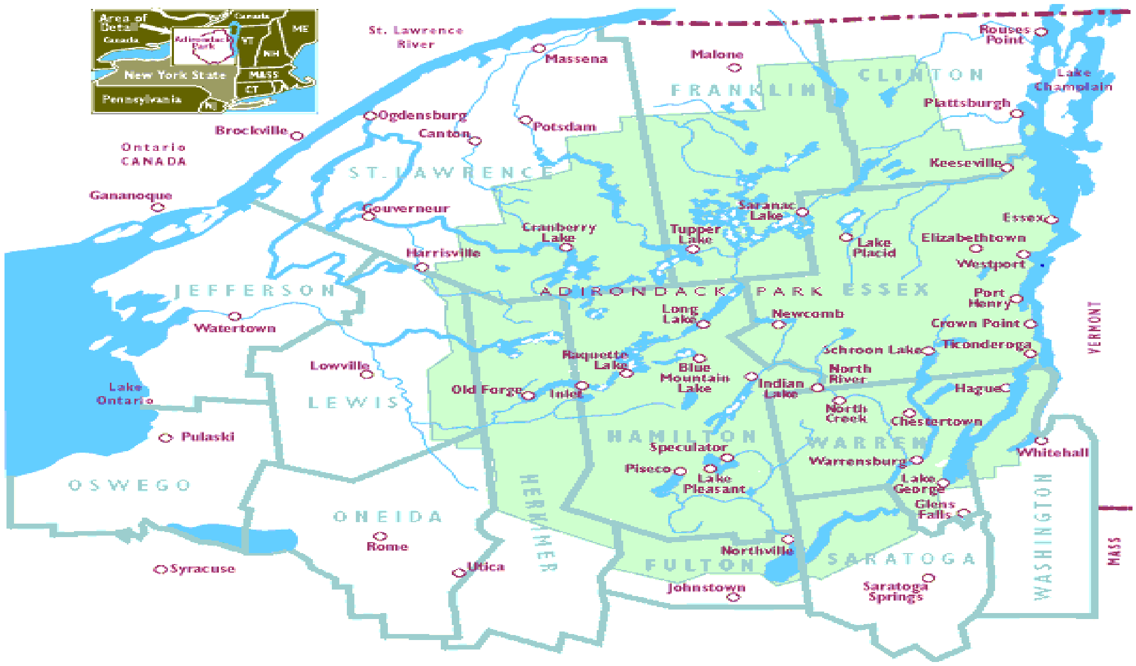
Adirondack Lake Assessment Program
2010



<u>Thirteen Years in the program</u>
Cranberry Lake, Loon Lake, Oven Mountain Pond, Blue Mountain Lake, Silver Lake, Eagle Lake
<u>Twelve Years in the program</u>
Little Long Lake, Gull Pond, Stony Creek Ponds, Thirteenth Lake, Eli Pond
<u>Eleven Years in the program</u>
Austin Pond, Osgood Pond, Middle Saranac Lake, White Lake, Brandreth Lake, Trout Lake
<u>Ten Years in the program</u>
Hoel Pond, Great Sacandaga Lake, Tripp Lake, Sherman Lake, Wolf Lake, Twitchell Lake, Deer Lake, Arbutus Pond, Rich Lake, Catlin Lake, Pine Lake, Lake of the Pines, Pleasant Lake
<u>Nine Years in the program</u>
Spitfire Lake, Upper St. Regis, Lower St. Regis, Garnet Lake, Lens Lake, Snowshoe Pond, Lake Ozonia, Long Pond, Lower Saranac Lake
<u>Eight Years in the program</u>
Raquette Lake, Lake Colby, Kiwassa Lake, Canada Lake
<u>Seven Years in the program</u>
Indian Lake, Schroon Lake, Lake Eaton, Chazy Lake, Big Moose Lake
<u>Six Years in the program</u>
Dug Mountain Pond, Seventh Lake, Abanakee Lake, Moss Lake, Mountain View Lake, Indian Lake, Tupper Lake
<u>Five Years in the program</u>
Sylvia Lake, Fern Lake
<u>Four Years in the program</u>
Adirondack Lake, Lower Chateaugay Lake, Upper Chateaugay Lake, Lake Easka, Lake Tekeni
<u>Three Years in the program</u>
Simon Pond
<u>Two Years in the program</u>
Amber Lake, Jordan Lake, Otter Pond, Rondaxe Lake
<u>One Year in the program</u>
Auger Lake, Lake Titus, Star Lake

Adirondack Lake

Assessment Program

Big Moose Lake

Summer 2010

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Introduction

The Adirondack Lake Assessment Program is a volunteer monitoring program established by the Residents' Committee to Protect the Adirondacks (RCPA) and the Adirondack Watershed Institute (AWI). The program is now in its' thirteenth year and continues to grow. The program was established to help develop a current database of water quality in Adirondack lakes and ponds. There were 70 participating lakes in the program in year 2010.

Methodology

Each month participants (trained by AWI staff) measured transparency with a secchi disk and collected a 2-meter composite of lake water for chlorophyll-a analysis and a separate 2-meter composite for total phosphorus and other chemical analyses. The participants filtered the chlorophyll-a sample prior to storage. Both the chlorophyll-a filter and water chemistry samples were frozen for transport to the laboratory at Paul Smith's College.

In addition to the volunteer samples, AWI staff sampled water quality parameters in most of the participating lakes as time and weather allowed. In most instances, a 2-meter composite of lake water was collected for chlorophyll-a analysis. Samples were also collected at depths of 1.5 meters from the surface (epilimnion) and within 1.5 meters of the bottom (hypolimnion) for chemical analysis. Once collected, samples were stored in a cooler and transported to the laboratory at Paul Smith's College.

All samples were analyzed by AWI staff in the Paul Smith's College laboratory using the methods detailed in *Standard Methods for the Examination of Water and Wastewater, 21st edition* (Greenberg, *et al*, 2005). Volunteer samples were analyzed for pH, alkalinity, conductivity, color, nitrate, chlorophyll a and total phosphorus concentrations. Samples taken by AWI staff were analyzed for the same parameters, as well as for calcium, chloride, and aluminum concentrations.

Results Summary

Big Moose Lake was sampled twice by a volunteer in 2009. Samples were collected on the following dates: 7/09/09 and 8/30/2009. Results for 2010 are presented in Appendix A and will be discussed in the following sections. Results are presented as concentrations in milligrams per liter (mg/L) or its equivalent of parts per million (ppm) and micrograms per liter (μg/L) or its equivalent of parts per billion (ppb).

1 mg/L = 1 ppm; 1 μg/L = 1 ppb; 1 ppm = 1000 ppb.

Adirondack lakes are subject to the effects of acidic precipitation (i.e. snow, rain). A water body's susceptibility to acid producing ions is assessed by measuring pH, alkalinity, calcium concentrations, and the Calcite Saturation Index (CSI). These parameters define both the acidity of the water and its buffering capacity. Based on the results of the 2009 Adirondack Lakes Assessment program, the acidity status of Big Moose Lake is considered to be moderately endangered or threatened. The pH is satisfactory but the alkalinity, calcium, and CSI values indicate Big Moose Lake to be impaired and sensitive to acidification.

Limnologists, the scientists who study bodies of fresh water, classify lake health (trophic status) into three main categories: oligotrophic, mesotrophic, and eutrophic. The trophic status of a lake is determined by measuring the level of three basic water quality parameters: total phosphorus, chlorophyll-a, and secchi disk transparency. These parameters will be defined in the sections that follow. Oligotrophic lakes are characterized as having low levels of total phosphorus, and, as a consequence, low levels of chlorophyll-a and high transparencies. Eutrophic lakes have high levels of total phosphorus and chlorophyll-a, and, as a consequence, low transparencies. Mesotrophic lakes have moderate levels of all three of these water quality parameters. Based upon the results of the 2009 Adirondack Lakes Assessment Program, Big Moose Lake is considered to be a mesotrophic water body.

pH

The pH level is a measure of acidity (concentration of hydrogen ions in water), reported in standard units on a logarithmic scale that ranges from 1 to 14. On the pH scale, 7 is neutral, lower values are more acidic, and higher numbers are more basic. In general, pH values between 6.0 and 8.0 are considered optimal for the maintenance of a healthy lake ecosystem. Many species of fish and amphibians have difficulty with growth and reproduction when pH levels fall below 5.5 standard units. Lake acidification status can be assessed from pH as follows:

pH less than 5.0	Critical or Impaired
pH between 5.0 and 6.0	Endangered or Threatened
pH greater than 6.0	Satisfactory or Acceptable

The pH in the upper waters of Big Moose Lake in 2009 averaged 6.32. Based solely on pH, Big Moose Lake’s acidity levels are considered to be satisfactory for 2009 but endangered or threatened during 2004 - 2008.

Alkalinity

Alkalinity (acid neutralizing capacity) is a measure of the buffering capacity of water, and in lake ecosystems refers to the ability of a lake to absorb or withstand acidic inputs. In the northeast, most lakes have low alkalinities, which mean they are sensitive to the effects of acidic precipitation. This is a particular concern during the spring when large amounts of low pH snowmelt runs into lakes with little to no contact with the soil’s natural buffering agents. Alkalinity is reported in milligrams per liter (mg/L) or microequivelents per liter (μeq/L). Typical summer concentrations of alkalinity in northeastern lakes are around 10 mg/l (200 μeq/L). Lake acidification status can be assessed from alkalinity as follows:

Alkalinity less than 0 ppm	Acidified
Alkalinity between 0 and 2 ppm	Extremely sensitive
Alkalinity between 2 and 10 ppm	Moderately sensitive
Alkalinity between 10 and 25 ppm	Low sensitivity
Alkalinity greater than 25 ppm	Not sensitive

The alkalinity of the upper waters of Big Moose Lake in 2009 averaged 6.4 ppm. This value indicates a moderate sensitivity to acidification.

Calcium

Calcium is one of the buffering materials that occurs naturally in the environment. However, it is often in short supply in Adirondack lakes and ponds, making these bodies of water susceptible to acidification by acid precipitation. Calcium concentrations provide information on the buffering capacity of that lake, and can assist in determining the timing and dosage for acid mitigation (liming) activities. Adirondack lakes containing less than 2.5 ppm of calcium are considered to be sensitive to acidification.

The calcium in Big Moose Lake was measured in 2009 and the concentration was found to be 1.88. This value shows a lake that is sensitive to further acidification.

Calcite Saturation Index

The Calcite Saturation Index (CSI) is another method that is used to determine the sensitivity of a lake to acidification. High CSI values are indicative of increasing sensitivity to acidic inputs. CSI is calculated using the following formula:

$$CSI = -\log_{10} \frac{Ca}{40000} - \log_{10} \frac{Alk}{50000} - pH + 2$$

Where *Ca* = Calcium level of water sample in ppm or mg/L
Alk = Alkalinity of the water sample in ppm or mg/L
pH = pH of the water sample in standard units

Lake sensitivity to acidic inputs is assessed from CSI as follows:

CSI greater than 4	Very vulnerable to acidic inputs
CSI between 3 & 4	Moderately vulnerable to acidic inputs
CSI less than 3	Low vulnerability to acidic inputs

The CSI value in the upper waters of Big Moose Lake was calculated and found to be 3.90. This value shows a lake that is moderately vulnerable to further acidic inputs.

Total Phosphorus

Phosphorus is one of the three essential nutrients for life, and in northeastern lakes, it is often the controlling, or limiting, nutrient in lake productivity. Total phosphorus is a measure of all forms of phosphorus, both organic and inorganic. Total phosphorus concentrations are directly related to the trophic status (water quality conditions) of a lake. Excessive amounts of phosphorus can lead to algae blooms and a loss of dissolved oxygen within the lake. Surface water (epilimnion) concentrations of total phosphorus less than 10 ppb are associated with oligotrophic (clean, clear water) conditions. Concentrations greater than 25 ppb are associated with eutrophic (nutrient-rich) conditions.

The total phosphorus in the upper waters of Big Moose Lake in 2009 averaged 18 ppb. This is indicative of mesotrophic conditions.

Chlorophyll-a

Chlorophyll-a is the green pigment in plants used for photosynthesis, and measuring it provides information on the amount of algae (microscopic plants) in lakes. Chlorophyll-a concentrations are also used to classify a lakes trophic status. Concentrations less than 2 ppb are associated with oligotrophic conditions and those greater than 8 ppb are associated with eutrophic conditions.

The chlorophyll-a concentrations in the upper waters of Big Moose Lake in 2009 averaged 4.47 ppb. This is indicative of mesotrophic conditions.

Secchi Disk Transparency

Transparency is a measure of water clarity in lakes and ponds. It is determined by lowering a 20 cm black and white disk (Secchi) into a lake to the depth where it is no longer visible from the surface. This depth is then recorded in meters. Since algae are the main determinant of water clarity in non-stained, low turbidity (suspended silt) lakes, transparency is also used as an indicator of the trophic status of a body of water. Secchi disk transparencies greater than 4.6 meters (15.1 feet) are associated with oligotrophic conditions, while values less than 2 meters (6.6 feet) are associated with eutrophic conditions (DEC & FOLA, 1990).

Secchi disk transparency in Big Moose Lake in 2009 was 3.2 meters. This value is indicative of mesotrophic conditions.

Nitrate

Nitrogen is another essential nutrient for life. Nitrate is an inorganic form of nitrogen that is naturally occurring in the environment. It is also a component of atmospheric pollution. Nitrogen concentrations are usually less than 1 ppm in most lakes. Elevated levels of nitrate concentration may be indicative of lake acidification or wastewater pollution.

The nitrate level in Big Moose Lake in 2009 averaged 0.22 ppm.

Chloride

Chloride is an anion that occurs naturally in surface waters, though typically in low concentrations. Background concentrations of chloride in Adirondack Lakes are usually less than 1 ppm. Chloride levels 10 ppm and higher is usually indicative of pollution and, if sustained, can alter the distribution and abundance of aquatic plant and animal species. The primary sources of additional chloride in Adirondack lakes are road salt (from winter road de-icing) and wastewater (usually from faulty septic systems). The most salt impacted waters in the Adirondacks usually have chloride concentrations of 100 ppm or less.

The chloride in Big Moose Lake was measured in 2009 and found to be a very low 0.90 ppm.

Conductivity

Conductivity is a measure of the ability of water to conduct electric current, and will increase as dissolved minerals build up within a body of water. As a result, conductivity is also an indirect measure of the number of ions in solution, mostly as inorganic substances. High conductivity values (greater than 50 μohms/cm) may be indicative of pollution by road salt runoff or faulty septic systems. Conductivities may be naturally high in water that drains from bogs or marshes. Eutrophic lakes often have conductivities near 100 μohms/cm, but may not be characterized by pollution inputs. Clean, clear-water lakes in our region typically have conductivities up to 30 μohms/cm, but values less than 50 μohms/cm are considered normal.

The conductivity in the upper waters of Big Moose Lake in 2009 averaged 14.4 μohms/cm.

Color

The color of water is affected by both dissolved materials (e.g., metallic ions, organic acids) and suspended materials (e.g., silt and plant pigments). Water samples are collected and compared to a set of standardized chloroplatinate solutions in order to assess the degree of coloration. The measurement of color is usually used in lake classification to describe the degree to which the water body is stained due to the accumulation of organic acids. The standard for drinking water color, as set by the United States Environmental Protection Agency (US EPA) using the platinum-cobalt method, is 15 Pt-Co. However, dystrophic lakes (heavily stained, often the color of tea) are common in this part of the country, and are usually found in areas with poorly drained soils and large amounts of coniferous vegetation (i.e., pines, spruce, hemlock). Dystrophic lakes usually have color values upwards of 75 Pt-Co.

Color can often be used as a possible index of organic acid content since higher amounts of total organic carbon (TOC) are usually found in colored waters. TOC is important because it can bond with aluminum in water, locking it up within the aquatic system and resulting in possible toxicity to fish (see Aluminum).

The color in the upper waters of Big Moose Lake in 2009 averaged 16.0 Pt-Co.

Aluminum

Aluminum is one of the most abundant elements found within the earth's crust. Acidic runoff (from rainwater and snowmelt) can leach aluminum out of the soil as it flows into streams and lakes. If a lake is acidic enough, aluminum may also be leached from the sediment at the bottom of it. Low concentrations of aluminum can be toxic to aquatic fauna in acidified water bodies, depending on the type of aluminum available, the amount of dissolved organic carbon available to bond with the aluminum, and the pH of the water. Aluminum can form thick mucus that has been shown to cause gill destruction in aquatic fauna (i.e., fish, insects) and, in cases of prolonged exposure, can cause mortality in native fish populations (Potter, 1982). Aluminum concentrations are reported as mg/L of total dissolved aluminum.

The aluminum in Big Moose Lake in 2009 was found to be 0.040 ppm.

Dissolved Oxygen

The dissolved oxygen in a lake is an extremely important parameter to measure. If dissolved oxygen decreases as we approach the bottom of a lake we know that there is a great amount of bacterial decay that is going on. This usually means that there is an abundance of nutrients, like phosphorous that have collected on the lake bottom. Oligotrophic lakes tend to have the same amount of dissolved oxygen from the surface waters to the lake bottom, thus showing very little bacterial decay. Eutrophic lakes tend to have so much decay that their bottom waters will have very little dissolved oxygen. Cold-water fish need 6.0 ppm dissolved oxygen to thrive and reproduce. Warm water fish need 4.0 ppm oxygen.

The dissolved oxygen and temperature profiles for Big Moose Lake were measured in 2008 and can be found in Appendix A. The dissolved oxygen remained constant till about 16 meters were it began to drop off to zero ppm by about 22 meters. The dissolved oxygen was lower than in the previous year of 2004.

Summary

Big Moose Lake was a moderately productive mesotrophic lake during 2009. Based on the results of the 2009 Adirondack Lakes Assessment program, the acidity status of Big Moose Lake is considered to be moderately endangered or threatened. The pH is satisfactory but the alkalinity, calcium, and CSI values indicate Big Moose Lake to be impaired and sensitive to acidification. The dissolved oxygen remained constant till about 16 meters were it began to drop off to zero ppm by about 22 meters. The dissolved oxygen was lower than in the previous year of 2004.

Six years of data is sufficient to begin to detect water quality trends. We can also compare levels in 2009 to levels in 2008. The pH, alkalinity, chlorophyll-a, nitrate, and calcium levels increased, while the conductivity, color, and chloride levels decreased.

The last six years has seen a steady rise in pH, alkalinity and calcium levels in Big Moose Lake. This is a positive sign and it could be due to less acidic rainwater in the last few years due to the Clean Air Act. The total phosphorous levels in Big Moose Lake have increased over the last few years. This has led to increased algae growth, as shown by increased chlorophyll a levels during 2008 and 2009. This has also led to decreased transparency readings in 2008 and 2009.

Literature Cited

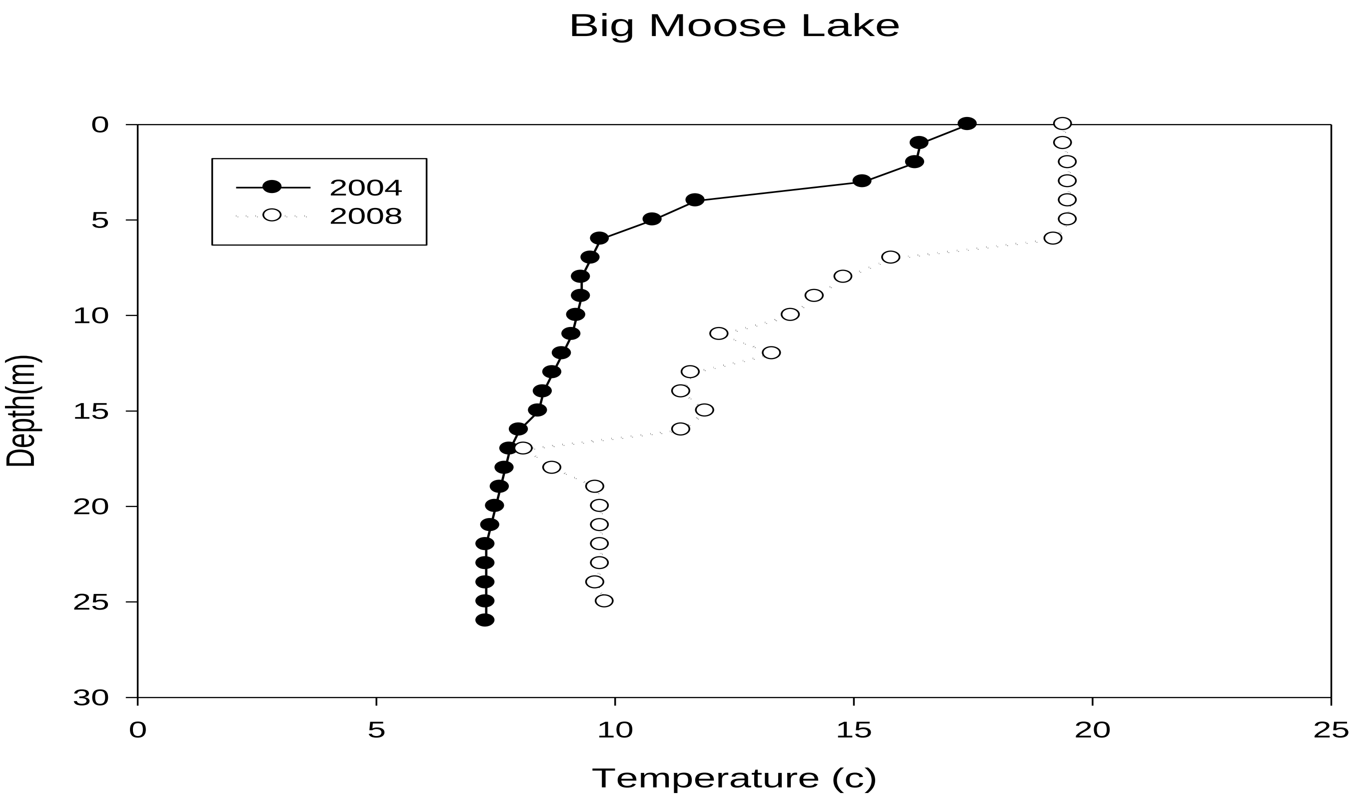
DEC & FOLA. (1990). Diet for a Small Lake: A New Yorker's Guide to Lake Management. New York State Department of Environmental Conservation & The Federation of Lake Associations, Inc.: Albany, New York.

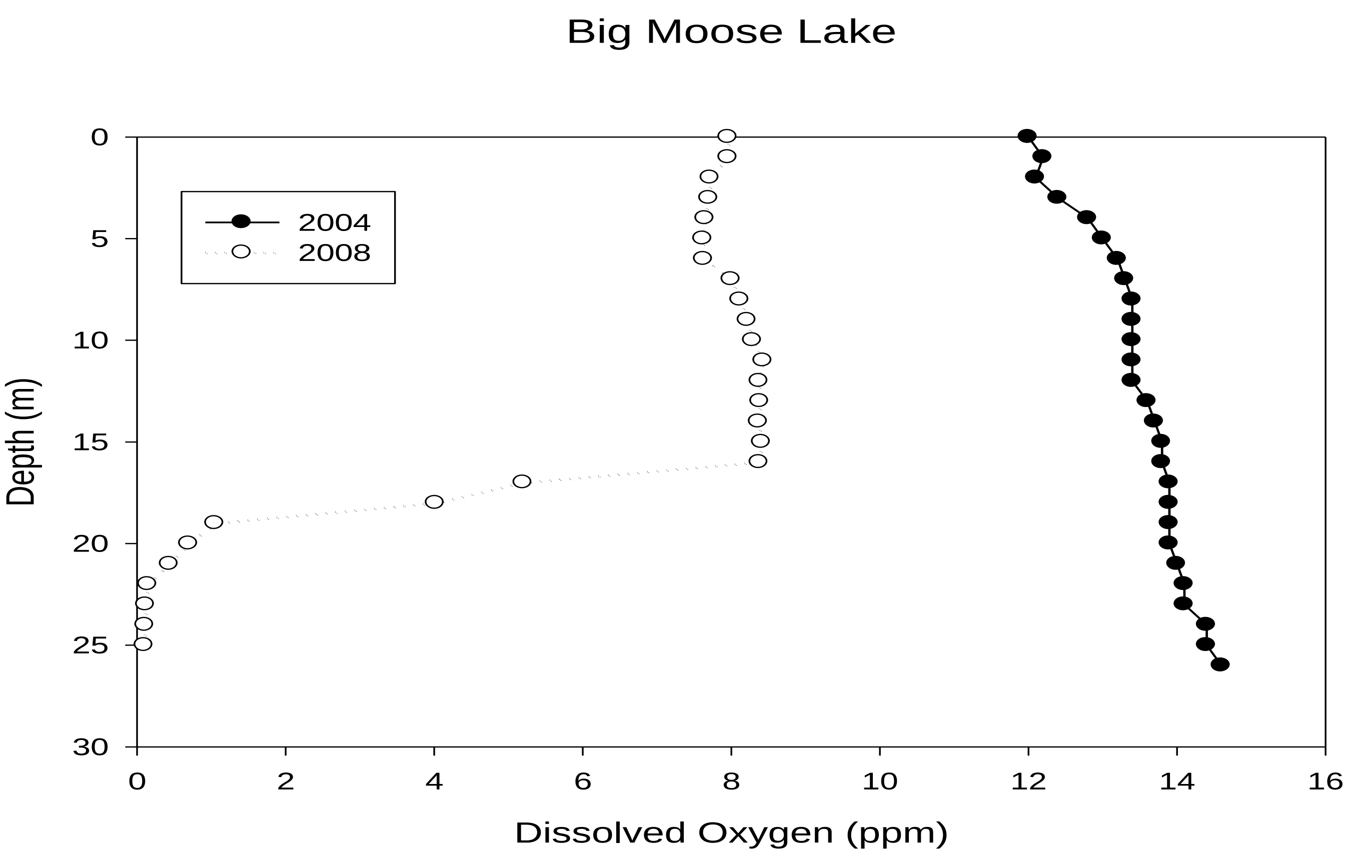
Greenberg, A.E., Eaton, A.D., and Leseri, L.A. (editors). (2005). Standard Methods for the Examination of Water and Wastewater, 21st Edition. American Public Health Association: Washington, D.C.

Potter, W. (1982). *The Effects of Air Pollution and Acid Rain on Fish, Wildlife and Their Habitats – Lakes*. Technical Report FWS/OBS – 80/50.4. United States Fish and Wildlife Service, Biological Services Program: Washington, D.C.

Appendix A

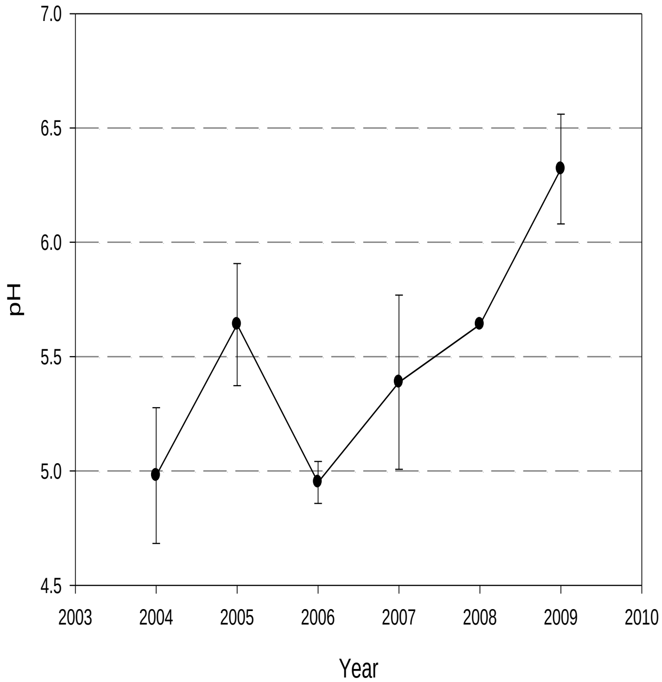
Water Quality Data


Big Moose Lake
2004
2008
Depth(m)
Temperature (c)
0
5
10
15
20
25
30


Big Moose Lake
2004
2008
Depth (m)
Dissolved Oxygen (ppm)
0
2
4
6
8
10
12
14
16

Source	Lake/Pond Name	Sampling Location	Sampling Date	pH (units)	Alkalinity (ppm)	Conductivity (μohms/cm)	Color (Pt-Co)	Total P (ppm)	Chl a (μg/l)
AWI	Big Moose	Epilimnion	5/19/2004	5.4000	2.0000	18.0000	23.0000	0.0150	4.7700
Vol	Big Moose	Deephole	6/18/2004	4.7100	0.4000	17.8000	28.0000	0.0140	4.7600
Vol	Big Moose	Deephole	7/8/2004	5.0300	1.2000	14.8000	17.0000	0.0080	
	Big Moose	Deephole	8/17/2004	4.9500	1.0000	16.4000	19.0000	0.0010	5.9300
	Big Moose	Deephole	9/15/2004	4.8600	0.8000	16.7000	31.0000	0.0030	3.6500
			Mean	4.9900	1.0800	16.7400	23.6000	0.0082	4.7775
			Std Dev	0.2582	0.5933	1.2837	5.8992	0.0063	0.9309
Vol	Big Moose	Hypolimnion	5/19/2004	5.3200	2.0000	15.0000	60.0000	0.0210	
Source	Lake/Pond Name	Sampling	Sampling	pH	Alkalinity	Conductivity	Color	Total P	Chl a
Vol	Big Moose	Deephole	5/19/2005	5.3100	2.0000	16.2000	46.0000	0.0150	4.8700
Vol	Big Moose	Deephole	6/19/2005	5.9200	4.4000	20.6000	55.0000	0.0140	3.3100
Vol	Big Moose	Deephole	7/28/2005	5.4200	2.8000	16.1000	30.0000	0.0160	4.3600
Vol	Big Moose	Deephole	8/17/2005	5.8700	4.4000	17.1000	24.0000	0.0160	4.8700
Vol	Big Moose	Deephole	9/19/2005	5.6600	4.1000	33.4000	31.0000	0.0180	6.1500
			Mean	5.6360	3.5400	20.6800	37.2000	0.0158	4.7120
			Std Dev	0.2688	1.0854	7.3428	12.8335	0.0015	1.0256
Vol	Big Moose	Deephole	5/25/2006	4.8700	1.2000	17.6000	18.0000	0.0140	5.2800
Vol	Big Moose	Deephole	7/31/2006	4.9300	1.2000	15.3000	70.0000	0.0150	5.7500
Vol	Big Moose	Deephole	8/31/2006	5.0500	2.4000	15.3000	70.0000	0.0150	3.7000
			Mean	4.9500	1.6000	16.0667	52.6667	0.0147	4.9100
			Std Dev	0.0917	0.6928	1.3279	30.0222	0.0006	1.0739
Source	Lake/Pond Name	Sampling	Sampling	pH	Alkalinity	Conductivity	Color	Total P	Chl a
Vol	Big Moose	Deephole	5/26/2007	4.9800	1.2000	18.1000	22.0000	0.0070	1.8300
Vol	Big Moose	Deephole	6/17/2007	5.5000	2.8000	17.7000	10.0000	0.0100	2.3800
Vol	Big Moose	Deephole	7/22/2007	5.0100	1.2000	15.5000	33.0000	0.0070	1.5200
Vol	Big Moose	Deephole	8/12/2007	5.8500	4.6000	18.6000	10.0000	0.0040	1.0300
Vol	Big Moose	Deephole	9/23/2007	5.6000	4.4000	17.2000	15.0000	0.0080	1.9400
			Mean	5.3880	2.8400	17.4200	18.0000	0.0072	1.7400
			Std Dev	0.3809	1.6517	1.1904	9.7211	0.0022	0.5025
Source	Lake/Pond Name	Sampling	Sampling	pH	Alkalinity	Conductivity	Color	Total P	Chl a
AWI	Big Moose	Epilimnion	6/19/2008	5.6400	2.8000	22.4000	37.0000	0.0180	5.8800
AWI	Big Moose	Deephole	8/24/2008	6.0400	4.0000	15.4000	16.0000	0.0170	7.0400
AWI	Big Moose	Deephole	10/12/2008	6.1600	5.6000	19.8000	8.0000	0.0100	2.5600
			Mean	5.9467	4.1333	19.2000	20.3333	0.0150	5.1600
			Std Dev	0.2723	1.4048	3.5384	14.9778	0.0044	2.3252
AWI	Big Moose	Hypolimnion	6/19/2008	5.5600	4.4000	22.8000	39.0000	0.0180	x
Source	Lake/Pond Name	Sampling Location	Sampling Date	pH (units)	Alkalinity (ppm)	Conductivity (uohms/cm)	Color (Pt-Co)	Total P (ppm)	Chl a (μg/l)
AWI	Big Moose	Deephole	7/9/2009	6.49	7.2	15.4	17	0.018	4.45
AWI	Big Moose	Deephole	8/30/2009	6.15	5.6	13.3	15	0.018	4.49
			Mean	6.3200	6.4000	14.3500	16.0000	0.0180	4.4700
			Std Dev	0.2404	1.1314	1.4849	1.4142	0.0000	0.0283

Source	Lake/Pond Name	Sampling Location	Sampling Date	Secchi (meters)	Nitrate (ppm)	Calcium (ppm)	Chloride (ppm)	Aluminum (ppm)	CSI
AWI	Big Moose	Epilimnion	5/19/2004	3.4000	0.8000	1.4700	0.0000	0.0370	#REF!
Vol	Big Moose	Deephole	6/18/2004		0.4000				
Vol	Big Moose	Deephole	7/8/2004		0.3000				
	Big Moose	Deephole	8/17/2004		0.5000				
	Big Moose	Deephole	9/15/2004		0.3000				
			Mean	3.4000	0.4600				
			Std Dev	0.0000	0.2074				
Vol	Big Moose	Hypolimnion	5/19/2004		0.9000	1.3200	0.0000	0.0650	#REF!
Source	Lake/Pond Name	Sampling	Sampling	Secchi	Nitrate	Calcium	Chloride	Aluminum	CSI
Vol	Big Moose	Deephole	5/19/2005	3.8000	0.4000				
Vol	Big Moose	Deephole	6/19/2005	4.9000	0.4000				
Vol	Big Moose	Deephole	7/28/2005	4.8000	0.1000				
Vol	Big Moose	Deephole	8/17/2005	4.8000	0.1000				
Vol	Big Moose	Deephole	9/19/2005	4.6000	0.1000				
			Mean	4.5800	0.2200				
			Std Dev	0.4494	0.1643				
Vol	Big Moose	Deephole	5/25/2006	3.7000	0.3000				
Vol	Big Moose	Deephole	7/31/2006	3.6000	0.2000				
Vol	Big Moose	Deephole	8/31/2006	4.1000	0.2000				
			Mean	3.8000	0.2333				
			Std Dev	0.2646	0.0577				
Source	Lake/Pond Name	Sampling	Sampling	Secchi	Nitrate	Calcium	Chloride	Aluminum	CSI
Vol	Big Moose	Deephole	5/26/2007	7.0000	0.5000				
Vol	Big Moose	Deephole	6/17/2007	5.5000	0.4000				
Vol	Big Moose	Deephole	7/22/2007	9.0000	0.3000				
Vol	Big Moose	Deephole	8/12/2007	10.1000	0.3000				
Vol	Big Moose	Deephole	9/23/2007	6.0000	0.2000				
			Mean	7.5200	0.3400				
			Std Dev	1.9690	0.1140				
Source	Lake/Pond Name	Sampling	Sampling	Secchi	Nitrate	Calcium	Chloride	Aluminum	CSI
AWI	Big Moose	Epilimnion	6/19/2008	3.2000	0.2000	1.6400	1.0000	0.0400	5.0000
AWI	Big Moose	Deephole	8/24/2008	2.7500	0.2000				
AWI	Big Moose	Deephole	10/12/2008	4.7500	0.2000				
			Mean	3.5667	0.2000				
			Std Dev	1.0492	0.0000				
AWI	Big Moose	Hypolimnion	6/19/2008	x	0.1000	1.7200	1.0000	0.0370	
Source	Lake/Pond Name	Sampling Location	Sampling Date	Secchi (meters)	Nitrate (ppm)	Calcium (ppm)	Chloride (ppm)	Aluminum (ppm)	CSI
AWI	Big Moose	Deephole	7/9/2009		0.226	1.88	0.9	0.04	
AWI	Big Moose	Deephole	8/30/2009	3.2	0.22				
			Mean	3.2000	0.2230				
			Std Dev	#DIV/0!	0.0042				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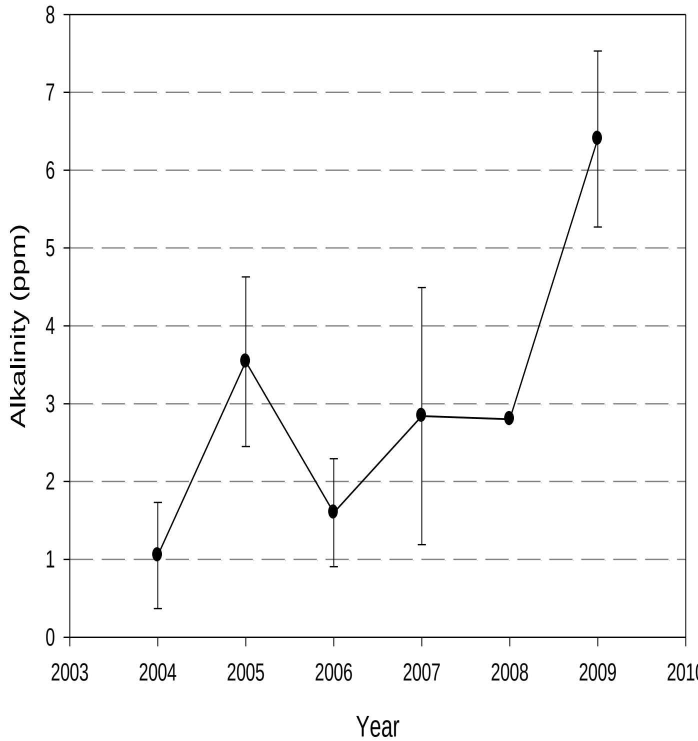
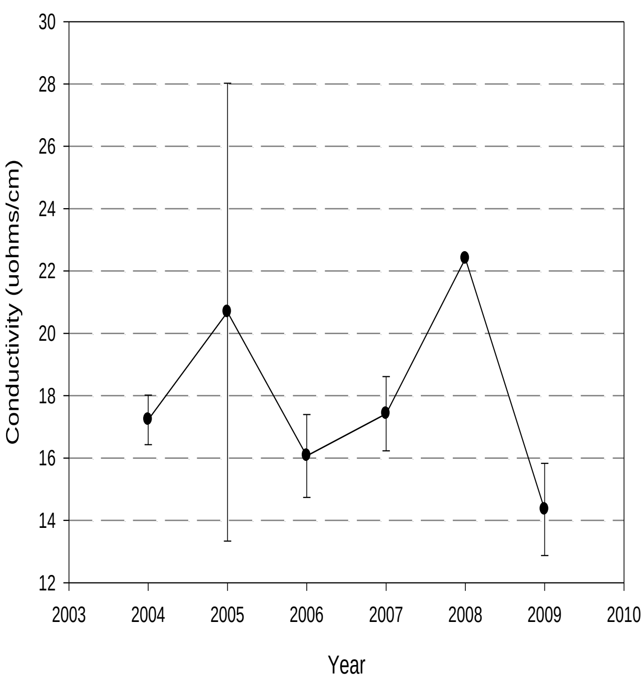
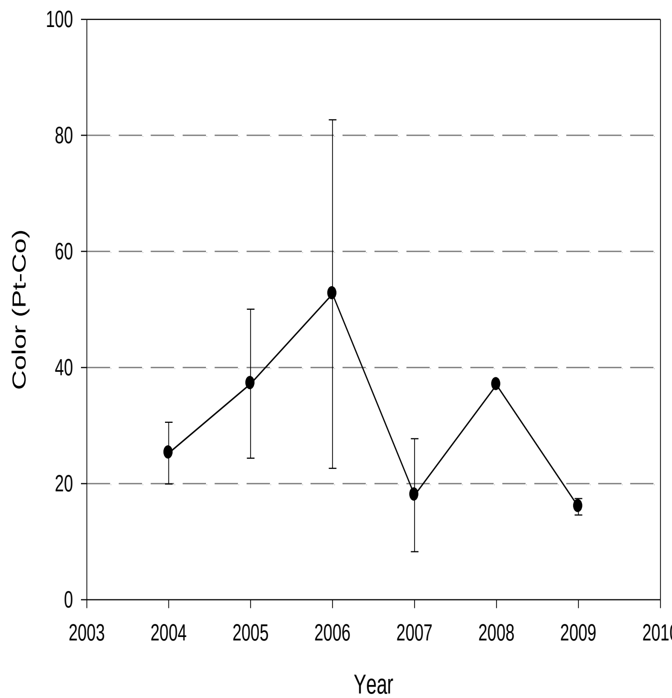
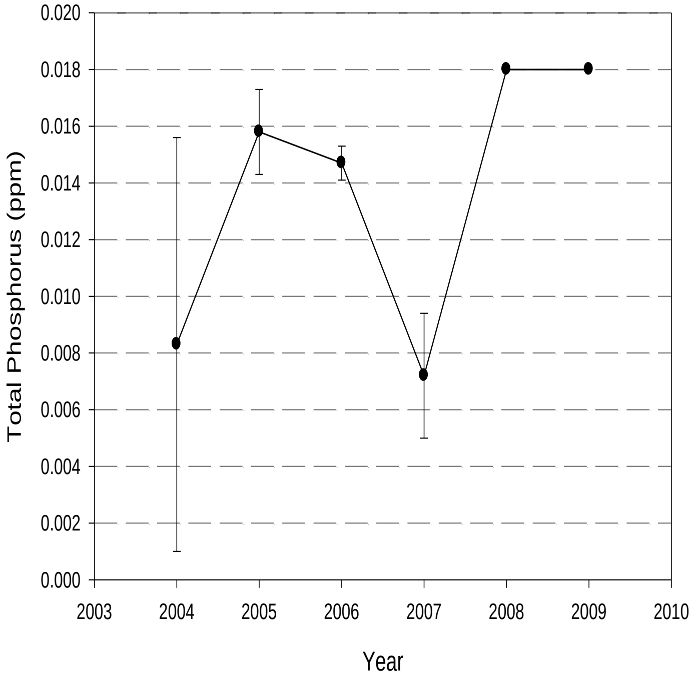
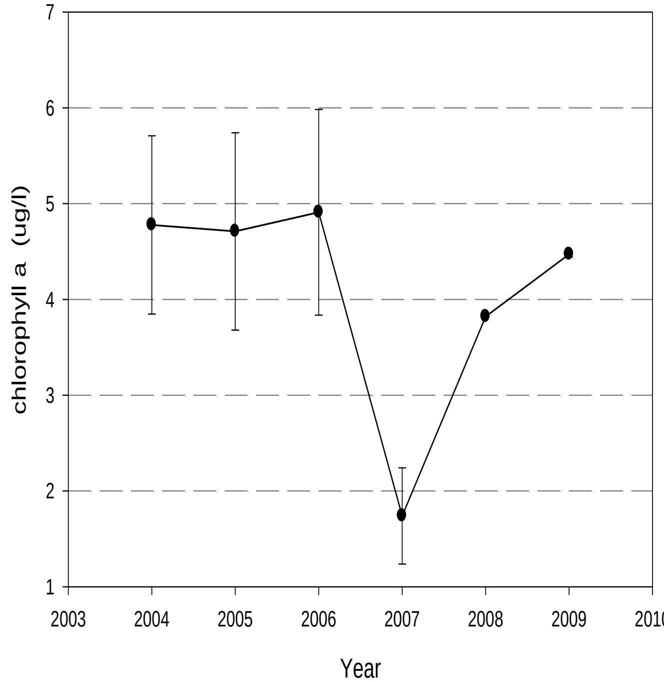
6.5
6.0
5.5
5.0
4.5
pH
2003
2004
2005
2006
2007
2008
2009
2010
Year

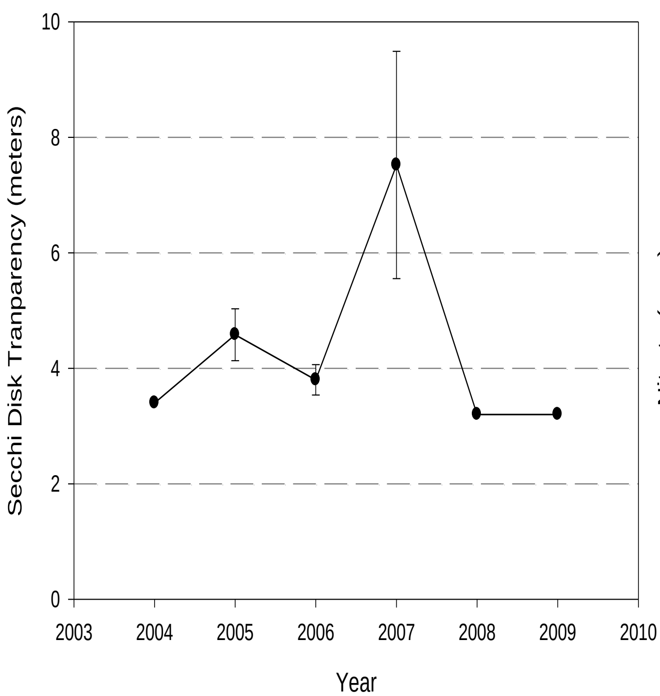

8
7
6
5
4
3
2
1
0
Alkalinity (ppm)
2003
2004
2005
2006
2007
2008
2009
2010
Year

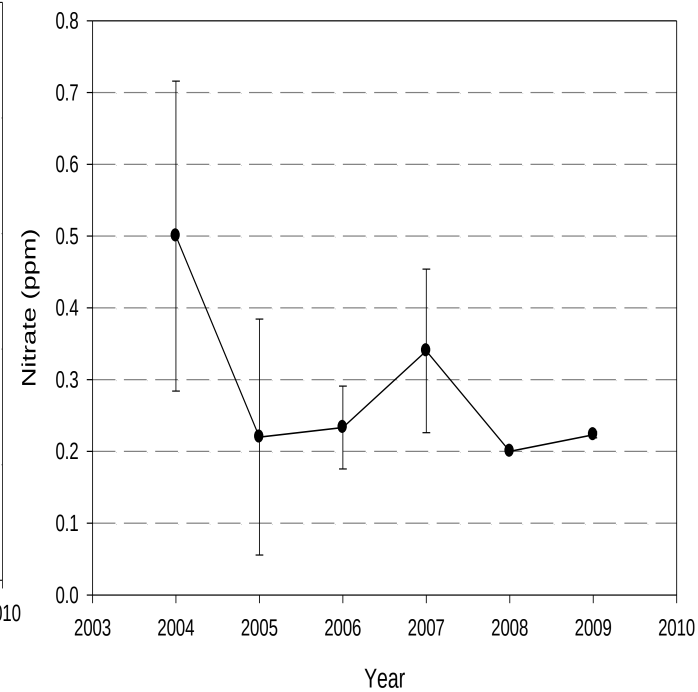

30
28
26
24
22
20
18
16
14
12
Conductivity (uohms/cm)
2003
2004
2005
2006
2007
2008
2009
2010
Year

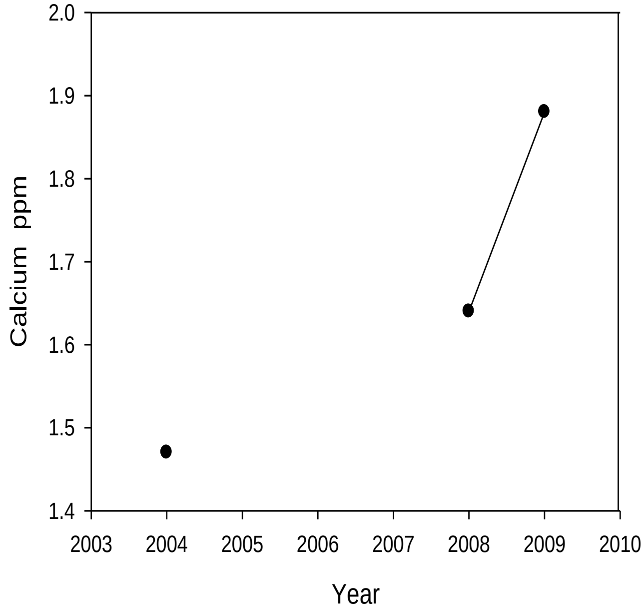

100
80
60
40
20
0
Color (Pt-Co)
2003
2004
2005
2006
2007
2008
2009
2010
Year

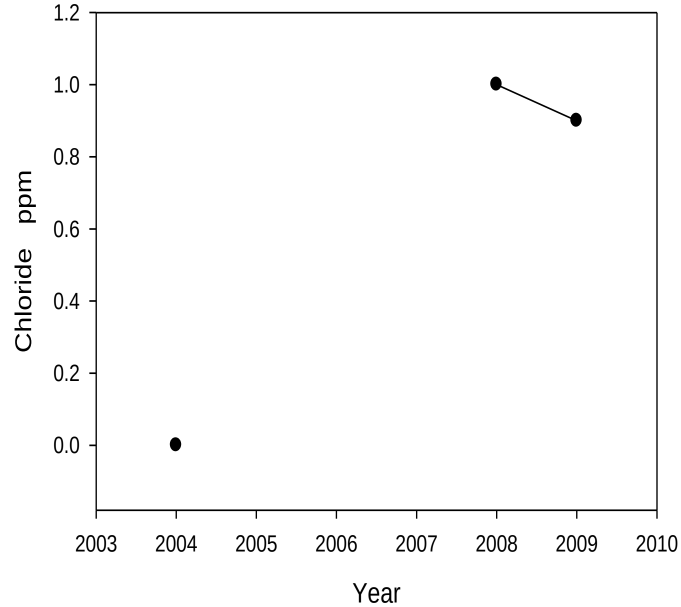

Total Phosphorus (ppm)
0.000
0.002
0.004
0.006
0.008
0.010
0.012
0.014
0.016
0.018
0.020
2003
2004
2005
2006
2007
2008
2009
2010
Year

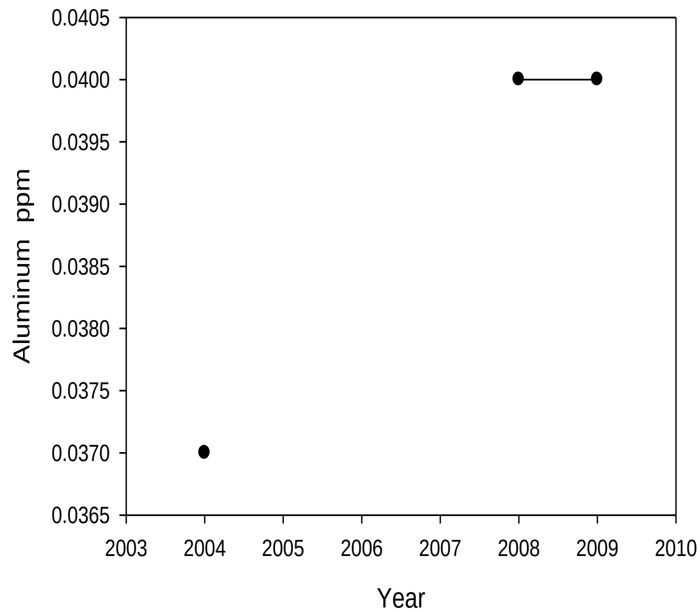

chlorophyll a (ug/l)
1
2
3
4
5
6
7
2003
2004
2005
2006
2007
2008
2009
2010
Year


Secchi Disk Tranparency (meters)
0
2
4
6
8
10
2003
2004
2005
2006
2007
2008
2009
2010
Year


Nitrate (ppm)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
2003
2004
2005
2006
2007
2008
2009
2010
Year


Calcium ppm
2.0
1.9
1.8
1.7
1.6
1.5
1.4
2003 2004 2005 2006 2007 2008 2009 2010
Year


Chloride ppm
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2003 2004 2005 2006 2007 2008 2009 2010
Year


Aluminum ppm
0.0405
0.0400
0.0395
0.0390
0.0385
0.0380
0.0375
0.0370
0.0365
2003 2004 2005 2006 2007 2008 2009 2010
Year