# 2017 Biological and Water Quality Assessment of the Upper Des Plaines River and Tributaries

## Background

In 1969, the Cuyahoga River in Cleveland, Ohio was saturated with raw sewage, industrial waste, floating debris, and no sign of aquatic life. Sparks from a passing train set fire to the river for the 13th time, and when photos were published, concern erupted nationwide. In response, Congress passed the Clean Water Act (CWA) (1972) the primary objective of which is to restore and maintain the integrity of the nation's waters.

For many years, the focus of the CWA was on the chemical aspects of the water quality integrity goal. During the past three decades, however, more attention has been given to physical and biological integrity. As CWA programs have evolved over nearly 50 years, they have shifted approach, from program-by-program, to more holistic watershed-based strategies. These strategies are guided by holistic indicators, such as biological assemblages (varifying that all of the various species that exist in a particular habitat are present). Under this type of watershed approach, equal emphasis is placed on protecting healthy waters and restoring impaired ones. A full array of issues are addressed, not just those subject to CWA regulatory authority.

The DRWW hired three contractors to collect data on the health of the rivers and streams in the watershed, and by the end of 2016, they had collected the baseline data. On Aug. 31, 2017, DRWW received the draft report from one of DRWW's contractors, Midwest Biodiversity Institute, on the results of the baseline data. The draft report, "Biological and Water Quality Assessment of the Upper Des Plaines River and Tributaries 2016" is summarized below.

## What is a Biological and Water Quality Survey?

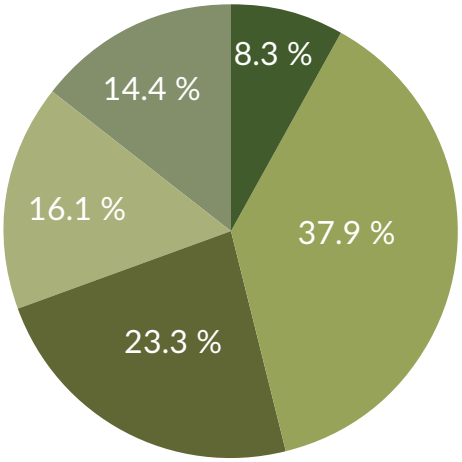
A biological and water quality survey, or "bioassessment", consists of (1) a biological survey (how many and which species of fish, macroinvertebrates, insects, etc. live in the stream), (2) sampling for pollutants in water and sediment, and (3) an assessment of the quality of habitat the stream provides for the fish, invertebrates, and other organisms that need to live there in order for it to be healthy.

The goal of the biological and water quality survey is to document; pollutants in the water and sediments, the amount of habitat the stream provides, the amount of life in the stream, and the major stressors that affect the health of the stream. This data is compared to the Illinois Water Quality Standards, specifically the Aquatic Life Use Standard, to determine if the sampling location meets the standards or, if it doesn't, it is labeled "non-supporting" or "partially supporting."

Of the 69 sites assessed:

0 were fully supporting (met all standards)
22 were non-supporting-fair
26 were non-supporting-poor
21 were partially supporting

The main reason why most of the non-supporting and all of the partially supporting sites did not meet the standards was due to a lack of diversityin fish species found.




## Major Causes Associated with Aquatic Life Impairments: Upper Des Plaines 2016

- Siltation (37.9%)
- Chlorides/Conductivity (23.3%)
- Habitat-Related (16.1%)
- Org. Enrich./D.O./Nutrients (14.4%)
- PAH/Manganese (8.3%)

## Causes

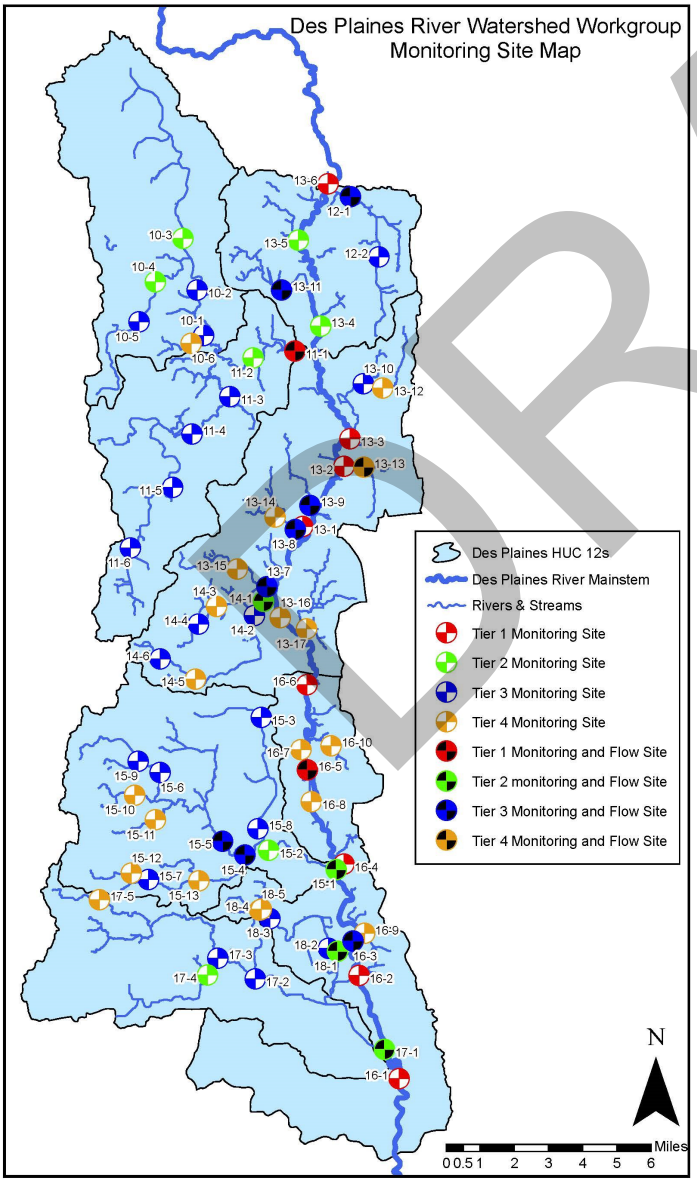
The reasons the standard was not met, or the major causes for non-support, were identified based on lines of evidence and professional judgment.

- Siltation* reduces spawning and feeding habitat for fish
- Chlorides* are harmful to many animals living in rivers and streams
- Habitat-Related (refers to things like: no riparian zone, bank erosion, channel modification)
- Organic Enrichment/Dissolved Oxygen/Nutrients create low oxygen levels that some fish cannot tolerate or large fluctuations of oxygen in the water between day and nighttime, which is stressful on fish
- PAH/Manganese are pollutants

*Siltation and Chlorides were pervasive (found at almost all sampling sites).

## Sources of the Causes

1. Urban runoff (sediments, nutrients, pollutants, streambank erosion)
2. Habitat alterations (straightening streams, dams, etc.)
3. Altered hydrology (rainwater not soaking into the ground, loss of native ecosystems such as wetlands)
4. Wastewater Treatment Plant discharge (nutrients, pollutants)




## Conclusions

The problems most commonly found across all the 69 sites sampled were: (1) heavy siltation caused by habitat alterations and altered hydrology from urban and suburban stormwater runoff and (2) high levels of chlorides from road salting.

## Recreational Use

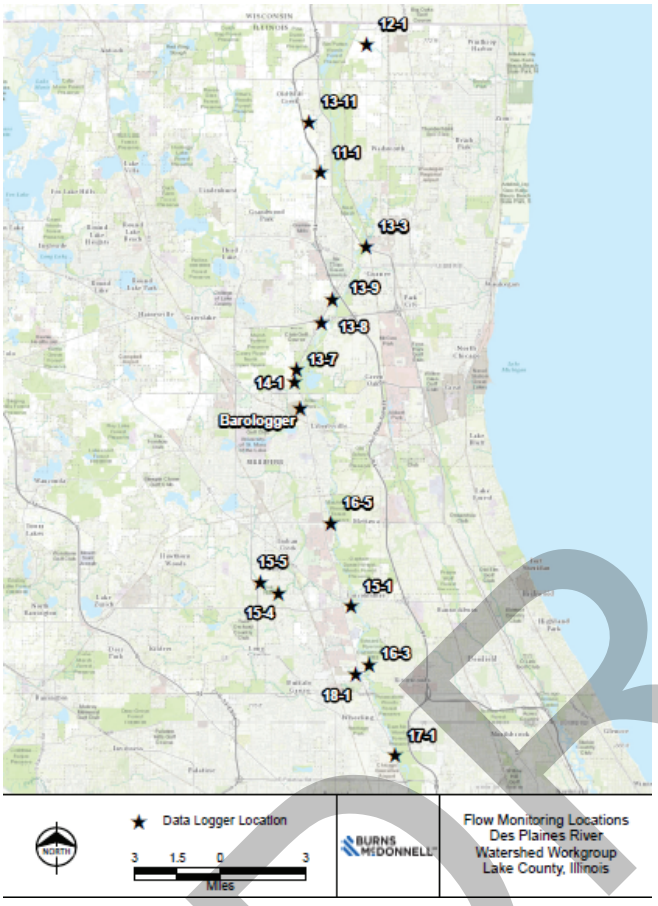
The recreational use in and on the waters in the watershed were evaluated based on amount of E. Coli bacteria found in samples. Many samples had higher levels of E. Coli then recommended by the U.S. EPA. Wastewater treatment plant discharge and stormwater runoff from urban and agricultural land are the possible sources of the high levels.

## Questions?

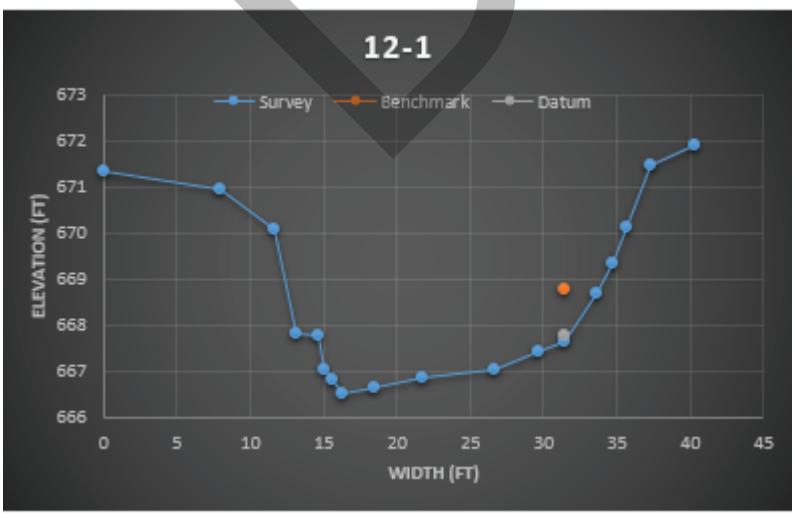
If you have questions or would like more informtion, please contact Beth Adler, the DRWW Technical Coodinator at 847-377-7702 or badler@lakecountyil.gov

# 2017 Summary of: Des Plaines River Watershed Flow Monitoring Project

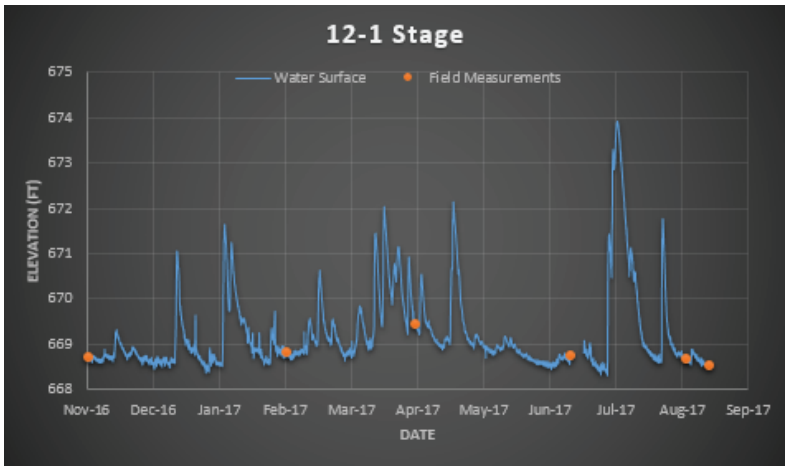
One of DRWW's contractors, Burns & McDonnell Engineering Company, Inc. (B&M), installed a flow monitoring network of 15 in-stream stage data loggers in late 2016 and collected data from the data loggers in 2017 to estimate flow in the Main Branch of the Des Plaines River and its tributaries. Data from six existing U.S. Geological Survey (USGS) data loggers were also used, equaling 21 locations overall. Flow data helps estimate pollutant loads and track water quality and biological community trends.



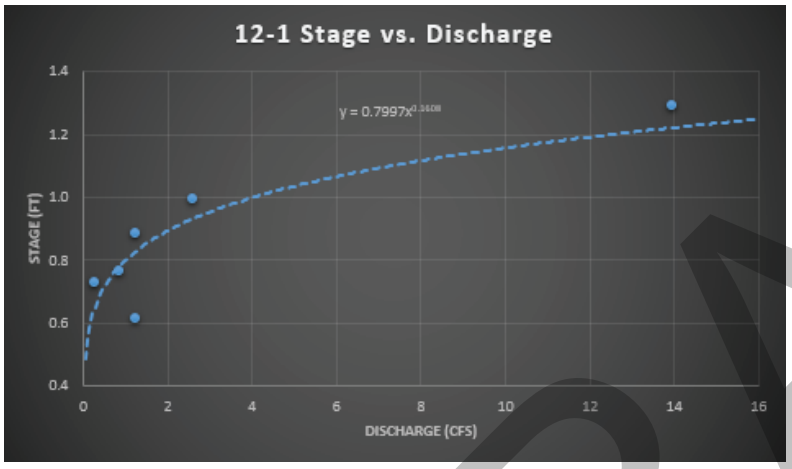

Field measurements were taken six times at the 15 locations to confirm that the data collected by the loggers reflected actual field conditions.




All of this data was used to create three graphs for each of the 15 locations. The first graph illustrates the x-section of the stream where the data logger was installed.




The second graph shows the elevation of water in the stream over time. The red dots are where the actual measurements were taken by field crews.




The third graph is the Stage vs. Discharge graph, which allows us to estimate the amount of flow in that section of the stream during various water levels (or during rain events). The blue dots are the actual field measurements taken by field crews.



The proposed monitoring locations were chosen based on a qualitative review of the current DRWW stream monitoring network within the watershed. Sites were chosen based on position in the watershed, proximity to existing gauge stations, proximity to existing water quality sampling locations, and relative contribution of flow from subwatersheds. The study was intended to establish a baseline of monitoring locations and begin to develop reliable stage-discharge relationships that can be used to estimate pollutant loads within the watershed. Pollutant loads are calculated as the product of stream discharge and the concentration of a pollutant in water. Loads can be calculated as an instantaneous value or summed to provide an annual load. Understanding the relative magnitude and timing of pollutant loads across subwatersheds is a powerful tool for prioritizing water quality improvement projects and determining where to allocate scarce resources.

All of the Stage vs. Discharge graphs can be located on DRWW's website, at www.DRWW.org. Once there, click on the "Maps & Photos" tab, select "Maps," and then click "Lake County Impaired Waters Web Map (WebApp)." The flow monitoring locations are identified by rain clouds, just click a cloud to view the map - you may have to scroll down on the dialog box to see the map. If you have any questions, feel free to contact Beth Adler, the DRWW Technical Coordinator, at 847-377-7702 or Badler@lakecountyil.gov.