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Genesee River Monroe County, New York

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Originating in Potter County, Pennsylvania, the Genesee River travels 157 miles northward before emptying into the Rochester Embayment at the Port of Rochester on Lake Ontario. The 2,500-mi^2 watershed of the Genesee River is predominately in agriculture and forest until it reaches the suburban urban environment of the City of Rochester, New York. Several wastewater plants, including Eastman Kodak's industrial waste plant (King's Landing) and Scottsville, and Honeoye Falls sewage treatment plants, discharge into the river. Just west and east of the outfall of the Genesee River into Lake Ontario are Charlotte and Durand Eastman Beaches that are periodically closed due to nuisance algae, bacterial abundance, and algal mat development along the southern shoreline of Lake Ontario. The Genesee River is also a major point of access to Lake Ontario and has over 1000 boat slips. The Genesee River's high flow makes it a key contributor to the water quality of the Rochester Embayment in the nearshore zone. This short report provides a synopsis of data collected monthly from May through September (2003 to 2009) on the water quality of the Genesee River and the lakeside (swimmable depth) of Lake Ontario near the mouth of the river.


The Genesee River at the Port of Rochester

Phosphorus is of concern as it stimulates the growth of plants, causing blooms of algae such as *Cladophora*. Both lakeside and river 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 (111.5±43.2 µg P/L) were slightly higher than Genesee River concentrations (78.9±14.9 µg P/L) while river soluble reactive phosphorus (SRP) concentrations (20.5±3.0 µg P/L) were much higher than lakeside concentrations (4.3±1.2 µg P/L). However, phosphorus levels in the lakeside waters (Fig. 1a) were higher than the concentrations in the Genesee River from 2006 through 2009, while the river levels of the previous two years had been higher. Compared to TP concentrations of other Lake Ontario creeks/rivers (83.8±7.0 µg P/L), average TP concentrations in the Genesee River (78.9±14.9 µg P/L) were slightly lower but significantly higher than the concentrations in the offshore waters (9.5±0.7 µg P/L). Algae levels (indicated by *chlorophyll a*, Fig. 1c*)* had shown no trends through the study period; however, 2009 levels were much higher than in previous years. Concentrations of phycocyanin (Fig. 1d), an indicator of the nuisance species of blue-green algae, soil and sediment in the water [total suspended solids (TSS), Fig. 1e] and total Kjeldahl nitrogen (TKN, Fig. 1g) had no trends through the study period. Nitrate (Fig. 1f) levels were consistently higher in the Genesee River than in lakeside waters. Seasonally, lakeside chlorophyll levels spiked in July (Fig. 2c); however, no other lakeside trends were observed. At the river site, TP, SRP, TSS, phycocyanin, and perhaps TKN increased from May to September, while chlorophyll peaked in July and nitrate decreased through the summer period (Fig. 3).

References

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

Makarewicz, J.C., M. Arnold, T.W. Lewis, and C. Beal. 2001. Ecological health of sediments located in the Rochester Embayment, Lake Ontario, NY. Prepared for the Monroe County Department of Health, Rochester, NY.

http://www.monroecounty.gov/p/pw-WastewaterCollectionTreatment.pdf

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. The Genesee River watershed is shown in the insert.

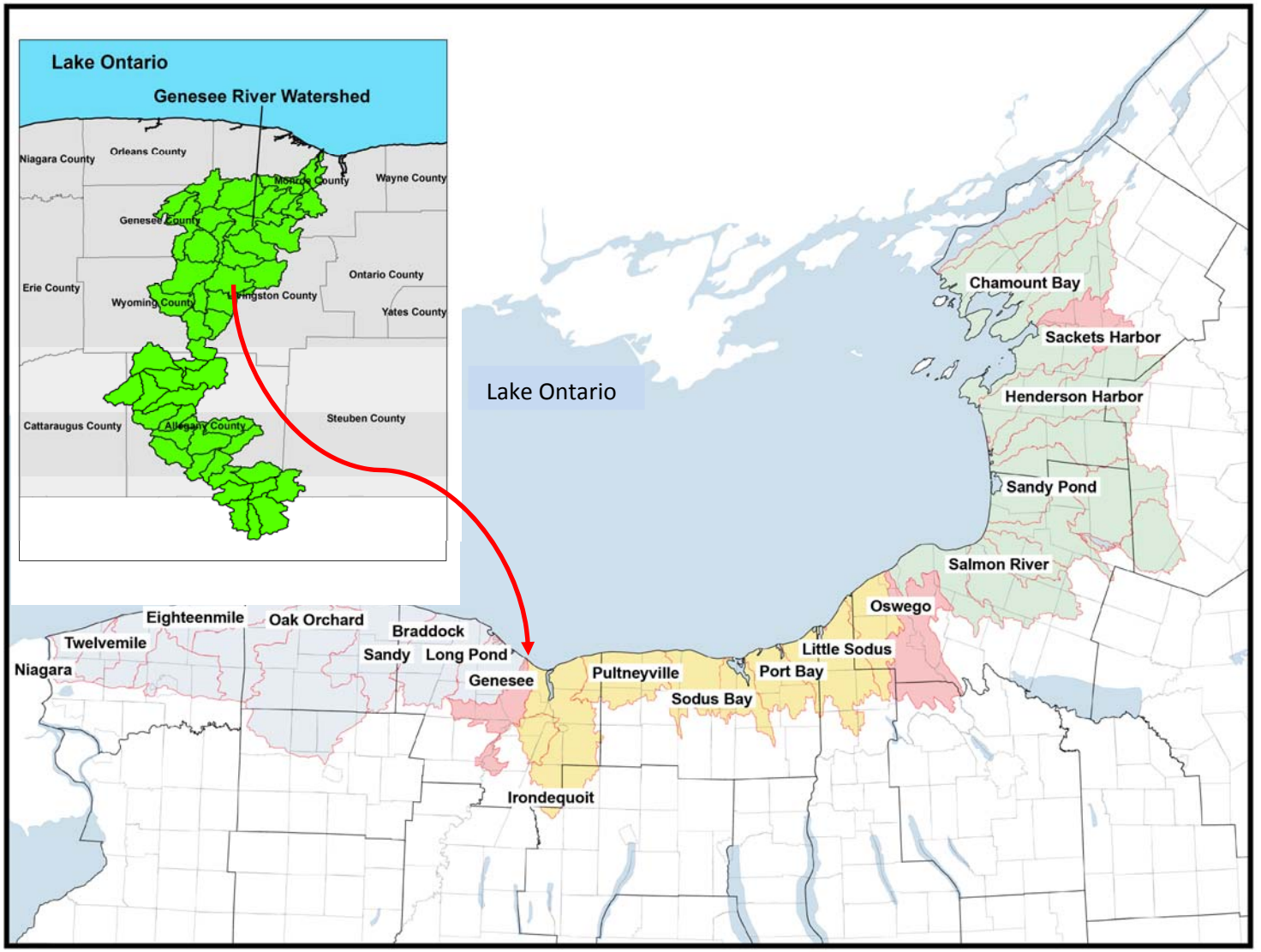

Figure 1. Average (±S.E) summer total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen concentrations at the lakeside of Lake Ontario near the Genesee River and at the Genesee River. Surface water samples were taken monthly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

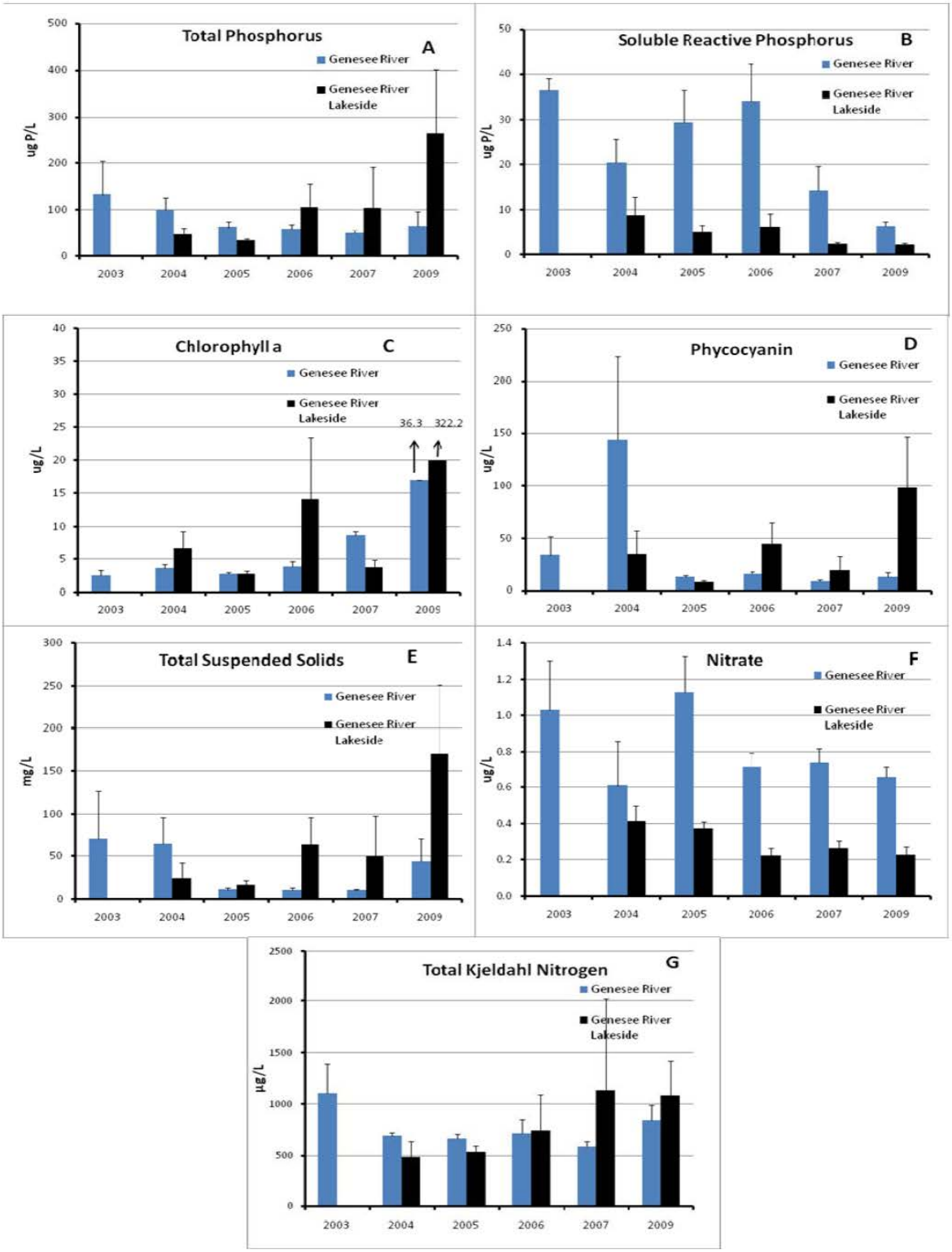

Figure 2. Average (±S.E) seasonal concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen at the lakeside of Lake Ontario near the Genesee River.

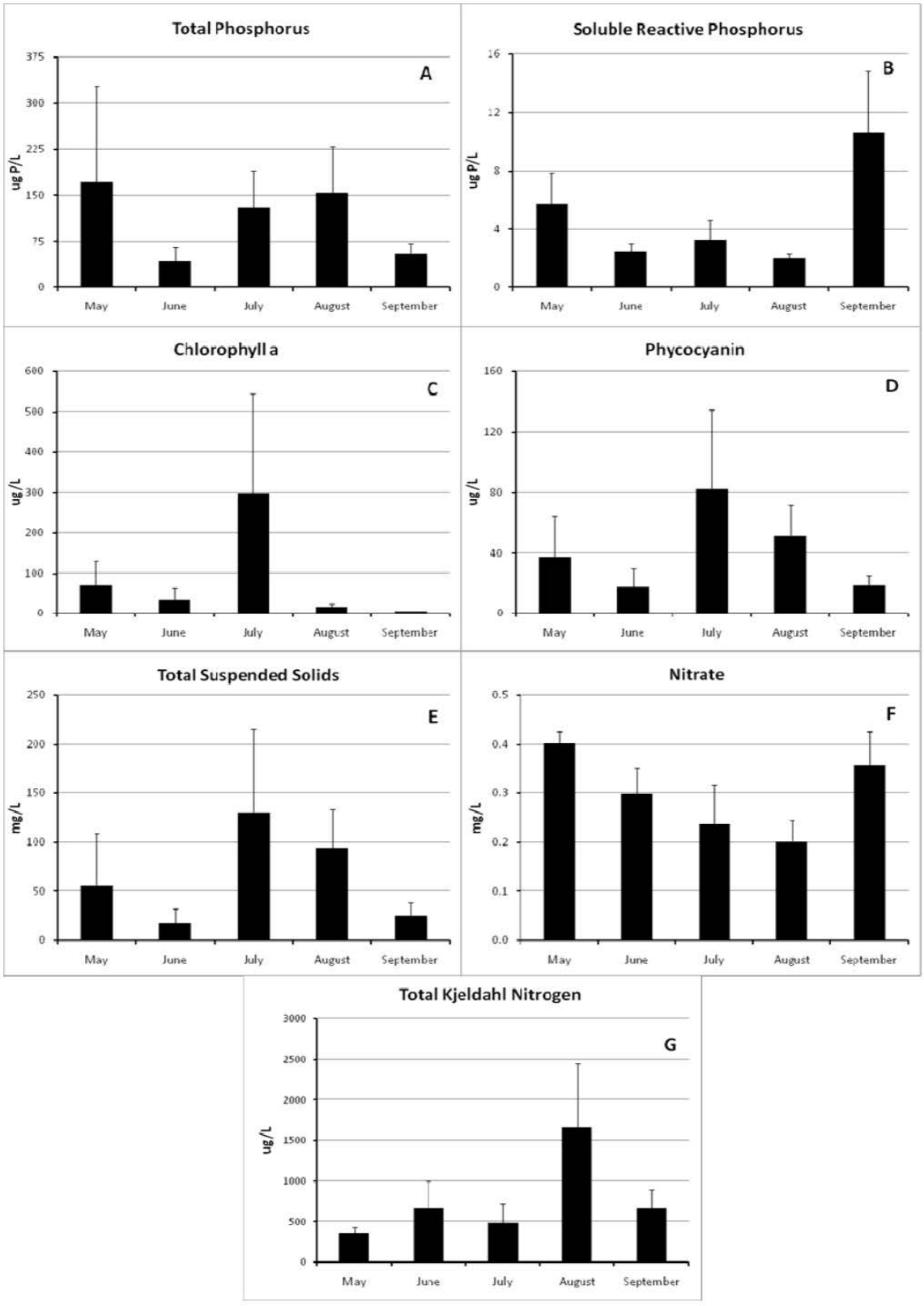

Figure 3. Average (±S.E) seasonal concentrations of total phosphorus, soluble reactive phosphorus, chlorophyll a, phycocyanin, total suspended solids, nitrate, and total Kjeldahl nitrogen in the Genesee River.