ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

2023-24

PARTNER PROGRAM AND PROJECT UPDATES

Point Sources and Watershed Groups

Illinois Department of Agriculture

Illinois Environmental Protection Agency

Illinois Extension
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Des Plaines River Watershed Workgroup

The Des Plaines River Watershed Workgroup, DRWW, formed in 2015 with a primary goal of improving water quality in the Des Plaines River basin in Lake County through a collaborative, locally led process. Membership in the group consists of 40 municipal and county government agencies, publicly owned treatment works, POTWs, park districts, consulting firms, and environmental not-for-profits.

Nutrient Assessment Reduction Plan

The DRWW continued its work with Geosyntec to develop a Nutrient Assessment Reduction Plan, NARP. The NARP, required by special condition in the National Pollutant Discharge Elimination System, NPDES, permits of multiple DRWW members, aims to address phosphorus-related impairments in waters receiving discharge from POTWs. In 2023, Geosyntec used the watershed models to analyze several management scenarios to evaluate the effectiveness of watershed-based strategies in improving water quality. These scenarios were compared with the baseline scenario which represents the existing conditions in the watershed. The management scenarios included load reductions from POTWs, upstream sources and nonpoint sources as well as combined scenarios. There were five key findings from the analysis:

1. POTW total phosphorus reductions beyond 0.5 mg/L have minimal impact on water quality.
2. Upstream total phosphorus reduction reduces sestonic chlorophyll *a* and improves dissolved oxygen during high flows.
3. Tributary total phosphorus reductions reduce sestonic chlorophyll a but have minimal impact on dissolved oxygen.
4. A combined reduction in the load from POTWs, nonpoint sources, and upstream improves the water quality in the Des Plaines River.
5. Improving upstream dissolved oxygen addresses the impairment in upper reaches of the Des Plaines River.

The NARP report also presented recommended actions for addressing phosphorous related impairments along with an implementation plan and schedule. The report was submitted to Illinois EPA on Dec. 29, 2023.

As of spring 2025, the DRWW has yet to receive feedback or approval of its NARP from the Illinois EPA. In 2024, the DRWW reviewed its NARP implementation plan with membership and began moving forward cautiously as the group awaits feedback. In 2024, the DRWW engaged with the Wisconsin Department of Natural Resources on its ongoing Total Maximum Daily Load, TMDL, study within the Wisconsin portion of the Des Plaines River watershed. The DRWW also met with the U.S. Geological Survey, USGS, about adding one of its super gages near the state line to gather real-time monitoring of nutrients and other parameters as Wisconsin progresses through its TMDL implementation in the watershed.

Monitoring Program

The DRWW continues to conduct water quality and bioassessment monitoring. Data from this monitoring is the foundation of the Integrated Prioritization System, IPS, and NARP models that will be used by individual members to prioritize and implement water quality improvement projects. The Monitoring Committee meets frequently with stakeholders to update and adapt the monitoring plan as needed. The committee reviewed and approved the DRWW 2022-23 Water Quality Monitoring Report, completed by Macroinvertebrate Biotic Index, MBI. Similar to previous years' reports, the results suggest that quality of aquatic life in the Des Plaines River mainstream improves downstream through the workgroup area.

Lakes Committee

The DRWW Lakes Committee continued to monitor the lakes within the watershed and coordinated outreach and education opportunities targeting topics including lake management plans, invasive species, routine monitoring of lake and stormwater inlets, nutrient reduction, and project implementation. The DRWW continued to monitor the water quality of project lakes and carp removal efforts.

The DRWW Lakes Committee has also been reviewing the NARP Implementation Plan. The Committee reviewed actions that provide benefits to the watershed and is working to review practices such as street sweeping and leaf litter pickup. The committee is designing a survey to distribute to the DRWW membership to assess those practices. The leaf collection survey will be distributed at the February 2025 annual meeting.

Deicing Workshops

The DRWW 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. The 2023 virtual workshops trained over 1,000 individuals in winter best management practices for both public roads, parking lots, and sidewalks.

On Sept. 20, 2023, the DRWW also supported a Deicing Calibration Day, which was the collaborative effort of several Lake County departments: Stormwater Management Commission, Health Department and Community Health Center, and Division of Transportation, LCDOT. This event focused on sharing hands-on experience to calibrate winter maintenance vehicles before winter in Illinois. LCDOT staff demonstrated calibrating a vehicle for 21 participants, who can now practice responsible road salt use for their own vehicles. The participants also toured LCDOT’s in-house liquid blending systems and operations to view the salt brine and beet juice winter maintenance alternatives.

The DRWW’s website is drww.org.

DuPage River Salt Creek Workgroup



The DuPage River Salt Creek Workgroup, DRSCW, formed in 2005 in response to concerns about Total Maximum Daily Loads, TMDLs, developed for the east and west branches of the DuPage River and Salt Creek located in portions of Cook, DuPage, and Will counties in northeastern Illinois. The DRSCW seeks to implement targeted watershed activities that resolve priority waterway problems cost- effectively.

In 2015 and 2020, a Special Condition to DRSCW National Pollutant Discharge Elimination System permits was added that substantially increased financial commitments to restoration efforts focused on improving aquatic life. The Special Condition includes 10 stream restoration projects, two studies, and the development of a Nutrient Implementation Plan.

For more information, see drscw.org.

Physical Projects

Spring Brook Phase 2

In 2023 and 2024, Year 3 and 4 of a planned five-year post-project monitoring was conducted at the Phase 2, Stream Restoration Project at the Blackwell Forest Preserve in Wheaton, DuPage County. This stream restoration project included the removal of the Arrow Road dam. The channel was realigned into the adjacent floodplain in order to increase sinuosity, mimic natural geomorphology, and create 22.8 acres of wetlands. After four years of post-project monitoring, Spring Brook Phase 2 met its post-project targets for Qualitative Habitat Evaluation Index and Fish Index of Biotic Integrity both within the project footprint and at sites monitored as part of the post-project impact evaluation. Post-project Macroinvertebrate Index of Biotic Integrity, mIBI, targets were not met but are expected to continue to increase at the site as the restoration project matures.

Klein Creek Streambank Stabilization Project

The DRSCW entered a Memorandum of Understanding with the Village of Carol Stream to fund the river resource improvement elements of the Klein Creek Section Stream Bank Stabilization Project which was completed in 2022. This project re-meandered a section of the channel and increased its length approximately 200 feet. As the longitudinal slope was too flat for riffle structures, two rock substrate areas were added to provide riffle-type benefits. Stream banks were stabilized with vegetated rock toes or rootwads embedded at outside bends, as well as rock vanes (stream barbs) at strategic locations. The top of bank was lowered adjacent to approximately 1.4 acres of newly created wetlands.

Activities in 2023 and 2024 at the project focused on plantings and maintenance and monitoring activities. Trees and shrubs were planted in late spring 2023 and plugs were planted in early fall 2023.

Maintenance and monitoring continued in 2024 and included several naturalized areas: 16.76 acres of upland prairie/economy prairie, 3.74 acres of open riparian area, 1.44 acres of sedge meadow, and 0.93 acres of shallow emergent area. Based on the results of the 2024 monitoring, the project exceeded expectations for its second year. Planted species, as well as native species from the seed soil bank, are abundant and will continue to increase in coverage in 2025. The in-stream structures, upland

restoration zones, and wetland restoration zones have all met the designated second-year performance standards and are expected to exhibit continued progression in subsequent growing seasons.

2024 was also the first year for biological monitoring and for habitat five-year post-project monitoring at the site. Post-project Macroinvertebrate Index of Biotic Integrity, Fish Index of Biotic Integrity, and Qualitative Habitat Evaluation Index have all improved since the pre-project monitoring and are expected to continue to increase as the restoration matures.

Fullersburg Woods Dam Removal and Stream Restoration

In November 2023, the DRSCW, in cooperation with the Forest Preserve District of DuPage County, began construction on the Fullersburg Woods Dam Removal and Stream Restoration Project in the Fullersburg Woods Forest Preserve in the Village of Oak Brook and DuPage County. The project was designed and permitted with assistance from Hey and Associates. It was constructed by V3 Companies with construction management services provided by the Metropolitan Water Reclamation District of Greater Chicago. The project objectives were to establish fish passage on Salt Creek by removing the Graue Mill Dam, to improve dissolved oxygen, and to raise Macroinvertebrate Index of Biotic Integrity, Fish Index of Biotic Integrity, and Qualitative Habitat Evaluation Index scores in Salt Creek.

On November 27, 2023, instream work for the removal of the Graue Mill Dam, also known as the Fullersburg Woods, began with the installation of a causeway upstream of the dam. Dam demolition began on Nov. 30, 2023. By the end of that day the majority of the dam above the water line had been removed. December 2023 work focused on the removal of the dam to its spread footing and the removal of the dewatering structure located on the north bank. Construction of Riffle #1 at the former location of the dam began Dec. 15, 2023, and was completed by Dec. 19.

Summer 2024 activities focused on the installation of stream restoration practices along 1.25 miles of Salt Creek upstream of the former dam. Eight additional riffles were installed upstream of Riffle #1. The original project design also included pool excavation upstream of each constructed riffle. However, a site survey conducted after the dam removal found the presence of existing, natural pools upstream of riffles 3, 4, and 8. Additionally, pools 2, 5, and 6 were eliminated from the design due to the channel configuration of Salt Creek post dam removal. Approximately 1,000 linear feet of bank stabilization was installed in summer 2024.

In addition to the stream restoration practices, all of the amenities included in the Master Plan for Salt Creek at Fullersburg Woods were installed in the summer and fall of 2024. Amenities near Graue Mill included an ADA-accessible trail, a river overlook, a landscape feature smaller overlook on the opposing bank, a re-designed mill raceway with water source, cascade, and motor to turn the waterwheel. Work conducted by the Fullersburg Woods Nature Center included rehabilitation and waterproofing the existing, failing, floodwall.

Seeding of all disturbed areas associated with the project was completed in November and December 2024. In total, 11.25 acres of wetland conversion, 23.6 acres of wetland enhancement, and 14.5 acres of upland buffer were seeded. Impact assessment of biological metrics and water chemistry will commence in 2025.

Nutrient Implementation Plan

In December 2023 the DRSCW, in cooperation with the Lower DuPage River Watershed Coalition submitted the Nutrient Implementation Plan, NIP, for the East Branch DuPage River, West Branch DuPage River, Lower DuPage River, and Salt Creek to the Illinois Environmental Protection Agency. A crucial step in developing this NIP was establishing a watershed threshold concentration for total phosphorus that is protective of aquatic life in the NIP area. A relationship between total phosphorus concentrations, fish species and macroinvertebrate taxa and their indices of biotic integrity was established using a multivariate analysis published in 2023 by the watershed groups. The analysis, which drew on paired biological, chemical, and physical data from 640 sites in northeast Illinois, found fish species and the Fish Index of Biotic Integrity, fIBI, were more sensitive to total phosphorus concentration variation than the macroinvertebrate taxa and the Macroinvertebrate Index of Biotic Integrity. The 75th percentile of sites in the fIBI range of 41 and 49 (meeting and exceeding the General Use standard for aquatic life) was found to correspond to an upper total phosphorus threshold concentration of 0.277 milligrams per liter. The NIP adopted this as the upper threshold of the watershed total phosphorus target.

Analysis of the mean total phosphorus concentrations at sites monitored by the watershed groups' rolling bioassessments under various flow regimes show a clear differentiation between sites. Water downstream of Waste Water Treatment Plants, WWTPs, is a product of both wastewater and non-wastewater. Non-wastewater is comprised of stormwater and background sources, summarized as urban. Annual mean concentrations at these sites ranged from 0.70 mg/L to 2.12 mg/L. Concentrations at urban-only sites, or upstream of any WWTP influence, had total phosphorus concentrations ranging nearly an order of magnitude lower, 0.03–0.53 mg/L. Instream flow was an important factor, with total phosphorus concentrations falling both at wastewater-influenced and at urban sites as flow increased. Mean annual concentrations at all urban sites were beneath the watershed threshold of 0.277 mg/L in all years sampled when flows were above the 25th percentile. Sites downstream of WWTPs outfalls had a total phosphorus concentration significantly higher than the watershed threshold in all years. Aggregation of the flows and water quality data to allow for reduction scenarios modeling showed that while WWTPs contributed 13% to 28% of annual flow, they contributed more than 80% of annual ambient instream total phosphorus.

Modeling was conducted using the QUAL2Kw platform to identify potential management scenarios that would decrease ambient instream total phosphorus concentrations below the identified total phosphorus watershed threshold. Receiving water models were developed for each basin and included the connectivity of the East and West Branches of the DuPage River model outputs to inform the headwater conditions of the Lower DuPage River. Notably the headwater condition includes the assumption, as recommended by the NIP, that all upstream WWTPs will be operating with a 0.35 mg/L total phosphorus limit. Following model calibration, channel geometry and hydraulics were modified for the Lower DuPage River and Salt Creek to reflect the imminent removals of dams on these waterways; both dams have since been removed. Ultimately, the suite of scenarios modeled demonstrated that an effluent total phosphorus permit limit of 0.35 mg/L (for an effective effluent concentration of 0.28 mg/L) for WWTPs along Salt Creek and the West and East Branches of the DuPage River would be sufficient to achieve the watershed threshold value satisfactorily.

The modeled reductions of effluent total phosphorus concentrations did not show meaningful improvements in predicted minimum and mean dissolved oxygen, DO, concentrations due in part to localized persistence of low gradients or flow restrictions which also factor into existing DO impairments.

The NIP recommended implementation of targeted physical projects focused on eliminating DO sags and improving instream habitat. Recommendations include that WWTPs discharging to Salt Creek and the East and West Branches of the DuPage River adopt an effluent limit of 0.35 mg/L total phosphorus. This limit would lead to an effective mean effluent concentration of 0.28 mg/L, assuming a 20% margin of safety. The limit would be a seasonal geometric mean for warm weather months of May through October as part of an annual 0.50 mg/L total phosphorus geometric mean.

Fox River Study Group

The Fox River Study Group, FRSG, is a diverse coalition of stakeholders who have been working since 2003 to improve the health of the Fox River for the benefit of the nearly 1 million people in the Fox River Valley and for over 300,000 people whose drinking water comes from the river. The study group is using research, data, and collaboration to guide the region toward a cleaner, safer, and more beautiful Fox River and to support sustainable policies and development across the Fox River watershed. The group's study area encompasses 1,405 square miles of the Fox River watershed from the Stratton Dam in McHenry County to the mouth of the river in LaSalle County. The watershed includes an additional 1,253 square miles upstream in the Chain O'Lakes region in Illinois and into Wisconsin to the river's source near Waukesha.

Since completing a 2022 update of their 2015 Fox River Implementation Plan, FRIP, the group has been working on plan implementation. The group worked with the U.S. Army Corps of Engineers on a feasibility study that looked at the benefits of removing dams on the river. FRSG has collected water quality data in the watershed for 23 years. The group also continues to contract work with the U.S. Geological Survey, Illinois State Water Survey, and the Illinois Natural History Survey to collect and analyze data on water quality and aquatic life in the Fox River watershed. The FRSG conducted a number of public outreach events during 2023 and 2024 in addition to virtual monthly board meetings that are open to all.

Implementation of the 2022 Fox River Implementation Plan

The 2022 FRIP calls for:

- Achievement of a 0.5 mg/L total phosphorus limit on effluent from major wastewater treatment plants by 2030
- Support of removal of dams along the Fox mainstem as identified in the corps study and for the FRSG to take the lead in monitoring the water quality impacts of the removed dams
- Encouragement of state-of-the-art watershed management practices that can mitigate the impact of projected population growth

- Statewide cooperation to leverage support for evaluation of streambank erosion and quantification of its impact on phosphorus loads in the watershed
- Expansion of partnerships to reduce nutrients entering the FRIP study area, especially with the agricultural community in the most southern portion of the study area and upstream entities in the Chain O'Lakes region of Illinois and Wisconsin
- Collaboration with other agencies and organizations on goals to eliminate impairments in the river due to pollutants besides nutrients and to remove the river from the Illinois EPA list of impaired waters.

The FRSG worked with the Illinois EPA throughout 2023 and 2024 on updating FRSG Special Condition language for the permits of wastewater facilities in the watershed that reflects the work completed and work underway consistent with the 2022 FRIP Update.

Activities related to other action items conducted throughout 2023 and 2024 are described below. The 2022 FRIP, an executive summary, and all appendices can be found at tinyurl.com/2022FRIPFolder.

U.S. Army Corps of Engineers Fox River Connectivity and Habitat Study

FRSG continues to work with U.S. Army Corps of Engineers, USACE, and the Illinois Department of Natural Resources, IDNR, to complete the Fox River Habitat and Connectivity Study that was restarted in June 2022. This study is evaluating the efficacy and cost-effectiveness of fish passage and riverine function restoration methods at 10 low head, run-of-the-river dams on the Fox River from Algonquin to Montgomery. The FRSG has a Joint Funding Agreement with the IDNR to cover the local cost share needed to complete the study. In September 2023, the corps released the *draft Project Implementation Report and Environmental Assessment (PIR/EA) for the Fox River Connectivity & Habitat Study in Kane and McHenry Counties, Illinois* for a 60-day public comment period that recommended removal of nine of the 10 dams under study. The Algonquin dam was not recommended for removal. Three public meetings were held during the public comment period. At each of these meetings, engineer Art Malm, who represents Friends of the Fox River on the group's board, provided the Fox River study group's findings on the impacts of dams on water quality in the Fox River. The study group's key message was that dam removals are necessary and cost effective for improving water quality in the reach of the river studied by the group. Modeling predicts dam removal is necessary to resolve river dissolved oxygen impairments. Without removing the dams, further phosphorus reductions by upgraded wastewater treatment plants improvements would have little effect on total algae populations and would not eliminate the dissolved oxygen impairments within the dam impoundments, despite the high costs involved. During the public comment period, the FRSG provided the U.S. Army Corps of Engineers with all the analyses in support of the 2022 FRIP recommendation for improving water quality by removing dams along the mainstem river cost-effectively. The corps anticipates finalizing its report in 2025.

Forest Preserve District of Kane County's Removal of Carpenter Dam

In the fall of 2024, the Forest Preserve District of Kane County, in collaboration with IDNR, completed removal of one of the dams identified for removal in the corp's draft report. The Carpenter Dam was located within the District's Fox River Shores Preserve on the Fox River in Carpentersville. Concurrently, the FRSG prepared a scope of work for post-removal water quality monitoring in the same reaches where a pre- removal water quality study was conducted in 2020. That work is to be performed in 2025.

Water Data Collection and Analysis

On a monthly basis since 2002, FRSG member groups collect and analyze samples using an all-volunteer and in-kind effort. Sampling sites are at seven mainstem locations and seven tributary locations along an 80-mile stretch of the Fox River from McHenry to Yorkville. FRSG also continues to fund the U.S. Geological Survey to collect continuous water quality data on the Fox River at the Stratton Dam (USGS Station #05549501) during the growing season.

The Illinois State Water Survey maintains the FoxDB environmental database, where all available data for the Fox River watershed are compiled and made publicly available at ilrdss.sws.uiuc.edu/fox. ISWS staff updated the FoxDB in December 2023. The FRSG submitted the data to the Illinois EPA for inclusion in their next update of the Illinois Integrated Water Quality Report in 2024.

ISWS staff also completed an analysis of trends in chloride, conductivity, turbidity, water temperature, pH, and chlorophyll levels in the watershed in 2023. This comprehensive trend analysis (https://www.ideals.illinois.edu/items/129469) for 5-, 10- and 25-year periods suggests predominantly stable or improving trends in water quality parameters across the Fox River watershed, from the Stratton Dam to the river's mouth at the Illinois River.

The Chicago Metropolitan Agency for Planning worked with the group and other watershed stakeholders to complete a watershed-based plan for the Indian Creek watershed in Kane and DuPage counties in August 2023. FRSG funded the Hydrological Simulation Program Fortran, HSPF, model for the Indian Creek watershed that was updated as part of this effort. The watershed group continues to work with other stakeholders to secure funding for a microbial source tracking pilot project recommended in the plan.

Communications and Outreach

In 2023 and 2024, FRSG conducted a number of outreach activities, both in-person and virtual. The FRSG helped plan and publicize the bistate Fox River Summit, held annually in March. Attendance is typically 150 people with both in-person and virtual attendance options. In the fall of 2023, the group returned to hosting in-person annual meetings with the celebration of its 20th anniversary, followed by another in-person annual meeting in 2024.

20th Anniversary Celebration of the Fox River Study Group



Attendance at the annual meetings is typically around 80 people. In addition, the group has hosted a number of Lunch & Learn webinars related to the recommendations of the 2022 FRIP. These included sessions on streambank erosion, trends in water quality in the Fox River, the Great Lakes to Gulf Virtual Observatory, and the development of a nutrient trading pilot program in the Fox River watershed. The Lunch & Learn sessions typically attract 20 to 30 attendees. For more information, see foxriverstudygroup.org and the FRSG videos folder.

Lower Des Plaines Watershed Group

The Lower Des Plaines Watershed Group, LDPWG, formed in 2017 as a proactive way for municipalities and other dischargers to work together to address water quality issues in the watershed. The watershed encompasses approximately 490 square miles from Willow Creek, just north of O'Hare Airport in Cook County, to the confluence with the Kankakee River in Will County. All but two municipal dischargers are participating in the LDWG. In 2018, the LDWG worked with Illinois EPA to develop special conditions language for National Pollutant Discharge Elimination System permits that allow and encourage dischargers to work together to develop a NARP.

For more information, see www.LDPWatersheds.org.

Bioassessment Activities

The Lower Des Plaines Watershed Group coordinates a watershed bioassessment program to identify and address priority water quality issues in the Lower Des Plaines River and its 19 tributaries. The bioassessment program include sampling at 146 stations across the Lower Des Plaines River and 19 tributaries. Sampling includes water and sediment chemistry, fish, macroinvertebrates, and habitat assessments. Additional dissolved oxygen, nutrient, and chlorophyll sampling was done at a subset of

sites. As a means of dividing this large scale sampling effort over multiple years, the bioassessment is conducted over a five-year cycle with one of four sub-basins sampled in a consecutive year followed by one year off: Year 1: Upper Main Stem Des Plaines River, Year 2: Lower Main Stem Des Plaines River, Year 3: Hickory Creek Sub-Watershed, Year 4: Other Major Tributaries and Year 5: No bioassessment sampling conducted. In the 2023, bioassessment sampling was conducted in the Upper Main Stem Des Plaines River and in 2024 sampling was conducted in Lower Main Stem Des Plaines River. The 2023 and 2024 sampling was the second round of bioassessment sampling for the mainstem Des Plaines River as these sub-basins were previously sampled in 2018 and 2019, respectively.

NARP Related Activities

In December 2023, the LDWG submitted their Nutrient Assessment and Reduction Plan, NARP, for all wastewater treatment plants, WWTPs, discharging to the mainstem Des Plaines River. The 2023 NARP for the non-wadeable sections of the Lower Des Plaines River included an Implementation Plan that included the following tasks:

- LDWG members shall continue active workgroup participation and funding
- Continued implementation of the bioassessment program
- Collection of additional water chemistry, biological and habitat data to develop an Identification and Prioritization System, IPS, Tool for the determination of a non-wadeable total phosphorus, TP, target
- Development and calibration of a continuous QUAL2Kw receiving water quality model for the non-wadeable Lower Des Plaines River
- Develop and run various management application scenarios for future conditions to understand the potential impacts of changes to regional and local WWTP discharge limits of total phosphorus concentrations with the IPS target for non-wadeable streams as the goal.

The NARP Implementation for the non-wadeable section of the Lower Des Plaines River is scheduled to be completed by December 2028.

Additionally, in December 2024, the LDWG submitted their NARP for all WWTPs discharging to tributaries of the Des Plaines River. A crucial step in developing this NARP was establishing a watershed threshold concentration for total phosphorus that is protective of aquatic life for the NARP area. For wadeable streams, a relationship between total phosphorus concentrations and fish species, macroinvertebrate taxa and their indices of biotic integrity was established by a multivariate analysis published in 2023 by the DuPage River Salt Creek Workgroup, DRSCW, and Lower DuPage River Watershed Coalition, LDRWC. The analysis, which drew on paired biological, chemical, and physical data from 640 sites in northeast Illinois found fish species and Fish Index of Biotic Integrity, fIBI, were more sensitive to total phosphorus concentration variation than macroinvertebrate taxa and Macroinvertebrate Index of Biotic Integrity, mIBI. The 75th percentile of sites in the fIBI range of 41 and 49 (meeting or exceeding the General Use Standard for aquatic life) was found to correspond to an upper total phosphorus concentration of 0.28 milligrams per liter (mg/l).

The 0.28 mg/L TP instream threshold was utilized to develop appropriate effluent targets for the ten (10) major and three (3) minor WWTPs that discharge to tributaries. Preliminary effluent limits of 1 mg/l (minors), 0.5 mg/l and 0.35 mg/l are recommended based on the observed ambient

concentrations downstream of the plant and the facilities current level of TP removal. Limits are preliminary as current ambient data is limited to one year and the NARP recommends future monitoring be implemented ahead of the limit adoption schedule to refine the recommended limits.

Additional details on both NARPs can be found at https://ldpwatersheds.org/about-us/lower-des-plaines-watershed-group/our-work/narp/.

Other Activities

- Working with the LDRWC, the LDWG continues to expand and develop new materials to help members meet MS4 outreach requirements. Campaigns focus on ways residents can reduce their negative impacts on water quality. Topics include using native plants, rain gardens, and rain barrels, detention basin maintenance, pet waste, proper leaf disposal, and reducing chlorides. Outreach materials include social media posts, articles for newsletters and websites, printable handouts, and posters. All materials are available on the website ldpwatersheds.org/outreach with additional winter-related materials at www.SaltSmart.org.
- To further facilitate the coordination of outreach and education activities, a joint website between LDWG and the Lower DuPage River Watershed Coalition was maintained through 2023 and 2024. The website can be found at www.LDPWatersheds.org and includes information about each group and joint information about water quality related topics, stream ecology, involvement opportunities for residents.
- The LDWG, LDWRC, DRSCW, and Chicago Area Waterways Chloride Workgroup, CAWCW, collaborated with staff from Lake County Department of Transportation and Health Department to host technical deicing workshops in 2023 and 2024. In 2023, three virtual Public Roads Deicing Workshops were held and survey results indicate that a minimum of 690 persons from Cook, DuPage, Kane, Lake, McHenry and Will counties attended the workshops. Also, in 2023, two virtual Parking Lots and Sidewalk Deicing Workshops were held and attended by 330 individuals. In 2024, a new Salt Smart Roads Workshop was presented at three in-person and three virtual workshops and survey results indicate that a minimum of 870 persons from Champaign, Cook, DuPage, Fulton, Kane, Kendall, Lake, McHenry and Will counties attended. Additionally in 2024, one in-person and two virtual Parking Lots and Sidewalk Deicing workshops were held with a minimum of 425 persons in attendance.
- On Sept. 12, 2023, the LDWG, LDWRC, DRSCW, and CAWCW, the Conservation Foundation, and the SaltSmart Collaborative hosted an in-person Northeast Illinois Salt Conference at Medinah Shriners. Presentations covered Weather and Pavement Temperature, Route Management, and Liquids, Plow Driver training, and the Salt Smart Certified program for parking lots and sidewalks. The workshop was attended by 101 public works directors and supervisors.

Lower DuPage River Watershed Coalition

The Lower DuPage River Watershed Coalition, LDRWC, was formed in 2012 to identify and address priority water quality issues in the Lower DuPage River and its tributaries, located almost entirely in Will County. The coalition is comprised of municipalities and other public agencies, with participation from all six municipal wastewater dischargers. For more information, see ldpwatersheds.org.

Physical Projects

In 2024, the LDRWC began construction on its second restoration project, the DuPage River Stream Enhancement Project. The project is located on the mainstem of the DuPage River between Route 126 and Renwick Road, Village of Plainfield, Will County. The Project was designed and permitted with assistance from Hey and Associates, constructed by RES Environmental Operating Company, LLC, with construction management services provided by the Village of Plainfield and Strand Associates, Inc. The objectives of the project are to raise Lower DuPage River scores of Qualitative Habitat Evaluation Indes, QHEI, and Fish Index of Biotic Integrity, fIBI, and Macroinvertebrate Biotic Index, mIBI.

On Sept. 5, 2024, the LDRWC and the Village of Plainfield hosted an Open House to present the Lower DuPage Stream River Restoration Project to the public. The Open House, held at the Plainfield Village Hall, was attended by approximately 30 residents. Presentations included project description and goals, information and illustrations or photographs of each of the major project components, and a timeline of activity and construction expectations. Exhibit boards included a map and location of project components. Staff fielded several questions from residents. Overall, the project was very well received.

Site work began the week of Oct. 21, 2024, with the tree clearing and the removal of invasive species by Homer Tree Service, a subconsultant to RES. Tree clearing activities were completed by mid-November 2024. Earthwork operations included stripping and stockpiling topsoil and the removal of the failed retaining wall on the west bank of the DuPage River. Once the failed wall was removed, the banks were graded and a boulder toe was installed. The disturbed area was then seeded with a native seed mix and protected with erosion control blanket. Approximately 850 linear feet of a failed concrete retaining wall was removed, and 1,000 linear feet of boulder toe was installed as part of the project.

In addition to the bank stabilization work, the Lower DuPage Stream Enhancement Project included stream restoration practices including the installation of riffles, stream barbs, brush boxes, and other practices. During the week of Dec. 9, 2024, RES installed the first of two riffles within the Lower DuPage River. Riffle 2 is located downstream from Riffle 1 and was installed on Dec. 18, 2024.

RES also completed the installation of the instream structures including stream barbs, rootwads, brush boxes, and trunk barbs. A combination of harvested material recycled from other construction sites and new riprap stone was used to construct these in-stream features. These structures provide habitat and refuge areas for small fish, as well as concentrate flow toward the center of the DuPage River. The project includes 18 stream barbs, 36 rootwads, 8 trunk bars, and 7 brush boxes. Additionally, five vegetative clusters will be added to instream features in spring of 2025 when the perennial native plants are installed onsite.

Additional work including the installation of an engineered log jam, and the restorations of five DuPage tributary swales within the project footprint are planned for 2025. Also planned for 2025 is the installation of native plant plugs and trees and the start of maintenance and monitoring activities. Maintenance and monitoring will continue for three years (2025-28) to ensure that the seeded and planted areas conform to performance criteria.



Plate 1. Photographs of the Lower DuPage Stream Restoration Project. Left: Instream structures including stream barbs, rootwads and brush boxes. Middle: Riffle 2. Right: Bank stabilization.

Nutrient Implementation Plan

In December 2023, the LDRWC, in cooperation with the DuPage River Salt Creek Workgroup, DRSCW, submitted the Nutrient Implementation Plan, NIP, for the East Branch DuPage River, West Branch DuPage River, Lower DuPage River, and Salt Creek (Illinois) to the Illinois Environmental Protection Agency. A crucial step in developing this NIP was establishing a watershed threshold concentration for TP that is protective of aquatic life in the NIP area. A relationship between total phosphorus concentrations, fish species and macroinvertebrate taxa and their indices of biotic integrity was established using a multivariate analysis published in 2023 by the watershed groups. The analysis, which drew on paired biological, chemical, and physical data from 640 sites in northeast Illinois, found fish species and the Fish Index of Biotic Integrity, fIBI, were more sensitive to total phosphorus concentration variation than the macroinvertebrate taxa and the Macroinvertebrate Index of Biotic Integrity. The 75th percentile of sites in the fIBI range of 41 and 49 (meeting and exceeding the General Use standard for aquatic life) was found to correspond to a upper total phosphorus threshold concentration of 0.277 milligrams per liter (mg/L). The NIP adopted this as the upper threshold of the watershed total phosphorus target.

Analysis of the mean total phosphorus concentrations at sites monitored by the watershed groups' rolling bioassessments under various flow regimes show a clear differentiation between sites. Water downstream of Waste Water Treatment Plants, WWTPs, is a product of both wastewater and non-wastewater. Non-wastewater is comprised of stormwater and background sources, summarized as urban. Annual mean concentrations at these sites ranged from 0.70 mg/L to 2.12 mg/L. Concentrations at urban-only sites, or upstream of any WWTP influence, had total phosphorus concentrations ranging nearly an order of magnitude lower, 0.03–0.53 mg/L. Instream flow was an important factor, with concentrations falling at both wastewater-influenced and urban sites as flow increased. Mean annual concentrations at all urban sites were beneath the watershed threshold of 0.277 mg/L in all years sampled when flows were above the 25th percentile. Sites downstream of WWTPs outfalls had a total phosphorus concentration significantly higher than the watershed threshold in all years. Aggregation of the flows and water quality data to allow for reduction scenarios modeling showed that while WWTPs contributed 13% to 28% of annual flow, they contributed more than 80% of annual ambient instream total phosphorus.

Modeling was conducted using the QUAL2Kw platform to identify potential management scenarios that would decrease ambient instream total phosphorus concentrations below the identified total phosphorus watershed threshold. Receiving water models were developed for each basin and

included the connectivity of the East and West Branches of the DuPage River model outputs to inform the headwater conditions of the Lower DuPage River. Notably the headwater condition includes the assumption, as recommended by the NIP, that all upstream WWTPs will be operating with a 0.35 mg/L TP limit. Following model calibration efforts, channel geometry and hydraulics were modified for the Lower DuPage River and Salt Creek to reflect the imminent removals of dams on these waterways (both dams have since been removed). Ultimately, the suite of scenarios modeled demonstrated that an effluent TP permit limit of 0.5 mg/L (for an effective effluent concentration of 0.4 mg/L) for WWTPs along the Lower DuPage River would be sufficient to achieve the local threshold value satisfactorily.

The modeled reductions of effluent total phosphorus concentrations did not show meaningful improvements in predicted minimum and mean dissolved oxygen, DO, concentrations due in part to localized persistence of low gradients or flow restrictions which also factor into existing DO impairments.

The NIP recommended implementation of targeted physical projects focused on eliminating DO sags and improving instream habitat. Recommendations include that WWTPs discharging to the mainstem of the Lower DuPage River adopt an effluent limit of 0.50 mg/L total phosphorus. This would lead to an effective mean effluent concentration of 0.4 mg/L, assuming a 20% margin of safety, for warm weather months as an annual geometric mean on a rolling 12-month basis. Recommendations also included that the Crest Hill Sewage Treatment Plant, which discharges to a tributary on the Lower DuPage River, adopt the 0.35 mg/L total phosphorus limit.

Other Activities

- Working with the Lower DuPage Watershed Group, LDWG, the LDRWC continues to expand and develop new materials to help members meet MS4 outreach requirements. Campaigns focus on ways residents can reduce their negative impacts on water quality. Outreach materials include social media posts, articles for newsletters and websites, printable handouts, and posters. All materials are available on the website ldpwatersheds.org/outreach with additional winter-related materials at saltsmart.org.
- To further facilitate the coordination of outreach and education activities, a joint website between LDWRC and the LDWG was maintained through 2023 and 2024. The website, at LDPWatersheds.org, includes information about each group and joint information about water quality related topics, stream ecology, and involvement opportunities for residents.
- The LDWRC, LDWG, DRSCW, and Chicago Area Waterways Chloride Workgroup, CAWCW, collaborated with staff from Lake County DOT and Health Dept to host technical deicing workshops in 2023 and 2024. In 2023, three virtual Public Roads Deicing Workshops were held and survey results indicate that a minimum of 690 persons from Cook, DuPage, Kane, Lake, McHenry and Will counties attended the workshops. Also, in 2023, two virtual Parking Lots and Sidewalk Deicing Workshops were held and attended by 330 individuals. In 2024, a new Salt Smart Roads Workshop was presented at three in-person and three virtual workshops and survey results indicate that a minimum of 870 persons from Champaign, Cook, DuPage, Fulton, Kane, Kendall, Lake, McHenry and Will counties attended. Additionally in 2024, one in-person and two virtual Parking Lots and Sidewalk Deicing workgroups were held with a minimum of 425 persons in attendance.

- On Sept. 12, 2023, the LDWRC, LDWG, DRSCW, and CAWCW, The Conservation Foundation, and the SaltSmart Collaborative hosted an in-person Northeast Illinois Salt Conference at Medinah Shriners. The workshop was attended by 101 public works directors and supervisors.

North Branch Chicago River Watershed Workgroup

The North Branch Chicago River Watershed Workgroup was formed in January 2018 to identify and assess water quality issues along the three forks of the North Branch Chicago River. The watershed encompasses over 95 square miles, with northern and southern boundaries roughly extending from Illinois Route 132 in Waukegan, Lake County south to Dempster Street in Morton Grove, Cook County. The workgroup membership consists of 42 separate organizations, including 24 MS4 communities and agencies, two of which are Publicly Owned Treatment Works.

In 2023 and 2024, the NBWW focused on the development of the NARP with the assistance of a consultant. The NARP is scheduled to be completed by Dec. 31, 2025.

For more information, find the NBWW website at nbwwil.org.