Combined Sewer System Impact on the Integrity of an Urban Waterway

Little, S. F. B.; Krygier, L.; Lowry, C. S.
Department of Geology, University at Buffalo, The State University of New York, Buffalo, NY | Email: susanlit@buffalo.edu

Introduction

Combined sewer systems (CSSs) are common in the larger cities of the Great Lakes Region, including Chicago, Milwaukee, and Buffalo. They are designed to capture both sanitary sewage and urban stormwater in a common system for conveyance to the City’s wastewater treatment plant. These systems are designed to manage only a set flow of water, and as a consequence, during large rain events the system is overwhelmed. The influx of stormwater results in both components being discharged, untreated, into nearby waterways by means of combined sewer overflows (CSOs).

Escherichia coli Results

Figure 5. E. coli levels observed during Summer 2013 (A) and Winter 2014 (B).

YSI and HACH Results

Figure 1. CSO distribution (A) and design (B) in the Great Lakes Region.

Research Objectives

Scajaquada Creek, located in Erie County, New York, is primarily an urban stream, running through the heart of the City of Buffalo. Buried, and diverted in the 1920’s, the Creek was then connected to Buffalo’s combined sewer system, via the Scajaquada Drain and CSO #053. This research attempts to create a temporal picture of water quality in the Creek in order to better advise management decisions and mediate health risks associated with the City’s CSS.

Methodology

CSO #053, the point of discharge, was the starting point for this study, which monitored approximately 2.5 miles of Scajaquada Creek over a nine month period. Six constituents were measured monthly using a YSI Multi-probe and a HACH Turbidimeter. These included conductivity, dissolved oxygen, pH, temperature, and turbidity. Seasonal monitoring of the indicator bacteria, Escherichia coli (E. coli), was also completed, and samples were run using the Colilert quantification method.

Conclusions

Preliminary results suggest:
1) Input from CSO #053 has contributed to high E. coli levels, which decrease with distance along Scajaquada Creek. Levels remain detectable, even during winter months.
2) Changes in stream gradient, occurring just before reaches 4 and 9 contribute to increases in turbidity.
3) Increases in conductivity occurring in the winter months and spatially as one moves downstream are most likely related to the use of road salts.

Acknowledgements

This research would not have been possible without the cooperation of Forest Lawn Cemetery and Buffalo Niagara Riverkeeper, in addition to the assistance of Matt Celestino, Dominick Ciuszu, Chelsea Kearney, Katrina Lindey, and Jonathan Malzone. Funding was provided by the Center for Academic Excellence and Creative Activities at the University at Buffalo, The State University of New York.