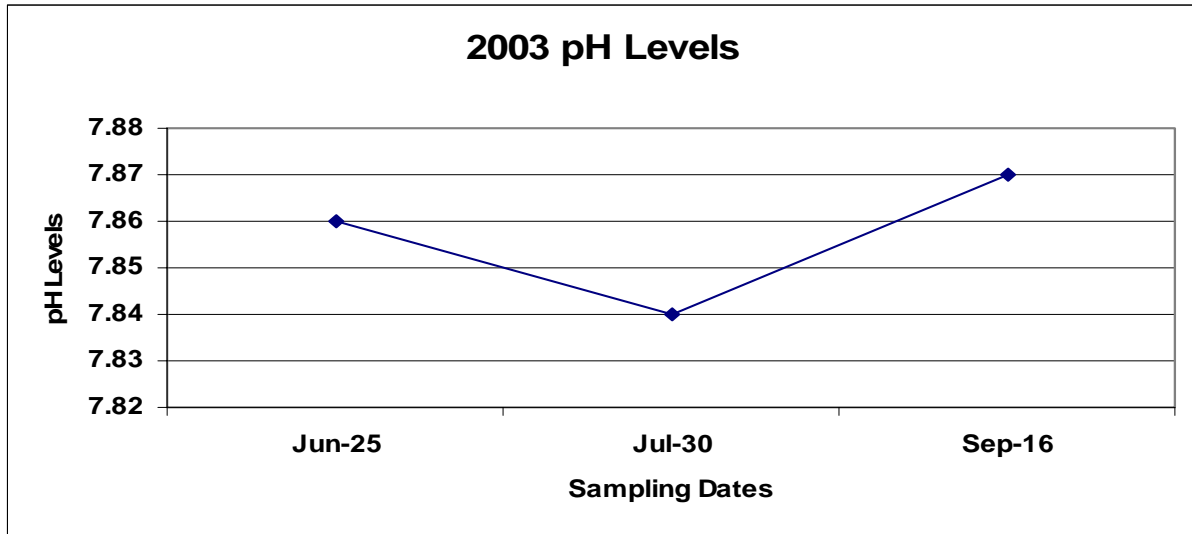
The lower the chlorophyll a density in your lake, the clearer your lake is. Chlorophyll a is directly affected by the amount of total phosphorus in your lake. The more phosphorus there is in the water, the more algal growth will occur.

INTERPRETING YOUR CHLOROPHYLL A RESULTS	
Secchi Reading	Lake Nutrient Status
Up to 2 ug/L - low algal density	Oligotrophic - unenriched, few nutrients
2-4 ug/L - moderate algal density	Mesotrophic - moderately enriched, some nutrients
More than 4 ug/L- high algal density	Eutrophic - enriched, higher levels of nutrients



**Evaluating your pH Results:**

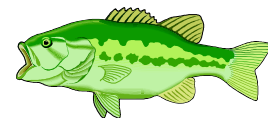
Lakes with pH levels at 7.3 or higher are vulnerable to zebra mussels invasive.



**KISHKEBUS LAKE – Main Basin**

**DISSOLVED OXYGEN/TEMPERATURE PROFILES**

MOE Rec. Lks. Station 18-3430-711-01 MVC Station # 03-11



Date: July 30, 2003

Depth: 19 Metres

Euphotic Zone (Penetration of Light) = 9.6 Metres

Depth [Metres]	Temperature [Degrees Celsius]	Dissolved Oxygen [Milligrams/Litre]	Percent % Saturation	Thermal Stratification
0.1	22.6	9.0	99	Epilimnion
1.0	22.3	9.0	98	
2.0	22.1	9.0	98	
3.0	21.7	8.9	97	
4.0	20.6	9.0	96	
5.0	12.8	8.9	80	Metalimnion or Thermocline
6.0	9.4	8.4	70	
7.0	7.2	8.0	64	
8.0	6.4	7.9	63	Hypolimnion
9.0	5.8	7.8	61	
10.0	5.1	8.1	63	
11.0	4.9	8.2	63	
12.0	4.7	8.2	62	
13.0	4.6	8.2	62	
14.0	4.5	8.2	62	
15.0	4.3	8.1	61	
16.0	4.3	8.0	60	
17.0	4.3	7.7	58	
18.0	4.3	8.1	61	

Optimal Habitat for Cold Water Fisheries (Trout) = DO > 6 mg/L at < 10°C.

Vital Habitat for Cold Water Fisheries (Trout) = DO > 4 mg/L at < 15.5°C.

**Note:** Warm Water Fisheries Habitat (Bass, Walleye, Pike, Perch) = DO > 4 mg/L at < 25°C.

## KISHKEBUS LAKE – Main Basin Continued...

Date: September 16, 2003

Depth: 19 Metres

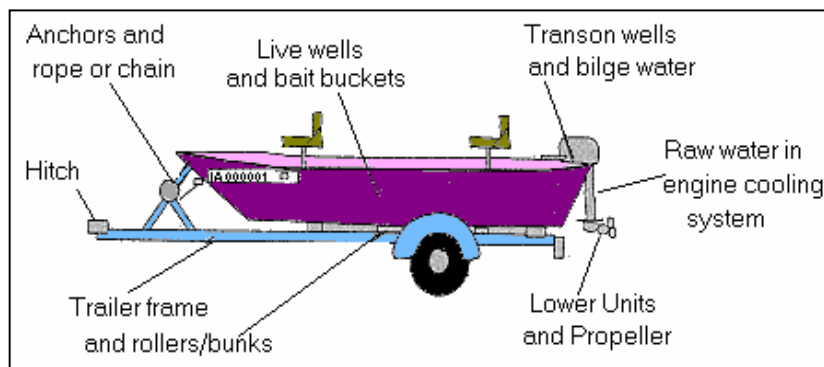
Euphotic Zone (Penetration of Light) = 10.0 Metres

Depth [Metres]	Temperature [Degrees Celsius]	Dissolved Oxygen [Milligrams/Litre]	Percent % Saturation	Thermal Stratification
0.1	19.9	7.8	83	Epilimnion
1.0	19.9	7.7	82	
2.0	19.9	7.6	80	
3.0	19.9	7.6	80	
4.0	19.8	7.5	79	
5.0	18.4	6.5	67	Metalimnion or Thermocline
6.0	13.6	5.6	52	
7.0	9.1	5.0	42	
8.0	7.7	5.0	41	
9.0	6.5	5.1	40	
10.0	5.9	5.3	41	Hypolimnion
11.0	5.5	5.5	42	
12.0	5.2	5.6	43	
13.0	5.0	5.6	43	
14.0	5.5	5.2	39	
15.0	4.9	5.4	40	
16.0	4.8	5.5	41	
17.0	4.6	5.2	39	
18.0	4.5	5.2	39	Bottom



### MVC and O.F.A.H. need your help to Stop the Invasion!

*Check & clean your boat every time you change water bodies*



Working with Lake Associations, we hope to improve signage at public launching areas to identify lakes where zebra mussels and spiny water fleas are already present. We hope to focus on an ambitious educational campaign to help reduce their spread to lakes where they are not yet present.

*For more information call MVC at (613)259-2421, the Invading Species Hotline 1-800-563-7711.*





## Mississippi Valley Conservation

*The Watershed Watch program was made possible thanks to the generous support of the Ministry of Environment, Lake Associations, area Stewardship Councils, the Lake Stewardship Network and concerned citizens.*

**For more information regarding Watershed Watch or for advice on how you can help protect or enhance your lake environment, contact Melissa Dakers, Water Quality Technician, Mississippi Valley Conservation at (613) 259-2421 or [mdakers@mvc.on.ca](mailto:mdakers@mvc.on.ca)**

