Chaumont Bay
Jefferson County, New York

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Chaumont Bay is a 9,000-acre embayment located on the east end of Lake Ontario. The bay receives tributary waters from Guffon Creek, Three Mile Creek, and the Chaumont River, creating three smaller embayments within Chaumont Bay on the northeastern side. The bay is lined by shoreline development, but the watershed is primarily agriculture. Algae blooms plague Chaumont Bay and hamper boating, swimming, and fish consumption. Direct sewage discharges into Chaumont Bay have been documented, but inadequate septic systems are considered the primary source of nutrient loading to the bay. This short report provides a synopsis of data collected monthly from May through September (2005 to 2009) on the water quality of Chaumont Bay and the lakeside (swimmable depth) of Lake Ontario near the bay.

Chaumont Bay, New York

Phosphorus is of concern as it stimulates the growth of plants, causing blooms of algae such as *Cladophora*. The average Chaumont Bay total phosphorus (TP) concentrations (19.7±2.5 µg P/L) met the NYSDEC ambient guideline of 20 µg P/L, while Chaumont lakeside levels (26.7±6.9 µg P/L) were slightly higher. Bay soluble reactive phosphorus (SRP) levels (3.9±0.8 µg P/L) were slightly higher than those measured at the lakeside site (2.8±0.6 µg P/L) and were comparable to SRP concentrations in the offshore waters of Lake Ontario (3.1-5.2 µg P/L, Table 1). In comparison to concentrations in other Lake Ontario bays (129.7±59.6 µg P/L), average TP concentrations in Chaumont Bay (19.7±2.5 µg P/L) were significantly lower. Algae levels, as indicated by chlorophyll levels in Chaumont Bay (2.4±0.5 µg/L), were comparable to levels in the offshore waters of Lake Ontario (2.0-2.6 µg/L, Table 1) and were significantly lower than in other bays (20.0±2.4 µg/L) of Lake Ontario (Table 1). Algae levels were consistently higher in the lakeside waters than in the bay (Fig. 1c) and were likely related to the higher phosphorus levels in these waters (Fig. 1a). With the exception of decreasing blue-green algae populations in Chaumont Bay (Fig. 1d), annual concentrations of lakeside phycocyanin, total suspended sediment (TSS, Fig. 1e), nitrate (Fig. 1f), and total Kjeldahl nitrogen (TKN, Fig. 1g) showed no clear annual trends from 2005 to 2009 at both the lakeside and bay sites. Seasonally, TP and SRP (Figs. 2a, b) in lakeside waters generally increased while nitrate levels (Fig. 2f) decreased from May through September. Phycocyanin, TSS, and TKN peaked in August at the lakeside

site (Fig. 2). At Chaumont Bay, seasonal decreases in TP (Fig. 3a) and nitrate (Fig. 3f) were observed from May to September while SRP (Fig. 3b) and phycocyanin (Fig. 3d), an indicator of nuisance blue-green algae, peaked in mid-summer.

References:

Jefferson Soil and Water Conservation District. 2009. Available at: http://www.jeffersonswcd.org

Makarewicz, J.C. 2000. New York's North Coast: A Troubled Coastline: The Lake Ontario Embayment Initiative. SUNY Brockport. Available from The Center for Environmental Information. Rochester , NY.

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, 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 for the Lake Ontario Coastal Initiative. The Chaumont Bay watershed is shown in the insert.

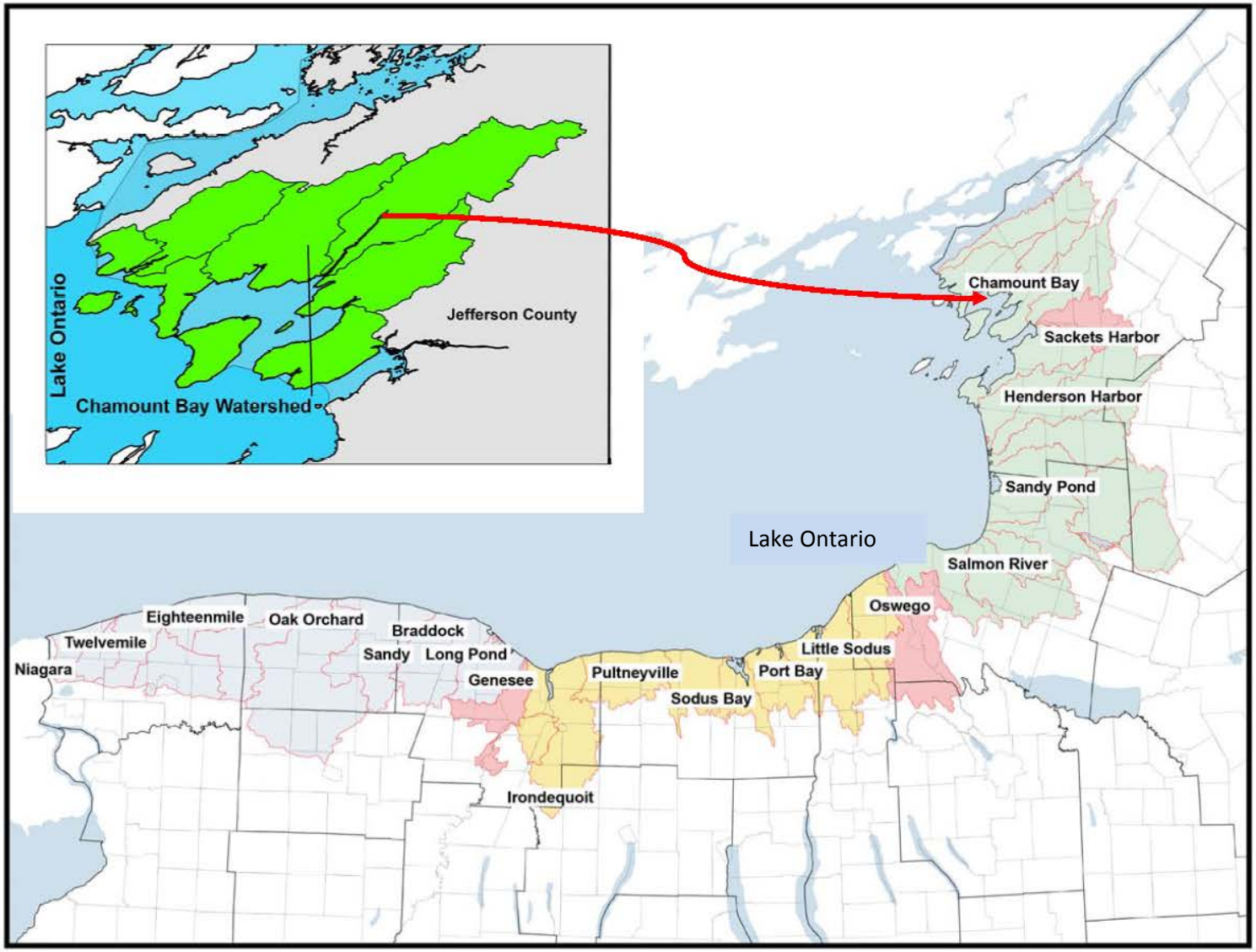

Figure 1. Average (±S.E) summer total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen concentrations at the lakeside of Lake Ontario near Chaumont Bay and Chaumont Bay. Samples were taken in the months of May through September at a 1-meter depth.

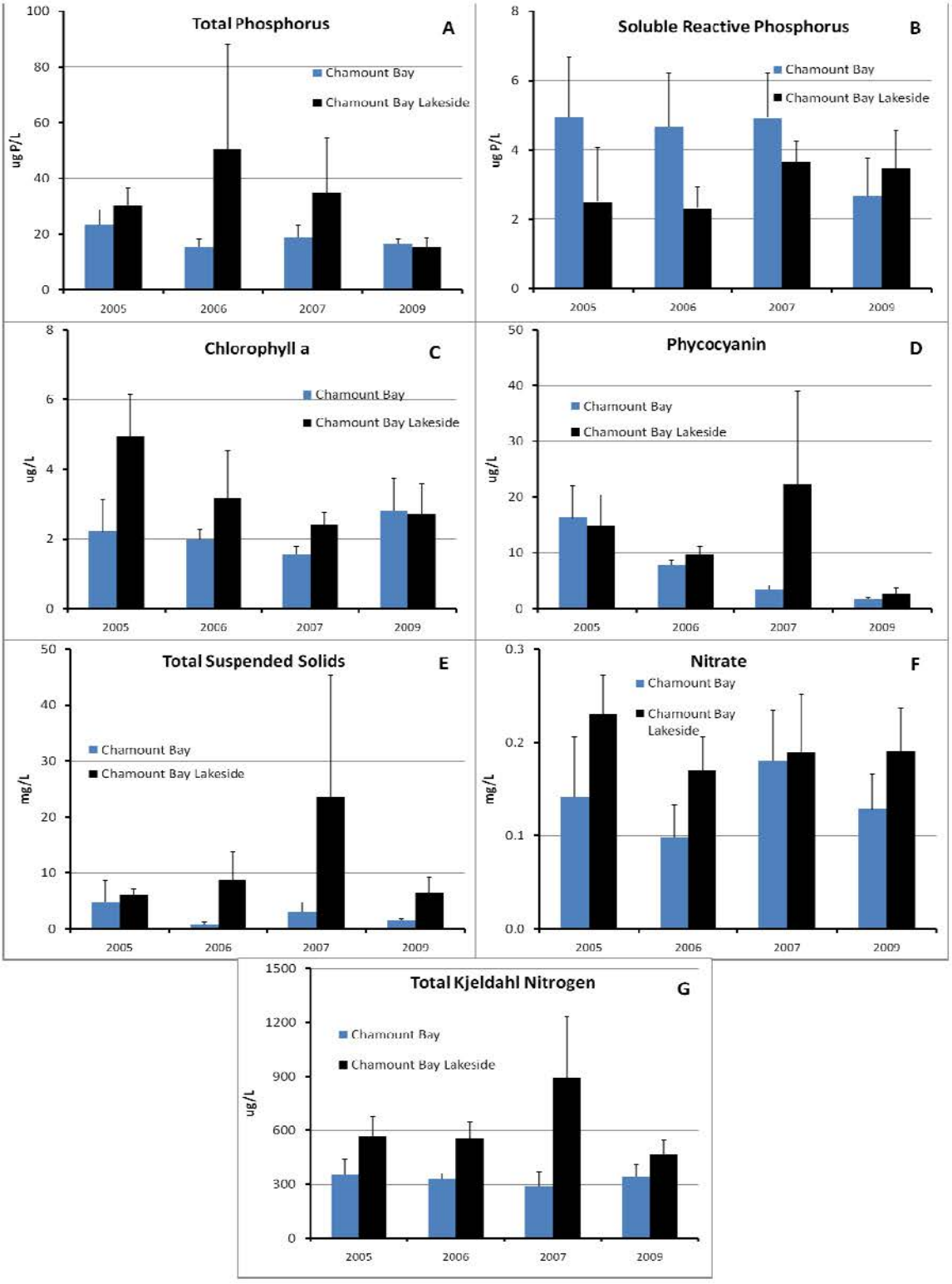

Figure 2. Average (±S.E) seasonal concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen at the lakeside of Lake Ontario near Chaumont Bay.

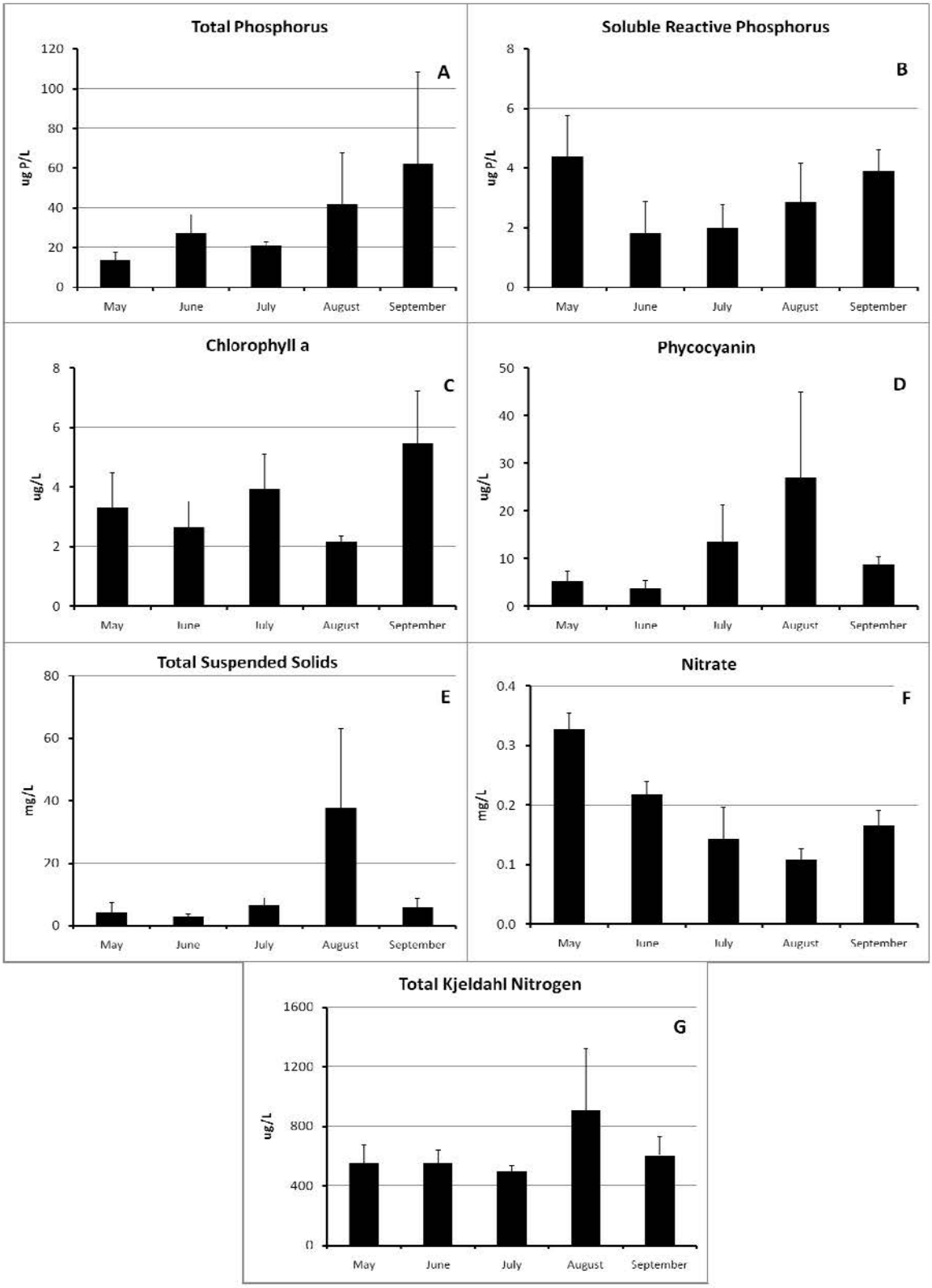

Figure 3. Average (±S.E) seasonal concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen in Chaumont Bay.