

Summer 2007

Follow-up on Lake Louisa's trophic status
Final Report
2007



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Please note that for comparison purpose, only sampling stations that were the same than previous sampling campaigns were used in this report

Final report
Lake Louisa 2007

Sampling plan

Sampling dates:

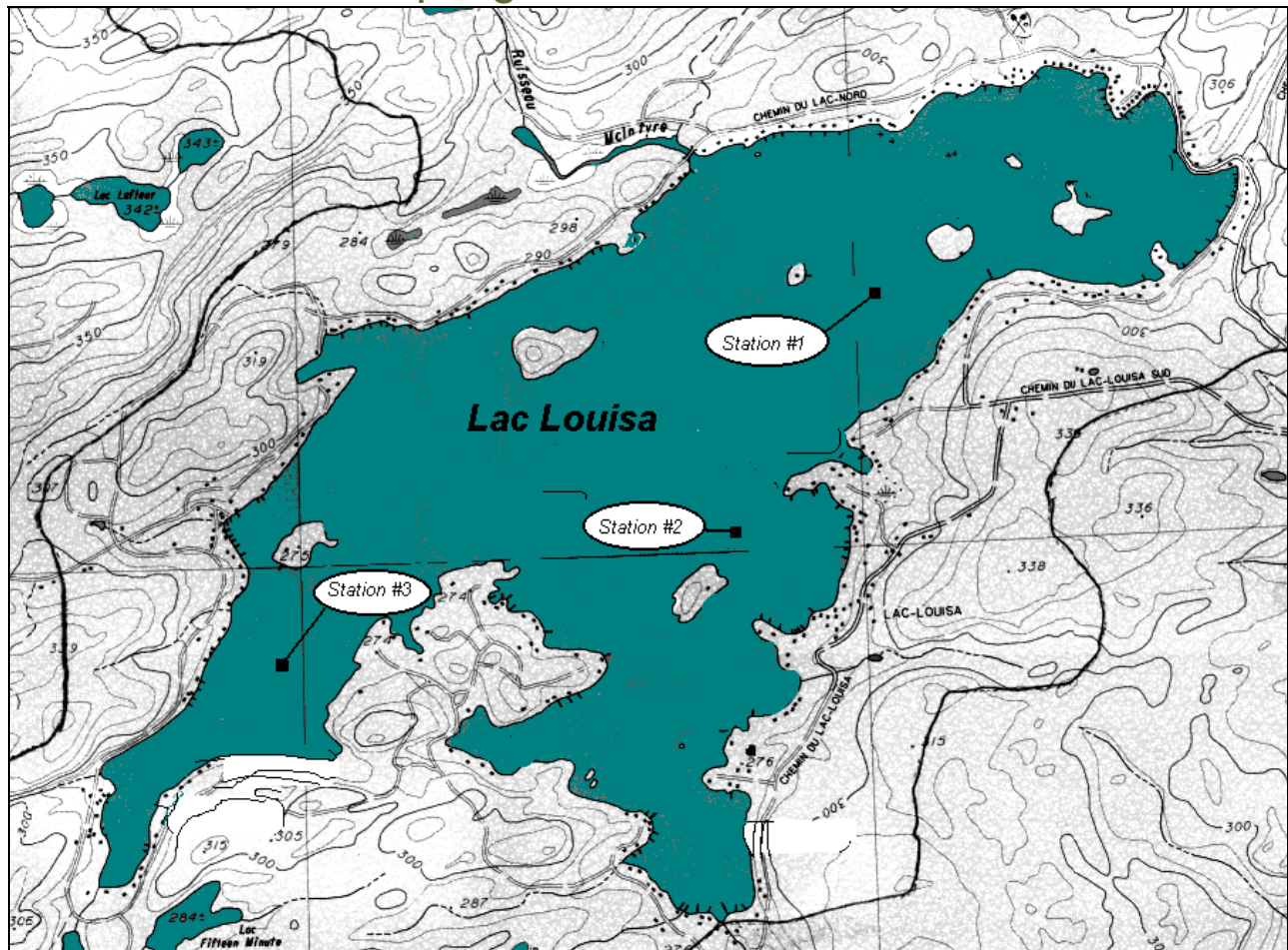
July 5th 2007.

July 30th 2007.

September 11th 2007.

Sampled by: Mr. Jack Davis

Localization of sampling stations



Parameters

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

Results

July 5th 2007

Stations	1	2	3
Total phosphorus	<0,009 mg P/L	<0,009 mg P/L	0,012 mg P/L
Chlorophyll-a	1,6 µg/L	1,4 µg/L	1,2 µg/L
Transparency	6,0 m	5,5 m	6,1 m
pH	6,9	7,0	7,2

Station no.1

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Temperature °C	21,0	21,0	21,0	21,0	21,0	21,0	21,0	21,0	13,0	11,0	9,0	9,0	9,0	8,5	8,5
Oxygen (ppm)	8,6	8,5	8,6	8,6	8,5	8,6	8,6	8,6	10,0	11,4	11,0	11,0	11,2	10,9	11,2

Station no.2

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature °C	21,0	21,0	21,0	21,0	21,0	20,0	19,8	18,5	14,5	11,0	10,5	10,0	9,0	8,5	8,0	8,0
Oxygen (ppm)	8,2	8,3	8,3	8,4	8,3	8,4	8,5	8,4	11,4	11,0	11,2	11,1	10,4	10,6	10,7	10,6

Station no.3

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature °C	21,0	21,0	20,5	20,2	20,0	20,0	19,1	19,5	13,0	11,0	10,0	9,0	8,8	8,2	8,0	8,0
Oxygen (ppm)	8,4	8,4	8,6	8,7	8,6	8,4	8,9	9,0	11,5	11,6	10,8	11,2	11,0	10,6	10,5	>15

July 30th 2007

Stations	1	2	3
Total phosphorus	0,026 mg P/L	0,063 mg P/L	0,029 mg P/L
Chlorophyll-a	1,5 µg/L	1,4 µg/L	1,2 µg/L
Transparency	Not avail.	-	-
pH	7,2	7,3	7,3

High phosphorus reading at station 2 is probably due to presence of sediments at sampling

Station no.1

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature °C	23,8	23,8	23,6	23,5	21,0	22,8	21,5	20,5	17,9	14,3	12,0	10,2	9,1	8,4	8,1	7,8
Oxygen (ppm)*	10,8	10,8	10,8	10,7	10,8	11,4	11,3	11,6	12,8	13,0	12,3	11,8	11,4	11,0	11,4	11,0

*** Oxygen measures taken from another oxygen meter than the one supplied by Eco-Guide International. These measures show signs of a false calibration of the meter, with oxygen % contents above 100% in the top 6m above thermocline (126 to 129%) which has never been measured before in this lake and normally should not be measured deep oligotrophic to mesotrophic lakes.**

Station no.2

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature °C	23,5	23,8	23,6	23,4	22,9	20,6	21,3	17,2	14,0	10,1	11,1	9,2	8,6	8,1	7,7	7,4
Oxygen (ppm)*	10,9	10,8	10,8	10,9	11,1	11,4	11,3	12,0	12,8	12,6	12,5	11,9	11,5	11,3	11,2	10,9

Station no.3

Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature °C	23,7	23,7	23,5	23,5	23,4	23,2	21,7	20,8	17,8	12,8	11,0	9,7	8,8	8,4	8,1	7,8
Oxygen (ppm)*	9,8	9,7	9,6	9,6	9,6	10,1	10,1	10,6	11,4	11,3	11,0	10,7	10,5	10,4	10,1	10,1

September 11th 2007

Stations	1	2	3
Total phosphorus	0,023 mg P/L	0,026 mg P/L	0,033 mg P/L
Chlorophyll-a	1,8 µg/L	2,1 µg/L	1,7 µg/L
Transparency	Not avail.	-	-
pH	7,0	7,4	7,4

Station no.1

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

Station no.2

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

Station no.3

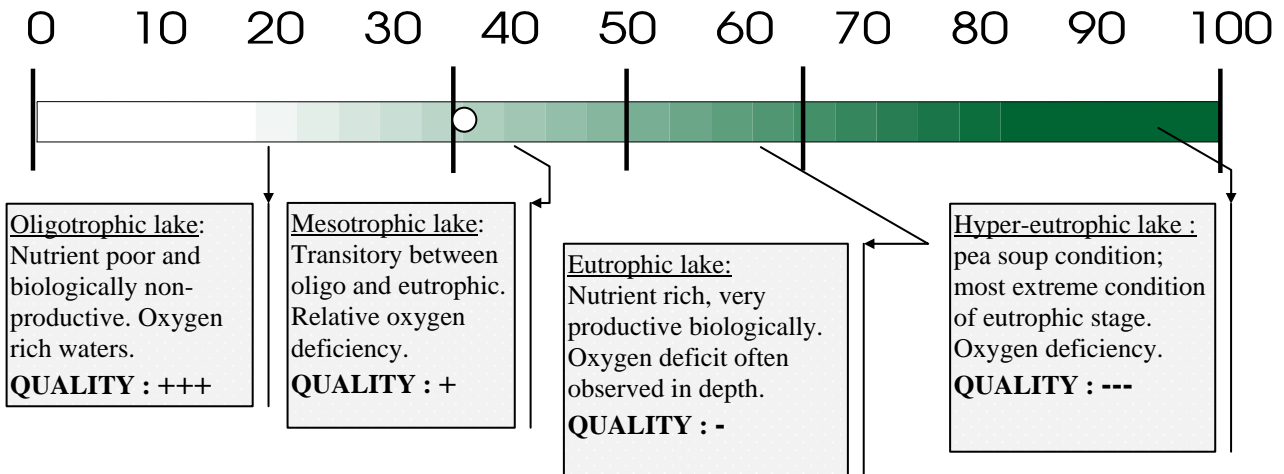
Depth (m)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Temperature °C	19,8	19,9	19,9	19,9	19,9	19,9	19,9	19,9	19,8	14,9	10,5	9,2	8,6	8,2	7,9	7,4
Oxygen (ppm)	8,7	8,8	8,9	8,9	9,0	9,0	9,0	9,1	9,1	9,9	9,9	9,8	9,2	8,9	9,0	8,9

Eutrophication index

Eutrophication index (using the mean of the three sampling stations per sampling period)

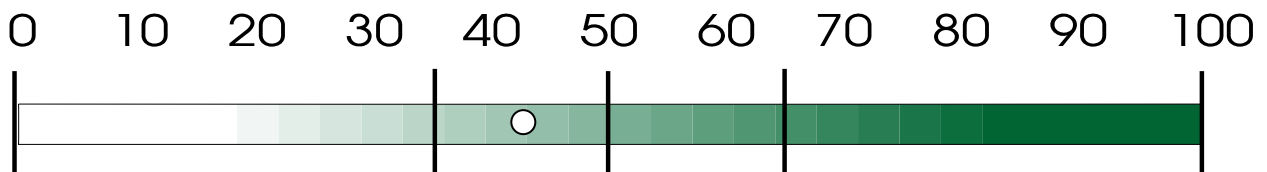
July 5th 2007	Results	Trophic values
Total Phosphorus ($\mu\text{g P/L}$)	12,0	39
Chlorophyll-a ($\mu\text{g /L}$)	1,17	34
Secchi transparency (m)	5,9	35

MOYEN / AVG: 36



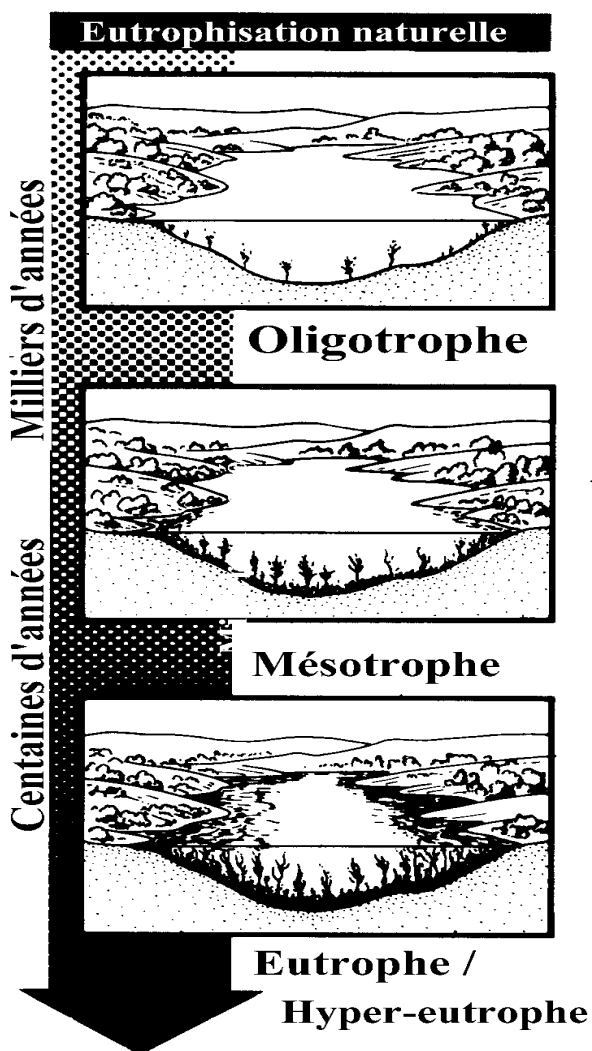
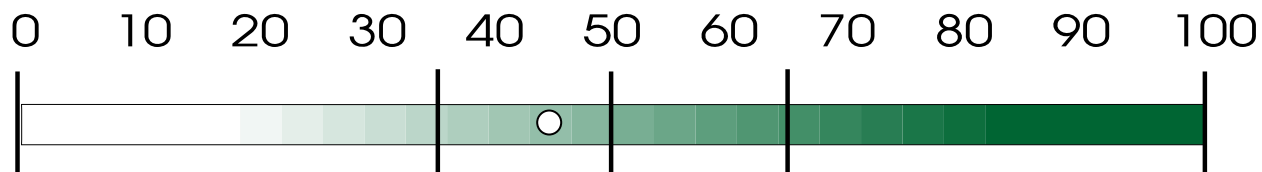
July 30th 2007	Results	Trophic values
Total Phosphorus ($\mu\text{g P/L}$)	27,5	52
Chlorophyll-a ($\mu\text{g /L}$)	1,4	34
Secchi transparency (m)	-	-

MOYEN / AVG: 43



September 11th 2007	Results	Trophic values
Total Phosphorus ($\mu\text{g P/L}$)	27,3	53
Chlorophyll-a ($\mu\text{g /L}$)	1,87	36
Secchi transparency (m)	-	-

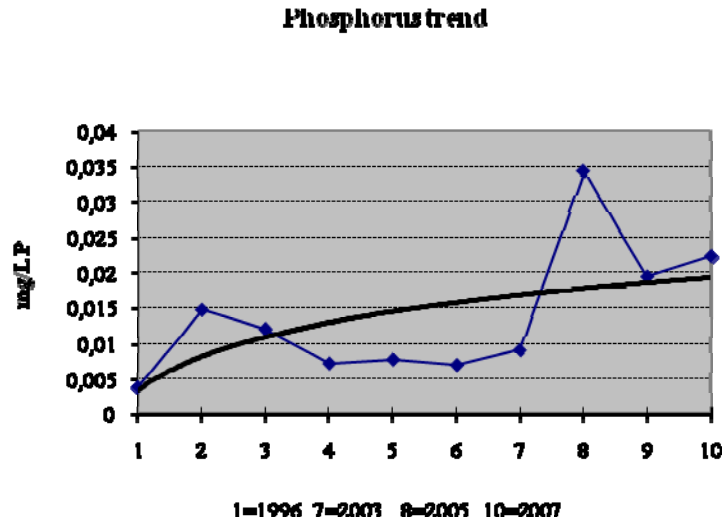
MOYEN / AVG: 44,5



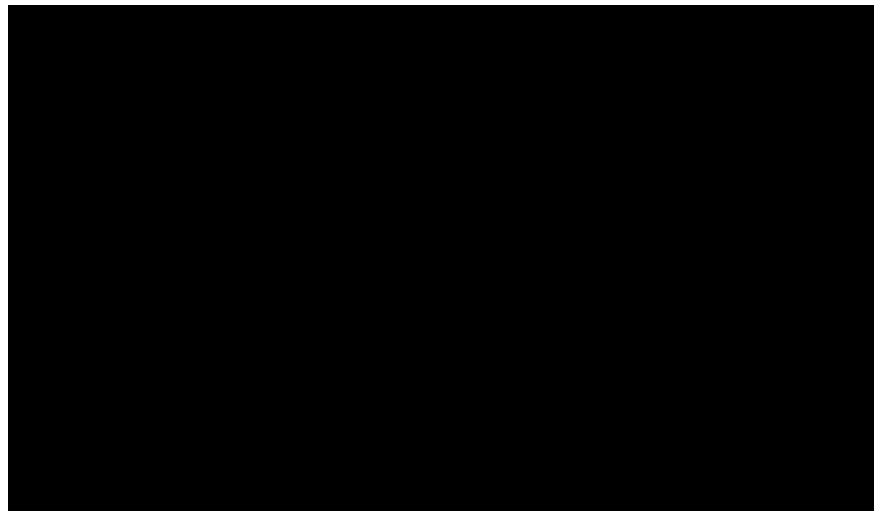
← Lake Louisa status, 2007 season

Water quality trends

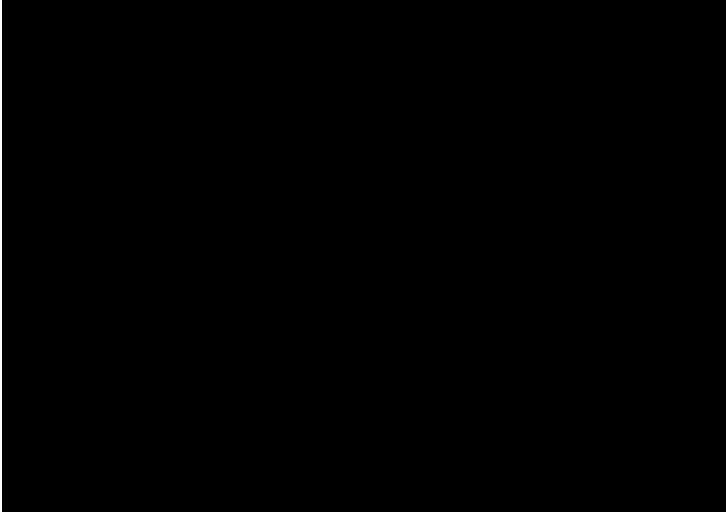
Phosphorus



Chlorophyll-a

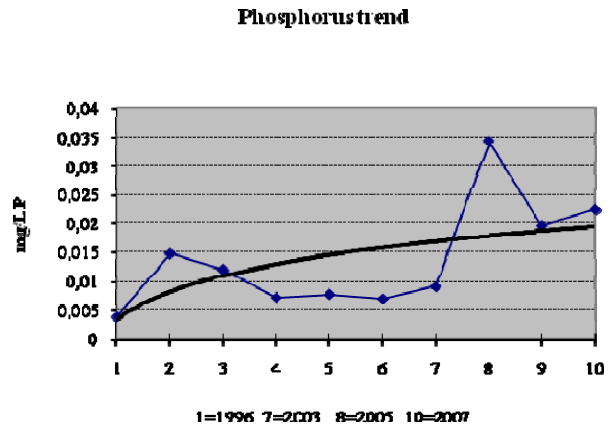


Secchi Transparency



Conclusion

Looking at the phosphorus trend, Lake Louisa is not responding positively to all the shoreline protection and management programs that were established many years ago. Small algae blooms were reported during the 2007 summer season, located mostly in isolated bays. These are signs that the lake is going through a transition phase from oligotrophic (3 years ago) to mesotrophic, with occasional phosphorus concentrations typical to eutrophic lakes.



My opinion (and this was expressed many years ago at multiple occasions), nutrient inputs within the watershed are exceeding what the lake can naturally sustain, i.e. the natural lake capacity is being ignored.

Again, the only way to protect this lake is to know what is the actual lake natural capacity, and apply the data collected to limit shoreline development to the limits established. The lake is presently showing through the data collected that nutrient inputs are within the limits of an upper mesotrophic lake, if not eutrophic lake. Although it must be done on every lot, planting shoreline specific vegetation and identifying defective septic installations will only reduce the speed of eutrophication – it will not reduce the watershed’s nutrient value, other than through the new regulations on lower phosphorus concentrations in dishwasher soaps.

At this rate, all nutrient reductions will be nullified by the construction of new houses, or again by summer cottages transformed into permanent houses. The only way to know what is the future of this lake is to conduct a lake capacity study (also called shoreline capacity study).

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