



Mississippi Valley Conservation

# State of the Lake Environment Report 2008

## 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, 2003 and 2008 through Mississippi Valley Conservation's (MVC) *Watershed Watch Program* provides for a 10 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.

Kishkebus Lake has one sampling station on the lake at the deepest point. The average secchi disc reading for 2008 is 3.5 metres, compared to 5 years ago, when the average was 4.73 metres. Thus indicating that Kishkebus Lake remains 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 ( $\mu\text{g/L}$ ). In 2008, the mean for the euphotic zone (depth at which sunlight can penetrate or two times the secchi disc depth) was  $13.7 \mu\text{g/L}$ . The mean for the samples taken one metre off the bottom was  $17.3 \mu\text{g/L}$ , both readings above the provincial objective. Five years ago, the average phosphorus level was  $7.33 \mu\text{g/L}$  in the euphotic zone and  $5.67 \mu\text{g/L}$  one metre off the bottom of the lake, both readings below the Provincial Objective.

Chlorophyll *a* is a measure of the algal density in the lake. The average chlorophyll *a* density for the sampling stations was  $2.8 \mu\text{g/L}$ . Thus, indicating a moderate algal density for Kishkebus Lake in 2008.

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 June of 2008 indicate sufficient optimal habitat is present in 17 metres of the water column. The DO and temperature data, measured in October indicate no optimal habitat available, only 18 metres of meters of vital habitat is available.

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.

## **MVC and OFAH need your help to Stop the Invasion!**

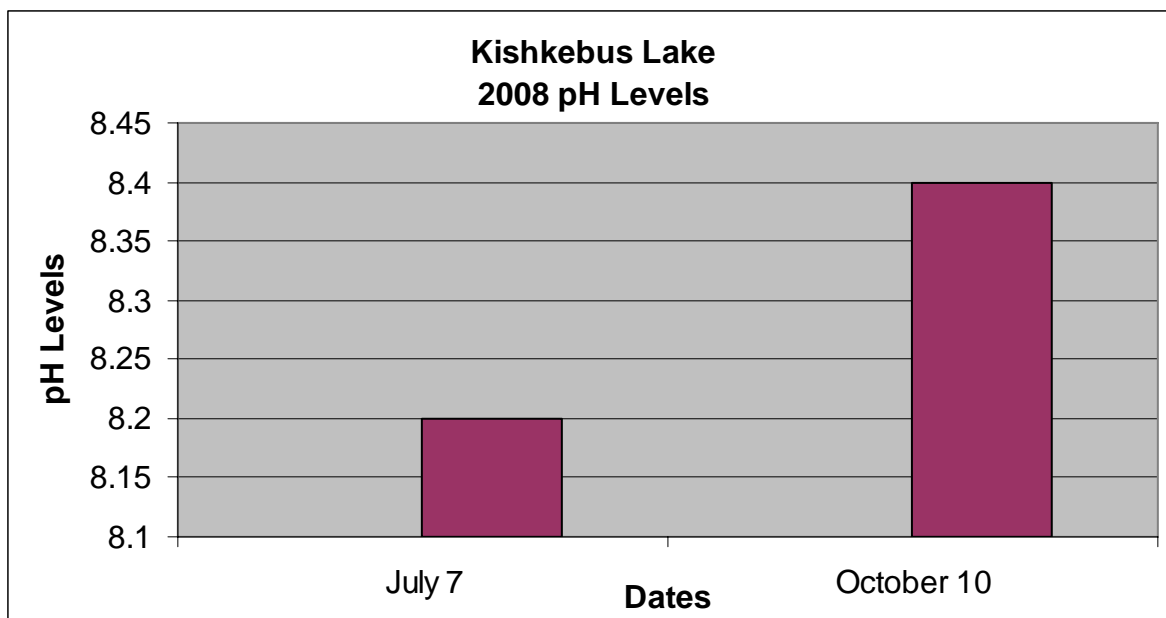
### ***Check & clean your boat every time you change water bodies***

Kishkebus Lake was also tested for invasive species in 2008, in particular, for zebra mussels and spiny water flea, in partnership with the Ontario Federation of Anglers and Hunters. Kishkebus Lake did not have spiny water flea or zebra mussel veligers present in the sample collected in 2008. However, zebra mussel veligers (larvae) have been detected in the samples collected in previous years. Residents and property owners need to ensure that all access points to the lake have posted signs indicating the presence of zebra mussels and the precautions they can take to avoid the spread of invasive species to other lakes.

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

### **Evaluating your pH Results**

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

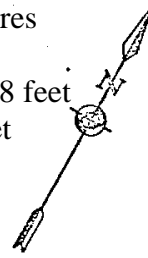




Mississippi Valley Conservation

# Kishkebus Lake

Surface Area: 206 acres  
Perimeter: 3.1 miles  
Maximum Depth: 108 feet  
Mean depth: 40.4 feet

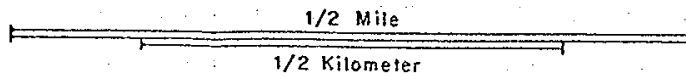


To  
Mazinow L.  
0.75 mile

↑  
Watershed Watch  
Sampling Station

## Remember

*Use non-lead sinkers to protect the health of the fish and this lake.*



*This map is intended for illustration only; it should not be used as a navigation guide.*

# How Does Kishkebus Lake Measure Up?

## 1976 - 2008 WATER QUALITY RESULTS - Kishkebus Lake

| Sample Year<br>[Various (Stations)] | Secchi Disc<br>Depth<br>[Metres] | Total Phosphorus<br>Euphotic Zone<br>[Micrograms/Litre] | Total Phosphorus<br>1 Metre off Bottom<br>[Micrograms/Litre] | Chlorophyll a<br>Composite<br>[Micrograms/Litre] |
|-------------------------------------|----------------------------------|---|--|--|
| 1976                                | 4.2                              | 8.0   |  | 2.2  |
| *1998                               | 3.7                              | 10.0  | 13.4   | 1.8  |
| *2003                               | 4.73                             | 7.3   | 5.67   | 2.43   |
| *2008                               | 3.5                              | 13.7  | 17.3   | 2.8  |
| n                                   | 4                                | 4   | 3  | 4  |
| Minimum                             | 3.5                              | 7.33  | 5.67   | 1.80   |
| Maximum                             | 4.7                              | 13.7  | 17.30  | 2.8  |
| Mean                                | 4.0                              | 9.8   | 12.1   | 2.3  |
| Standard Deviation                  | 0.55035595                       | 2.862613899   | 5.919175055  | 0.418996818                                      |

\* Mean based on less than 6 measurements \*\* Includes Recreational Lakes Program Data

\* Chlorophylla data prior to 1985 has been adjusted to reflect new lab procedures in filtering resulting in an increase in chla concentrations by 35%

**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**

### Preservation

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

### Enhancement

Native species are planted and non-native species are removed



### Naturalization

Degraded shorelines are left alone to return to their natural

### Restoration

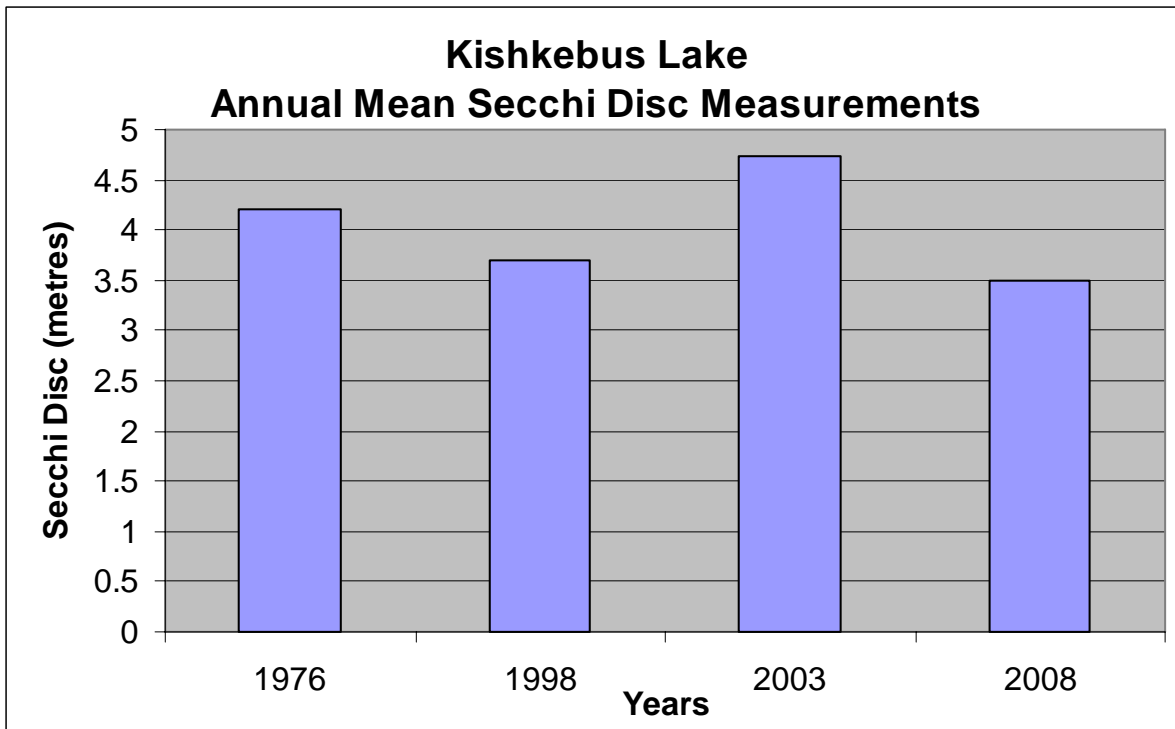
Clear areas are planted with native species.

## Interpreting Secchi Disc Readings:

A Secchi disc is a black and white coloured disc used to determine water clarity. The disc 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 Disc measurement the clearer your lake is.**

| INTERPRETING YOUR SECCHI DISC RESULTS |   |
|---------------------------------------|---|
| Secchi Reading                        | Lake Nutrient Status                              |
| 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  |



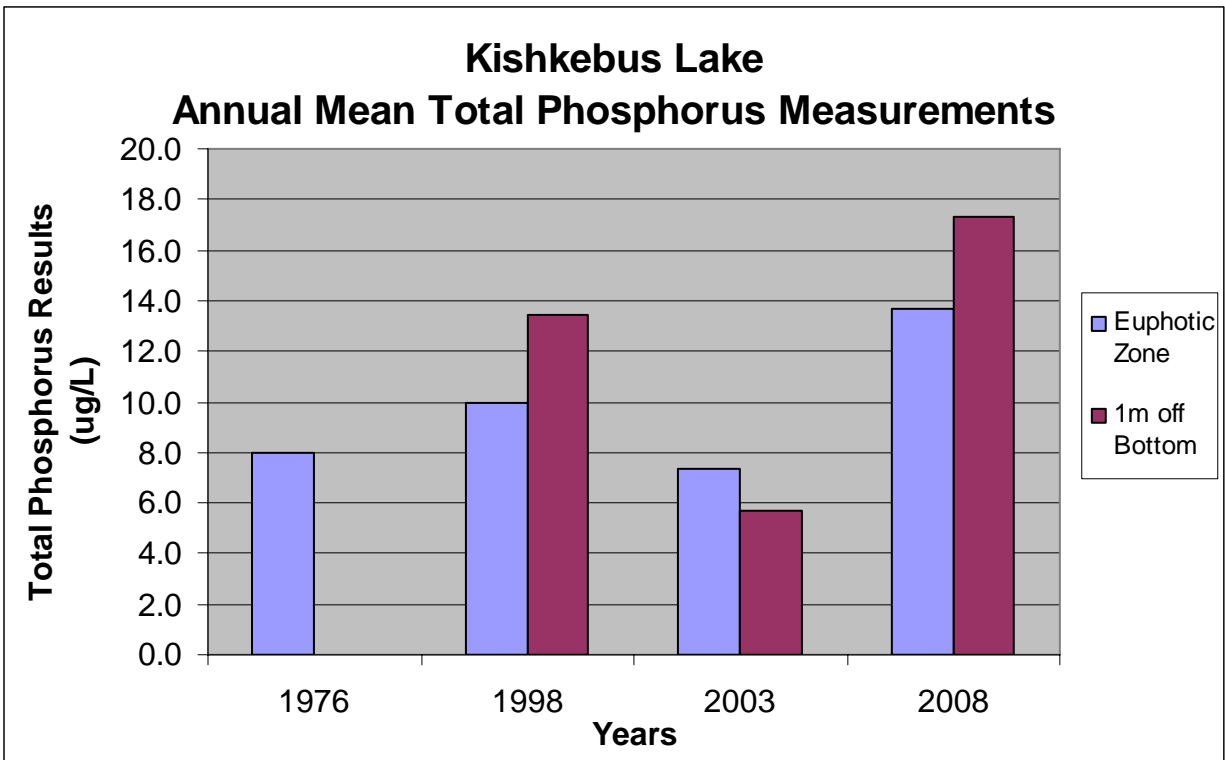
## **FIVE EASY STEPS TO IMPROVE WATER QUALITY**

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.

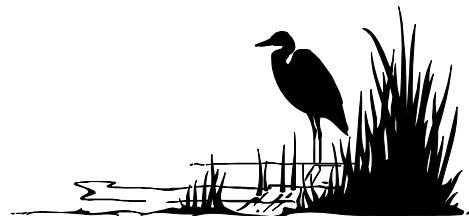


## Interpreting Total Phosphorus Results:

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.

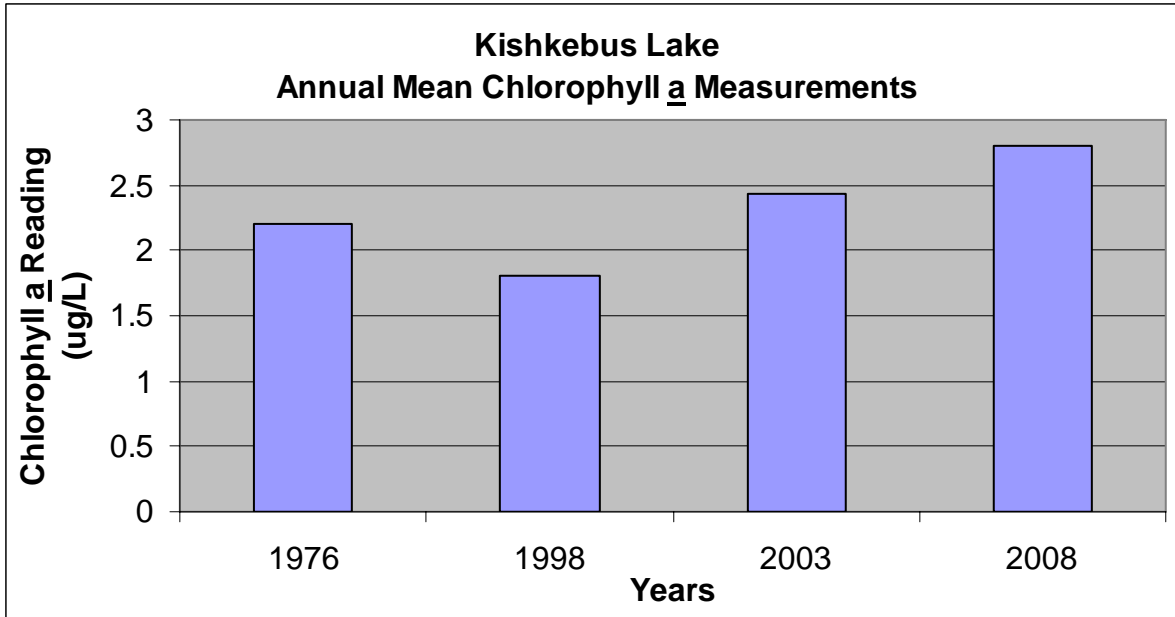


| INTERPRETING YOUR TOTAL PHOSPHORUS RESULTS |   |
|--|---|
| Total Phosphorus                           | Lake Nutrient Status                              |
| 10 ug/L or less                            | Oligotrophic - unenriched, few nutrients          |
| 11 to 20 ug/L                           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

**For more information on lakes in the  
Mississippi Valley**

**Watershed, visit MVC online  
at**

**[www.mvc.on.ca](http://www.mvc.on.ca)**





**KISHKEBUS LAKE - MAIN BASIN**  
**DISSOLVED OXYGEN/TEMPERATURE PROFILE**


MOE Rec.Lks. Station 18-3430-7-01 MVC Station 08-11


Date: June 02, 2008

Depth: 31.0 Metres

Euphotic Zone (Penetration of Light) = 5.0 Metres

| Depth<br>[Metres] | Temperature<br>[Degrees Celsius] | Dissolved Oxygen<br>[Milligrams/Litre] | Percent %<br>Saturation | Thermal<br>Stratification     |
|-------------------|----------------------------------|--|-------------------------|-------------------------------|
| 0.1               | 16.8                             | 8.0                                    | 79                      | Epilimnion                    |
| 1                 | 16.6                             | 8.0                                    | 79                      |                               |
| 2                 | 16.2                             | 8.0                                    | 78                      |                               |
| 3                 | 16.1                             | 7.9                                    | 77                      |                               |
| 4                 | 15.3                             | 7.8                                    | 75                      | Metalimnion<br>or Thermocline |
| 5                 | 14.0                             | 7.8                                    | 73                      |                               |
| 6                 | 9.7                              | 7.2                                    | 61                      | Hypolimnion                   |
| 7                 | 7.6                              | 7.0                                    | 55                      |                               |
| 8                 | 6.3                              | 7.0                                    | 54                      |                               |
| 9                 | 5.8                              | 6.8                                    | 53                      |                               |
| 10                | 5.4                              | 6.8                                    | 52                      |                               |
| 11                | 5.2                              | 6.7                                    | 51                      |                               |
| 12                | 5.1                              | 6.7                                    | 51                      |                               |
| 13                | 5.0                              | 6.6                                    | 50                      |                               |
| 14                | 4.8                              | 6.7                                    | 50                      |                               |
| 15                | 4.6                              | 6.7                                    | 50                      |                               |
| 16                | 4.5                              | 6.7                                    | 50                      |                               |
| 17                | 4.4                              | 6.6                                    | 48                      |                               |
| 18                | 4.4                              | 6.6                                    | 48                      |                               |
| 19                | 4.3                              | 6.6                                    | 48                      |                               |
| 20                | 4.2                              | 6.6                                    | 48                      |                               |
| 21                | 4.2                              | 6.4                                    | 48                      |                               |
| 22                | 4.1                              | 6.3                                    | 48                      |                               |
| 23                | 4.1                              | 6.0                                    | 44                      |                               |
| 24                | 4.1                              | 5.9                                    | 43                      |                               |
| 25                | 4.1                              | 5.6                                    | 41                      |                               |
| 26                | 4.1                              | 5.5                                    | 40                      |                               |
| 27                | 4.1                              | 5.4                                    | 39                      |                               |
| 28                | 4.0                              | 5.2                                    | 37                      |                               |
| 29                | 4.1                              | 5.0                                    | 37                      |                               |
| 30                | 4.1                              | 5.0                                    | 37                      |                               |
| 31                | Bottom                           | Bottom                                 | Bottom                  |                               |

 Optimal Habitat for Cold Water Fisheries =  
greater than 6 mg/L DO at less than 10 degrees Celsius

 Vital Habitat for Cold Water Fisheries =  
greater than 4 mg/L DO at less than 15.5 degrees Celsius

**KISHKEBUS LAKE - MAIN BASIN**

**DISSOLVED OXYGEN/TEMPERATURE PROFILE**

MOE Rec.Lks. Station 18-3430-7-01 MVC Station 08-11

Date: July 07, 2008

Depth: 27.0 Metres

Euphotic Zone (Penetration of Light) = 10.0 Metres

| Depth<br>[Metres] | Temperature<br>[Degrees Celsius] | Dissolved Oxygen<br>[Milligrams/Litre] | Percent %<br>Saturation | Thermal<br>Stratification     |
|-------------------|----------------------------------|--|-------------------------|-------------------------------|
| 0.1               | 25.3                             | 8.6                                    | 100                     | Epilimnion                    |
| 1                 | 24.3                             | 8.8                                    | 100                     |                               |
| 2                 | 23.5                             | 8.6                                    | 96                      |                               |
| 3                 | 20.4                             | 8.3                                    | 88                      | Metalimnion<br>or Thermocline |
| 4                 | 18.4                             | 7.5                                    | 97                      |                               |
| 5                 | 14.4                             | 7.4                                    | 70                      |                               |
| 6                 | 12.4                             | 7.0                                    | 63                      |                               |
| 7                 | 9.2                              | 7.4                                    | 63                      |                               |
| 8                 | 7.7                              | 7.7                                    | 63                      |                               |
| 9                 | 6.6                              | 7.8                                    | 62                      |                               |
| 10                | 5.7                              | 8                                      | 62                      |                               |
| 11                | 5.3                              | 8.1                                    | 62                      |                               |
| 12                | 5.2                              | 8.1                                    | 62                      |                               |
| 13                | 4.8                              | 8.2                                    | 62                      | Hypolimnion                   |
| 14                | 4.7                              | 8.0                                    | 60                      |                               |
| 15                | 4.6                              | 8.0                                    | 60                      |                               |
| 16                | 4.5                              | 8.0                                    | 60                      |                               |
| 17                | 4.4                              | 7.7                                    | 58                      |                               |
| 18                | 4.3                              | 7.6                                    | 57                      |                               |
| 19                | 4.3                              | 7.2                                    | 54                      |                               |
| 20                | 4.2                              | 6.8                                    | 51                      |                               |
| 21                | 4.2                              | 6.5                                    | 48                      |                               |
| 22                | 4.2                              | 6.5                                    | 48                      |                               |
| 23                | 4.2                              | 6.2                                    | 46                      |                               |
| 24                | 4.2                              | 6.0                                    | 45                      |                               |
| 25                | 4.2                              | 5.3                                    | 39                      |                               |
| 26                | 4.2                              | 4.7                                    | 35                      |                               |
| 27                | Bottom                           | Bottom                                 | Bottom                  |                               |

Optimal Habitat for Cold Water Fisheries =  
greater than 6 mg/L DO at less than 10 degrees Celsius

Vital Habitat for Cold Water Fisheries =  
greater than 4 mg/L DO at less than 15.5 degrees Celsius

**KISHKEBUS LAKE - MAIN BASIN**  
**DISSOLVED OXYGEN/TEMPERATURE PROFILE**


MOE Rec.Lks. Station 18-3430-7-01 MVC Station 08-11


Date: October 10, 2008

Depth: 23.0 Metres

Euphotic Zone (Penetration of Light) = 6.0 Metres

| Depth<br>[Metres] | Temperature<br>[Degrees Celsius] | Dissolved Oxygen<br>[Milligrams/Litre] | Percent %<br>Saturation | Thermal<br>Stratification     |
|-------------------|----------------------------------|--|-------------------------|-------------------------------|
| 0.1               | 12.9                             | 9.0                                    | 82                      | Epilimnion                    |
| 1                 | 12.9                             | 9.0                                    | 82                      |                               |
| 2                 | 12.5                             | 8.9                                    | 80                      |                               |
| 3                 | 12.5                             | 8.7                                    | 78                      |                               |
| 4                 | 12.5                             | 8.7                                    | 78                      |                               |
| 5                 | 12.5                             | 8.5                                    | 76                      |                               |
| 6                 | 12.0                             | 8.3                                    | 74                      | Metalimnion<br>or Thermocline |
| 7                 | 10.5                             | 4.9                                    | 43                      |                               |
| 8                 | 9.3                              | 4.5                                    | 39                      |                               |
| 9                 | 7.1                              | 4.5                                    | 36                      |                               |
| 10                | 5.3                              | 4.5                                    | 35                      |                               |
| 11                | 5.3                              | 5.1                                    | 39                      | Hypolimnion                   |
| 12                | 4.9                              | 5.2                                    | 39                      |                               |
| 13                | 4.5                              | 5.2                                    | 38                      |                               |
| 14                | 4.4                              | 5.2                                    | 38                      |                               |
| 15                | 4.3                              | 5.4                                    | 40                      |                               |
| 16                | 4.2                              | 5.4                                    | 40                      |                               |
| 17                | 4.2                              | 5.0                                    | 37                      |                               |
| 18                | 4.1                              | 4.7                                    | 36                      |                               |
| 19                | 4.0                              | 3.9                                    | 29                      |                               |
| 20                | 4.0                              | 3.5                                    | 26                      |                               |
| 21                | 4.0                              | 1.9                                    | 13                      |                               |
| 22                | 3.9                              | 1.4                                    | 10                      |                               |
| 23                | Bottom                           | Bottom                                 | Bottom                  |                               |

 Optimal Habitat for Cold Water Fisheries =  
greater than 6 mg/L DO at less than 10 degrees Celsius

 Vital Habitat for Cold Water Fisheries =  
greater than 4 mg/L DO at less than 15.5 degrees Celsius



## 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 Susan Lee, Watershed Monitoring Supervisor, Mississippi Valley Conservation at (613) 259-2421 or [slee@mvc.on.ca](mailto:slee@mvc.on.ca)**

