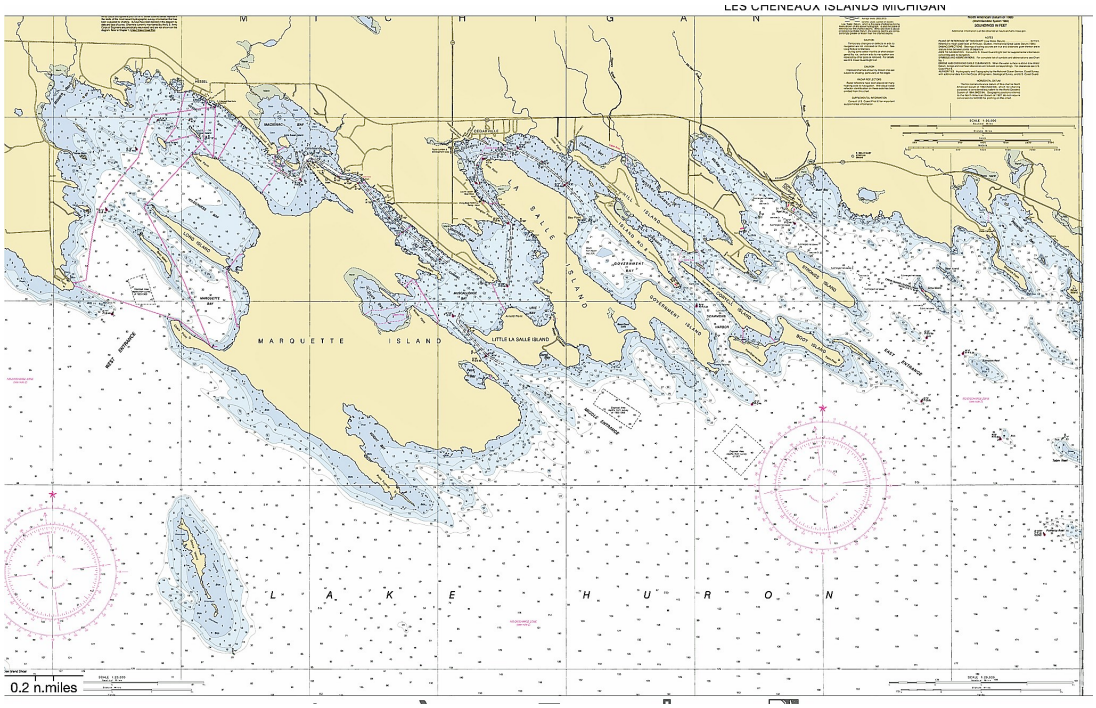


LCI WATER QUALITY REPORT FOR 2022

R. SMITH

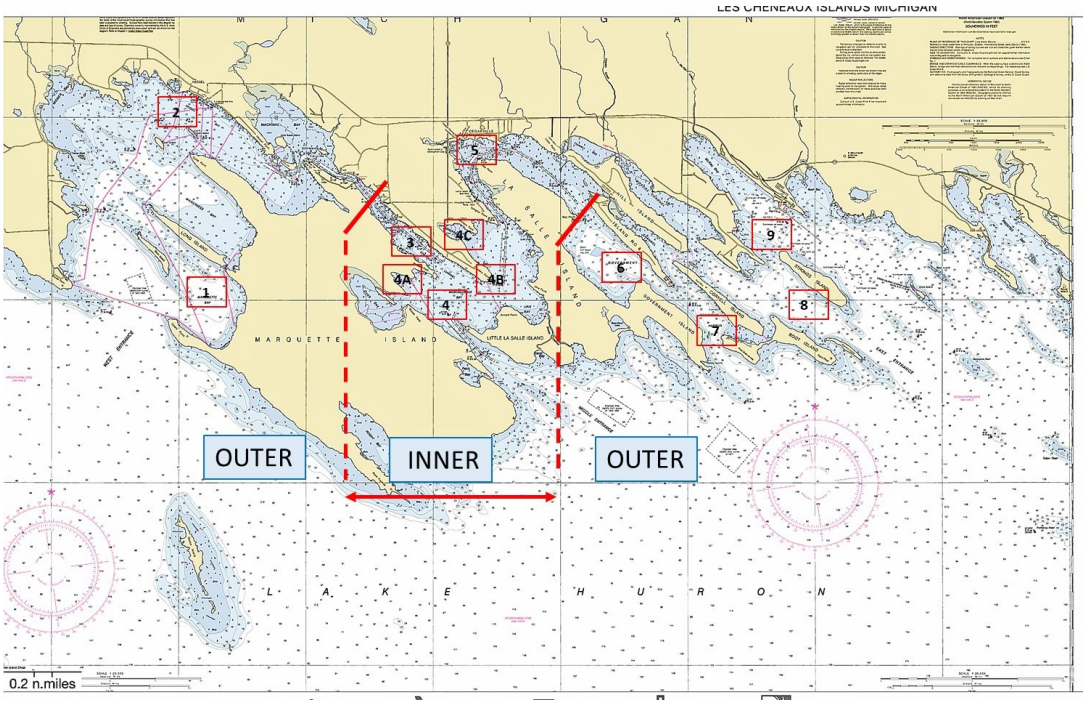
30 January 2023

LCI WATER QUALTIY REPORT FOR 2022. JAN 2023 RAS

Summary: Les Cheneaux waters continue to be rated as excellent for recreational purposes based on results from variables monitored during the summer of 2022. As has been the case since 2001, areas of our channels that have historically been rated as low in nutrients and algae concentrations have remained so. Similarly, areas which have which have been rated as higher in nutrients and algae densities have also remained in this category.

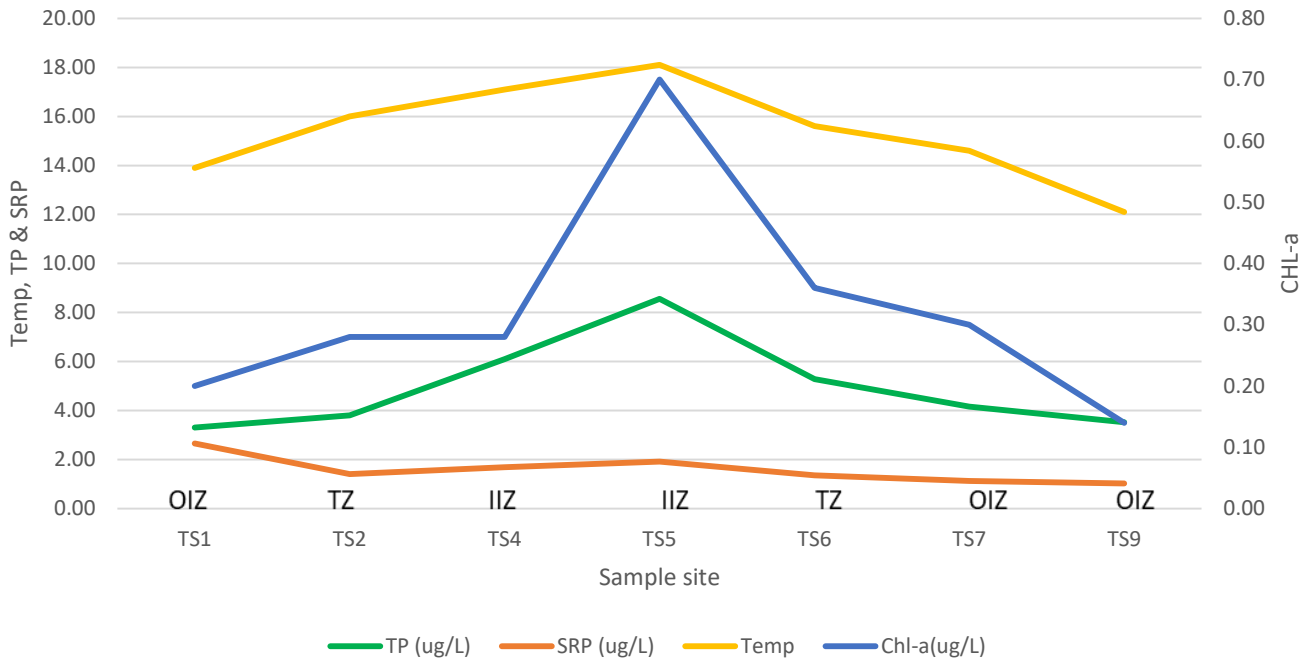
Samples were collected during 2022 to monitor water quality throughout the Les Cheneaux channels and analytical results are reported herein. Mean seasonal values for water quality variables monitored from May through Sep 2022 reflected expected levels based upon historical characteristics of each site. Less plankton growth was observed in areas of lower nutrients (phosphorus) and more intense plankton growth was observed in areas of higher nutrients (Fig. 1, 2). It should be noted that the higher nutrient Inner Island Zones (IIZ) in Les Cheneaux waters exhibit only a moderate level of nutrients and, therefore, moderate levels of plankton growth. Certain pockets within the Islands may temporarily support higher concentrations of plankton but on a much lower scale than is considered problematic in other areas of Lake Huron or in the other Great Lakes. The highest nutrient, plankton (Chl-a) and temperature values were recorded in the IIZ: TS4 and TS5 as well as in the Transition Zone (TZ) TS6 (Fig. 2). Lowest concentrations of these same variables were recovered in the Outer Island Zones (OIZ).

Fig. 1. Nutrient and productivity zones of the Les Cheneaux Islands. An Inner Island Zone (IIZ: higher nutrient and higher plant/animal productivity) is shown between the vertical/angled red lines whereas the Outer Island Zones (OIZ): Lower nutrients and less productive areas are shown East and West of the Inner Island Zone. Numbers signify sample sites.



Raw data from collections are shown in App A and plots for seasonal mean values for each variable monitored are shown in App B. There were no anomalies observed for plotted values. In general, nutrient levels peaked around Jul-Aug and the higher plankton (Chl-a) levels were observed in Aug-Sep. An exception was TS-5 where peak Chl-a was measured in May (App B., TS5). Early season plankton blooms are not uncommon and that is likely a reasonable explanation for the elevated Chl-a level observed for TS-5 in May, 2022.

Fig. 2. Mean seasonal values for Total Phosphorus, Soluble Reactive Phosphorus Chlorophyll-a and Temperature recorded for LCI water samples during 2022. <TSI



APPENDIX

APPENDIX A. Raw data from University of Michigan Biological Station (UMBS) analysis. November 2022.

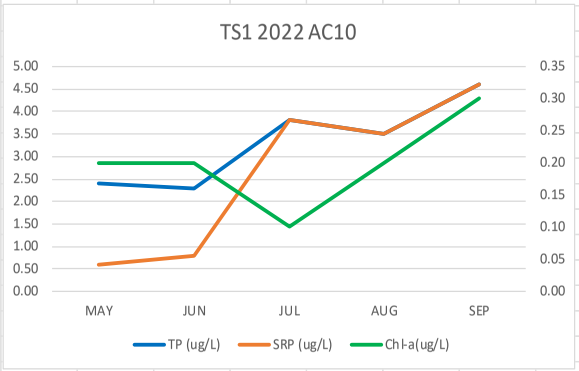
APPENDIX B. Plots of 2022 seasonal mean values for TSI sites.

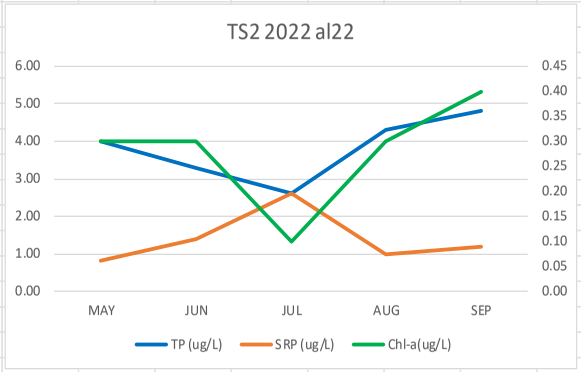
APPENDIX A

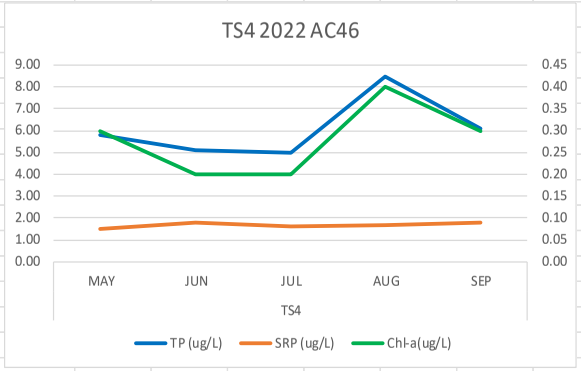
Table 1. RAW DAT FROM FIELD LOG & FROM UMBS FOR LCI SAMPLES IN 2022 SEASON <TSI RAWDAT 2022 /Sht1/N12>

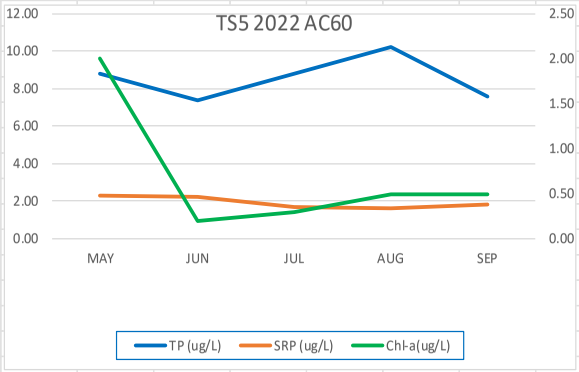
SITE	DATE	Month	TEMP (C)	SECCHI FT	Chl-a(ug/L)	TP (ug/L)	SRP (ug/L)
TS1	23-May-22	May	8.5	24	0.20	2.40	0.60
TS2	23-May-22	May	11	17 B	0.30	4.00	0.80
TS4	23-May-22	May	13	9	0.30	5.80	1.50
TS5	23-May-22	May	13	5	2.00	8.80	2.30
TS6	23-May-22	May	10.5	16	0.50	3.50	0.80
TS7	23-May-22	May	9.5	22	0.30	4.10	1.60
TS9	23-May-22	May	8	15 B	0.10	3.60	1.00
TS1	29-Jun-22	JUN	12.5	34B	0.20	2.30	0.80
TS2	29-Jun-22	JUN	15.5	17B	0.30	3.30	1.40
TS4	29-Jun-22	JUN	17	17B	0.20	5.10	1.80
TS5	29-Jun-22	JUN	18.5	8	0.20	7.40	2.20
TS6	29-Jun-22	JUN	15.5	19	0.40	4.90	1.70
TS7	29-Jun-22	JUN	14	34	0.40	4.40	0.90
TS9	29-Jun-22	JUN	10.5	15B	0.10	3.60	2.00
TS1	31-Jul-22	JUL	14	36	0.10	3.80	3.30
TS2	31-Jul-22	JUL	16	16	0.10	2.60	0.30
TS4	31-Jul-22	JUL	18	16	0.20	5.00	1.60
TS5	31-Jul-22	JUL	20	8	0.30	8.80	1.70
TS6	31-Jul-22	JUL	16	31	0.20	7.20	1.90
TS7	31-Jul-22	JUL	15	38	0.20	3.20	1.00
TS9	31-Jul-22	JUL	11	14	0.10	4.70	1.10
TS1	18-Aug-22	AUG	19.5	37	0.20	3.50	0.90
TS2	18-Aug-22	AUG	21	17	0.30	4.30	1.00
TS4	18-Aug-22	AUG	21.5	15	0.40	8.50	1.70
TS5	18-Aug-22	AUG	23	8	0.50	10.20	1.60
TS6	18-Aug-22	AUG	20.5	22	0.30	4.60	1.20
TS7	18-Aug-22	AUG	20	28	0.30	4.70	1.20
TS9	18-Aug-22	AUG	19	14	0.20	2.50	0.50
TS1	23-Sep-22	SEP	15	34	0.30	4.60	0.60
TS2	23-Sep-22	SEP	16.5	13	0.40	4.80	1.20
TS4	23-Sep-22	SEP	16	12.5	0.30	6.10	1.80
TS5	23-Sep-22	SEP	16	9B	0.50	7.60	1.80
TS6	23-Sep-22	SEP	15.5	9.5	0.40	6.20	1.20
TS7	23-Sep-22	SEP	14.5	23	0.30	4.40	0.90
TS9	23-Sep-22	SEP	12	16	0.20	3.20	0.50
				mn	0.322	4.96	1.33
				SD	0.308994	1.983084	0.610079

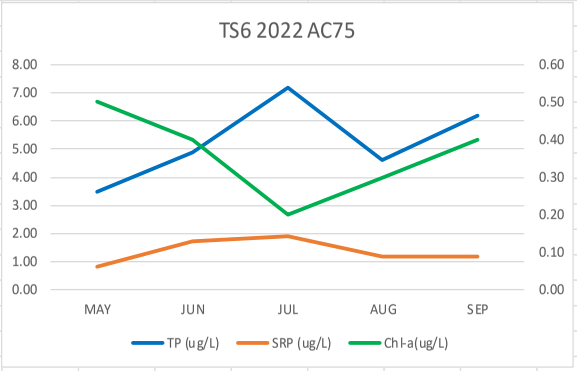
APPENDIX B. Plots of seasonal mean values for TP, SRP and Chl-a in 2022.<TSI RAWDAT 2022 SEASON / SHT3 / G50 FROM SHT1 AL26-AL60>

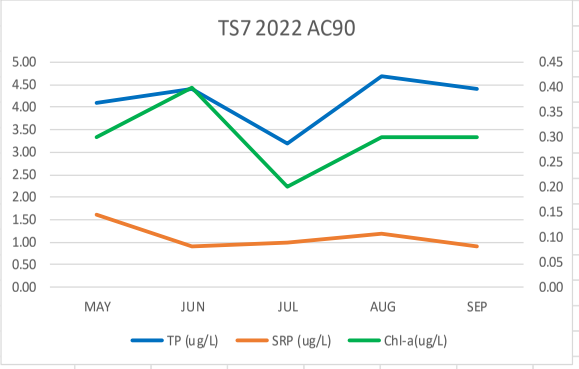


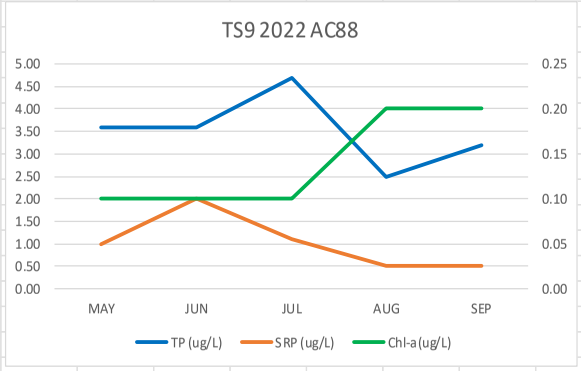












TSI DAT F0R 2022: LOGGED TO SHT1 AL 26 - AL 60
OBSERVATIONS:
TS1: Although Chl-a increased from Jul through Sep, demand was not to a degree that SRP was consumed to any degree. In fact TP & SRP were about equal in conc, indicating further that there was little demand for SRP.
TS2: As with TS1, Chl-a conc decreased from May-Jul then increased Aug-Sep. SRP curve decreased with increased CHL-a demand. TP curve and conc was similar to TS1.
TS4: CHL-a curve similar to TS1 & 2 with the increased conc in Jul & Aug. CHL-a curve closely followed the TP. SRP flat thruout.
TS5: Chl-a dropped 4X from May-Jun & remained low for the season. TP had minimal flux, as did SRP...need to check temps to see why so little flux at TS5.
TS6: CHL-a drop May-Jul then increase Jul-Sep. TP curve reflects Chl-a activity. SRP had little flux thru season.
TS7:Chl-a max in Jun, dropped in Jul then increased for Aug-Sep
TS9:Chl-a flat till Jul then doubled for Aug-Sep. Both TP & SRP decreased during Chl-a increase although all conc were low.

-do seasonal comparison for each variable. Did OIZ & IIZ values trend as expected?