



Des Plaines River Watershed Workgroup 2020 Monitoring Strategy

Purpose

This Monitoring Strategy for the Des Plaines River Watershed in Lake County Illinois was developed by the Monitoring Committee of the Des Plaines River Watershed Workgroup (DRWW). This 2020 Monitoring Strategy update is being written to document changes to the DRWW's monitoring program beginning in 2020.

The Monitoring Strategy is considered a living document. The DRWW Monitoring Committee will continue to use adaptive management to review the results of the monitoring program and will revise and update the Monitoring Strategy if changes are needed. In 2020, the DRWW plans to modify its Monitoring Strategy to focus the attention on the Watershed Group's Nutrient Assessment Reduction Plan (NARP).

Review

In 2016, 44 locations were sampled for water chemistry, 49 locations for sediment, and 69 locations were sampled for biology. Midwest Biodiversity Institute's (MBI) Biological and Water Quality Assessment of the Upper Des Plaines River and Tributaries (2016) report documents the results of the baseline sampling.

In 2017, the DRWW sampled 70 locations; 50 locations for water chemistry, and 1/3 of the 70 sites for biological/sediment. Indian Creek, Aptaksic Creek, and Buffalo Creek subwatersheds plus direct tributaries to Des Plaines River adjacent those subwatersheds and nested between the mainstem and the subwatershed boundaries (23 sites) were sampled for biology/sediment. Continuous Flow Monitoring was conducted at 21 locations. Chlorophyll-a sampling and continuous monitoring at 14 locations for temp, pH, DO, and specific conductance.

In 2018, the DRWW sampled 71 locations for water chemistry, and 1/3 of the 71 sites for biological/sediment. The Upper Des Plaines mainstem (18 sites) plus small direct tributaries to the lower one-half of the mainstem (2 sites) were sampled for biology/sediment in 2018 (1/3 of the watershed). Continuous Flow Monitoring was conducted at 21 locations. Chlorophyll-a sampling and continuous monitoring was collected at 14 locations for temp, pH, DO, and specific conductance. Winter season Continuous Monitoring program for conductivity as a surrogate for chlorides was collected at 9 locations.

In 2019, the DRWW sampled 73 locations for water chemistry, and the remaining 1/3 of the 73 sites for biological/sediment. This included sites in the Mill Creek and Bull Creek sub-watersheds plus direct tributaries to the Des Plaines River adjacent to those two watersheds and nested between the mainstem and the sub-watershed boundaries (30 sites). Continuous Flow Monitoring was conducted at 21 locations. Chlorophyll-a sampling and continuous monitoring was collected at 14 locations for temp, pH, DO, and specific conductance.

In addition to sampling, DRWW has contracted with MBI for Integrated Prioritization System (IPS) Modeling - An in-depth analysis of all chemical, physical, and biological data collected. The DRWW has also contracted with Geosyntec to develop a Preliminary Nutrient Assessment Reduction Plan workplan for the Dees Plainses River. The scope of work should be completed in early 2020.

Two Quality Assurance Project Plans (QAPPs) were developed for the monitoring program. The Bioassessment QAPP and the Flow Monitoring QAPP are appended to and inform this Monitoring Strategy.

Introduction and Background

The Des Plaines River Watershed covers over 130,000 acres or just over 200 square miles. The river starts just west of Kenosha, Wisconsin and flows south through Racine and Kenosha Counties in Wisconsin, and then through Lake, Cook, and Will Counties in Illinois. The river then joins the Sanitary and Ship Canal in Lockport, flows west through Joliet, before converging with the Kankakee River to form the Illinois River. The Illinois River then flows into the Mississippi River which flows south to the Gulf of Mexico.

Portions of the Des Plaines River, tributaries and lakes within the watershed in Lake County are listed as impaired by the Illinois EPA and do not meet their designated uses under the Clean Water Act. Segments are listed as impaired for pollutants including arsenic, chloride, dissolved oxygen, fecal coliform, iron, manganese, methoxychlor, mercury, phosphorous, polychlorinated biphenyls, and total suspended solids. Phosphorous is currently limited by regulatory action through Publicly Owned Treatment Works (POTWs) National Pollutant Discharge Elimination System (NPDES) permits. In addition, Total Maximum Daily Loads (TMDLs) have been completed for some stream segments and lakes within the watershed and more may continue to be developed. However, it is unclear as to whether any of these regulatory mechanisms will ultimately allow for the impaired waterbodies to meet Clean Water Act standards.

The Des Plaines River Watershed Workgroup (DRWW) brings together local stakeholders to 1) better determine stressors to the aquatic system through a long term water quality monitoring program; and 2) to work together to preserve and enhance water quality in the Des Plaines River and its tributaries. This 2018 monitoring strategy was developed by the DRWW Monitoring Committee.

Program Goals

The DRWW will undertake a comprehensive monitoring program to fulfill the following goals:

- Develop and implement a comprehensive monitoring program that will include chemical, physical, and biological components that will accurately identify the quality of stream and river ecosystems as well as stressors associated with non-attainment of water quality standards and designated uses. The DRWW monitoring program will establish baseline conditions, and then measure progress towards meeting water quality standards. Baseline conditions were established and documented in MBI's report Biological and Water Quality Assessment of the Upper Des Plaines River and Tributaries (2016).
- Assist NPDES permittees in meeting monitoring permit requirements, including monitoring requirements for upstream and downstream of POTWs and Municipal Separate Storm Sewer Systems (MS4s).

- Develop a Nutrient Assessment Reduction Plan with the intended purpose to identify phosphorus input reductions and other measures needed to help ensure that dissolved oxygen and offensive aquatic algae and aquatic plant criteria are met throughout the watershed.

The revised monitoring program will focus on meeting the analytical requirements of the NARP while continuing to document the existing water quality status of the rivers and streams of the Des Plaines River watershed within Lake County, Illinois. The monitoring program will emphasize the direct assessment of biological assemblages by sampling fish and macroinvertebrates using standardized sampling and assessment methodologies. In addition to determining aquatic life status, the monitoring program will also ascertain the associated causes and sources associated with biological impairments by using paired chemical, physical, and other stressor data and information within a systematic analytical process detailed in a comprehensive plan of study, specifically monitoring habitat and water and sediment chemistry.

Water Column and Sediment Chemistry Monitoring

Water column and sediment chemistry is being sampled using a tiered site design to allow for more frequent monitoring of sites with greater flow and tributary area while still allowing for comprehensive coverage of the watershed. Water samples will be collected using grab samples upstream of the monitoring station unless otherwise noted in site description maps. If high pollutant loads are detected, follow up sampling at a refined scale may be undertaken to further determine the cause.

- Tier 1: 14 sites located on the mainstem Des Plaines River and Mill Creek. These sites will be included in the biological assessment, sestonic and benthic chlorophyll a studies, and water column and sediment monitoring programs.
- Tier 2: 41 sites located on the Des Plaines and tributary streams. These sites will be included in the 6-year biological assessment and water column and sediment monitoring programs.
- Tier 3: 18 stream stations located on tributary streams within the watershed. These sites will be included in the 6-year biological assessment and water column monitoring programs.

The following is a summary of the DRWW Monitoring Program for 2020:

- **Water Column Sampling/Analysis Programs**
 - 73 Monitoring Locations for 2020
 - Five water column collection periods in 2020
 - February, May, July, August, & September
 - Increase monitoring for nutrients to 4 “summer” sampling periods.
 - Add Dis. Reactive Phosphorus & ammonia nitrogen to parameters. These changes address needs from NARP.
 - Remove metals & organics from Water Analyses Program.
 - Reduce monitoring for E. coli, conductivity, chloride, sulfate, hardness to 2x/year. (February & August)
- **Sediment Sampling/Analysis Programs**
 - Samples sediment every 6 years
 - Continue to Sample Sediments at Tier 1 & 2 Sites
 - This will focus on metals, and organic chemical analyses

- **Bioassessment Monitoring Program**
 - Conduct full Bioassessment (73 sites) every 6 years
 - Conduct Bioassessment Studies bi-annually on 14 core sites and 6 additional sites located on the main stem of the Des Plaines River beginning in 2020.
 - This bi-annual assessment will be used to track progress of biology scores within the watershed.

- **Continuous Monitoring / Chlorophyll a Sampling & Analyses Programs**
 - Deployment of data sondes collecting D.O. temperature, TSS, pH, chlorophyll and conductivity data.
 - Deploy continuous monitoring sondes year round at 3 sites on annual basis. Sites 13-6, 13-1 and 16-4 on main stem.
 - Collection of benthic chlorophyll a samples annually at 14 core sites.
 - Sampling & analysis of sestonic Chlorophyll a at 14 sites over four summer-time sampling dates.

Quality Assurance Project Plan

All monitoring is being conducted under two Illinois EPA approved QAPPs. The DRWW used the DuPage River Salt Creek Workgroup's (DRSCW) approved QAPP and adapted it to be watershed specific for the Des Plaines Watershed bioassessment monitoring. A separate QAPP was developed and submitted to Illinois EPA for flow monitoring.

Illinois EPA requires the development of a QAPP for any activity involving the collection and analysis of environmental data. A QAPP presents the policies and procedures, organization, objectives, quality assurance requirements, and quality control activities designed to achieve the type and quality of environmental data necessary to support project or program objectives. It is the policy of Illinois EPA that no data collection or analyses will occur without an approved QAPP. All in-house and external environmental data collection activities are subject to this requirement. All contracts must address quality assurance requirements (e.g., data quality and reporting requirements) when those contracts pertain to, or have an impact on, data collection or analysis activities. Additionally, all grants and contracts need to address quality assurance requirements specified in applicable state acquisition or procurement regulations. The DRWW QAPP follows U.S. and Illinois EPA guidance for the development of a project specific QAPP.

Data and Reporting

Suburban Labs, the water and sediment chemistry contractor, sends water column and sediment chemistry data to the DRWW following analysis via email in the format of one final report of laboratory analysis in pdf form per site. After data is collected at each site for that sampling event, the laboratory sends an Excel spreadsheet summarizing all sites and parameters. DRWW staff take this data and format it to fit the Illinois EPA requirements for reporting surface-water - monitoring data format (EDDMasterStructureAndFormat_VersionAsOf2015_06_30_ToChrisDavis_2016_02_1...).

Midwest Biodiversity Institute (MBI), the bioassessment contractor, will send biological data to the

DRWW and will be appended to the project database.

MBI will also be responsible for completing a final monitoring report, analyzing the results of the water column and sediment chemistry as well as the fish, macroinvertebrate, and habitat data. Interpretative statistics, such as long-term central tendencies, will be based on all available data within the database, developed over time, including past data collection efforts.

Data will be submitted annually to Illinois EPA by March 31.