Summer 2006

Follow-up on Lake Louisa's trophic status
Final Report

2006

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Lake Louisa September 1st 2005

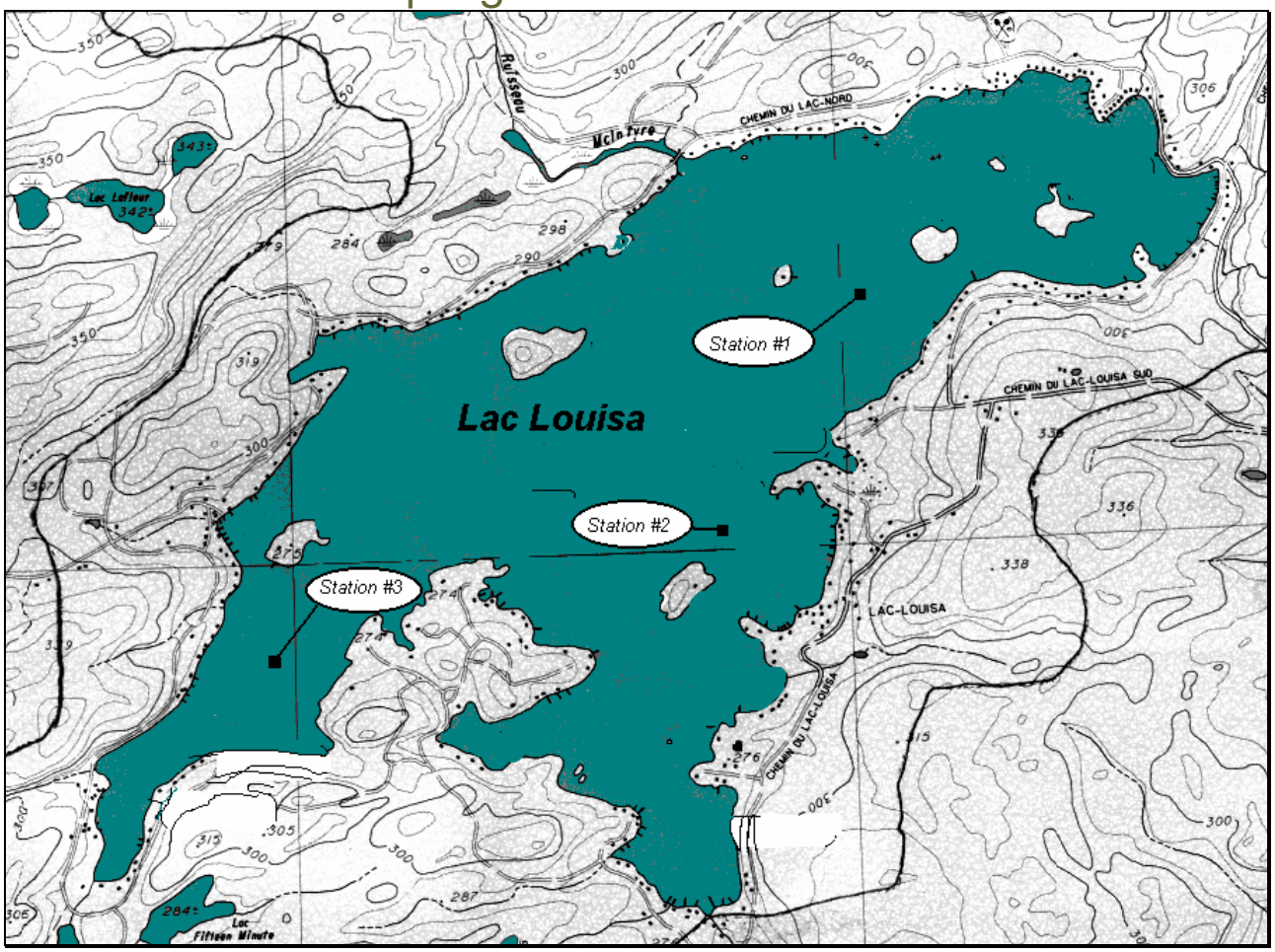
Sampling plan

3 sampling stations; 3 visits.

Sampling dates:
July 11th 2006.
August 15th 2006.
September 7th 2006.

Sampled by: Dany Boudrias & Isabelle Arshoun

Localization of sampling stations



Parameters

- Dissolved oxygen / temperature ;
- pH (surface);
- Total phosphorus;
- Chlorophyll-a;
- Secchi transparency

Results

July 11th 2006

Stations	1	2	3
Total phosphorus	0,014 mg P/L	0,017 mg P/L	0,019 mg P/L
Chlorophyll-a	0,9 µg/L	1,2 µg/L	1,4 µg/L
Transparency	7,8 m	7,7 m	7,8 m
pH	7,61	7,59	7,60

Station no.1

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature ^{0}C	24,0	24,0	23,0	22,0	22,0	21,2	21,0	18,0	16,2	12,0	11,0	10,5	9,8	9,2	9,0	8,5
Oxygen (ppm)	8,0	8,0	8,2	8,3	8,3	8,4	8,9	9,0	10,5	10,4	10,2	9,0	8,9	8,4	8,0	7,3

Station no.2

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature ^{0}C	24,3	24,0	23,1	22,2	22,0	21,3	21,0	18,0	16,5	12,0	11,0	10,5	9,5	9,0	9,0	8,5
Oxygen (ppm)	8,1	8,1	8,3	8,4	8,5	8,6	9,0	9,2	10,7	10,5	10,1	9,1	9,0	8,5	8,1	7,8

Station no.3

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Temperature ^{0}C	24,5	24,0	23,0	22,5	22	21,5	21,0	18,2	16,5	12,0	11,5	10,5	10,0	9,0
Oxygen (ppm)	8,1	8,1	8,0	8,2	8,5	8,9	9,2	9,2	10,5	10,4	8,9	7,3	4,8	2,9

August 15th 2006

Stations	1	2	3
Total phosphorus	0,015 mg P/L	0,023 mg P/L	0,023 mg P/L
Chlorophyll-a	1,8 µg/L	1,9 µg/L	2,0 µg/L
Transparency	7,4 m	7,4 m	7,3 m
pH	7,66	7,67	7,64

Station no.1

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature ^{0}C	21,2	20,5	20,0	20,0	20,0	20,0	20,0	18,5	17,2	16,0	12,0	11,0	10,0	9,5	9,0	8,5
Oxygen (ppm)	8,1	8,2	8,2	8,1	8,1	8,2	8,2	8,4	9,5	9,4	9,0	8,6	8,0	7,8	7,4	7,2

Station no.2

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature ^{0}C	21,0	20,5	20,0	20,0	20,0	20,0	20,0	18,5	17,0	16,0	12,0	11,0	10,3	9,5	9,0	8,5
Oxygen (ppm)	8,2	8,2	8,3	8,3	8,2	8,2	8,5	8,8	9,2	9,3	9,2	8,4	8,1	8,0	7,5	7,3

Station no.3

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Temperature ^{0}C	21,3	21,0	20,5	20,0	20,0	20,0	20,0	19,0	17,5	15,5	12,5	11,5	10,5	9,3
Oxygen (ppm)	8,0	7,9	8,0	8,0	8,1	8,1	8,2	8,7	10,5	10,0	8,6	7,2	4,2	1,9

September 7th 2006

Stations	1	2	3
Total phosphorus	0,014 mg P/L	0,031 mg P/L	0,019 mg P/L
Chlorophyll-a	1,7 µg/L	2,0 µg/L	1,8 µg/L
Transparency	7,8 m	7,8 m	7,7 m
pH	7,61	7,60	7,61

Station no.1

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature ^{0}C	19,0	19,0	19,0	19,0	19,0	19,0	19,0	19,0	18,5	17,0	12,0	11,0	10,0	9,5	9,0	8,5
Oxygen (ppm)	8,0	8,1	8,1	8,2	8,1	8,1	8,1	8,2	8,0	8,4	8,4	7,4	7,3	7,0	7,1	7,0

Station no.2

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature ^{0}C	19,0	19,0	19,0	19,0	19,0	19,0	19,0	19,0	19,0	17,5	12,5	11,0	9,8	9,5	9,2	8,5
Oxygen (ppm)	8,1	8,1	8,1	8,1	8,1	8,2	8,2	8,2	8,3	8,5	8,1	7,5	7,4	7,2	7,1	7,1

Station no.3

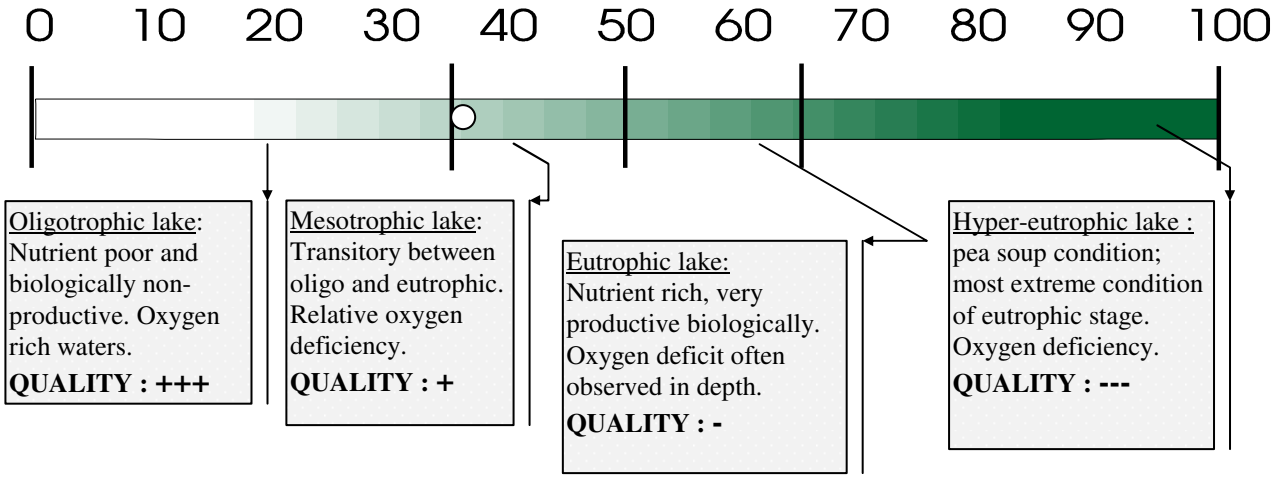
Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12
Temperature ^{0}C	19,0	19,0	19,0	19,0	19,0	19,0	19,0	18,5	18,0	17,0	12,5	11,5	10,5
Oxygen (ppm)	8,2	8,2	8,2	8,1	8,1	8,1	8,2	8,3	9,1	8,0	7,0	3,1	0,9

Eutrophication index

Data TRANSFERT to eutrophication index (using the mean of the three sampling stations per sampling period)

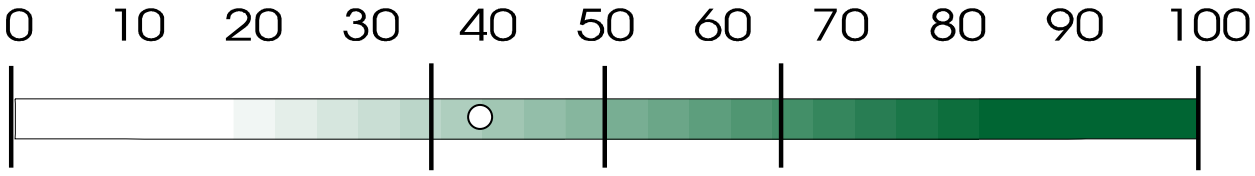
July 11th 2006	Results	Trophic values
Total Phosphorus (µg P/L)	16,7	45
Chlorophyll-a (µg /L)	1,17	32
Secchi transparency (m)	7,6	31

MOYEN / AVG: 36



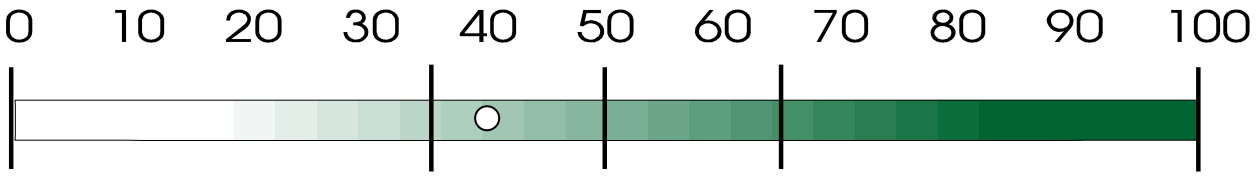
August 15th 2006	Results	Trophic values
Total Phosphorus (µg P/L)	20,3	47
Chlorophyll-a (µg /L)	1,9	37
Secchi transparency (m)	7,4	32

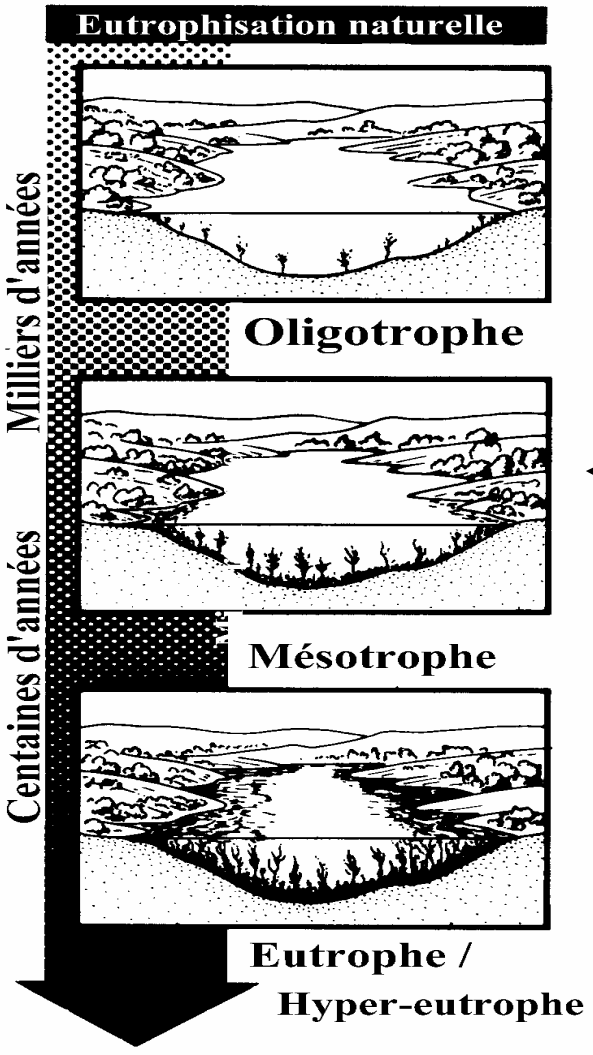
MOYEN / AVG: 38,7



September 7th 2006	Results	Trophic values
Total Phosphorus (µg P/L)	21,3	48
Chlorophyll-a (µg /L)	1,83	37
Secchi transparency (m)	7,8	31

MOYEN / AVG: 38,7

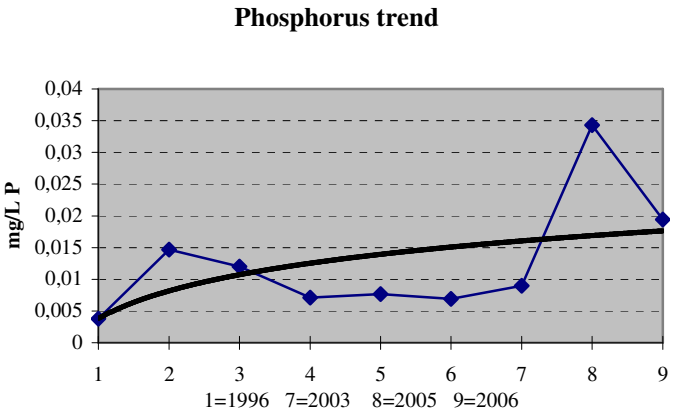




← Lake Louisa status, 2006 season

Water quality trends

Phosphorus



Chlorophyll-a

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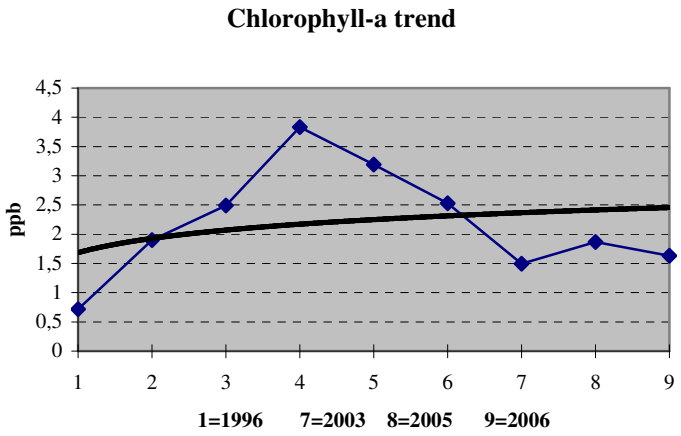
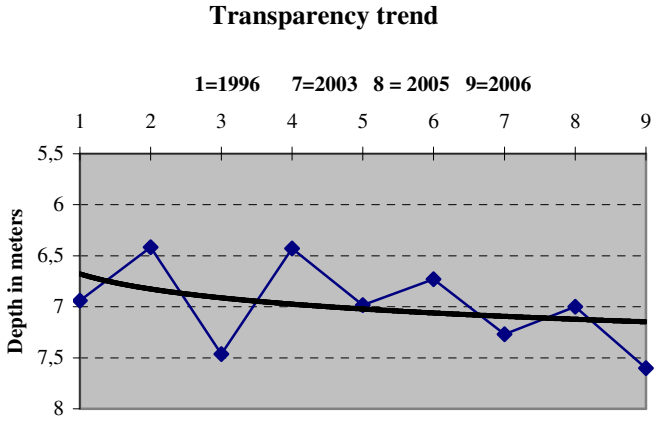


Secchi Transparency



Phosphorus is still high, chlorophyll-a seems to have stabilized and water transparency seems to be stable, if not even increasing!?!

Hard to do an adequate interpretation, although we might have some indications on the lake's reaction related to climate and watershed/shoreline development. It seems that although the nutrient level has drastically increased in 2005, phosphorus is gradually coming down and might stabilize at a lower mesotrophic level which is what we would expect when looking at the watershed. Cottage development seems to be constantly increasing the number of permanent residents and it cannot be without an impact. Here again as it was stated in past reports, we cannot continue household development at Lake Louisa without knowing the future impacts on the environment. Thus we should be doing a lake capacity study and start a study of the status of septic installations.

Summer 2005 was particularly hot and by the end of the season when it started to rain, nutrients within the watershed started to leach down. Season 2006 was on the contrary very average in terms of weather and it rained throughout the summer. Some of the nutrients continued to leach into the lake, but this time it would seem with lesser impacts although phosphorus was still the second highest level measured since 1996. The only way that we know that can reduce drastically these sudden high inputs of nutrients is to put more emphasize on SHORELINE restoration, but mostly plantation of bushes and trees between each septic installation (leaching beds) and the shoreline. If it were just for me (the consultant), I would pass a specific bylaw that would make it compulsory. I suggest that a meeting with the municipality (or MRC) be organized and that we start a) talking about it; b) look into what other municipalities (in Quebec or elsewhere) have done; and c) make changes within the limits of what can be done and write up a bylaw specific to this matter and apply it as soon as possible. This season's weather clearly shows a definite change and trend to an increase in annual temperatures (no ice or snow on the lake on Christmas day!); this will have negative impacts at Lake Louisa, and other lakes in Quebec as we have seen in 2006 with new records of lakes having cyanobacteria blooms (algae blooms).

Also, we believe that the lake association must be independent from any governmental programs that we believe are presently not serving properly the lake associations. They are still at the level of 'studying' the problem of lake eutrophication and are not proactive enough. You must take in charge your own sampling with the help of professional consultants that will also help you in the interpretation of results. We will be organizing sessions in spring especially for lake stewards (associations). We will teach them the basics of limnology, what to sample for and how, how to plot and present your results on graphs and to use an eutrophication model that will allow a lake association to define the trophic status of their lake.

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