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Long Pond Monroe County, New York

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Long Pond, located on Lake Ontario near Rochester, New York, is surrounded by a mix of residential development, state park, and protected wildlife areas. Land use within the watershed is a mix of suburbia, including the Village of Spencerport, and agriculture. The waters of Long Pond are considered hypereutrophic, meaning it is very productive due to high nutrient loading. This productivity is likely due to nonpoint sources and the point source represented by the Spencerport Sewage Treatment Plant which releases advanced secondary sewage effluent into a tributary of Long Pond (Makarewicz 2000). Nuisance algae, bacterial abundance, and algal mat development near Long Pond along the southern shoreline of Lake Ontario were evident. This short report provides a synopsis of data collected monthly from May through September (2003 to 2009) on the water quality of Long Pond and the lakeside (swimmable depth) of Lake Ontario near the mouth of the pond.

Cranberry, Long Pond, and Buck Ponds

Phosphorus is of concern as it stimulates the growth of plants, causing blooms of algae such as *Cladophora*. Long Pond total phosphorus (TP) concentrations (average=128.8±13.6 µg P/L) were not dissimilar from those of other Lake Ontario bays (129.7±59.6 µg/L) while the Long Pond lakeside concentrations (average=129.6±36.6 µg P/L) were much higher than the other Lake Ontario lakeside sites (62.0±7.4) (Table 1). Both the pond and lakeside water TP concentrations were also significantly higher than TP concentrations in the open (9.5±0.7 µg P/L) offshore waters of Lake Ontario and exceeded the NYSDEC ambient guidelines for phosphorus (20 µg P/L). Soluble reactive phosphorus (SRP) was generally higher in Long Pond (8.4±1.1 µg P/L) than in lakeside (4.8±1.1 µg P/L, Fig. 1b) waters but had clearly decreased at both locations in the past six years (Fig. 1b). This may reflect the improvements (flocculation to reduce phosphate) to the Spencerport Sewage Plant whose effluent enters Long Pond via Northrup Creek. Annually chlorophyll concentrations at the lakeside site mimicked algae levels in Long Pond (Fig. 1c), suggesting that the lakeside site was influenced by effluent from Long Pond. Levels of chlorophyll (average=61.0±7.5 µg/L), a general measure of all algae, and phycocyanin (average=85.9±13.1 µg/L), an indicator of the nuisance species of blue-green algae, were very high compared to the levels of offshore Lake Ontario waters (2.6±0.3, 2.0±0.2 µg/L, respectively) (Table 1). Harmful algal blooms (toxic microcystins) were observed in Long Pond during the summers of 2003 to 2006 (Makarewicz et al. 2009). Lakeside TP, chlorophyll, phycocyanin, total suspended solids, and total Kjeldahl nitrogen generally peaked in June and

July (Fig. 2). Lakeside SRP increased from May to September (Fig. 2d). Long Pond total phosphorus, SRP, phycocyanin, and nitrate reached peak concentrations in July with a secondary peak in September (Figs. 3a, b, d, f).

References

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Table 1. Average concentrations (2003 to 2009, May through September) and standard errors (S.E.) of total phosphorus (TP), soluble reactive phosphorus (SRP), nitrate, Chlorophyll a (Chl a), phycocyanin, total suspended solids (TSS), total Kjeldahl nitrogen (TKN), sodium, and silica.

	TP (µg P/L)		SRP (µg P/L)		Nitrate (mg/L)		Chlorophyll (µg/L)		Phycocyanin (µg/L)		TSS (mg/L)		TKN (µg/L)		Sodium (mg/L)		Silica (mg/L)	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Lakeside	62.0	7.4	7.0	0.9	0.27	0.01	19.1	4.1	17.8	2.2	33.5	4.8	795	96	13.78	0.19	0.56	0.06
Rivers	83.8	7.0	44.8	5.4	0.57	0.03	6.5	0.8	13.2	3.0	10.5	1.9	559	25	26.65	1.28	1.42	0.15
Embayments	129.7	59.6	15.5	2.0	0.14	0.01	20.0	2.4	237.5	207.6	17.0	5.70	923	70	27.47	1.49	1.29	0.11
Lake Ontario 30m	9.9	0.7	3.1	0.5	0.31	0.02	2.0	0.17	5.5	1.2	0.7	0.14	253.3	21.0	11.46	0.23	0.35	0.05
Lake Ontario 100m	9.5	0.7	5.2	2.1	0.31	0.01	2.6	0.26	6.1	1.3	0.8	0.12	343.4	50.9	11.45	0.24	0.40	0.07

Map of the "North Coast" of New York showing sampling locations forthe Lake Ontario Coastal Initiative. The Long Pond watershed is shown in the insert.

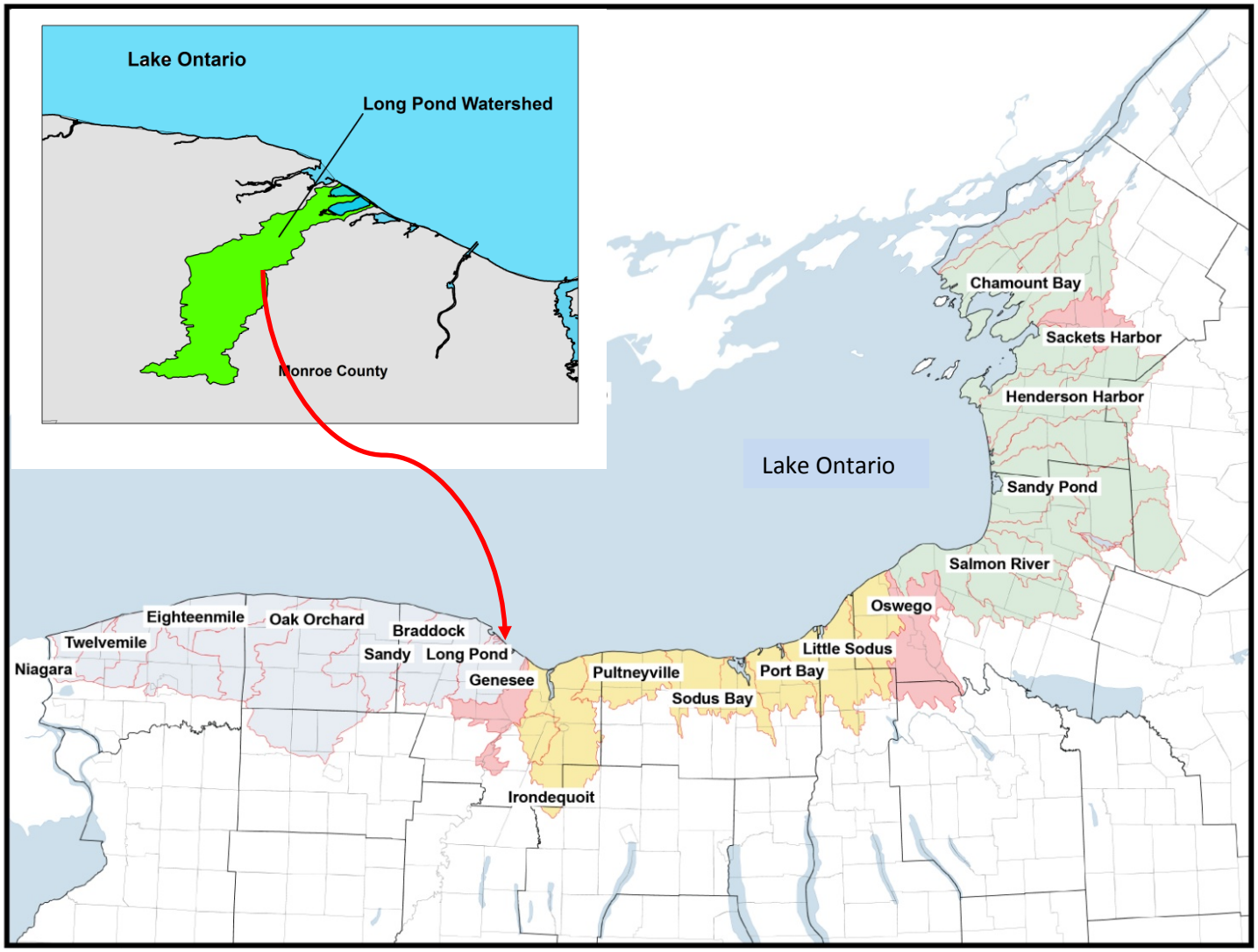

Figure 1. Average (±S.E) summer total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen concentrations at the lakeside of Lake Ontario near Long Pond and at Long Pond. Lakeside surface water samples were taken monthly (May-September) at a 1-meter depth.

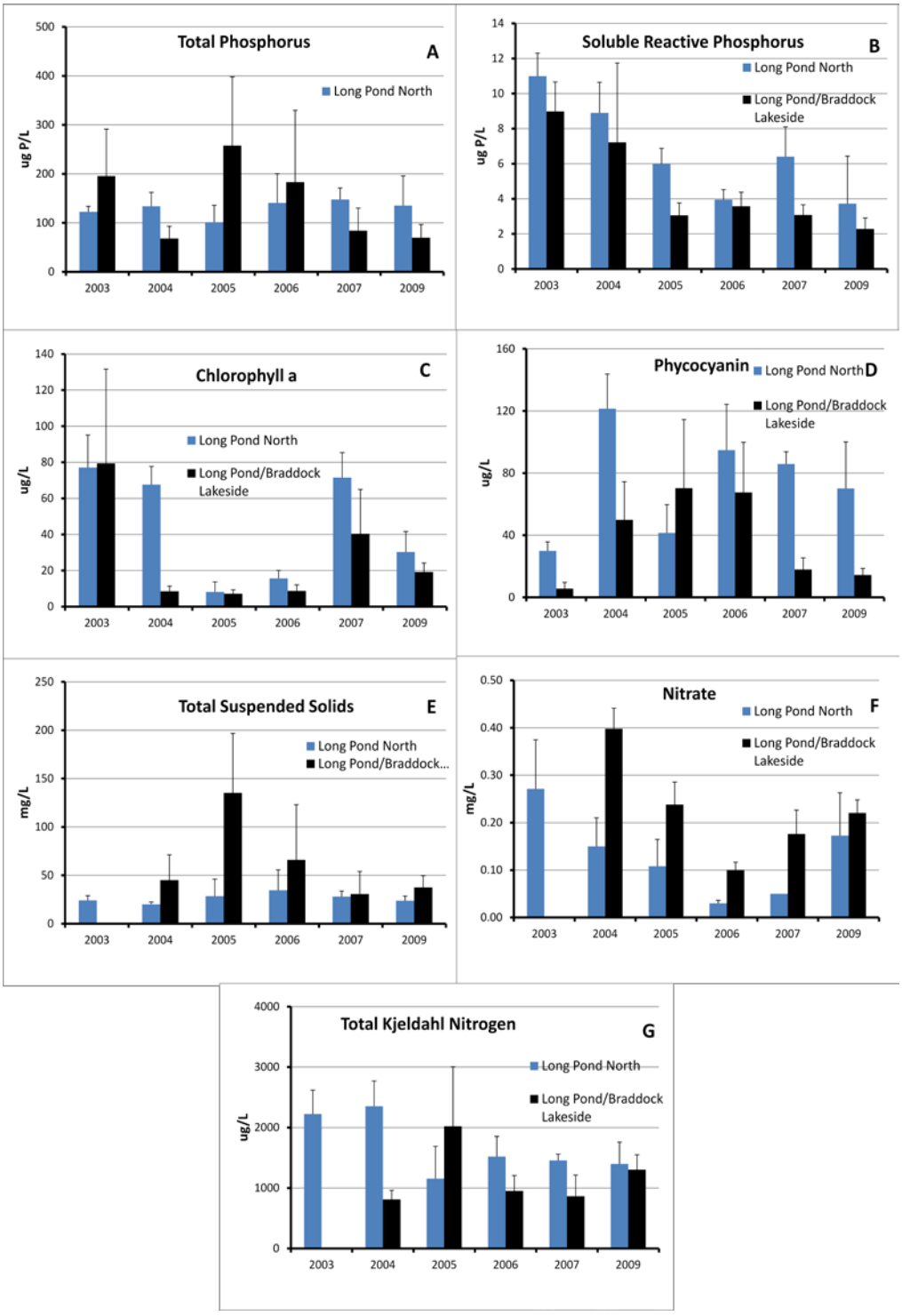

Figure 2. Average (±S.E) seasonal concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen at the lakeside of Lake Ontario near Braddock Bay and Long Pond.

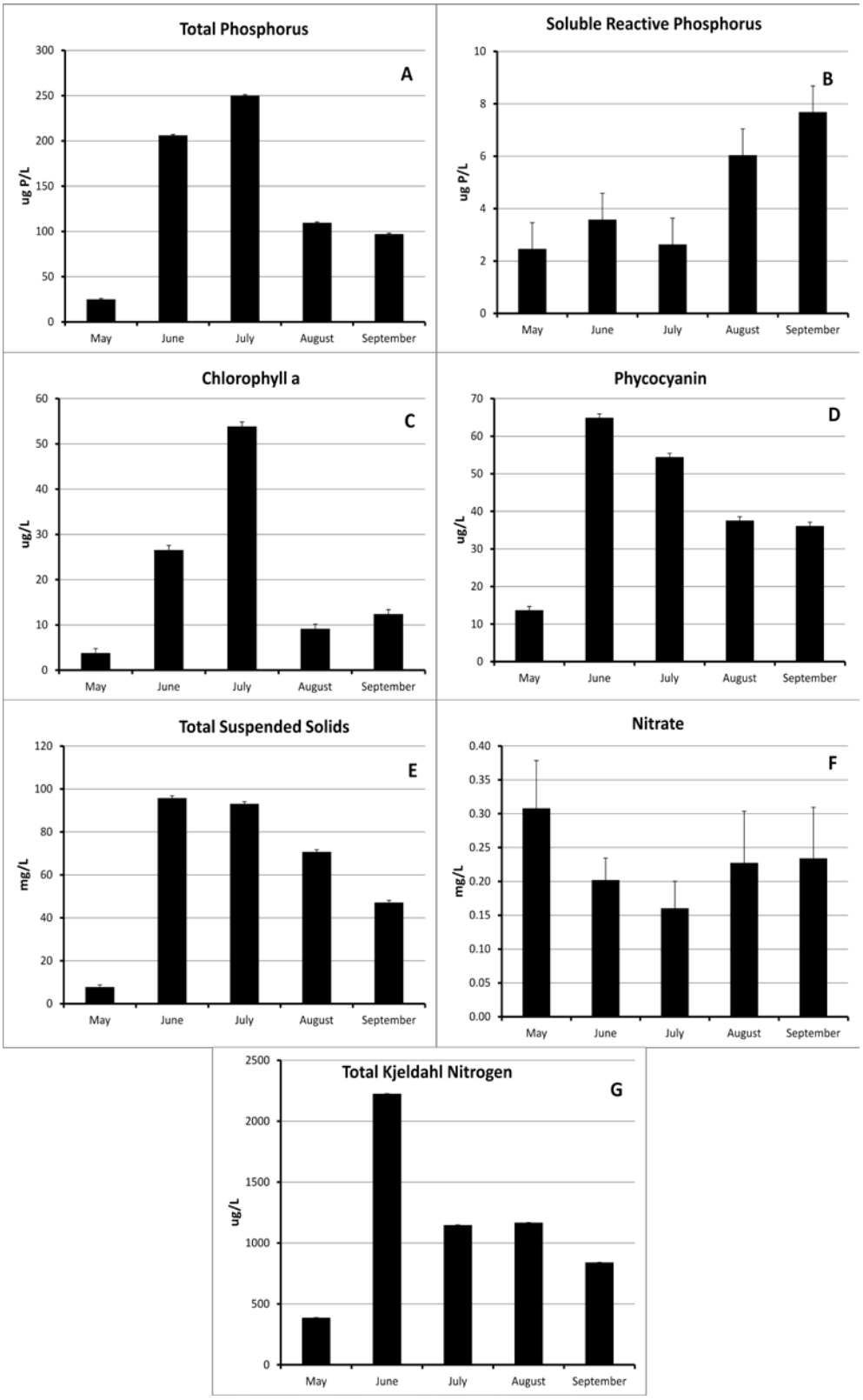

Figure 3. Average (±S.E) seasonal concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen in Long Pond