

Water Quality Index as Applied to Pogues Run

Pogues Run is an urban stream approximately 11 miles in length with its origins on the Eastside of Indianapolis. Throughout much of its course, the surrounding landscape is dominated by residential, urban park, commercial and industrial land uses. Prior to flowing into White River, the last two miles (approximate distance) of Pogues Run is contained in an underground storm sewer informally referred to as the "Pogues Run Box."

In terms of environmental impacts, there are 20 combined sewer overflows along Pogues Run. Some of the combined sewer overflows have been removed or modified due to infrastructure improvements in recent years. The 21st Street bridge over Pogues Run is a useful landmark in terms of defining the location of the combined sewer overflows. All of the combined sewer overflows are South of the 21st Street bridge, while a flood control and wetland mitigation area (approximately 22 acres in size) is situated less than a quarter mile North of the bridge (see map 1).

The flood control area North of the 21st Street bridge was built as part of an overall construction project for a large-scale sports and entertainment venue in downtown Indianapolis. The sports and entertainment venue would remain in the Pogues Run floodplain without the construction of the flood control area. There are not believed to be any documented combined sewer overflows or point sources of pollution that would possibly degrade the quality of the water upstream of the flood control area. The flood control area design should in theory aid in filtering the water from non-point pollution originating upstream of it and result in improved water quality.

The *Canadian Council of Ministers of the Environment* (CCME) water quality index was used for the data collected by the Marion County Public Health Department, Department of Water Quality and Hazardous Materials Management. Using the index, water quality data collected from the fixed collection points along Pogues Run was summarized and scored. For a summary of how the index works, its advantages and limitations, and its relevance to the 10 Essential Public Health Services, please reference the document titled "Water Quality Index As Applied to Fall Creek" which is accessible via the Internet at <http://www.mchd.com/wq/html/waterq.htm>.

Data from two fixed monitoring points along Pogues Run (Emerson Avenue and 21st Street bridge) was used in the index. The Emerson Avenue monitoring point is upstream (North) of the flood control area and in theory has poorer water quality, as the water has not yet flowed through the wetland plants and series of sections within the flood control area designed to slow the flow of water. The 21st Street bridge monitoring point is immediately downstream of the flood control area and as mentioned previously should result in improved water quality. For both monitoring points, the same data parameters were used to determine an overall index value: E. coli levels, pH, dissolved Oxygen and specific conductivity.

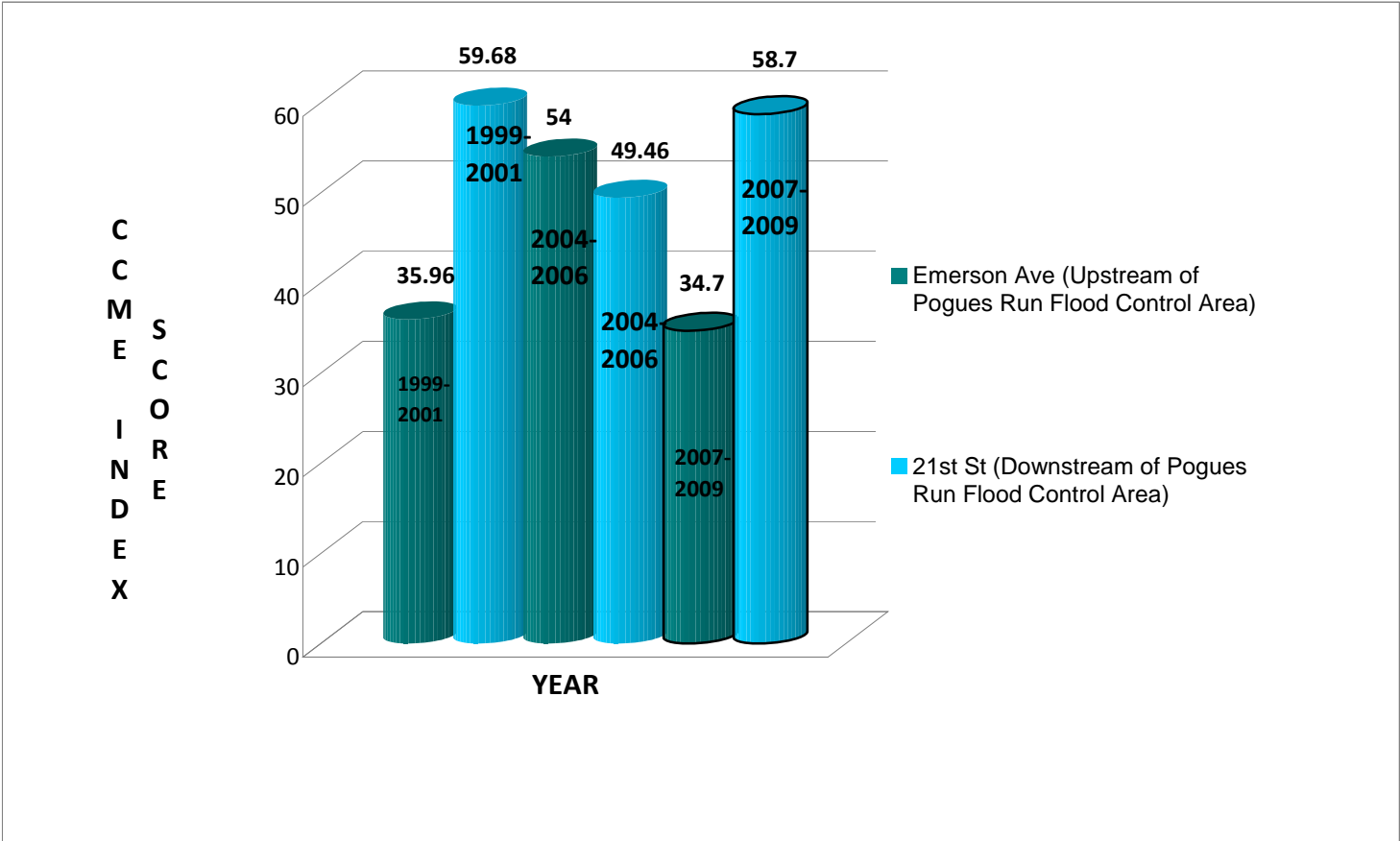
Three time periods of data collection were selected for the index, data collected from 1999-2001, 2004-2006, and 2007-2009. The 1999-2001 data is significant in that it is representative of the water quality of Pogues Run before the flood control area was completed while the 2004-2006 data is representative of Pogues Run after its completion. 2007-2009 data is representative of Pogues Run at least thirty-six months following construction of the flood control area. Graph one shows the final index score for each monitoring point and time period.

The calculated index values indicate marginal water quality for all of the monitoring points and time periods except for the 1999-2001 and 2007-2009 data collected from Pogues Run at Emerson Avenue. The index values for the 1999-2001 and 2007-2009 Emerson Avenue data sets indicate poor water quality. Comparing the 1999-2001 and 2004-2006 time periods to each other, the index score suggests that an improvement in water quality occurred over time at the Emerson Avenue monitoring point while degradation in water quality occurred at the 21st Street bridge monitoring point. Index scores for the 21st Street Bridge monitoring point were interesting. While both time periods were still within the "marginal" water quality classification, the actual index score for the 2004-2006 time period (49.46) was less than the 1999-2001 time period (59.68). The lowering of the index value of the 21st Street monitoring point is contrary to what is expected given the potential benefits the flood control area might provide in terms of water quality. The reduction in the index score for the 21st Street bridge monitoring point (only) occurring between the 1999-2001 and 2004-2006 data collection period is not significant. The data collection time period of 2007-2009 is interesting in that the index scores for both monitoring points is almost identical to the index scores for the pre-construction time period of 1999-2001.

The Department of Water Quality and Hazardous Materials Management plans on utilizing the CCME water quality index for future data collected from Pogues Run at Emerson Avenue and 21st Street monitoring points. Additional summaries are planned as new data is collected and analyzed.



Map One, Aerial of Monitoring points and location of flood control area.



Graph One, Calculated index score for both monitoring points and all data collection time periods.