



Des Plaines River Watershed Workgroup

MAY 2022 NEWSLETTER



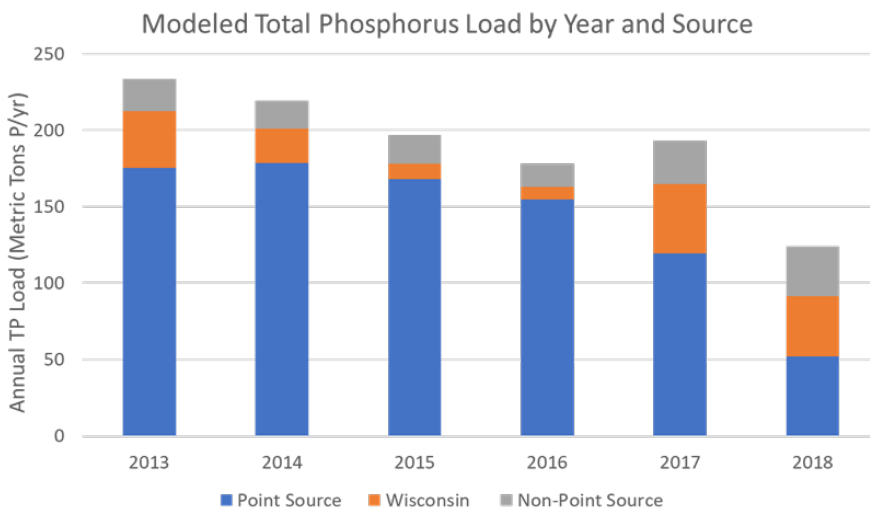
DES PLAINES RIVER
WATERSHED
WORKGROUP

Nutrient Assessment & Reduction Plan (NARP) Update

The DRWW engaged Geosyntec to develop a NARP between 2020-2023 with assistance from Kieser & Associates and The Conservation Fund. The NARP is required due to special conditions language in the National Pollutant Discharge Elimination System (NPDES) permits of multiple DRWW members. This NARP is intended to address phosphorus-related impairments in waters receiving discharge from publicly owned treatment works (POTWs) that discharge more than one million gallons per day and must be completed by December 31, 2023. The objectives of the NARP are to establish watershed-specific water quality targets, determine measures needed to eliminate phosphorus-related impairments, and identify mechanisms to facilitate cost-effective implementation of the NARP. This will be accomplished in four separate phases:

Phase 1: Conduct Data Analysis (Completed)

Geosyntec analyzed water quality data collected in the watershed from 2008-2020. The review indicated the phosphorus impairments in the Des Plaines River may be strongly influenced by upstream loading from Wisconsin. The results of the data analysis were presented at the DRWW General Membership Meeting on February 17, 2021.



Phase 2: Develop Modeling Tools (In Progress)

Modeling tools will be utilized to identify linkages between individual phosphorus inputs, such as POTWs and non-point source discharges, and the related impairments. Two models will be utilized to accomplish this task. A Soil and Water Assessment Tool (SWAT) watershed model will be developed to predict discharge rates and pollutant inputs from tributaries to the Des Plaines River Mainstem. The results of SWAT model indicate that phosphorus loading from POTWs had decreased from 2013 to 2018. The outputs from the SWAT model will be used in a QUAL2kw model. The QUAL2kw will be utilized to model the hydrodynamics and water quality of the impaired stream reaches that this NARP will address. The development of the QUAL2kw model is expected to be completed by June 2022.

Phase 3: Evaluate Management Scenarios (In Progress)

The modeling tools created in Phase 2 will be used to assess multiple watershed management strategies to identify the best ways to address phosphorus-related impairments within the watershed. This information will be used along with the DRWW's Integrate Prioritization System model, the Lake County Green Infrastructure Model, and the Des Plaines River Watershed-Based Plan to create a list of recommended actions for the workgroup. Geosyntec plans to complete the evaluation by January 2023.

Phase 4: Implementation Planning and Schedule (Future)

An implementation plan and schedule will be created for the list of recommended actions created in Phase 3. This will include analysis of the potential for funding mechanisms such as grants and potentially a water quality trading program. Additionally, a long-term adaptive management strategy will be created. This will provide guidance for the workgroup to document NARP implementation and communicate progress towards eliminating phosphorus related impairments to the Illinois EPA. It is anticipated that final plan will be ready for submittal to Illinois EPA by October 2023.

Annual Monitoring Updates

DRWW 2022 Monitoring Strategy

Water Column Sampling

- » 73 Monitoring locations sampled 5 times for water chemistry and nutrients

Sediment Sampling

- » None in 2022
- » Sediment Sampling is on a 6-year rotation to sample all 73 DRWW sites

Bioassessment Monitoring Program

- » Biannual collection on 14 core sites & 6 sites on the Des Plaines River main stem
- » The Bioassessment Monitoring Program is on a 6-year rotation for sampling all 73 DRWW sites

Continuous Monitoring & Chlorophyll *a* Sampling

- » Data sondes at 3 sites (13-6, 13-1, 16-4) for year round collection of dissolved oxygen (DO), water temperature, turbidity, pH, chlorophyll *a* and conductivity
- » 14 core sites: annual collection of benthic chlorophyll *a*, and 4 summer samples of sestonic chlorophyll

2021 Annual Monitoring Report

The DRWW 2021 Annual Monitoring Report was submitted to the Illinois Environmental Protection Agency (Illinois EPA) on March 28, 2022 to meet the DRWW Member Agencies Publicly Owned Treatment Works (POTW) requirement for the NPDES Permit Special Condition related to monitoring of receiving streams and to meet the monitoring component for its Member Agencies Municipal Separate Storm Sewer Systems (MS4) Permits.

DRWW Continuous Monitoring Program

DRWW contracted with North Shore Water Reclamation District (NSWRD) to perform continuous monitoring at three locations on the Des Plaines River in Lake County Illinois. This project was needed to fill water quality data gaps identified by Geosyntec as part of the Nutrient Assessment Reduction Plan (NARP) development.

NSWRD is using Eureka Manta +35 multi-probe sondes for this project. A sonde is a water quality logging instrument that is used for unattended sampling and is designed for surface water applications. It can be equipped with many different sensors depending on the parameters of interest. The most important feature of the sonde is the ability to take water quality measurements at specific intervals 24 hours a day, 7 days a week and log the reading into an internal memory.

NSWRD staff constructed and installed PVC structures that attach to the side of a bridge to secure the sondes. The structure allows easy access and protects the sonde from theft and debris.

The sondes being deployed for this study are equipped with sensors that measure optical dissolved oxygen, temperature, pH, conductivity, turbidity and *chlorophyll a*. They are programmed to take measurements every 15 minutes. After approximately 30 days, the sondes are retrieved and brought back to the laboratory for data download, maintenance and recalibration.

For every 30 day deployment period, the sonde will log over 17,000 water quality measurements. This continuous stream of data will allow investigators to see detailed daily and seasonal trends in the water quality at each monitoring location.



DRWW Member Highlight: NSWRD Biological Phosphorus Systems

The North Shore Water Reclamation District (NSWRD) operates two treatment facilities which discharge treated effluent in to the Des Plaines River. The Gurnee Water Reclamation Facility (WRF) has a design flow of 23.6 million gallons per day (MGD) and the Waukegan WRF at 22.0 MGD. In 2018, NSWRD completed a major improvement project converting a portion of the secondary treatment processes for biological phosphorus removal at these facilities. This construction project cost approximately \$14 million, of which about two thirds was attributed to these two facilities. This project modified existing aeration tanks to selector zones accommodating anaerobic/aerobic cycling for selection of polyphosphate accumulating organisms. Mixers were added to the anaerobic zones and existing air diffusers were replaced with new fine bubble air diffusers in the aerated zones. High efficiency variable speed blowers were also added as part of this project.



Since project completion, the operations staff have worked toward optimizing the new processes including additions of online instrumentation, automatic controls of dissolved oxygen and sludge retention time, adjustments to various operational processes and procedures, and extensive sampling and lab analyses. Since project completion, **phosphorus reductions of nearly 50% have been realized!** To further reduce effluent phosphorus concentrations, chemical phosphorus removal back-up systems have been installed at the Waukegan WRF and will be constructed at the Gurnee WRF in 2022 in the amount of about \$2.5 Million.

The chart below summarizes the performance data of the biological phosphorus systems during 2021. **NSWRD's**

facilities prevented 286,000 pounds of phosphorus from reaching the upper Des Plaines River during the year instead recovering it in biosolids. The additional pounds of phosphorous recovered will be kept for beneficial re-use.

	Phosphorus Removal 2021				% Removal
	Influent		Effluent		
	Average Conc. (mg/L)	Pounds Received	Average Conc. (mg/L)	Pounds Discharged	
Gurnee	4.93	192,700	0.84	29,400	84.7%
Waukegan	3.59	174,700	1.02	52,000	70.2%
Total	4.26	367,400	0.93	81,400	77.5%

DRWW Sponsors 2022 Virtual Deicing Workshop

To register and find more information: saltsmart.org/workshops/

The Des Plaines River Watershed Workgroup continues to sponsor and support the Northeastern Illinois regional deicing workshop. The deicing workshops focus training efforts on ways to keep public and private sector professionals up-to-date on best management practices for winter maintenance that safely reduces road salt use. DRWW has partnered with multiple agencies to host the Northeast Illinois Deicing Workshops for winter maintenance providers.

The DRWW encourages members to look for ways to reduce road salt use while ensuring safe travel, free of ice and snow, on transportation surfaces. Some tips to reduce road salt usage include:

- Remove snow as quickly as possible after a storm.
- Remove as much snow and ice as possible before using road salt.
- Do not use road salt when pavement temperatures are less than 15 F.
- Evenly spread road salt so granules are approximately 2-3 inches apart.
- Do not pile road salt or apply it to dry pavement or vegetation.
- Sweep up undissolved road salt after all ice and snow has been removed.
- Address known drainage problems such as leaking downspouts, roofs dripping onto steps, discharges to sidewalks, and low spots in parking lots or driveways during warm weather.

DRWW Executive Board Members

- President: Al Giertych, LCDOT
- Vice President: Dave Miller, NSWRD
- Treasurer: Michael Talbett, Village of Kildeer

- Secretary: Paul Kendzior, Village of Libertyville
- Member at Large: Gary Glowacki, LCFPD
- Lakes Committee Chair: Mike Adam, LCHD

- Monitoring/Water Quality Improvements Committee Chair: Steve Waters, NSWRD