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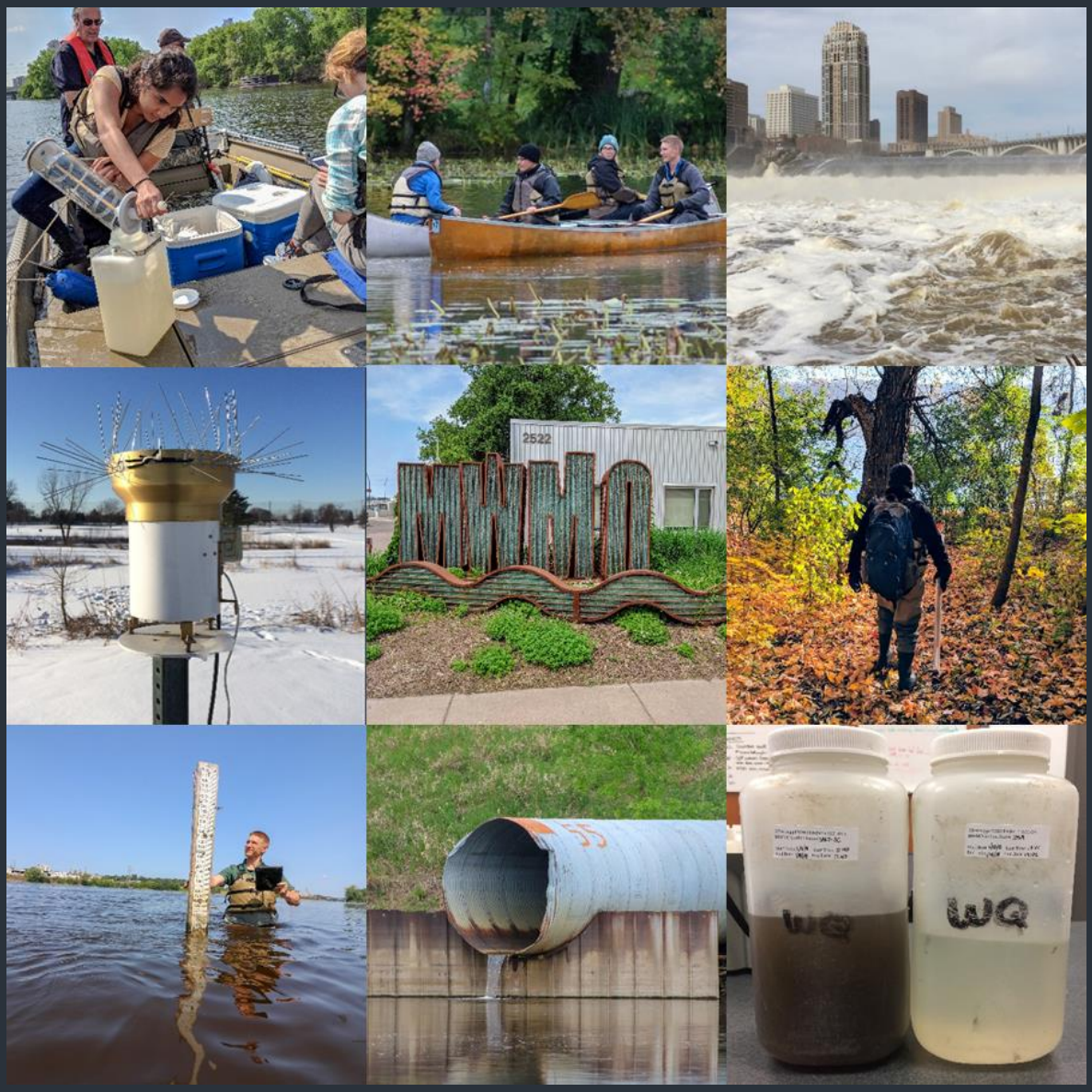
MISSISSIPPI WATERSHED MANAGEMENT ORGANIZATION

2018 Monitoring Executive Summary



MWMO Watershed Bulletin: 2019-1

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Acknowledgements

MWMO would like to acknowledge the monitoring work in 2018 of Water Resources Specialist Jennifer Keville and Water Quality Interns Shanti Penprase, Kyle Blazek, and Rikita Patel.

Suggested Citation

Mississippi Watershed Management Organization. (2021). *2018 Monitoring Executive Summary*. MWMO Watershed Bulletin 2019-1. 8 pp.

Front Cover

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Published date: June 2021

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Executive Summary

The Mississippi Watershed Management Organization's Monitoring team has completed another successful and active year of monitoring the watershed and is pleased to share the results of their work. The Monitoring section of the MWMO website has been updated with the latest precipitation, stormwater, river water quality, river bacteria, and lake monitoring data from 2018. Data summaries from other years can also be found on those pages.

Each year, MWMO staff publishes an annual report that summarizes the year's activities and outlines the next year's work plan. MWMO monitoring staff have begun publishing monitoring data results and summaries in the monitoring section of the website on an annual basis in lieu of a compiled monitoring report. This change has been made to make the data results more accessible and understandable. Current and past reports are available on the MWMO website at mwmo.org/monitoring-and-reports/water-quality-monitoring.

The MWMO monitors water quality in the watershed's stormwater drainage system, the Mississippi River, lakes, and wetlands. Within these systems, major factors influencing water quality include the amount of precipitation, timing of precipitation events, and land use practices in the watershed. Long-term monitoring is necessary to characterize the impact of various land use practices on surface water runoff within the MWMO and, ultimately, the Mississippi River. Water quality in the Mississippi River is also influenced by precipitation and land use practices in the entire Mississippi River basin upstream of the MWMO. Long-term monitoring of the river will aid the understanding of upstream weather patterns and land use impacts on the MWMO watershed.

The 2018 monitoring season included collection of precipitation data from eight monitoring locations, collection of bacteria and other water quality samples from seven locations in the Mississippi River, collection of water quantity and/or water quality data from five stormwater outfall sites draining to the Mississippi River and one stormwater pipe at the jurisdictional boundary of the Cities of Saint Anthony Village and Minneapolis, and collection of water quality samples from five stormwater best management practices. The Anoka Conservation District (ACD) collected water elevation at Sullivan Lake and Highland Lake for the MWMO.

As previously mentioned, MWMO monitoring staff collected precipitation data across the MWMO watershed. In 2018, the average total rainfall was 21.91 inches and the location with the most rainfall in one month was the rain gauge at Waite Park Elementary with 5.59 inches in September. January had the lowest average precipitation (0.19 inches), and the highest average precipitation was in September (4.76 inches).

Portions of the 14-mile stretch of the Mississippi River in the MWMO are listed on the Federal Clean Water Act's Section 303(d) list of impaired waters for fecal coliform. The Minnesota Pollution Control Agency (MPCA) has moved from a fecal coliform standard to an *Escherichia coliform* (*E. coli)* standard; therefore, all fecal coliform impairments are now evaluated with *E.*

coli data. Long-term monitoring of both the river and the stormwater drainage system is necessary to evaluate *E. coli* inputs from within the watershed compared to those inputs from upstream sources. The MPCA initiated the Upper Mississippi River Bacteria Total Maximum Daily Load (TMDL) Project in 2008 to develop daily *E. coli* load limits for the Mississippi River. In 2014, the MPCA released its Upper Mississippi River Bacteria TMDL Study and Protection Plan. This document designated the stretch of the Mississippi River within the MWMO as a Protection Reach and deferred it for a TMDL study. Within the MWMO, the Mississippi River is divided by the Saint Anthony Falls into two reaches for classification. Above the Saint Anthony Falls, the river has a water use classification of 2Bd (aquatic life and recreation and source of drinking water). Below the Saint Anthony Falls, the water use classification is 2B (aquatic life and recreation). The chronic standard for *E. coli* in 2B and 2Bd waters is 126 CFU/100 mL for a monthly geomean of at least five samples. The MPCA *E. coli* acute standard states that *E. coli* cannot exceed 1,260 CFU/100mL in more than 10 percent of the samples taken in one month. In 2018, 104 river samples were collected April through November. No river sites exceeded the acute standard. Four river sites exceeded the chronic standard in June, five sites exceeded the standard in September, and four in October. One sampling event in October occurred concurrently with a rain event.

MWMO staff began collecting water quality samples from the Mississippi River in 2014. The purpose of monitoring the water quality of the Mississippi River is to establish baseline water quality data within the watershed that can be used for understanding characteristics of the river and how they may change over time. Water quality measurements and samples were collected at seven sites, twice per month April through October and once per month January, February, March, November, and December. MWMO monitoring staff collected 100 river water quality samples in 2018. Sampling locations in the Mississippi River and within the MWMO's boundaries were selected to represent three distinct reaches of the river. Each site is located within, at the beginning of, or at the end of a river reach. Samples were collected from the middle of the river at three feet below the water surface and were analyzed for nutrients, sediment, inorganics, organics, and metals. MWMO staff also records river water elevation data April through October. MWMO monitoring staff recorded a total change of 5.4 feet at the MWMO river gage, and the river rose 3.3 feet higher and 2.1 feet lower than the five-year average elevation of 800 feet. The lowest elevation recorded was 797.7 feet in September and the highest recorded elevation was 803.3 feet in April. MWMO staff also continued to collect bathymetric data on the Mississippi River between Lock and Dam 1 and the Canadian Pacific Railway (CPR) Bridge in line with North 41st Avenue. The purpose of collecting Mississippi River bathymetric data is to provide baseline data on the shape and condition of the river bed and how it changes over time.

The MWMO continued monitoring water quantity and water quality of the watershed's stormwater drainage system by monitoring baseflow, snow-melt and rain events in six stormwater tunnels draining to the Mississippi River. In 2018, MWMO staff collected 228 stormwater quality samples. Samples were analyzed for nutrients, sediment, *E. coli*, inorganics, organics and metals. Water quality standards do not exist for stormwater; therefore, data were not compared to standards. The MWMO will continue to monitor stormwater drainage systems to develop a record of baseline data with which to characterize stormwater quality within the

watershed. The MWMO also provides stormwater data to the MPCA for TMDL projects within the watershed. To support the MWMO and City of Minneapolis's H and H modeling effort, the MWMO collected stormwater data in additional tunnels within monitored subwatersheds. Due to high river levels, two of the outfall monitoring locations, 6UMN and 4PP, were under river water for some parts of the year, including about 20 days in the spring, 22 days in the summer, and 11 days in the fall. In 2018, approximately 139,375,000 gallons of stormwater passed by the 10SA monitoring station, 277,496,000 gallons at 11CHF, 257,053,000 gallons at 1.2NE, and 618,037,000 gallons of stormwater passed by the 6UMN monitoring station. Stormwater quantity data were not collected at 4PP due to ongoing construction work in the tunnel but water quality samples were collected when possible.

In 2018, the MWMO monitored the effectiveness of four best management practices (BMPs) within the watershed. The monitored BMPs include: St. Anthony Regional Treatment and Research System (SART), Towerside District Stormwater System (Minneapolis), Edison High School Green Campus parking lot tree trench and athletic field underground storage tank (Minneapolis), and the MWMO Stormwater Park and Learning Center and its Media Filter Beds (Minneapolis). MWMO monitoring staff collected stormwater flow, volume, and water quality data at SART, Edison High, and MWMO Stormwater Park, and tank and outlet level at Towerside.

The MWMO contracted with the ACD to conduct water level monitoring activities on Sullivan Lake and Highland Lake in Columbia Heights. Water levels were measured 24 times in 2018 between April and October. Sullivan Lake fluctuated 2.64 feet and Highland Lake level fluctuated 0.5 feet. Detailed summaries of these data are located on the Lake Monitoring page of the website. In October 2018, MWMO staff collected bathymetric data at both lakes.

Fieldwork continued for the research study with the University of Minnesota Bioproducts and Biosystems Engineering Department in downtown Minneapolis to investigate the water quality of stormwater runoff from four different types of impervious surfaces. Three different streets, sidewalks, parking lots, and rooftops were test sites for this study. The water quality samples and runoff data from the street, sidewalk, and parking lot surfaces were collected using a rainfall simulator. The roof sites were outfitted with automated samplers to collect rainfall and runoff data. More details of the study and results can be found here: Analysis of Runoff from Impervious Surfaces in Downtown Minneapolis.

2018 Monitoring Data (Links)

- Precipitation (PDF)
- Stormwater water quality and water quantity (located under site descriptions)
- River water quality (PDF)
- River elevation data (PDF)
- River bacteria (PDF)
- Sullivan and Highland Lakes (PDF)