

## Port Bay Wayne County, New York

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Located midway between Rochester and Oswego, New York, Port Bay is one of southern Lake Ontario's larger but relatively shallow (<25 feet) embayments. The perimeter of the bay is



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primarily residential, but portions of the shoreline and watershed are part of the Lake Shores Marshes Wildlife Area. Wolcott Creek is the major tributary of Port Bay and drains ~27 mi<sup>2</sup> of land that is mostly in agriculture. The bay receives treated effluent from the Village of Wolcott Sewage Treatment Plant. Port Bay suffers from cultural eutrophication and is on the New York State 303d list of Impaired Waters due to an overabundance of phosphorus. Benthic anoxia is a major effect of this eutrophication. Port Bay is impacted by nuisance algae, and

harmful algal blooms have been observed (Makarewicz et al. 2009). This short report provides a synopsis of data collected monthly from May through September (2003 to 2009) on the water quality of Port Bay and the lakeside (swimmable depth) of Lake Ontario near the bay.

Phosphorus is of concern as it stimulates the growth of plants, causing blooms of algae such as *Cladophora*. Both lakeside and creek total phosphorus (TP) levels exceeded the NYSDEC ambient guideline of 20 µg P/L for phosphorus concentration. Average TP levels (Fig. 1a) in the lakeside waters (67.2±20.9 µg P/L) were lower than Port Bay concentrations (116.2±11.6 µg P/L) while bay soluble reactive phosphorus (SRP) levels (43.8±6.5 µg P/L) were significantly higher than lakeside concentrations (8.3±3.3 µg P/L). In comparison to TP concentrations in other Lake Ontario bays (129.7±59.6 µg P/L), average TP concentrations in Port Bay (116.2±11.6 µg P/L) were slightly lower. The bay and lakeside water TP concentrations were much higher than those of the open (9.5±0.7 µg P/L) offshore waters of Lake Ontario. Port Bay (10.8±1.8 µg/L) and lakeside (13.5±5.8 µg/L) chlorophyll concentrations were greater than average chlorophyll concentrations of the offshore waters of Lake Ontario (2.6±0.3 µg/L) (Table 1). Average annual SRP (Fig. 1b), nitrate (Fig. 1f), and perhaps TP (Fig. 1a) and total Kjeldahl nitrogen (TKN) (Fig. 1g) concentrations have decreased in the bay waters. Total suspended solids (TSS) (Fig. 1e), TKN (Fig. 1g), and TP (Fig. 1a) concentrations at the lakeside site appeared to have increased. Seasonally, bay and lakeside waters showed very strong trends with TP (Figs. 2a, 3a), SRP (Figs. 2b, 3b), chlorophyll (Figs. 2c, 3c), phycocyanin (Figs. 2d, 3d), TSS

(Figs. 2e, 3e), and TKN (Figs. 2g, 3g) increasing from May through September. Nitrate (Figs. 2f, 3f) decreased through these months. The similarity in the seasonal bay and lakeside peaks suggests that the bay waters are influencing the lakeside waters of Lake Ontario.

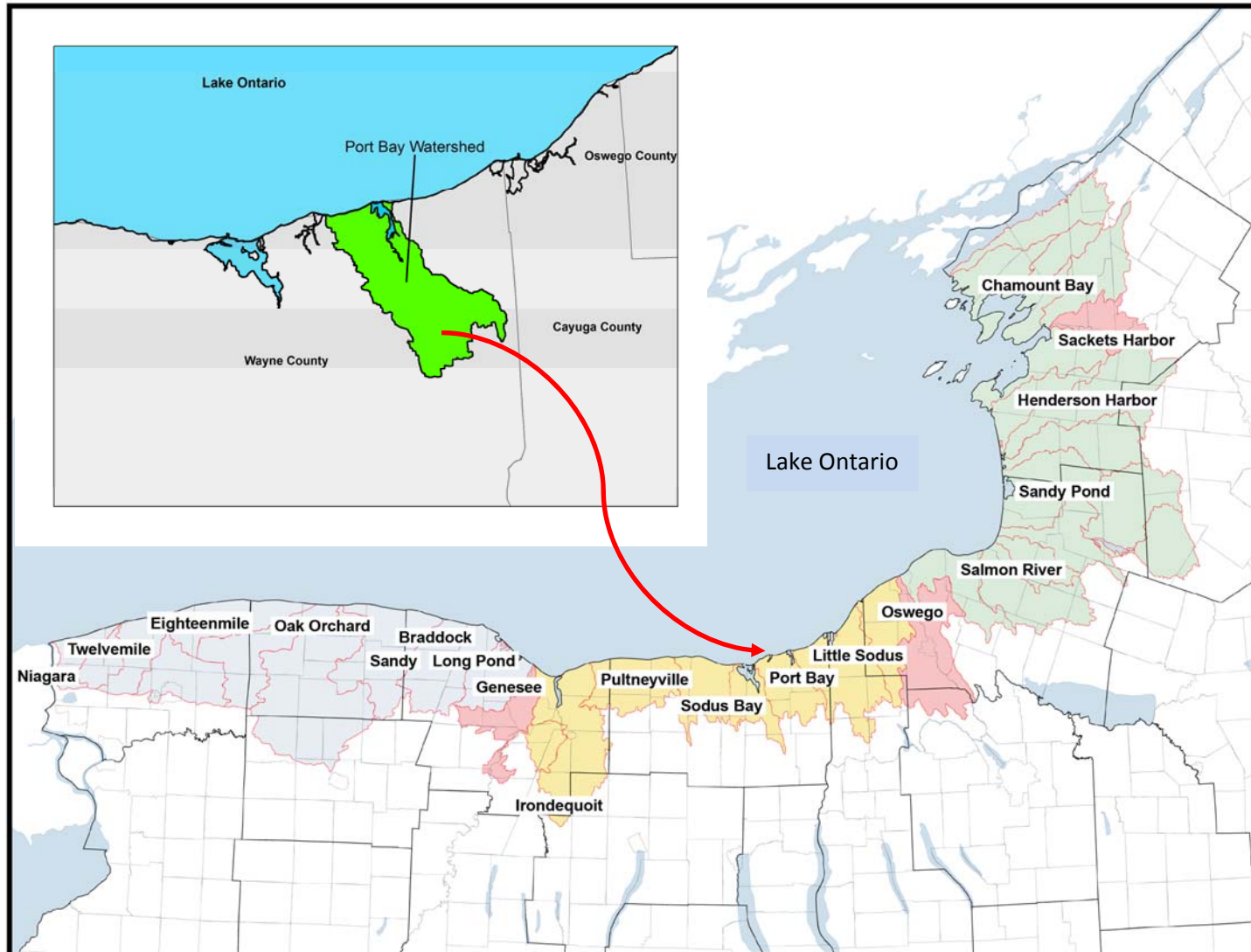
### References

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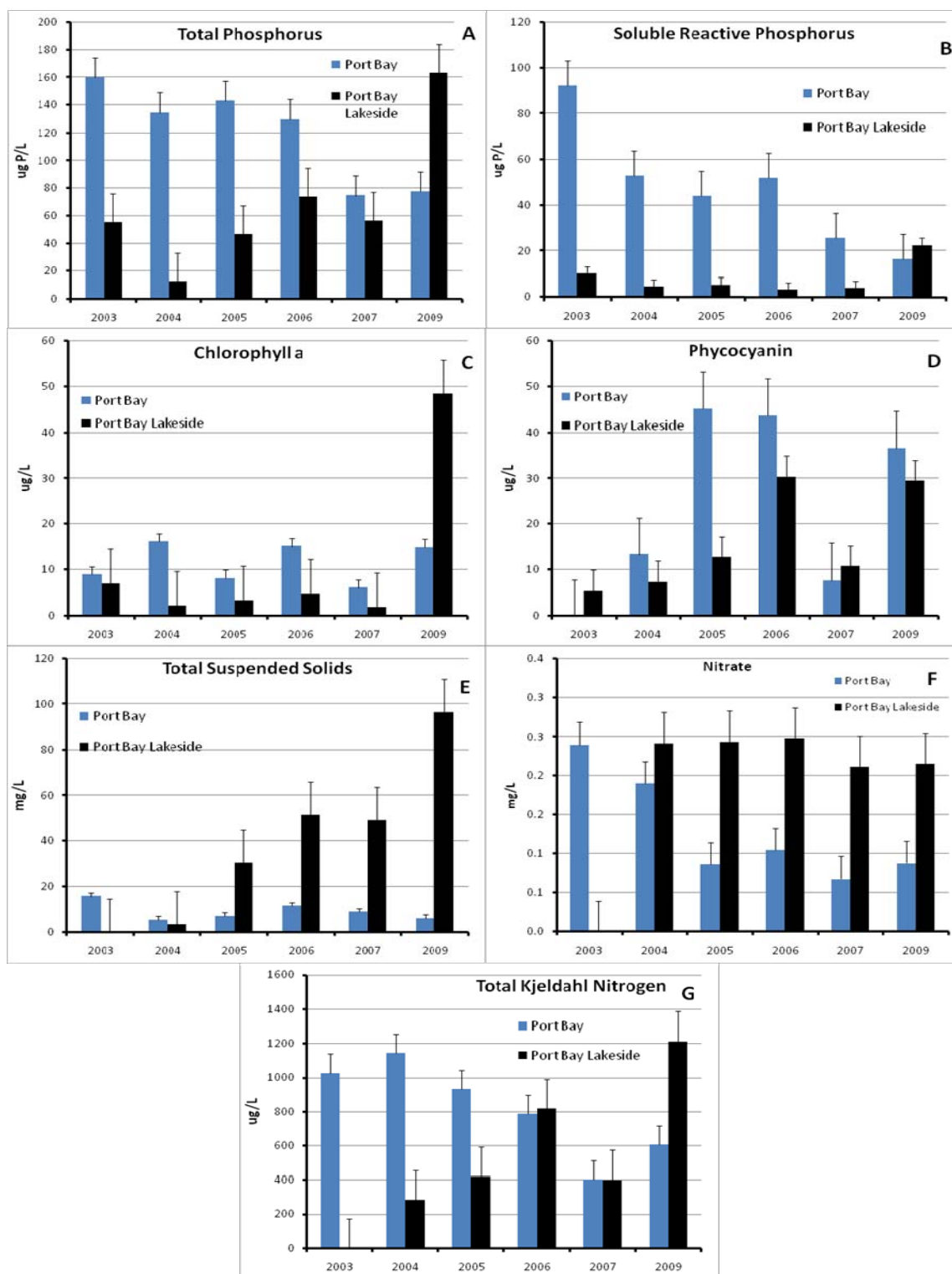
**Table 1. Average concentrations (2003 to 2009, May through September) and standard errors (S.E.) of total phosphorus (TP), soluble reactive phosphorus (SRP), nitrate, Chlorophyll a (Chl a), phycocyanin, total suspended solids (TSS), total Kjeldahl nitrogen (TKN), sodium, and silica.**

	TP ( $\mu\text{g P/L}$ )		SRP ( $\mu\text{g P/L}$ )		Nitrate ( $\text{mg/L}$ )		Chlorophyll ( $\mu\text{g/L}$ )		Phycocyanin ( $\mu\text{g/L}$ )		TSS ( $\text{mg/L}$ )		TKN ( $\mu\text{g/L}$ )		Sodium ( $\text{mg/L}$ )		Silica ( $\text{mg/L}$ )	
	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

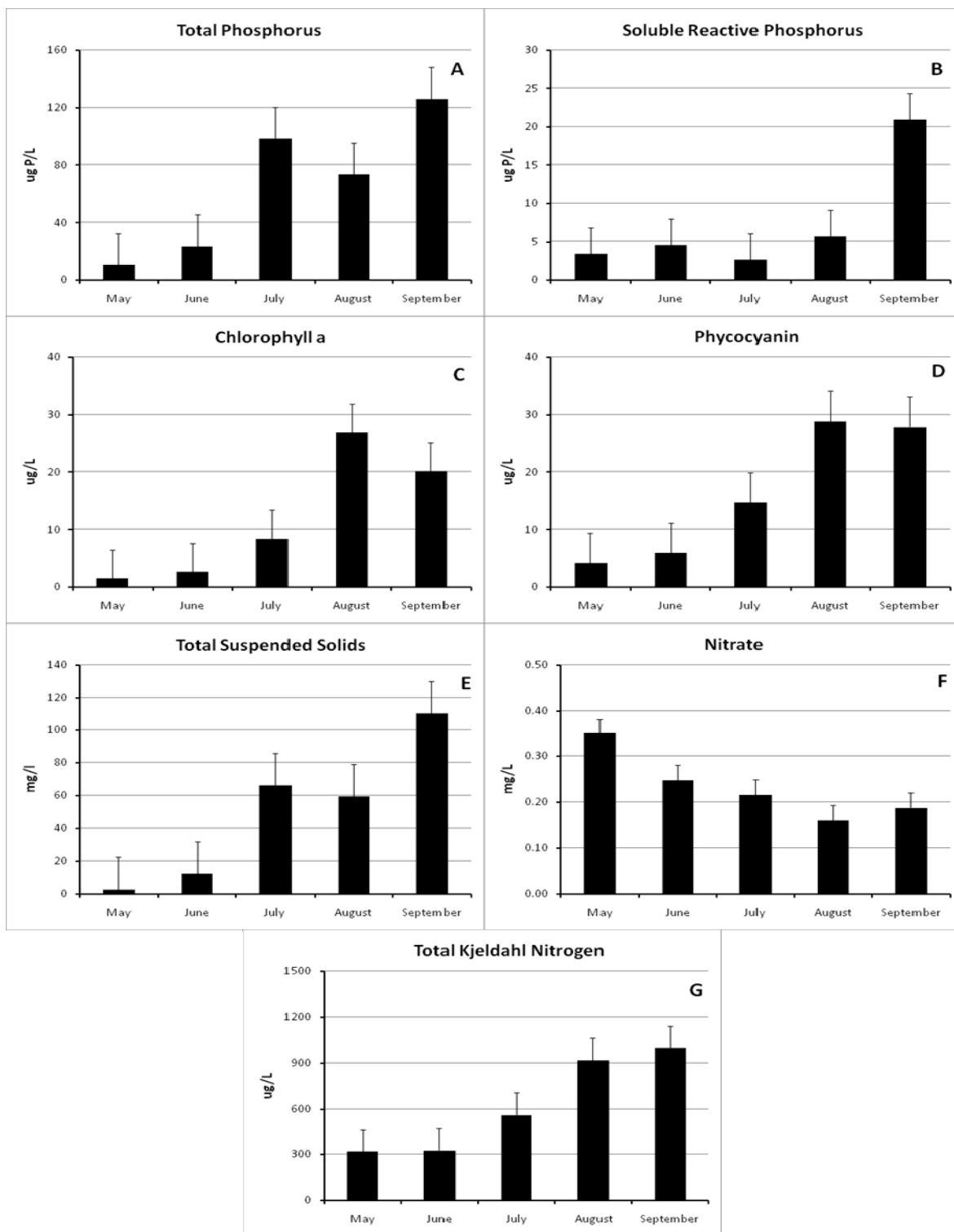
**Map of the “North Coast” of New York showing sampling locations for the Lake Ontario Coastal Initiative. Port Bay watershed is shown in the insert.**



**Figure 1. Summer concentrations (average $\pm$ S.E, 2003-2009) of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen at the lakeside of Lake Ontario near Port Bay and Port Bay. Surface water samples were taken monthly (May-September) at a 1-meter depth.**



**Figure 2. Seasonal concentrations (average  $\pm$ S.E, 2003-2009) of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen at the lakeside of Lake Ontario near Port Bay.**



**Figure 3. Seasonal concentrations (average  $\pm$ S.E, 2003-2009) of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen in Port Bay.**

