



Mississippi Valley Conservation

State of the Lake Environment Report 2009

Ardoch Lake



Ardoch Lake, also known locally as Green Lake, is located in the Township of North Frontenac. Ardoch Lake is at an elevation of 282 metres above sea level. The lake perimeter is 5.5 kilometres and the deepest point is 17.4 metres. Ardoch Lake supports a warm water fishery. In particular walleye, northern pike and smallmouth bass. As of 2004, there were 10 cottages and 6 camp sites on the lake.

How Does Ardoch Lake Measure Up?

1976 - 2009 WATER QUALITY RESULTS - Ardoch Lake

Sample Year [Various Stations]	Secchi Disc Depth [Metres]	Total Phosphorus Euphotic Zone [Micrograms/Litre]	Total Phosphorus 1 Metre off Bottom [Micrograms/Litre]	Chlorophyll <u>a</u> Composite [Micrograms/Litre]
**1976 Mean	7.4	16.0		2.70
**1980 Mean	4.6	12.4	126.0	2.21
1999 Mean	4.1	10.0	76.7	0.79
*2004 Mean	6.2	2.7	10.3	1.03
***2009 Mean	4.6	14.6	***15.0	2.5
n	5	5	4	5
Minimum	4.1	2.67	10.33	0.79
Maximum	7.4	16.0	126.00	2.7
Mean	5.4	11.1	57.0	1.8
Standard Deviation	1.37186005	5.24926471	55.04900446	0.876144965

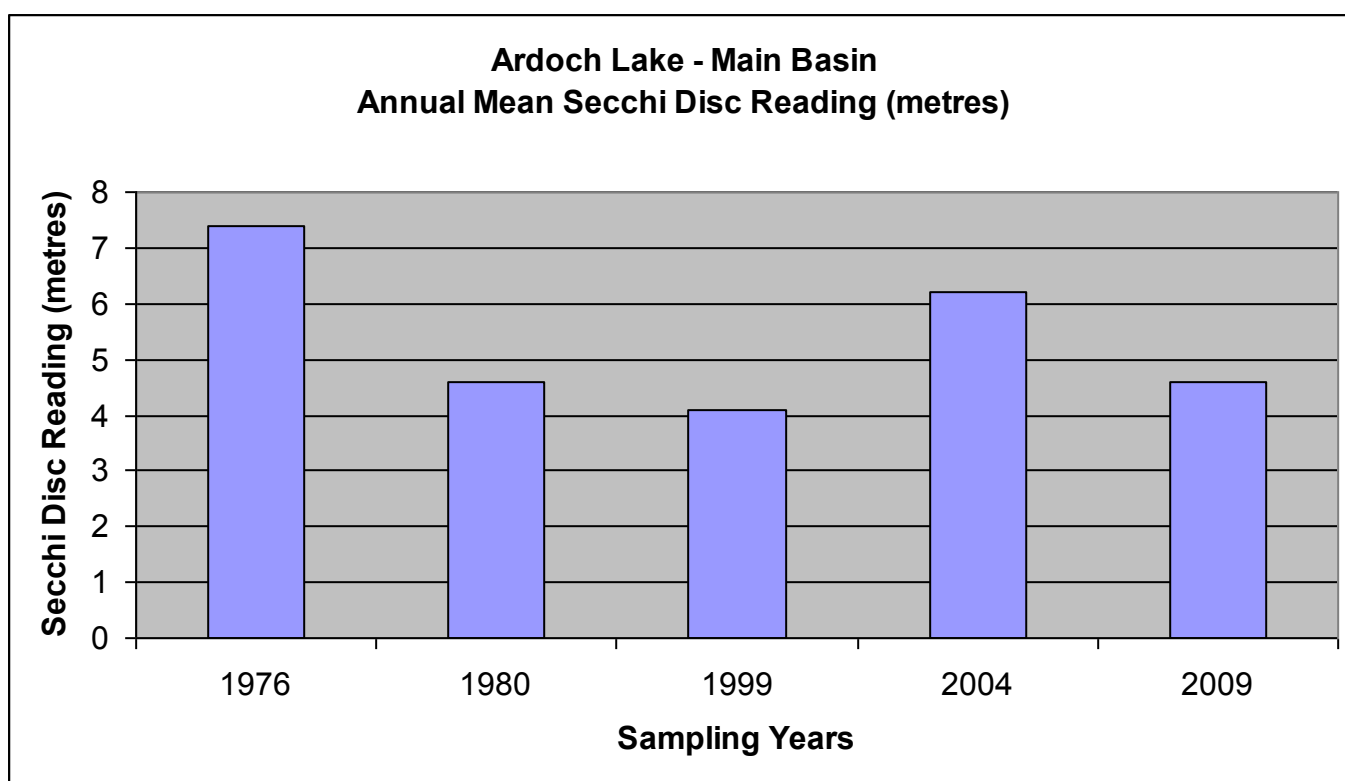
* Mean based on less than 6 measurements ** Includes Recreational Lakes Program Data

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

***Mean based on two samples as third sample was not usable.

The higher the Secchi Disc measurement the clearer

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



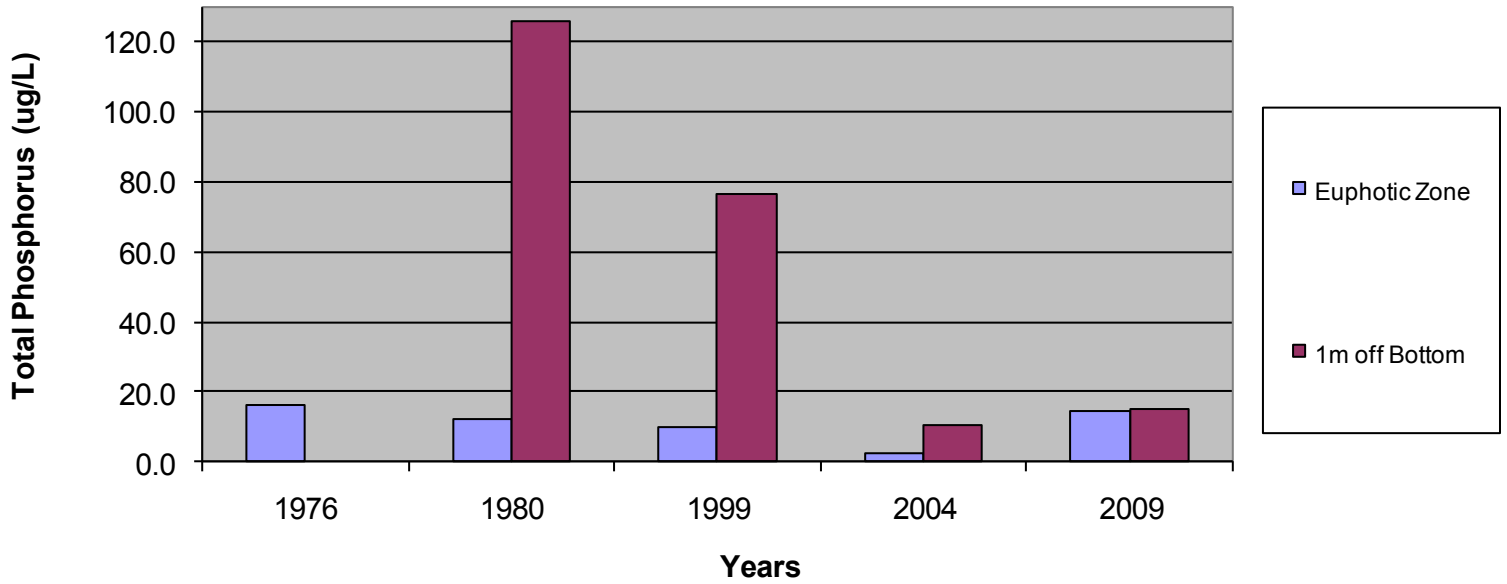
Interpreting Secchi Disc Readings

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.

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.

**Ardoch Lake - Main Basin
Annual Mean Total Phosphorus Measurements**

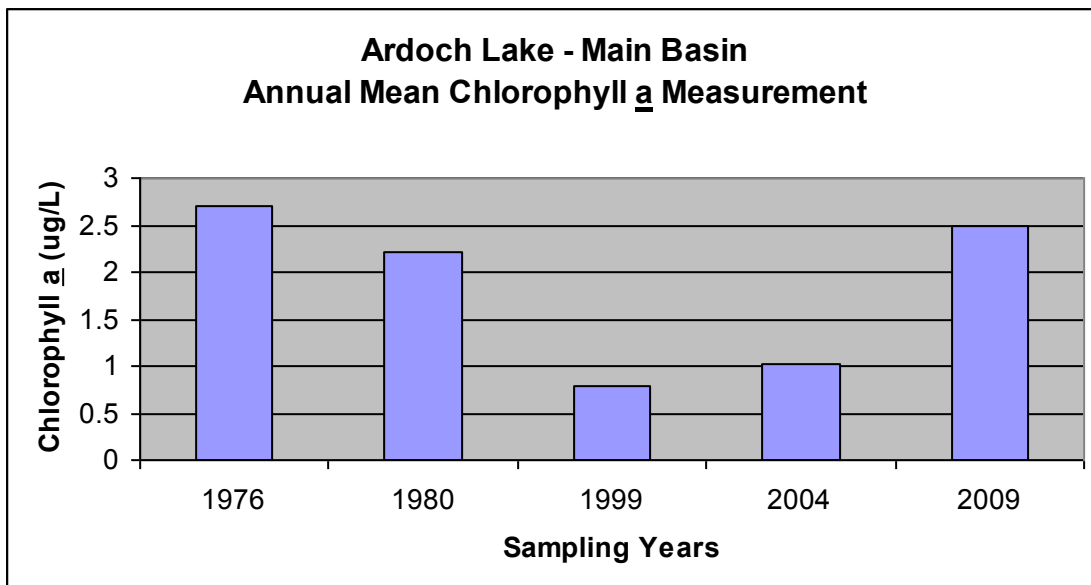


INTERPRETING YOUR TOTAL PHOSPHORUS RESULTS	
Total Phosphorus	Lake Nutrient Status
10 ug/L or less	Oligotrophic - unenriched, few nutrients
11 to 20 ug/L	Mesotrophic – moderately enriched, some nutrients
21 ug/L or more	Eutrophic – enriched, higher levels of nutrients

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 <u>A</u> RESULTS	
Chlorophyll <u>a</u> 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



MVC and OFAH need your help to Stop the Invasion!

Check & clean your boat every time you change water bodies

Ardoch Lake was also tested for invasive species in 2009, in particular, for zebra mussels and spiny water flea, in partnership with the Ontario Federation of Anglers and Hunters. Ardoch Lake did not have spiny water flea however; zebra mussel veligers (larvae) were present in the sample collected in 2009.

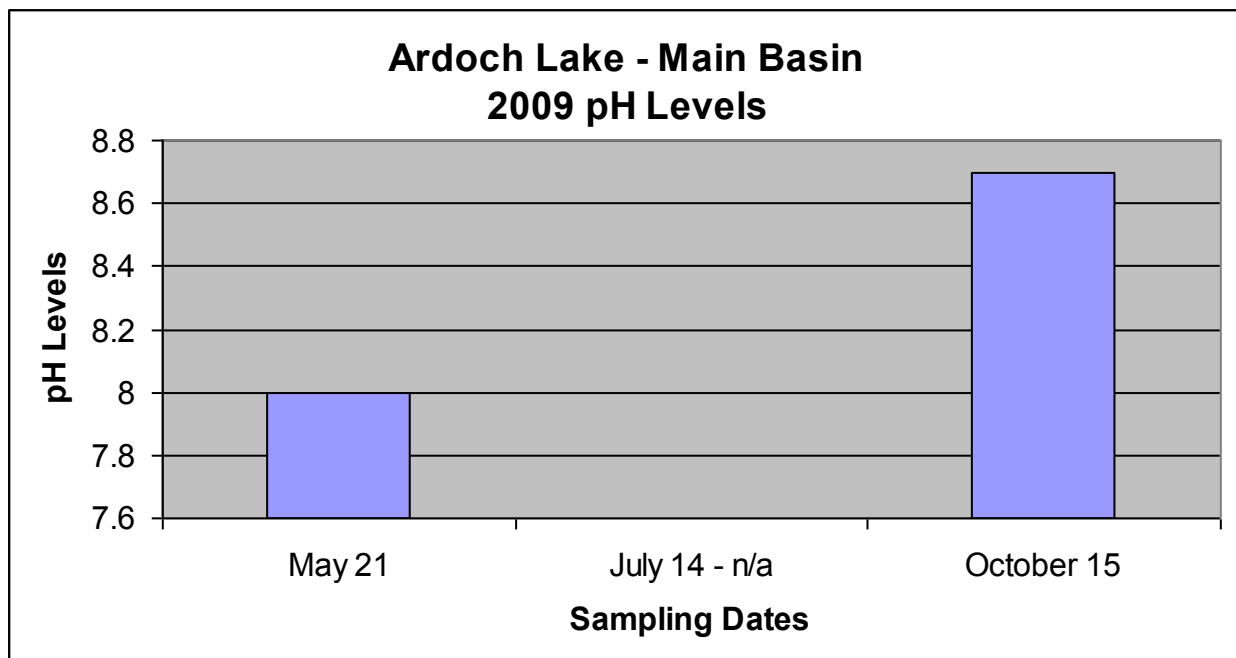
Ardoch Lake also tested positive for Rusty Crayfish.

Residents and property owners need to ensure that all access points to the lake have posted signs indicating the presence of invasive species such as 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.



Watershed Watch Seine Netting 2009

Seine netting by hand is a way of sampling fish species that may live or visit near various shorelines. A seine net is a type of fishing net that has floats along one edge and weight along the other edge, to keep it upright in the water. It is then dragged through a section of water, encircling it, thus collecting all the fish within that area. This method is used because it is affordable, easy to do, portable, and has a very limited impact on the health of the fish sampled.

Seine netting was conducted on all nine of the 2009 watershed watch lakes to help expand our knowledge of each lake beyond just its chemistry. Netting on Ardoch Lake was conducted in July to avoid disturbing sensitive nesting, and breeding sites, netting took place on the north side of the lake after you enter Ardoch Lake from Malcolm Lake.

The majority of the individual fish captured on the 2009 watershed watch lakes with the seine net are bait fish such as minnows and cyprinids; some juvenile and adult game fish were also caught. This is understandable because both groups (bait fish and juvenile game fish) tend to stick close to shore to avoid predation from larger fish that can be found in deeper waters. Near shore areas may also contain aquatic vegetation which is ideal camouflage for all sizes of fish that are either hiding from predators, or waiting to surprise prey, explaining why some adult game fish were caught. It is important to note that if something was not caught in the seine we cannot conclude that the fish species is not in the lake; it just means that that fish species wasn't where we were sampling when we were sampling.

Most peoples interest in fish species within a water body have to do with the game fish that they might go catch. However bait fish far outnumber game fish and thus play a critical role in their ecosystem and within the food chain. It is important to take note of their presence, and provide them the same consideration you would for larger fish. If you are curious about learning more about bait fish, as well as learning how to identify the different species, please refer to the Department of Fisheries and Oceans "[*Bait Fish Primer*](#)", it is available online, as well as in our office.

Ardoch Lake	Fish Species Caught
	Smallmouth Bass
	Pumpkinseed

Ardoch Lake
 # 09-21
 May 21, 2009
 12:00 PM


Depth (metres)	Temperature (Degree Celsius)	Dissolved Oxygen (Milligrams/Litre)	Percent % Saturation	Thermal Stratification
0.1	14.3	7.1	67	Epilimnion
1	14.1	13.8	129	
2	14.1	14.4	135	
3	14.0	18.7	n/a	
4	12.9	17.2	n/a	Thermocline 1
5	12.5	13.2	118	Thermocline 2
6	12.2	12.9	115	
7	12.2	11.5	104	
8	11.7	11.1	98	
9	9.5	8.8	74	Thermocline 3
10	8.9	7.5	63	Thermocline 4
11	8.7	6.2	52	
12	11.9	9.1	70	Hypolimnion
13	7.9	7.9	64	
14	Bottom	Bottom	Bottom	



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


Ardoch Lake
 # 09-21
 July 14, 2009
 10:00 a.m.

Depth [Metres]	Temperature [Degrees Celsius]	Dissolved Oxygen [Milligrams/Litre]	Percent % Saturation	Thermal Stratification
0.1	20.6	8.0	85	Epilimnion
1	20.6	8.1	87	
2	20.6	8.1	87	
3	20.6	8.1	87	
4	20.6	8.0	86	
5	20.5	8.0	87	
6	17.5	9.5	95	Thermocline
7	15.5	9.5	90	
8	12.7	8.3	75	
9	11.3	7.9	70	
10	10.5	5.2	45	Hypolimnion
11	9.5	3.7	31	
12	9.0	4.0	34	
13	8.3	1.3	10	
14	8.1	0.8	9	
15	Bottom	Bottom	Bottom	

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

Ardoch Lake
 # 09-21
 October 15, 2009
 11:30 PM

Depth (Metres)	Temperature (Degrees Celsius)	Dissolved Oxygen (Milligrams / Litre)	Percent % Saturation	Thermal Stratification
0.1	11.8	9.08	84.1	Epilimnion
1.0	12.0	9.01	83.7	
2.0	12.1	8.96	83.4	
3.0	12.1	8.96	83.4	
4.0	12.1	8.93	83.1	
5.0	12.1	8.94	83.1	
6.0	12.1	8.92	82.9	
7.0	12.1	8.93	82.9	
8.0	12.1	8.91	82.8	
9.0	12.0	9.00	83.5	
10.0	12.0	9.01	83.6	
11.0	12.0	9.03	83.8	
12.0	12.0	9.00	83.5	
13.0	12.0	9.03	83.8	
14.0	12.0	9.02	83.7	
15.0	11.9	8.84	82.0	
16.0	Bottom	Bottom	Bottom	

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