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# Eighteenmile Creek Niagara County, New York

Joseph C. Makarewicz
*The College at Brockport*, jmakarew@brockport.edu

Matthew J. Nowak
*The College at Brockport*

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Joseph C. Makarewicz and Matthew J. Nowak
The College at Brockport, State University of New York
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Eighteenmile Creek drains 93 $mi^2$ of land as it travels 26 miles before emptying into Lake Ontario. Topography is generally flat and comprised primarily of agricultural and rural residential development, with most of the industrial influences concentrated in the City of Lockport. The creek is a Great Lakes Area of Concern and has a Remedial Action Plan currently headed by the Niagara County Soil and Water Conservation District. PCBs, specifically, represent the area of stress that receives the most attention. In addition to a history of industrial waste exposure, the Lockport Sewage Treatment Plant diverts treated sewage to the stream. Despite these water quality issues, Eighteenmile Creek is a popular fishing stream due to major salmon runs, while Olcott Harbor at the mouth of the river is the home of much of the Niagara County sport fishing industry. Nuisance algae, turbid waters, and algal mat development impact the drowned river mouth and the nearshore waters along the southern shoreline of Lake Ontario. This short report provides a synopsis of data collected monthly from May through September (2003 to 2009) on the water quality of Eighteenmile Creek and the lakeside (swimmable depth) of Lake Ontario near the mouth of the creek.


Mouth of Eighteenmile Creek, Lake Ontario

Phosphorus is of concern as it stimulates the growth of plants, causing blooms of algae such as *Cladophora*. Total phosphorus (TP) levels in the lakeside waters (average=41.8±9.8 µg P/L, Fig. 1a) were lower than in creek water (average=124.7±12.3 µg P/L) indicating dilution with lake waters and perhaps uptake by algae. But clearly, the creek is impacting the nearshore waters of Lake Ontario. Both lakeside and creek phosphorus levels exceeded the NYSDEC ambient guideline of 20 µg P/L for phosphorus concentrations. Compared to TP concentrations in other Lake Ontario streams (83.8±7.0 µg P/L), average TP concentrations in Eighteenmile Creek (124.7±12.3 µg P/L) were higher, while the nearby lakeside waters (41.8±9.8 µg P/L) had lower concentrations than the average for lakeside Lake Ontario (62.0±7.4 µg P/L) (Table 1). As expected, both creek and lakeside TP concentrations were higher than in open (9.5±0.7 µg P/L) offshore waters of Lake Ontario (Table 1). No obvious annual trends from 2003 to 2009 were evident in TP, chlorophyll, total suspended solids (TSS, soil loss), and total Kjeldal nitrogen (TKN) (Figs. 1a, c, e, f). From 2003 to 2009, creek concentrations of soluble reactive phosphorus, phycocyanin, a pigment associated with blue-green algae, and nitrate appeared to be decreasing (Figs. 1b, d, f). Seasonally, lakeside TP, TSS (soil), TKN, and phycocyanin concentrations generally increased as the summer progressed (Fig. 2). Seasonal creek concentrations of TP and chlorophyll reached a peak in July before declining by September (Figs. 3a, c).

**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 for the Lake Ontario Coastal Initiative. Eighteenmile Creek watershed is shown in the insert.**

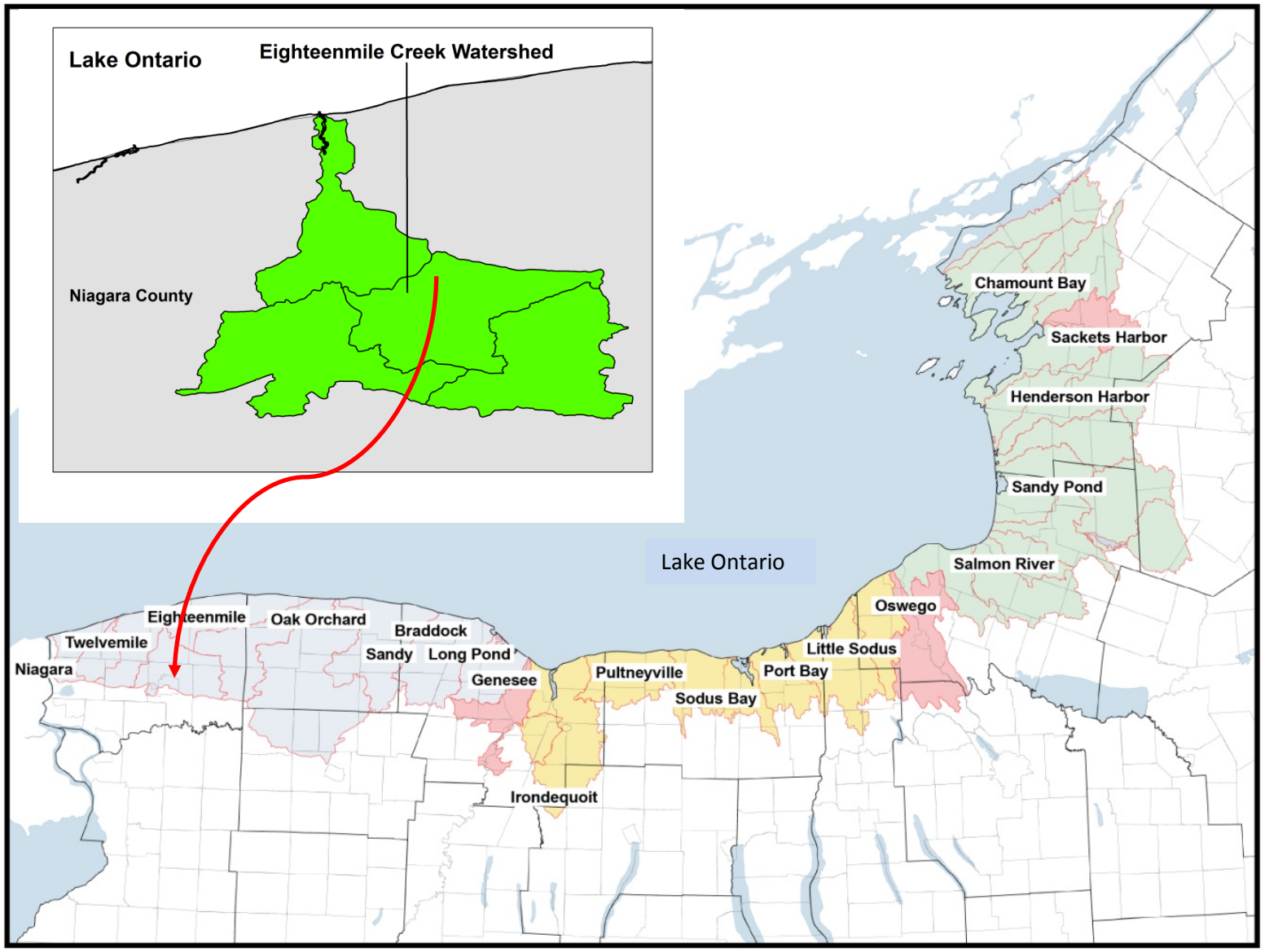

**Figure 1. Average summer (±SE) total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen concentrations in Eighteenmile Creek and near the mouth of the creek at the lakeside of Lake Ontario. Surface water samples were taken monthly (May-September) at a 1-meter depth.**

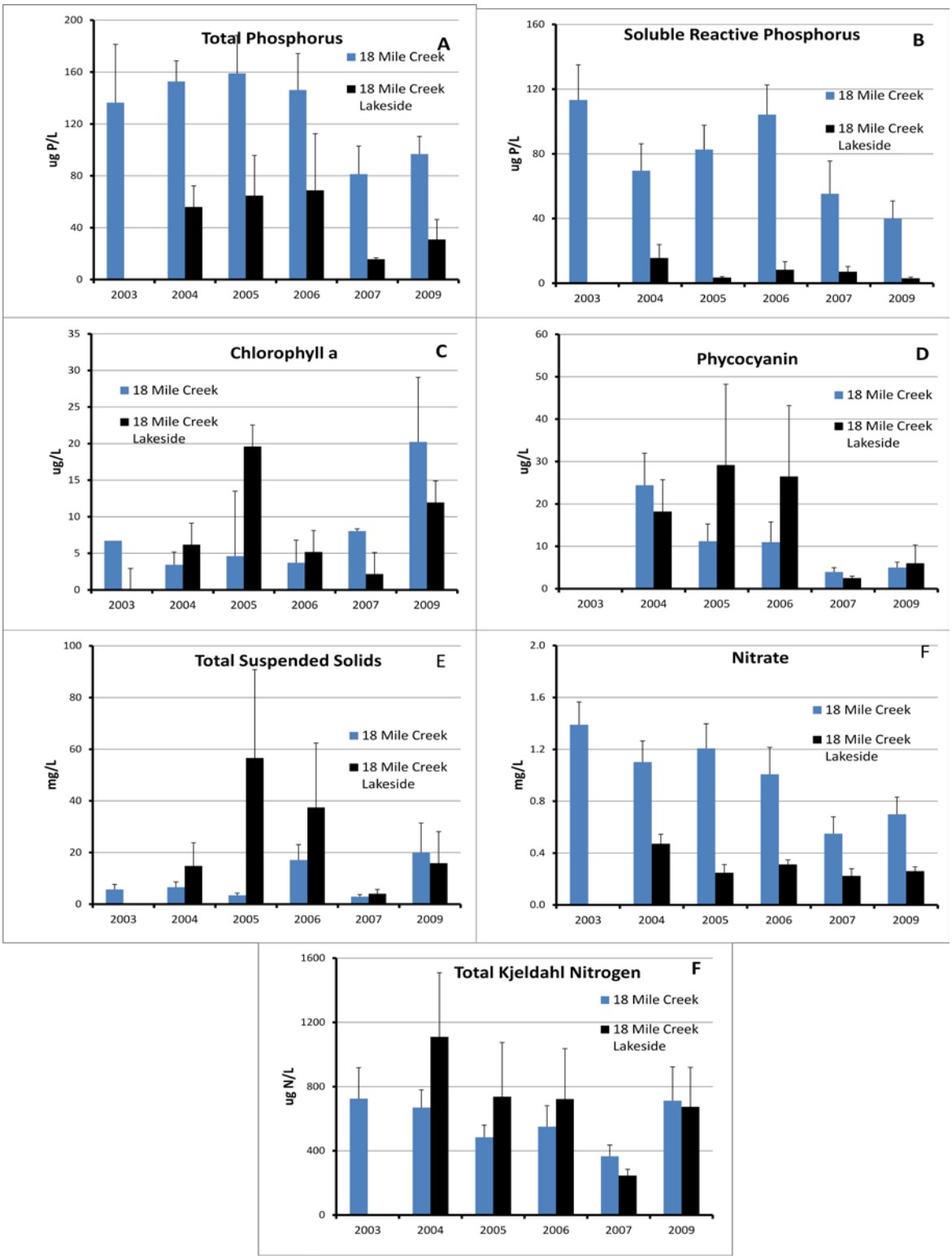

**Figure 2. Average summer (±SE) concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen at the lakeside of Lake Ontario near Eighteenmile Creek.**

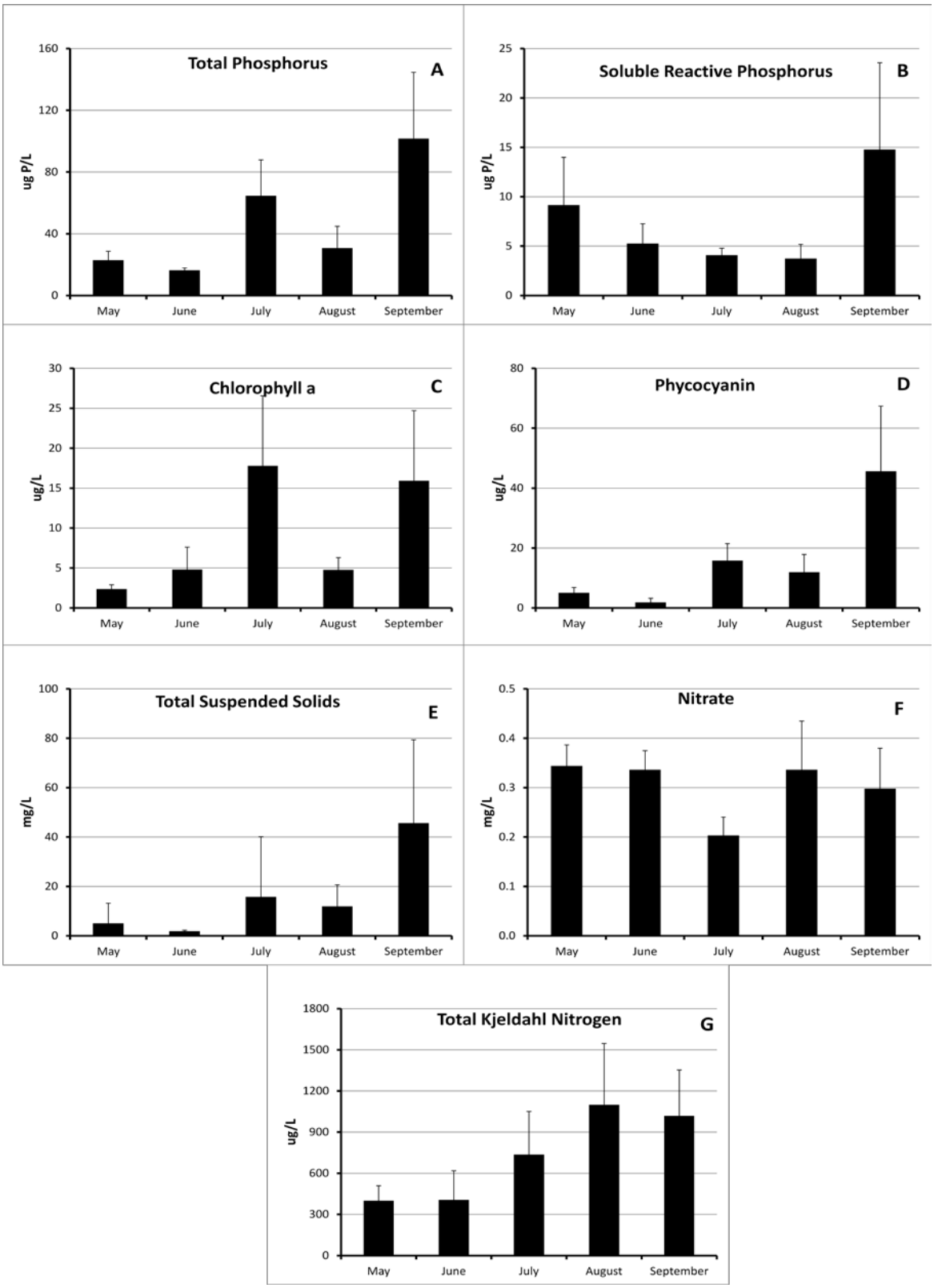

**Figure 3. Average (±S.E) seasonal concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen in Eighteenmile Creek.**