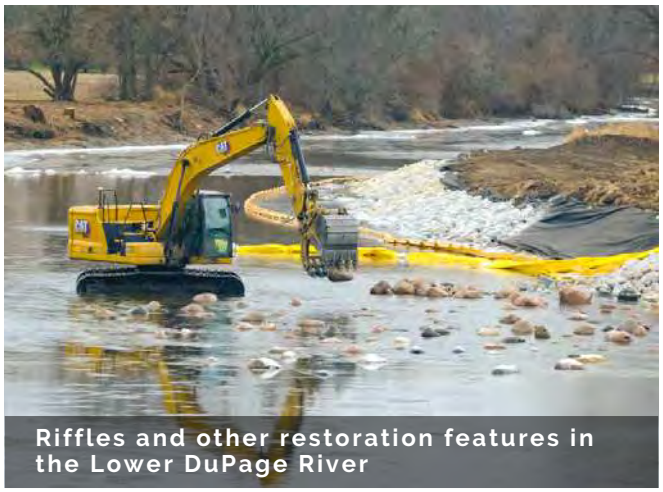
DuPage River/Salt Creek
Special Conditions Report

March 31, 2025

Completion of dam removal and stream restoration on Salt Creek

Best Management Practices for winter roads maintenance and chloride reduction



Riffles and other restoration features in the Lower DuPage River

DuPage River Salt Creek Workgroup

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Introduction and Participation DuPage/Salt Creek Special Conditions Report, March 30, 2025.

This report fulfills certain reporting requirements contained in DuPage River Salt Creek Workgroup's (DRSCW) and Lower DuPage River Watershed Coalition's (LDRWC) NPDES permits. The specific reporting requirements addressed herein include annual reporting on the progress of the projects listed in the Special Conditions, and certain baseline condition reporting for the Chloride Reduction Program.

Background – DuPage River Salt Creek Workgroup (DRSCW)

In 2015, the DRSCW submitted its Implementation Plan to the Illinois Environmental Protection Agency (IEPA). The adaptive management approach is based on high-resolution, comprehensive monitoring of chemical, biological, and physical characteristics of the watersheds. This monitoring provides the data needed to execute the "Plan-Do-Check-Act" methodology inherent to adaptive management. Analysis of the monitoring data provides insight into the highest-priority stressors that affect stream health and allows identification of projects or initiatives with the greatest potential to attain stream use goals. Monitoring also provides the feedback needed to properly assess the impacts of stream restoration projects and water quality initiatives to better formulate future activities.

The 2015 Implementation Plan was used to negotiate a Special Condition in the National Pollutant Discharge Elimination System (NPDES) permit for the watershed's major municipal WWTPs. The Special Condition covered two five-year permit cycles (10 years total); it set an effluent total phosphorus (TP) limit for WWTPs at 1.0 milligrams per liter (mg/L) required 10 years after the effective date of the initial permit for WWTPs using chemical treatment and 11 years after the effective date of the initial permit for WWTPs using biological treatment. Additionally, the Special Condition includes projects and activities as set out in the 2015 DRSCW Implementation Plan (Table 1 and Map 1).

Table 1. DRSCW Special Condition projects and activities per the 2022 NPDES Permit Special Condition

Project Name	Completion Date	Short-Term Objectives	Long-Term Objectives
Oak Meadows Golf Course Dam Removal	December 31, 2016 (Completed)	Improve dissolved oxygen (DO)	Improve fish passage
Oak Meadows Golf Course Stream Restoration	December 31, 2017 (Completed)	Improve aquatic habitat (Qualitative Habitat Evaluation Index (QHEI)), reduce inputs of nutrients and sediment	Raise macroinvertebrate Index of Biotic Integrity (mIBI)
Fawell Dam Modification	December 31, 2024 [1]	Modify dam to allow fish passage	Raise fish Index of Biotic Integrity (fIBI) upstream of structure

Project Name	Completion Date	Short-Term Objectives	Long-Term Objectives
Spring Brook Restoration and Dam Removal	December 31, 2020 (Completed)	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise mIBI and fIBI
Fullersburg Woods Dam Modification Concept Plan Development	December 31, 2016 (Completed)	Identify conceptual plan for dam modification and stream restoration	Build consensus among plan stakeholders
Fullersburg Woods Dam Modification	December 31, 2024 (Completed)	Improve DO, improve aquatic habitat (QHEl)	Raise mIBI and fIBI
Fullersburg Woods Dam Modification Area Stream Restoration	December 31, 2024 (Completed)	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise mIBI and fIBI
West Branch Physical Enhancement	December 31, 2023 (Completed)	Improve aquatic habitat (QHEI)	Raise mIBI and fIBI
Southern East Branch Stream Enhancement	December 31, 2024 [1]	Improve aquatic habitat (QHEl), reduce inputs of nutrients and sediment	Raise mIBI and fIBI
QUAL2Kw Modeling for West Branch, East Branch, and Salt Creek	December 31, 2023 (Completed)	Collect new baseline data and update model	Quantify improvements in watershed. Prioritize DO improvement projects for years beyond 2024
Nonpoint Source (NPS) Phosphorus Feasibility Analysis	December 31, 2021 (Completed)	Assess NPS performance from reductions leaf litter and street sweeping	Reduce NPS contributions to lowest practical levels
East Branch Phase II	December 31, 2028	Improve aquatic habitat (QHEI), reduce Inputs of nutrients and sediment	Raise mIBI and fIBI
Lower Salt Creek Phase II	December 31, 2028 (Completed) [2]	Improve aquatic habitat (QHEI), Remove fish barrier, reduce inputs of nutrients and sediment	Raise mIBI and fIBI
West Branch Restoration Project [a]	December 31, 2028	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise mIBI and fIBI

[1] Changed to December 31, 2025 (Fawell) and 2027 (Southern East Branch), via petition to IEPA by the DRSCW

[2]Added to Fullersburg Woods Project footprint

Another requirement of the Special Conditions is that the member WWTPs participate in a watershed Chloride Reduction Program with the objective of optimizing public agency winter chloride compound application rates to decrease watershed-wide chloride loading.

In 2022, the Special Conditions were extended for an additional five-year permit cycle and provided additional funding from participating members for projects identified in the 2020 Implementation Plan. The 2022 Special Condition also extended the effective date of the effluent TP limit for WWTPs at 1.0 mg/L for an additional three years. Four DRSCW members chose to retain the original NPDES permit language and will be implementing a TP limit of 1.0 mg/L monthly average starting between 10/01/2025 and 08/02/2026. Twelve agencies operating 16 WWTPs have adopted the new conditions and an additional two WWTPs are

already treating to 1.0 mg/L TP due to earlier plant expansions. These assessments between 2023 and 2025 (valued at $6,043,773) have been allocated to fund an expansion of the Fullersburg Woods Dam removal and stream restoration project (Section 1.5), the lower East Branch Stream Enhancement project (Section 1.7), and a not yet identified project on the West Branch of the DuPage River.

Table 2 includes a list of all DRSCW members and identifies their participation in both the 2015 Special Condition and the 2022 Special Condition. A copy of the 2022 DRSCW Special Conditions permit is included in Attachment 1.

Table 2. Participation in the DRSCW NPDES Permit Special Conditions 2023-2024

Agency Name	Facility Name	NPDES Permit Number	Membership Dues Paid 2023-24	Member Included in the 2015 Special Conditions	Assessment Paid for Paragraph 2 Table Project Funding for the 2022 Special Condition
Addison, Village of	A. J. LaRocca WTF	IL0027367	YES	YES	YES
Addison, Village of	Addison - North STP	IL0033812	YES	YES	YES
Bartlett, Village of	Bartlett WWTP	IL0027618	YES	YES	N/A
Bensenville, Village of	South STP	IL0021849	YES	YES*	N/A
Bloomingdale, Village of	Reeves WRF	IL0021130	YES	YES	YES
Bolingbrook, Village of	Bolingbrook #1	IL0032689	YES	YES	YES
Bolingbrook, Village of	Bolingbrook #2	IL0032735	YES	YES	YES
Carol Stream, Village of	Carol Stream WRC	IL0026352	YES	YES	YES
Downers Grove Sanitary District	Downers Grove S.D. – Wastewater Treatment Center	IL0028380	YES	YES	YES
DuPage County	Green Valley	IL0031844	YES	YES	YES
Elmhurst, City of	Elmhurst WRF	IL0028746	YES	YES	YES
Glenbard Wastewater Authority	Glenbard WWTP	IL0021547	YES	YES	YES
Glendale Heights, Village of	Glendale Heights WWTP	IL0028967	YES	YES	N/A
Hanover Park, Village of	Hanover Park STP	IL0034479	YES	YES	YES
Itasca, Village of	Itasca STP	IL0079073	YES	YES*	N/A
Metropolitan Water Reclamation District of Greater Chicago	Egan WRP	IL0036340	YES	YES	YES

Agency Name	Facility Name	NPDES Permit Number	Membership Dues Paid 2023-24	Member Included in the 2015 Special Conditions	Assessment Paid for Paragraph 2 Table Project Funding for the 2022 Special Condition
Metropolitan Water Reclamation District of Greater Chicago	Hanover WRP	IL0036137	YES	YES	YES
Roselle, Village of	J. Botterman WWTP	IL0048721	YES	YES	YES
Roselle, Village of	J. L. Devlin WWTP	IL0030813	YES	YES	YES
Salt Creek Sanitary District	Salt Creek Sanitary District STP	IL0030953	YES	YES	YES
West Chicago, City of and Winfield, Village of	West Chicago/Winfield Wastewater Authority Regional WWTP	IL0023469	YES	YES	N/A
Wheaton Sanitary District	Wheaton Sanitary District WWTF	IL0031739	YES	YES	N/A
Wood Dale, City of	City of Wood Dale - North STP	IL0020061	YES	YES	YES
Wood Dale, City of	Wood Dale - South STP	IL0034274	YES	YES	YES

*The Bensenville South STP and Itasca STP only contributed funds to the Chloride/NIP/QUAL 2K/Trading Program (also known as the "studies" portion) of the 2015 Special Condition funds as both facilities NPDES permits already included a 1 mg/L for TP.
N/A means the agency does not have the condition included in its permit.

Background – Lower DuPage River Watershed Coalition (LDRWC)

Similar to the DRSCW, the LDRWC has negotiated a Special Condition with the IEPA that includes projects and activities that are the sole responsibility of the LDRWC (Table 3) as well as those that are the joint responsibility of the LDRWC and DRSCW (Table 4). Map 2 depicts the location of the physical projects in the LDRWC's Special Conditions.

Table 3. LDRWC Special Condition projects per Implementation Planning from 2016

Project Name	Completion Date	Short-Term Objectives	Long-Term Objectives
Hammel Woods Dam Removal	December 31, 2022(Completed)	Improve DO, reduce nuisance algae	Improve fish passage
DuPage River Stream enhancement South of 119th Street in Plainfield	December 31, 2025	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise mIBI and fIBI

Table 4. LDRWC/DRSCW Joint Activities

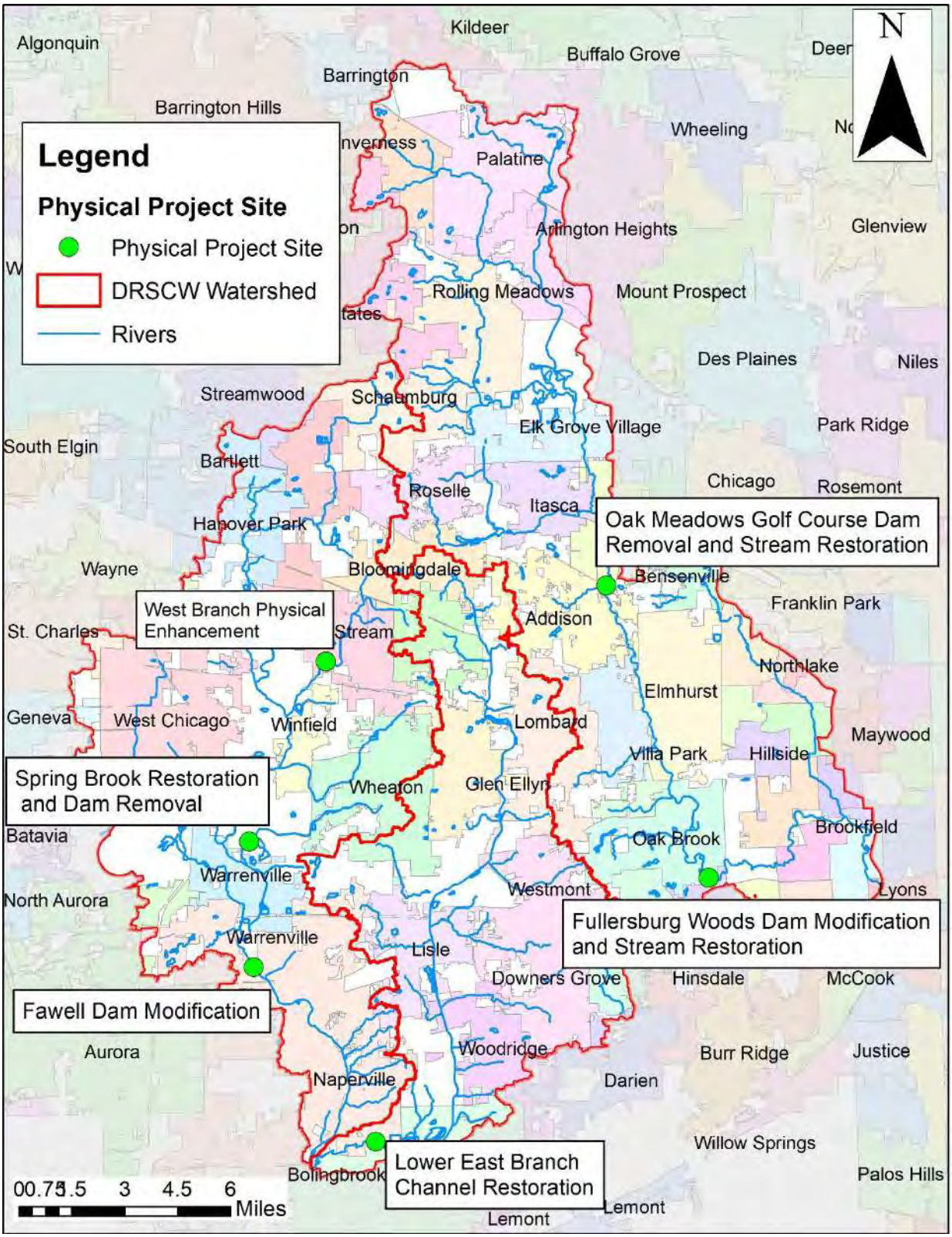
Project Name	Completion Date	Short-Term Objectives	Long-Term Objectives
Nonpoint Source (NPS) Phosphorus Feasibility Analysis	December 31, 2021 (Completed)	Assess NPS performance from reductions leaf litter and street sweeping	Reduce NPS contributions to lowest practical levels

In the LDRWC, three (3) WWTPs are already at 1 mg/l monthly average and two (2) WWTPs, Bolingbrook #3 and Naperville, will be moving to the 1 mg/l limit by 6/30/2026 and 12/31/2028 respectively. Crest Hill's TP schedule is being negotiated as part of their proposed plant expansion. Table 5 includes a list of all LDWRC members and identifies their participation in both the Special Conditions. A copy of the LDRWC permit Special Condition is included in Attachment 2. Note: As the LDRWC Special Condition differs between permit holders, the Special Condition for Bolingbrook STP#3 is included in the Attachment as a representation of the LDRWC's Special Conditions language.

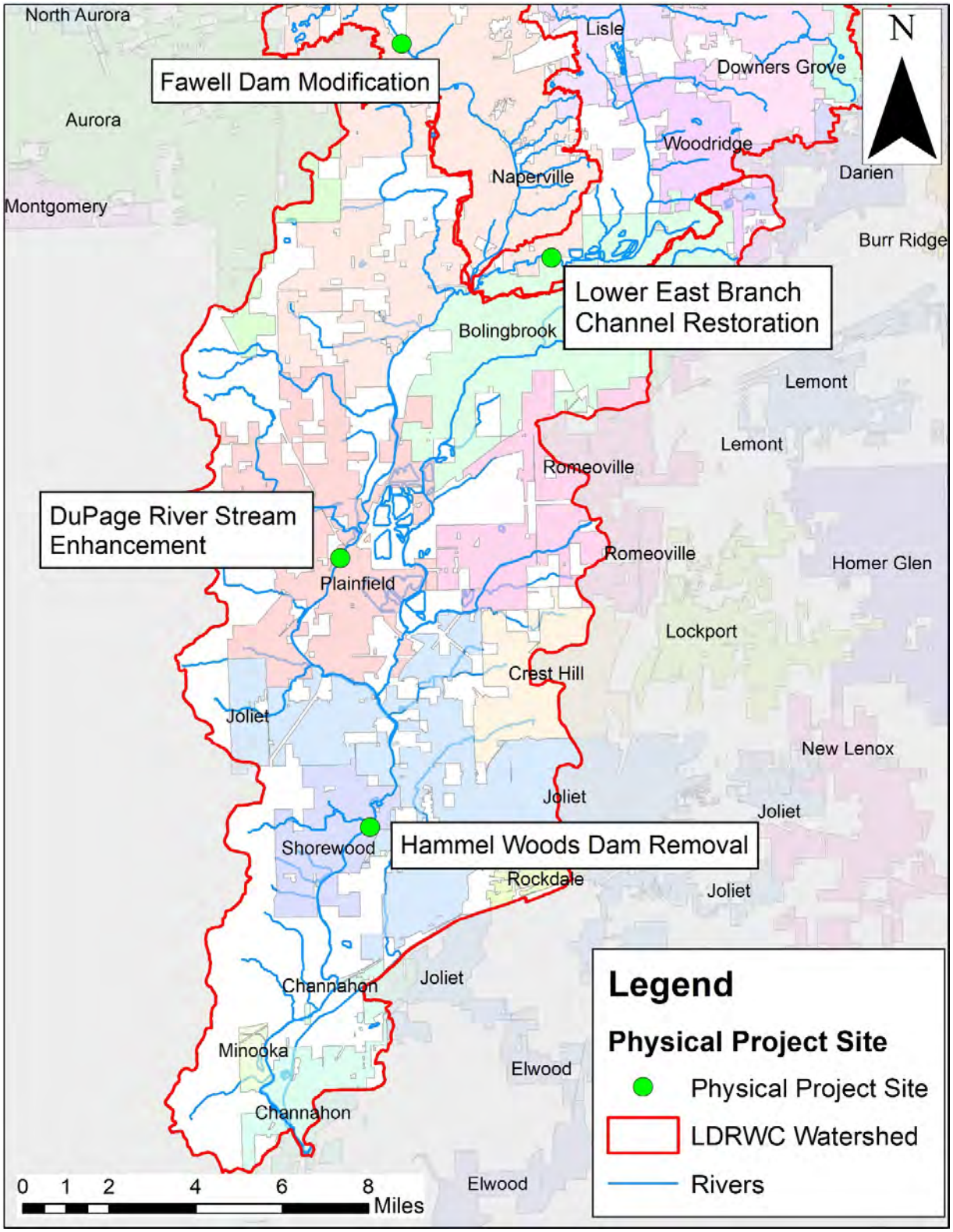
Table 5. Participation in the LDRWC NDPES Permit Special Conditions 2023-2024

Agency Name	Facility Name	NPDES Permit Number	Membership Dues Paid 2023-24	Assessment Paid for Paragraph 2 Table Project Funding*	Assessment Paid for the Chloride Reduction/NIP/QUAL 2k/Trading Program
Bolingbrook, Village of	Bolingbrook #3	IL0069744	YES	YES	YES
Crest Hill, City of	Crest Hill STP	IL0021121	YES	N/A*	YES
Joliet, City of	Aux Sable WWTP	IL0076414	YES	N/A	YES
Minooka, Village of	Minooka STP	IL0055913	YES	N/A	YES
Naperville, City of	Springbrook WRP	IL0034061	YES	YES	YES
Plainfield, Village of	Plainfield STP	IL0074373	YES	N/A	YES

*N/A means that the agency does not have that condition in its permit.



Map 1. Map of DRSCW Physical Projects set out in the Special Conditions



Map 2. Map of LDRWC Physical Projects set out in the Special Conditions

Chapter 1 Physical Projects

The Special Conditions Paragraph 2 identifies stream restoration and dam modification projects that must be completed by the DRSCW and/or LDRWC. The current DRSCW 2025-26 Budget and Four-Year Financial Plan and the LDRWC Three-Year Financial Plan identifies project expenses and funds allocated for each of the physical projects. Map 1 shows the DRSCW physical projects covered in this section; and Map 2 shows the LDRWC physical projects covered in this section.

1.1 Oak Meadows Golf Course Dam Removal and Stream Restoration

- Special Conditions Completion Date – December 31, 2016 (dam removal), December 31, 2017 (stream restoration)
- Project Status – Dam removal and stream restoration are complete. The post-project monitoring phase was completed in 2019. Future monitoring of the project area will be completed in conjunction with the bioassessment program. Salt Creek's next bioassessment is scheduled tentatively for the Summer of 2025.

1.1.1 Site Description

The 2016 Annual Report provided a site description.

1.1.2 Design Characteristics

The 2016 Annual Report described the Project's design characteristics.

1.1.3 Permitting Requirements

The 2016 Annual Report includes details on the Project's permitting requirements.

1.1.4 Project Implementation

The 2017 Annual Report details the project implementation.

1.1.5 Project Impact Evaluation

The 2021 Annual Report details the post project sampling completed to date. The next post-project sampling is scheduled to be conducted in conjunction with the Salt Creek bioassessment schedule for the summer of 2025. The Bioassessment program is the DRSCW's biological, chemical, and physical stream monitoring program. More information on the bioassessment programs can be found at https://drscw.org/activities/bioassessment/.

1.2 Fawell Dam Modification

- Special Conditions Listed Completion Date – December 31, 2025
- Status – In fabrication phase

The objective of the project is to allow fish passage for twelve (12) target species through the Fawell Dam. The DRSCW has been collaborating with DuPage County Stormwater Management (DC SWM) and the Forest Preserve District of DuPage County (FPDDC) on this project. DRSCW has budgeted $1,277,000 for design, construction and monitoring of this project.

1.2.1 Site Description

The 2017 Annual Report provided a site description.

1.2.2 Design Characteristics

Detail of the core design was provided in the 2020, 2021, and 2022 Annual Reports.

1.2.3 Permitting Requirements

The listed permits below are required for the Fawell Dam Modification. Status as of March 15, 2025 is included.

- U.S. Army Corps of Engineers (US ACOE) Nationwide Permit (LRC-2024-169) – The application was submitted in March 2024 and the permit was received on September 25, 2024.
  - SHPO Review– SHPO have issued a signoff letter stating that the project does not rise to the level of an adverse impact on either the dam or the adjacent Preserve.
  - Illinois Historic Preservation Agency Section 106 Clearance – Not Applicable
  - U.S. Fish & Wildlife Service Section 7 Consultation – Completed in Summer 2021, No Effect Determination received January 16, 2024
  - KDSCWD – Signoff on the SESC plan by the KDSWCD is a requirement of the US ACOE Nationwide Permit. A permit application and fee covering the SESC review was submitted to the KDSWCD in mid-September 2024. Signoff on the SESC Plans from KDSWCD was received on October 9, 2024.

- Illinois Department of Natural Resources
  - EcoCat Request – Updated Signoff received January 16, 2024.
    - Major Modification of Existing Dam Permit Application submittal – Application pending submission (Based on past discussions and the revised design, this permit may be combined with the Floodway Construction Permit). Plans were submitted to IDNR in December 2024 but confirmation has been received that they view the project as a Dam Modification as opposed to a Floodway Construction project
    - Floodway Construction Permit – Separate Floodway Construction Permit not anticipated to be required based on IDNR feedback.
    - IEPA - As the project is under one acre of disturbance an IEPA ILR10 this item is not required

- DuPage County Stormwater Management Certification and Building Permit
    - DuPage County Stormwater Management Certification and Building Permit – The permit application was submitted in December 2024. The DC submittal will combine the components of the Corps submittal and IDNR-OWR dam modifications submittal. It also incorporated the memorandum of understanding (MOU) with DuPage County.

1.2.4 Design Progress Report

In November 2023 a memorandum of understanding (MOU) was signed by all parties; DRSCW, DC SWM and the FPDDC. The MOU sets out the responsibilities for each party at each stage, including construction, transport, installation, monitoring and maintenance. DC SWM owns the dam and the parcel it sits on. The FPDDC owns the property surrounding the dam parcel, including the area under the downstream riprap. The MOU covers:

- Financial Obligations
- Fabrication and transport of ladder
- Permitting of the ladder
- Issuing of request for proposals for ladder placement
- Project oversight for ladder placement and “riffle grading”
- Maintenance of the structure (debris management and inspection of joints and anchors)
- Seasonal operation of the removable section where the ladder exits the upstream end of the culvert (winter removal and spring placement). This allows the ladder to be opened if the gate needs to be closed.
- Ad hoc operation of removable section
- Placement of winter debris screens
- Maintenance of instream elevation of the downstream riffle

A contract for oversight of fabrication of the system by the fabricator has been signed by the system designer (BK Riverfish). The first stage of fabrication is the generation of shop drawings showing detail on the materials gauge, weld types, angles and contact points. These drawings have been produced and are currently under review by the DRSCW Projects Committee.

Next Steps:

- Finalize IDNR permit.
- Finalize review and modifications of Shop Drawings.
- Authorize material purchase and start of fabrication.
- DC SWM will issue bid for ladder placement contract. Review needs for contract support with DC SWM. (Designer is contracted to work with DC SWM on installation but additional support may be required).
- Dry fitting of fabricated sections delivered onsite in coordination with DC SWM placement schedule.

- Installation supervised by County with assistance from BK Riverfish.
- Testing of fish passage through system.

1.2.5 Project Impact Evaluation

Post project, both fIBI and fish taxa will be sampled upstream of the site and compared to historical data. The upstream and downstream sites were sampled in 2020 as part of the DRSCW's rolling basin assessment.

The project's budget includes design and purchase of a custom fish capture net for the upstream fish exit. This will allow direct monitoring of any fish that make their way through the system.

DRSCW has budgeted for downstream and upstream sampling and is working with the FPDDC to monitor stream corridor populations up and downstream of the dam post installation.

1.3 Spring Brook Restoration and Dam Removal (Spring Brook Phase 2)

- Special Conditions Listed Completion Date – December 2019
- Status – Construction is complete. Post-project monitoring is on-going. Year 3 of post-project monitoring was completed in 2023 and Year 4 of post-project monitoring was completed in 2024. Year 5 of post-project monitoring is scheduled for 2025.

The project is being managed by the Forest Preserve District of DuPage County (FPDDC); construction, permitting, and long-term monitoring is being funded by the FPDDC, the Illinois State Toll Highway Authority (ISTHA), and the DRSCW.

Post-project survey results: After three (3) years of post-project monitoring, Spring Brook Phase 2 has met its post-project targets for QHEI and fIBI both within the project footprint and at sites monitored as part of the post-project impact evaluation.

1.3.1 Site Description

The 2020 Annual Report provided a site description.

1.3.2 Design Characteristics

The 2020 Annual Report provided a detailed description of the Project's design.

1.3.3 Permitting Requirements

The 2020 Annual Report includes details on the Project's permitting requirements.

1.3.4 Project Implementation

The 2020 Annual Report details the project implementation.

1.3.5 Project Impact Evaluation

The DRSCW, Midwest Biodiversity Institute (MBI), and the FPDDC developed a monitoring plan to assess the restoration work conducted by the FPDDC, ISTHA, and DRSCW contractors at the Spring Brook Phase 2 project location. Pre- and post-project monitoring includes five (5) sites. Three (3) of the sites (WB10, WB10C, and WB10D) are located within the project footprint with the remaining two (2) sites (10A and 10B) being located downstream of the project. The downstream sites serve as control sites that share the same annual water quality and flow variation as the upstream (restored) sites. It should also be noted that the location of WB10 has moved between the pre- and post-project sampling. As part of the project, a new stream channel was constructed for the portion of Spring Brook situated downstream of the former location of the Arrow Road dam and the former channel was converted to wetlands. Since prior to 2020, WB10 was located on the original channel. As part of the post-project monitoring, WB10 was relocated to the newly constructed channel immediately upstream of the pedestrian bridge. Table 6 is a summary of pre- and post- project biological and habitat data collected at Spring Brook Phase 2 in 2018, 2021, 2022, 2023, and 2024. Figure 1 to Figure 3 depict the pre- and post-project QHEI (Figure 1); mIBI scores (Figure 2); and fIBI scores (Figure 3). A map of sampling locations is included in Map 3. A summary of the post-project monitoring results will be provided at the end of the 5-year post-project monitoring period and will be included in this section of the 2025 Annual Report for Spring Brook Phase 2.

Table 6. Pre- (2018) and Post- (2021, 2022, 2023, and 2024) Project Biological and Habitat Data collected at Spring Brook Phase 2

Site ID	River Mile	Drainage Area (sq mi.)	fIBI	mIBI	QHEI	Aquatic Life Use Attainment Status (AQLU)
Spring Brook 2024						
WB10D*	1.51	6.00	35	44.9	77.8	PARTIAL
WB10C*	1.12	6.30	30	37.4	38.5	Non - Fair
WB10*	0.71	6.80	33	39.0	78.5	Non - Fair
WB10B	0.30	6.90	34	36.6	56.5	Non - Fair
WB10A	0.10	7.00	37	47.9	66.5	PARTIAL
Spring Brook 2023						
WB10D*	1.51	6.00	29	38.2	75.0	Non-Fair
WB10C*	1.12	6.30	30	32.2	40.0	Non-Fair
WB10*	0.71	6.80	26	40.9	73.5	Non-Fair
WB10B	0.30	6.90	35	47.6	60.0	PARTIAL
WB10A	0.10	7.00	32	44.8	67.5	PARTIAL
Spring Brook 2022						
WB10D*	1.51	6.00	30	45.3	70.3	PARTIAL
WB10C*	1.12	6.30	26	27.2	36.0	Non-Fair
WB10*	0.71	6.80	31	39.1	73.5	Non-Fair
WB10B	0.30	6.90	19	49.5	50.5	Non-Poor
WB10A	0.10	7.00	31	52.6	65.0	PARTIAL
Spring Brook 2021						
WB10D*	1.51	6.00	30	33.2	78.5	Non-Fair
WB10C*	1.12	6.30	24	23.3	48.0	Non-Fair
WB10*	0.71	6.80	22	33.1	81.0	Non-Fair
WB10B	0.30	6.90	27	44.6	64.0	PARTIAL
WB10A	0.10	7.00	27	52.3	68.0	PARTIAL
Spring Brook 2018						
WB10D*	1.51	6.00	29	29.5	54.0	Non-Fair
WB10C*	1.12	6.30	18	29.1	34.0	Non-Poor
WB10*	0.71	6.80	25	42.8	69.5	PARTIAL
WB10B	0.30	6.90	11	51.6	51.7	Non-Poor
WB10A	0.10	7.00	15	56.0	56.0	Non-Poor
Category			**fIBI**	**mIBI**	**QHEI**	**AQLU Status**
Excellent			>50	>73	>84.5	FULL
Good			>41-49	41.8-72.9	>75.9	FULL
Fair			20-<41	20.9-41.7	<75.9	PARTIAL
Poor			<20	<20.9	<50.1	NON-Fair
Very Poor					<25.0	NON-Poor

*Sites are located within the project footprint.

Figure 1. Pre- (2018) and Post-(2021, 2022, 2023, and 2024) Project QHEI Scores at Spring Brook Phase 2

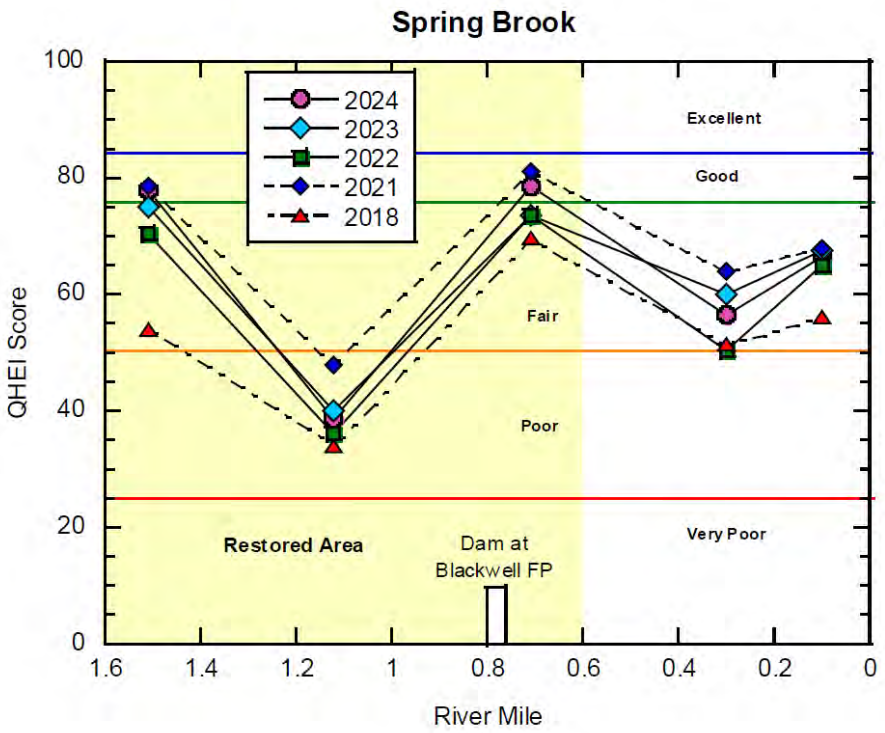


Figure 2. Pre- (2018) and Post-(2021, 2022, 2023, and 2024) Project mIBI Scores at Spring Brook Phase 2

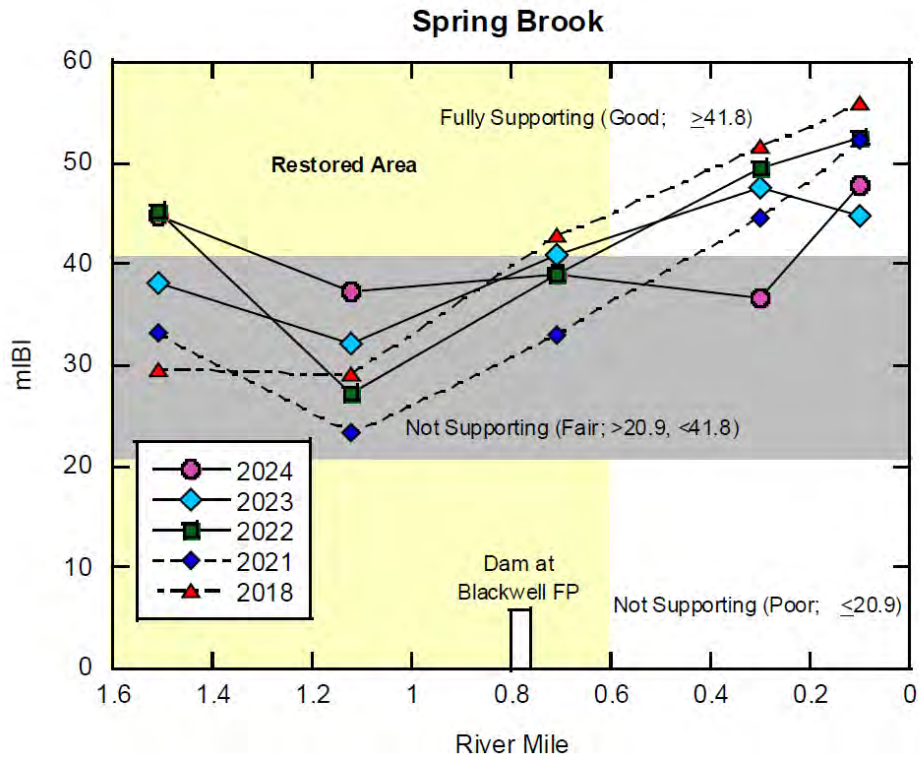
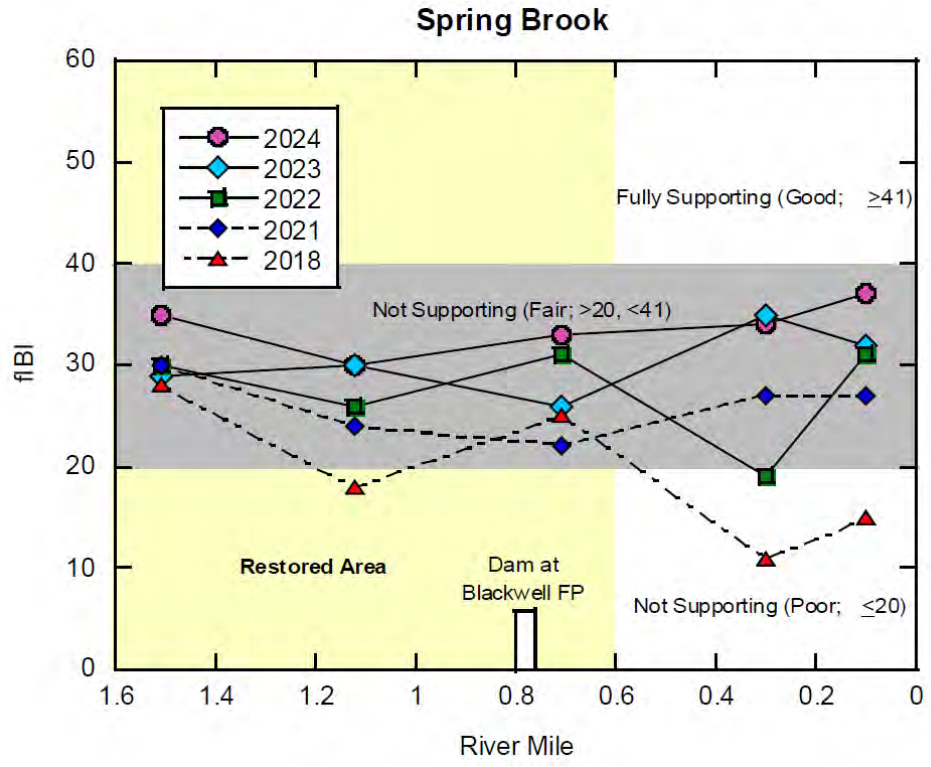


Figure 3. Pre- (2018) and Post-(2021, 2022, 2023, and 2024) Project fIBI Scores at Spring Brook Phase 2



Map 3. Pre-and Post-Project Monitoring Sites at Spring Brook Phase 2

1.4 Fullersburg Woods Dam Modification Concept Plan Development

- Special Conditions Listed Completion Date – December 2016
- Status – Complete (December 2016)

The DRSCW submitted the Fullersburg Woods Dam Modification Concept Plan to the IEPA on December 2016. The 2017 Annual Report included details on the findings of the Fullersburg Woods Dam Modification Concept Plan.

1.5 Fullersburg Woods Dam Modification and Stream Restoration and Salt Creek Phase II

- Special Conditions Listed Completion Date – December 31, 2024 (dam removal) and December 31, 2024 (stream restoration)
- Status – Outreach and Education Campaign is ongoing (started 2017). Master Planning process was completed in 2020. Final Design/Permitting/Preparation of Contract Bid Documents Construction is complete. Substantial Completion was met in December 2024. Monitoring and Management is ongoing.

The Fullersburg Woods Dam Modification and Stream Restoration Project and Salt Creek Phase 2 Project are located on the Salt Creek within the Fullersburg Woods Forest Preserve, Village of Oak Brook, DuPage County, Illinois. The Projects are collectively referred to as the Fullersburg Woods Dam Modification and Stream Restoration Project. The Project's objectives are to raise QHEI above its pre project average of 47.45, raise fIBI at the sites upstream of the dam above its pre project average score of 14.0, raise mIBI above its pre project average score of 25.5 for approximately 1.25 river miles and to improve dissolved oxygen (DO) in the impoundment, as compared to the 2007-2018 data set. The DRSCW has been collaborating with FPDDC and the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) on this project. DRSCW has budgeted $10,280,722 for design, construction and monitoring of this project.

1.5.1 Site Description

The 2018 Annual Report provided details on the Project's site description.

1.5.2 Research and Public Outreach

The 2021 Annual Report provided details on the Research and Public Outreach activities conducted between 2016 and 2021. All reports and materials developed as part of the research and public outreach phase of the Fullersburg Woods Dam Modification and Stream Restoration Project were maintained at the Project's website at RestoreSaltCreek.org. As construction is complete, the RestoreSaltCreek.org website has been archived.

1.5.3 Design Characteristics

The 2020 Annual Report provided the Project's design characteristics.

1.5.4 Permitting Requirements

The 2023 Annual Report provided details on the Permitting Requirements for the Project.

1.5.5 Design Progress Report

1.5.5.1. Phase 1: Development of the Concept Master Plan for Salt Creek at Fullersburg Woods

The 2021 Annual Report describes all work conducted as part of the development of a Concept Master Plan for Salt Creek at Fullersburg Woods. The Concept Master Plan was completed in September 2021.

1.5.5.2 Phase 2: Concept Master Plan for Salt Creek at Fullersburg Woods Final Design and Preparation of Contract Bid Documents

The 2023 Annual Report describes all work conducted as part of the final design and contract bidding. In early January 2021, the DRSCW entered into a contract with Hey and Associates, Inc. for the final design engineering and preparation of contract bid documents for the Project.

1.5.6 Project Implementation

Construction on the Master Plan for Salt Creek at Fullersburg Woods began in November 2023. The 2023 Annual Report detailed all construction activities conducted between November 2023 and February 2024.

As detailed in the 2023 Annual Report, demolition of the Fullersburg Woods (also known as the Graue Mill) dam began on November 30, 2023 and took approximately two weeks. A large, rock riffle was installed in the former location of the dam. Plate 1 to Plate 3 are photographs of the Fullersburg Woods dam prior to, during, and after demolition.

Plate 1. Fullersburg Woods Dam, with its impoundment drawn down, prior to demolition (Fall 2023)

Plate 2. Photograph of the demolition of the Fullersburg Wood Dam (Winter 2023)

Plate 3. Photograph of the rock riffle at the former location of the Fullersburg Woods Dam (Summer 2024)

Activities during the Summer of 2024 focused on the installation of the stream restoration practices along 1.25 miles of Salt Creek upstream of the former dam including riffles, pools, and bank stabilization. Eight (8) additional riffles were installed upstream of the riffle at the former dam location (Plate 3). Plate 4 to Plate 7 are representative photos of the riffles installed in Salt Creek as part of the Fullersburg Woods Dam Removal and Stream Restoration Project.

The original project design also included the excavation of a pool upstream of each of the constructed riffles. However, a site survey conducted after the dam was removed 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. Pool 2 and 5 were to be excavated in straight, slightly wide, slower moving sections of Salt Creek. However, due to concerns with the velocities in these sections not being able to maintain the pools, it was decided to not construction them. Pool 6 was to be located in the northern portion of the site adjacent to Willow Island. Construction of Pool 6 was omitted to allow a braided channel feature, revealed by lower water levels post dam removal, to be preserved. Plate 8 and Plate 9 are photographs of Pool 1 and 7 that were installed in Summer 2024.

Plate 4. Photograph of Riffle 2 in Salt Creek at Fullersburg Woods (Summer 2024)

Plate 5. Photograph of Riffle 3 in Salt Creek at Fullersburg Woods (Summer 2024)

Plate 6. Photograph of Riffle 5 in Salt Creek at Fullersburg Woods (Summer 2024)

Plate 7. Photograph of Riffle 7 in Salt Creek at Fullersburg Woods (Summer 2024)

Plate 8. Photograph of completed Pool 1 at Fullersburg Woods (Summer 2024)

Plate 9. Photograph of completed Pool 7 at Fullersburg Woods (Summer 2024)

Approximately 1,000 linear feet of bank stabilization was also installed in Summer 2024. Due to field conditions observed post dam removal, some of the planned locations of streambank stabilization were relocated to areas with more severe bank erosion. Areas where bank stabilization was installed will be planted with perennial plugs in Summer 2025. Plate 10 is a photograph of a section of streambank stabilization at Fullersburg Woods. Riffle 8 is also shown in the photograph.

Plate 10. Photograph of a section of streambank stabilization at Fullersburg Woods (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 also installed in the Summer and Fall of 2024. These amenities were focused in two areas: near the Graue Mill and adjacent to the Nature Center. Amenities near the Graue Mill included an ADA-accessible trail, an overlook, a landscape feature (smaller overlook), a re-designed raceway with waterfall to provide a water source, and a motor to turn the water waterwheel. The pump system to provide water to the raceway and the motor on the waterwheel are considered mitigation measures under Section 106 as required by the US Army Corps of Engineers under the Section 404 permit issued for the Project. Plate 11 to Plate 15 depict the amenities installed near the Graue Mill as part of the Master Plan for Salt Creek at Fullersburg Woods.

Plate 11. Photograph of the ADA-accessible trail near the Graue Mill (Fall 2024).

Plate 12. Photograph of the overlook on the east bank of Salt Creek near the Graue Mill (Fall 2024)

Plate 13. Photograph of the landscape feature on the west bank of Salt Creek near the Graue Mill (Fall 2024)

Plate 14. Photograph of the cascade in the re-design Graue Mill raceway

Plate 15. Photograph of the gear and chains associated with the motor during installation on the Graue Mill waterwheel

Work conducted by the Fullersburg Woods Nature Center included rehabilitation and waterproofing of the existing floodwall. The existing floodplain wall was sandblasted and retrofitted with a geomembrane and fabric as a waterproofing measure. Cobble was also installed on the streamside of the wall. The wall was then painted and a new wooden cap installed. Plate 16 depicts the floodwall rehabilitation and waterproofing work.

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.

The Master Plan for Salt Creek at Fullersburg Woods met its substantial completion deadline in December 2024 and has moved into its monitoring and maintenance phase. Activities for the remainder of 2025 will focus on two areas: 1) Installation of plant plugs and 2) Monitoring and Management (M&M). 2025 will be Year 1 of the 5-year regulatory M&M as required by the Section 404 permit.

1.5.7 Project Impact Evaluation

The 2021 Annual Report details the pre-project sampling completed to date. As the Project was under construction during the 2024 sampling season, no post- project sampling was conducted for that year. Post-project sampling is scheduled to begin in the Summer of 2025.

Plate 16. Photograph of the floodwall waterproofing activities at Fullersburg Woods (Summer 2024)

1.6 West Branch Physical Enhancement – Klein Creek Section 1 Streambank Stabilization Project

- Special Conditions Listed Completion Date – December 31, 2023
- Status — Construction was completed in 2022. Plugs, trees, and shrubs were installed in 2023. Post-project monitoring is scheduled to begin in 2024.

The DRSCW has a Memorandum of Understanding (MOU) with the Village of Carol Stream to fund the river resource improvement elements of the Klein Creek Section 1 Streambank Stabilization -- Section I. Klein Creek is a tributary to the West Branch of the DuPage River. The objectives of the Project are to raise QHEI above its current score of 41.25 and to raise fIBI and mIBI scores in Klein Creek. The DRSCW budgeted $1,249,623 for the Project's construction and three years of post-project monitoring. Construction funding was also provided by the Village of Carol Stream.

1.6.1 Site Description

The 2021 Annual Report provides a site description.

1.6.2 Design Characteristics

The 2021 Annual Report provided the Project's design characteristics.

1.6.3 Permitting Requirements

The 2021 Annual Report included details on the Project's permitting requirements. All required permits for the projects were obtained prior to the start of construction in 2022.

1.6.4 Project Implementation

The 2024 Annual Report included details on the construction of the Klein Creek Section 1 Streambank Stabilization Project. In summary, the project included the removal of streambank and channel grading along Klein Creek and the installation of streambank and instream practices including vegetated rock toe, toe wood with rock, habitat wood, habitat boulders, rock substrate areas, and stream barbs, as well as the installation of native vegetation and erosion control blanket for stabilization of the stream bed and protection of stormwater structures. All construction activities including seeding and planting were completed in 2023.

Activities in 2024 focused on the maintenance and monitoring (M&M) at the Klein Creek Section 1 Streambank Stabilization Project. The naturalized areas included in the M&M activities include 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. Overall, the naturalized areas comprise approximately 22.87 acres on the project site. All M&M activities are conducted by ENCAP Incorporated (ENCAP).

The primary objective of the M&M program is to track the success of natural area development over the 3-year period of regularly scheduled monitoring sessions. The M&M program documents changes in the plant community composition between years and reveals the need for management changes to improve or maintain natural area quality. The results from the monitoring effort are used by the USACE and Village of Carol Stream to determine if the restoration efforts have been successful. Specific goals of the monitoring program are to determine the vitality of species planted, the diversity of species growing on-site relative to the planted mixture, the degree of coverage by native and non-native/invasive species, and to list any recommendations for remedial action. In particular, annual vegetative cover should increase to levels prescribed by the USACE and Village of Carol Stream. If this is not achieved, supplemental planting or other measures may be required to bring the site into compliance. A general goal of the monitoring effort is to reveal the potential for problems that may affect the growth and persistence of the plantings, and to provide recommendations for resolving or

reducing these problems.

The below list summarizes the M&M activities conducted during 2024 at the Klein Creek Section 1 Streambank Stabilization Project:

- **March:** Approved herbicide was used to treat Thistle, Teasel, Crown Vetch (*Securigera varia*), Burdock (*Arctium minus*), Garlic Mustard (*Alliaria petiolata*), Motherwort *Leonurus cardiaca*), and Bird's Foot Trefoil.
- **April:** Approved herbicide was used to treat Reed Canary Grass, Willow (*Salix* spp.), Honeysuckle (*Lonicera* spp.), and Buckthorn (*Rhamnus* spp.). Approximately 1 acre of upland prairie seed was overseeded in the bare areas near the fire station.
- **May:** Approved herbicide was used to treat Thistle, Teasel, Crown Vetch, Plantain (*Plantago* spp.), Brome (*Bromus* spp.), and Kentucky Bluegrass (*Poa pratensis*). Annual species were selectively mowed, including Ragweed, Wild Carrot, Sweet Clover, Foxtail, Mare's Tail, and any other invasive annuals.
- **June:** Tractor mowing of non-native/invasive annuals occurred to reduce their spread. Spring monitoring and data collection occurred at the end of the month.
- **August:** Beaver enclosures were installed around all trees. Tractor mowing of nonnative/invasive annuals occurred in early August. Approved herbicide was applied to Purple Loosestrife, Thistle, Teasel, Bird's Foot Trefoil, Crown Vetch, and woody resprouts.
- **September:** Cattails and Common Reed were hand-wicked with approved herbicide. Approved herbicide was used to treat Reed Canary Grass, Purple Loosestrife, Thistle, woody re-sprouts, and Bird's Foot Trefoil. Non-native/invasive annuals were selectively cut. Supplemental plugs (450 in total) were installed along the stream corridor. Fall monitoring and data collection occurred at the beginning of the month.
- **October:** Approved herbicide was used to treat Reed Canary Grass, Thistle, and woody re-sprouts.
- **November:** Emergent plug enclosures were removed. Approved herbicide was used to treat Teasel. A total of 20 native trees were planted as replacements for the dead trees counted in 2024. Beaver tree protection was installed around these trees.

Based on the results of the 2024 monitoring conducted by ENCAP, the Klein Creek Section 1 Streambank Stabilization Project has exceeded expectations for its second year. Planted species and 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. Continued selective management of non-native/invasive species performed in 2025 will increase vegetative coverage by approved native species and will keep the project on target to meet third-year/final performance standards. Vegetative management activities should include selective herbicide to non-native/invasive perennial species, selective weed-whacking to non-native

annual species, re-planting/overseeding as necessary, and prescribed burning/off-season mowing.

The list below includes the specific M&M activities proposed for 2025 at the Klein Creek Section 1 Streambank Stabilization Project:

- Continue selective herbicide applications to non-native/invasive, perennial species as necessary. Focus special attention to Reed Canary Grass, Thistle, Teasel, Clover, Cattails, Purple Loosestrife, Buckthorn, Honeysuckle, Bird's Foot Trefoil, Crown Vetch, Common Reed, and Garlic Mustard.
- Continue to selectively cut or mow larger patches of non-native/invasive, annual species before seed-set to prevent proliferation. Focus special attention to Foxtail, Ragweed, Sweet Clover, Barnyard Grass, and Wild Carrot.
- Continue to water and protect planted tree and shrub species as necessary. Monitor the survivorship of woody plantings. Replace any dead/missing trees/shrubs as necessary.
- Interseed/overseed any bare soil areas as necessary.
- Conduct a prescribed burn and/or mowing/mulching with thatch removal of the native areas in fall 2025. The mowing/mulching should be conducted in areas that are too close in proximity to houses, structures, power lines, etc.
- Monitor the in-stream structures for stabilization and movement. Monitor the streambanks for any rills or gullies and/or erosion/sedimentation issues. Conduct any repairs as necessary.
- Monitor plugs and seeded areas as necessary, allowing timely replacement to increase time for establishment.
- Conduct soil sampling with the semi-annual monitoring visits.

1.6.5 Project Impact Evaluation

The DRSCW, MBI, and the Village of Carol Stream developed a monitoring plan to assess the restoration work conducted by the Village of Carol Stream at the Klein Creek Streambank Stabilization Project. Biological and habitat data were collected in 2021 (pre-project) and 2024 (post-project) at two (2) sites within the proposed project limits: WB19B and WB19C. Sites WB19, 19A, and 19B were collected upstream of the proposed project limits and are located within the limits of a second project being designed and constructed by Carol Stream. Site WB16 is located outside the project limits of both the Klein Creek Section 1 Stream Bank Stabilization Project and Carol Stream's other project and was also sampled to serve as downstream control site that is typical of Klein Creek water quality. Table 7 is a summary of pre- and post- project biological and habitat data collected at Klein in 2021 and 2024. Figure 4 to Figure 6 depict the pre- and post-project QHEI (Figure 4); mIBI scores (Figure 5); and fIBI scores (Figure 6). A map of sampling locations is included in Map 4. A summary of the post-project monitoring results will be provided at the end of the 5-year post-project monitoring period and will be included in this section of the 2028 Annual Report for the Klein Creek Streambank Stabilization Project.

Table 7. Pre- (2020) and Post- (2024) Project Biological and Habitat Data collected at the Klein Creek Section 1 Streambank Stabilization Project

Site ID	Fish/Macro River Mile	Drainage Area (sq mi)	fIBI	mIBI	QHEI	Aquatic Life Use Attainment Status (AQLU)
Klein Creek 2024						
WB19	3.60/3.60	5.3	20	26.28	41.0	Non - Poor
WB19A	2.97/2.97	8.36	17	35.63	60.0	Non - Poor
WB19B*	2.57/2.57	8.59	19	37.66	56.0	Non - Poor
WB19C*	2.44/2.44	8.64	16	39.16	64.0	Non - Poor
WB16	1.00/1.00	10.43	22	47.23	79.8	Partial
Klein Creek 2021						
WB19	3.60/3.60	5.3	16	20.8	36.8	Non - Poor
WB19A	2.97/2.97	8.36	14	21	43.0	Non - Poor
WB19B*	2.57/2.57	8.59	17	14.2	41.5	Non - Poor
WB19C*	2.44/2.44	24.3	14.2	24.3	41.0	Non - Poor
WB16	1.00/1.00	33	19	33	76.0	Non - Poor
Category			**fIBI**	**mIBI**	**QHEI**	**AQLU Status**
Excellent			>50	>73	>84.5	FULL
Good			>41-49	41.8-72.9	>75.9	FULL
Fair			20-<41	20.9-41.7	<75.9	PARTIAL
Poor			<20	<20.9	<50.1	NON-Fair
Very Poor					<25.0	NON-Poor

*Sites are located within the project footprint.

Figure 4. Pre- (2021) and Post-(2024) Project QHEI Scores at the Klein Creek Section 1 Streambank Stabilization Project

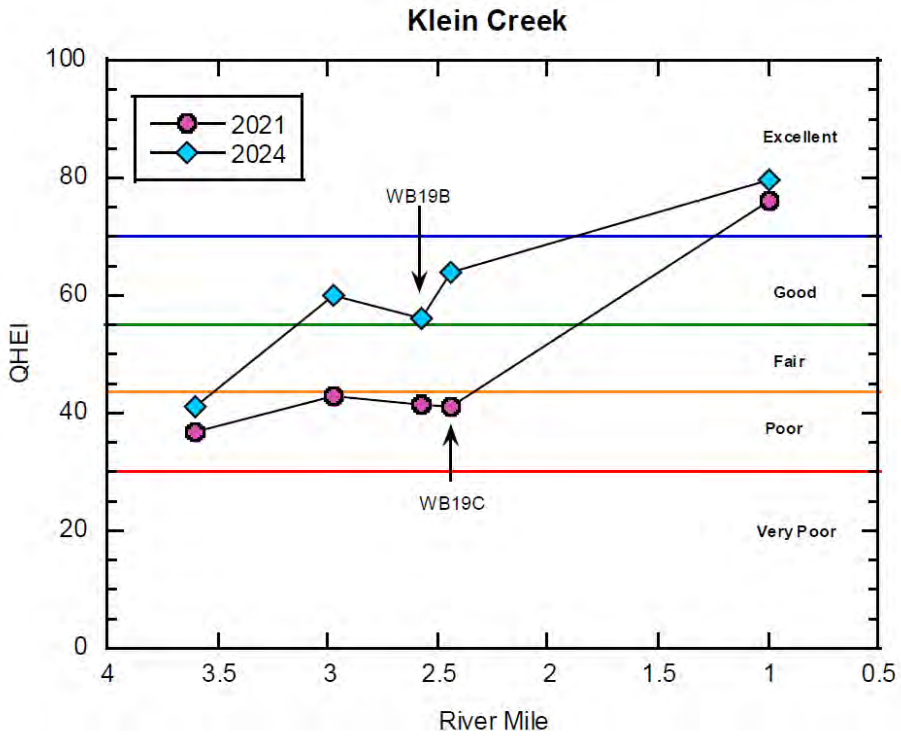


Figure 5. Pre- (2021) and Post-(2024) Project mIBI Scores at the Klein Creek Section 1 Streambank Stabilization Project

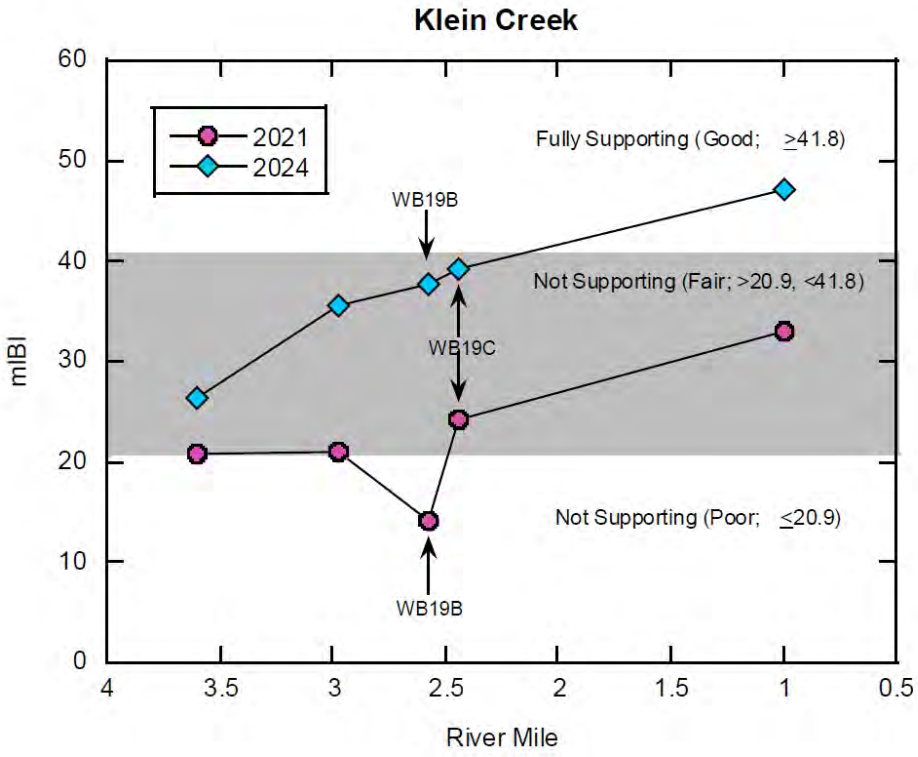
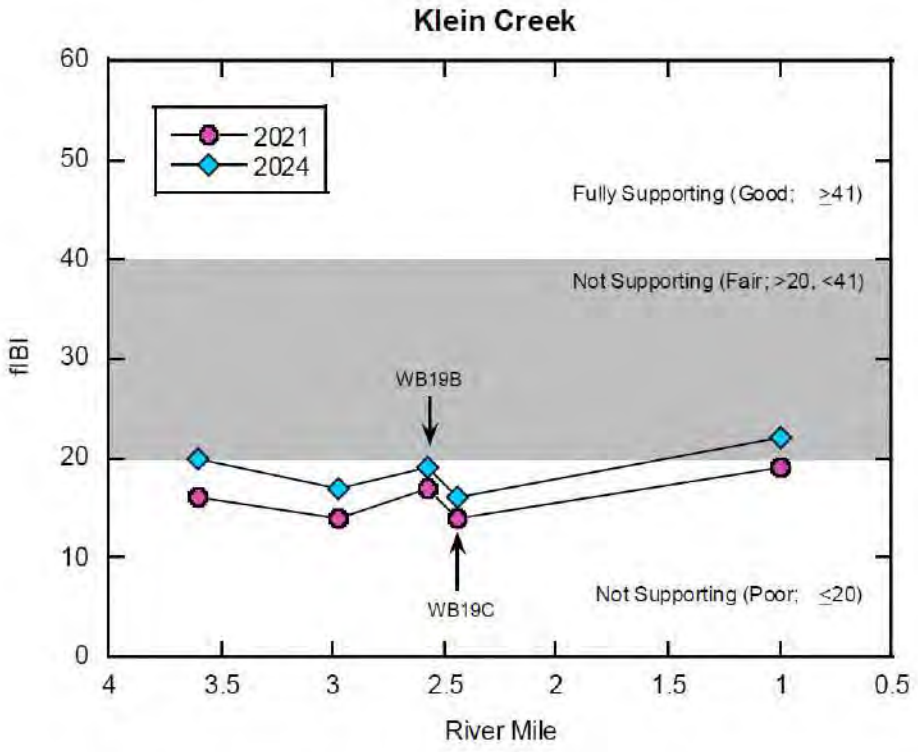


Figure 6. Pre- (2021) and Post-(2024) Project fIBI Scores at the Klein Creek Section 1 Streambank Stabilization Project



Map 4. Pre-and Post-Project Monitoring Sites at the Klein Creek Section 1 Streambank Stabilization Project

1.7 Southern East Branch Stream Enhancement and East Branch Phase II

- Special Conditions Listed Completion Date – December 31, 2027
- Status – Final Design/Construction is in progress and is scheduled for completion in 2025-2026.

The Southern East Branch Stream Enhancement and East Branch Phase II (referred to collectively as the Southern East Branch Stream Enhancement Project) are located on the East Branch DuPage River between its intersection with Royce Road and its intersection with Washington Street in the Village of Bolingbrook and City of Naperville, Will County, Illinois. The Projects' objectives are to raise QHEI above its current score of 65, raise fIBI above its current score of 29.0, and raise mIBI above its current score of 38 throughout the length of the project. The DRSCW will be collaborating with the Forest Preserve District of Will County (FPDWC), the Village of Bolingbrook and City of Naperville, and the Bolingbrook and Naperville Park Districts for this project (referred to collectively as the partners). The DRSCW has budgeted $4,485,000 for design, construction, and monitoring of this project.

1.7.1 Site Description

The 2021 Annual Report provided a site description.

1.7.2 Design Characteristics

The 2021 Annual Report described the Project's design characteristics.

1.7.3 Permitting Requirements

Permit coordination for the Project has not yet started. At a minimum, it is anticipated coordination with the following agencies will be required:

- US Army Corps of Engineers (US ACOE)
- United States Fish and Wildlife Service
- Illinois Department of Natural Resources (IDNR)
- Illinois Environmental Protection Agency (IEPA)
- Will County Stormwater Commission
- Will-Cook Soil and Water Conservation District

1.7.4 Design Progress Report

The 2021 Annual Report provides details on the "Lower East Branch River Stream Restoration Project, DuPage & Will Counties, IL Conceptual Design Report". In early 2022, the ACOE notified the DRSCW that reaches 2-4 of the Lower East Branch Stream Enhancement Project was eligible for funding under the Section 206 Aquatic Restoration Program for FY23-24. The project had been on hold until the federal funding is available to the DRSCW. The DRSCW plans

on proceeding with the final design and preparation of bid documents for the project during the 2025-2026reporting year.

1.7.5 Project Impact Evaluation

The DRSCW and MBI developed a monitoring plan to assess the pre- project conditions at the Southern East Branch Stream Enhancement Project. No pre-project biological and habitat data was collected in 2024. A summary of the pre-project monitoring data collected in 2021 and 2023, along with data collected during 2008, 2011, 2014, and 2019 bioassessments within the project footprint, was included in the 2023-24 DRSCW/LDRWC Annual Report.

1.8 Hammel Woods Dam Modification

- Special Conditions Listed Completion Date – December 31, 2022
- Status – Complete. The Hammel Woods dam was removed in Summer 2021 and the Project is complete. Post-project monitoring is on-going. Year 1 of post-project monitoring was completed in 2021, and Year 2 of post-project monitoring was completed in 2022. Year 3 of post-project monitoring is scheduled for 2026.

The Hammel Woods Dam was located on the Lower DuPage River within the Hammel Woods Forest Preserve, Shorewood, Will County, Illinois. The objective of the Project was to increase fIBI at sites located upstream of the dam. Fish sampling conducted both upstream and downstream of the dam in 2012-2018 indicated that the Hammel Wood Dam blocked eight species, including Central Mudminnow, Grass Pickerel, Mimic Shiner, Yellow Bass, Northern Sunfish, Slenderhead Darter, Pumpkinseed Sunfish, and Log Perch, from accessing the DuPage River watershed upstream of the dam. The LDRWC collaborated with the Forest Preserve District of Will County on the Hammel Woods Dam Modification Project. The LDRWC spent $611,270.76 on the project design and construction and has $15,000 budgeted for post-project monitoring.

1.8.1 Site Description

The 2017 Annual Report provided a site description.

1.8.2 Design Characteristics

The 2017 Annual Report provided the Project's design characteristics.

1.8.3 Permitting Requirements

The 2020 Annual Report includes details on the Project's permitting requirements.

1.8.4 Project Implementation

The 2021 Annual Report details the Project's implementation.

1.8.5 Project Impact Evaluation

The LDRWC and MBI developed a monitoring plan to assess the removal of the Hammel Woods Dam. Fish and habitat pre- and post-project monitoring were completed at four (4) sites in 2019, 2021, and 2022 and is detailed in the 2022 Annual Report. No post-project sampling was conducted in 2023 or 2024. The next post-project sampling is scheduled to be conducted in conjunction with the Lower DuPage bioassessment schedule for the summer of 2026. The Bioassessment program is the LDRWC's biological, chemical, and physical stream monitoring program. More information on the bioassessment programs can be found at https://ldpwatersheds.org/about-us/lower-des-plaines-watershed-group/our-work/bioassessment-monitoring/.

1.9 DuPage River Stream Enhancement

- Special Conditions Listed Completion Date – December 31, 2025
- Status – Construction is on-going and substantial completion is expected to be met by March 31, 2025. Planting of perennial plants and trees is scheduled for Spring 2025; and Year 1 of Monitoring and Maintenance will be 2025.

The Lower DuPage River Stream Restoration Project is located on the mainstem of the DuPage River between Route 126 and Renwick Road, Village of Plainfield, Will County, Illinois. The objectives of the Project are to raise QHEI, fIBI and mIBI scores in Lower DuPage River. The LDRWC budgeted $2,250,000 for the construction of the Project.

1.9.1 Site Description

The 2021 Annual Report provided a site description.

1.9.2 Design Characteristics

Preliminary concept plans and associated hydraulic modeling are complete. Details on this effort were included in the 2023 Annual Report.

1.9.3 Permitting Requirements

The permits listed below are required for the DuPage River Stream Enhancement Project. All project permits have been received as listed below.

- US Army Corps of Engineers (US ACOE) (LRC-2023-0742)
  - Application approved on May 31, 2024
  - Authorized as NWP 13 (Bank Stabilization) and NWP 27 (Aquatic Habitat Restoration)
- Illinois Historic Preservation Agency Section 106 Clearance (SHP LOG #019020524)
  - Compliance letter provided on May 2, 2024
- U.S. Fish & Wildlife Service Section 7 Consultation –
  - Completed USFWS self-documenting Section 7 Consultation in 2022

    - Additional work and memo provided on July 25, 2023
- Illinois Department of Natural Resources (IDNR)
    - EcoCat Request – Signoff Received on May 31, 2022
    - Floodway Constriction Permit submitted on November 22, 2023 and approved on April 3, 2024
- Illinois Environmental Protection Agency (IEPA)
    - NPDES Permit for Construction (ILR10) – ILR10ZE4I
        - Review / approval letter on May 20, 2024
        - Notice of Intent – Will be submitted by contractor upon award
- Will County Stormwater Commission
    - Delegated to Village of Plainfield. The Village of Plainfield sent an email on May 10, 2024 saying that it is approved
- Village of Plainfield Building and Stormwater Permits
    - Application submitted on January 18, 2024 – Pending
    - The Village of Plainfield sent an email on May 10, 2024 saying that stormwater is approved
- Will-Cook Soil and Water Conservation District
    - Soil erosion and sediment control (SESC) – approved on July 11, 2024

1.9.4 Design Progress Report and Project Implementation

1.9.4.1 Design Progress Report

In late 2021, the LDRWC initiated a qualifications-based selection process to select a consultant to assist with the final design and preparation of contract bid documents for the Lower DuPage River Stream Restoration Project. In mid-January 2022, the LDRWC contracted with Hey and Associates, Inc. for the final design engineering and preparation of contract bid documents for the Lower DuPage River Stream Restoration Project. The scope of work included in this contract is discussed below. Preliminary work on the contract began in early 2022 and was completed in 2024.

Task 1 – Site Survey

Task 1 includes a site survey of the proposed project area and was completed in 2022.

Task 2- Wetlands/Waters of the United States Assessment

Task 2 includes a site survey of the delineation wetlands and Waters of the United States and Will County jurisdictional wetlands. Task 2 was completed in 2022.

Task 3 –Final Design Engineering

Task 3 includes the final design engineering of all project components, including but not limited to stream restoration practices and amenities as included in the Village of Plainfield's Riverfront Master Plan. Task 3 was completed in late 2023.

Task 4 – Hydraulic and Hydrologic Modeling

Task 4 includes the development of a hydrology/hydraulic model(s) necessary for design, permitting, and construction. Modeling will ensure that the design of the in-stream features meet the enhancement goals of the project, are sustainable for the long-term, and do not negatively impact downstream or upstream properties. Task 4 was completed in 2023.

Task 5 – Procure Local, State, and Federal Permits for the Master Plan

Task 5 includes the preparation of all permit applications needed to procure all local, state and federal permits. At a minimum, it is anticipated coordination with the following agencies will be required:

- US Army Corps of Engineers (US ACOE)
- United States Fish and Wildlife Service
- Illinois Department of Natural Resources (IDNR)
- Illinois Environmental Protection Agency (IEPA)
- Will County Stormwater Commission

Task 4 was completed in 2024; details are provided in Section 1.9.3.

Task 6 –Preparation of Cost Estimate and Contract Bid Documents

Task 6 includes the preparation of contract bid documents and cost estimates. Hey and Associates, Inc. also provided Bid Assistance by addressing contractor questions during the public bid process. Task 6 was completed in 2024 and additional details on the bid process are included in Section 1.9.4.2.

Task 7 – Coordination Meetings

Task 7 includes six (6) meetings with Hey and Associates, Inc, LDRWC, and project stakeholders. These meetings included: project kick off meeting, two (2) stream restoration design alternatives selection meeting, and design review meetings at 50%, 75% and 100% of completion. Task 7 is was completed in 2024.

1.9.4.2 Project Implementation

The Village of Plainfield led the bid process with the bid advertisement posted on May 21, 2024. A non-mandatory pre-bid meeting for contractors was held at the project site on May 28, 2024. Bids were opened on June 7, 2024. Four valid bids were received with RES Environmental Operating Company, LLC (RES) submitting the low bid of $1,246,261.81 for the project including the nine (9) alternatives. The Village of Plainfield Board awarded RES the contract for the construction of the project at their June 17, 2024, meeting.

On September 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 was

held at the Plainfield Village Hall and approximately 30 residents attended. 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 October 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. Plate 17 is photograph of tree clearing activities on the east bank of the DuPage River during November 2024.

Plate 17. Photograph of tree clearing on east bank of the DuPage River at the DuPage River Stream Enhancement Project (Winter 2025)

During the week of November 18, 2024, RES mobilized on-site and installed soil erosion and sediment control (SESC) measures both within the DuPage River and around the project site. Earthwork operations including stripping and stockpiling topsoil and the removal of the failed retaining wall on the west bank of the DuPage River (Plate 18). Once the failed wall was removed, the banks were graded, and a boulder toe was installed (Plate 19). The disturbed area was then seeded with a native seed mix and protected with erosion control blanket (Plate 20). Approximately 850 linear feet of failed concrete retaining wall was removed and 1,000 linear feet of boulder toe was installed as part of the project.

Plate 18. Photograph of the removal of the failed retaining wall of the west bank of the DuPage River (Winter 2025)

Plate 19. Photograph of the boulder toe installed on the west bank of the DuPage River (Winter 2025)

Plate 20. Photograph of the completed boulder toe with seed and erosion control blanket on the west side of the Lower DuPage River (Winter 2025)

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 December 9, 2024 RES installed the first of two riffles within the Lower DuPage River (Plate 21 and Plate 22). Riffle 2 is located downstream from Riffle 1 and was installed on December 18, 2024 (Plate 23).

Plate 21. Photograph of the installation of Riffle 1 in the Lower DuPage River (Winter 2025)

Plate 22. Photograph of the completed Riffle 1 in the Lower DuPage River looking north towards the Route 126 bridge (Winter 2025)

Plate 23. Photograph of Riffle 2 in the Lower DuPage River looking south (Winter 2025)

RES has 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 eighteen (18) stream barbs, thirty-six (36) rootwads, eight (8) truck bars, and seven (7) brush boxes. Additionally, five (5) vegetative clusters will be added to instream features in Spring of 2025 when the perennial native plants are installed onsite. Plate 24 to Plate 28 depict the installation of the instream structures.

Plate 24. Photograph of a stream barb being installed on the west side of the Lower DuPage River (Winter 2025)

Plate 25. Photograph of a brush box being installed on the east side of the Lower DuPage River (Winter 2025)

Plate 26. Photograph of a completed brush box on the west side of the Lower DuPage River (Winter 2025)

Plate 27. Photographs of rootwads and stream barbs on the east side of the Lower DuPage River (Winter 2025)

Plate 28. Photograph of instream structures on the east side of the Lower DuPage River (Winter 2025)

Additionally, an engineered log jam was installed on the island located at the southern part of the project site. The log jam creates instream habitat for fish and macroinvertebrates, particularly for anglers looking to catch smallmouth bass. It is believed that the engineered log jam is the first to be installed in Illinois. Plate 29 depicts the log jam installed at the Lower DuPage River Stream Enhancement Project.

After finishing instream structures, RES began its work on improving the five (5) swales located on the west side of the Lower DuPage River. Each of the swales are being graded to improve stormwater conveyance, and a cascading water feature is being added. Work began in Swale 5 at the southern end of the project site and as each swale was completed, RES moved northward completed the swales. After the completion of swale 5, a minor design change was made to replace to the rip rap 3-6 inches (RR3) in the water feature with cobbles and boulders in order to improve the aesthetics of the swale and provide for a more naturalized stream appearance. In Spring 2025 each of the swales will be planted with perennial native plant plugs and six (6) native trees will be installed in Swale 5. Plate 30 to Plate 34 depict the work conducted in the swales at the Lower DuPage Stream Enhancement Project.

Plate 29. Photograph of the engineered log jam at the DuPage River Stream Enhancement Project (Winter 2025)

Plate 30. Photograph of grading activities in Swale 5 located in the southern portion of the DuPage River Stream Restoration Project (Winter 2025)

Plate 31. Photograph of the natural outcropping stone and RR3 water feature installed in Swale 5 at the DuPage Stream Restoration Project(Winter 2025)

Plate 32. Photograph of Swale 5 after being seeded and stabilized with erosion control blanket (Winter 2025)

Plate 33. Photograph of Swale 3 at the DuPage River Stream Enhancement Project (Winter 2025)

Plate 34. Photograph of Swale 1 at the DuPage River Stream Enhancement Project (Winter 2025)

The Lower DuPage River Stream Enhancement Project will meet substantial completion by March 31, 2025. Activities for the remainder of 2025 will focus on two areas 1) the installation of native plant plugs and trees and 2) maintenance and monitoring activities including weed control, mowing, burning, and other activities as needed. Maintenance and monitoring will continue for three years to ensure that the seeded and planted areas conform with performance criteria.

1.9.5 Project Impact Evaluation

The LDRWC and MBI developed a monitoring plan to assess the DuPage River Stream Enhancement Project. Macroinvertebrates, fish and habitat monitoring were completed at four (4) sites in 2022 as part of pre-project monitoring and is detailed in the 2022 Annual Report. No pre-project sampling was conducted in 2023 and 2024. Post-project sampling will begin 2026.

Chapter 2 Chloride Reduction Program

The Special Conditions Paragraph 3 requires NPDES holder participation in a watershed Chloride Reduction Program either directly or through the DRSCW and/or LDRWC. This section summarizes the DRSCW and LDRWC Chloride Reduction Program activities in 2024-2025.

2.1 Technical Workshops

In 2007, the DRSCW held its first deicing workshop to highlight new deicing methods, NPDES water quality goals, and best management practices in order to reduce chlorides and costs. During the following years, the DRSCW offered an additional workshop that targeted contractors responsible for snow and ice management of parking lots and sidewalks. Since 2007, the DRSCW has executed workshops every year targeting personnel responsible for 1) public roads and 2) parking lots and sidewalks. The programs have provided training and resources for numerous attendees from multiple agencies (Plate 35).

Plate 35. PowerPoint Slide from Sept. 17, 2024

During the Covid pandemic the workshops were held virtually. In 2024, based on feedback from some attendees, in-person workshops were again offered, alongside those in a webinar workshop format. The workgroup staff for the DRSCW, LDRWC, Lower Des Plaines Watershed Group (LDWG), and Chicago Area Waterways Chloride Workgroup (CAWCW) collaborated with staff from Lake County DOT and Health Dept. to coordinate the workshops.

Registration was made available to agencies over a wide area of northeastern Illinois resulting in staff attending from Champaign, Cook, DuPage, Fulton, Kane, Kendall, Lake, McHenry and Will Counties.

The 2024 in-person Public Roads Winter Best Practices Workshops were held on Sept. 17, Sept. 24, and Oct. 3, 2024. Public Roads webinars were held on Oct. 8, Oct. 15, and Nov. 19. Staff from The Conservation Foundation were engaged to present the material. A registration fee was required per person for the in-person workshops and per agency in order to view each webinar. The webinar links were shareable within an agency. A survey was provided at the end of each webinar to those who had signed in asking for the number of attendees from each agency and for an evaluation of the workshop. Evaluation surveys were also provided at the in-person workshops. The survey results indicated that a minimum of 870 persons attended the five 2024 Public Roads workshops. Certificates of attendance were provided to those who requested them. A link to the *Minnesota Snow and Ice Control: Field Book for Snowplow Operators* was provided to each registrant.

Plate 36. PowerPoint Slide from Sept. 26, 2024 Parking Lots & Sidewalks

The Parking Lots and Sidewalks Winter Best Practices Workshop webinars were held on Sept. 26 (Plate 36) and Nov. 13, 2023 and one in-person workshop was held on Oct. 1, 2024. The Workshops were presented by staff from The Conservation Foundation through the Salt Smart Collaborative. The survey results indicated that there was a minimum of 425 persons who attended the Workshops. Certificates of attendance were provided to those who requested them. The surveys provided an opportunity to provide an evaluation on the webinars. A link was sent to each registrant for the *Illinois Winter Maintenance Manual for Parking Lots and Sidewalks* developed by the Salt Smart Collaborative (developed in part by a Section 319 Grant issued by IEPA).

Illinois RiverWatch Chloride Watchers Program

Illinois RiverWatch is a statewide biological monitoring program that provides volunteers a hands-on opportunity to become stewards of our local waterways by monitoring stream habitat and water quality. Winter Chloride Watcher volunteers collect and test water samples from local waterways for chloride on a monthly basis between November and May.

The Conservation Foundation partnered with the Illinois RiverWatch Network (RiverWatch) to expand RiverWatch's Winter Chloride Watchers program in Northeast Illinois for the 2023-2024 winter season. Inclusive of both The Conservation Foundation and RiverWatch, 123 volunteers submitted 1,221 chloride results from 188 sites across 17 counties in IL. The waterways with the most samples taken were Salt Creek (9 sites, 96 samples) and the Fox River (9 sites, 60 samples).

LDRWC's Seasonal Educational Materials

During this reporting period, the LDRWC shared seasonal educational materials for members to use in residential outreach efforts (Plate 37). The materials were made available through their website https://ldpwatersheds.org/outreach/salt-smart/ and through the Salt Smart Collaborative website at www.saltsmart.org. The LDRWC is one of the lead collaborators for SaltSmart.org. Materials included blog posts, newsletter articles, supporting social media graphics, posters/handouts, plastic cups for spreading salt correctly and a bookmark with information for residents. Many of these materials were translated into Spanish this year. Both websites advertise the Winter Best Practices Workshops.

Plate 37. Outreach graphic for social media platforms, 2024

2.2 Tracking BMP Adoption

2.2.1 Chloride Questionnaire

The DRSCW has attempted to track adoption of sensible salting BMPs in the program area since 2007. This is done as ambient chloride concentration monitoring; and while the ultimate indicator of success, it has proven an imperfect metric for tracking efficiency trends in winter salt use. Tracking target BMP adoption in the program area allows the DRSCW to evaluate the success of the chloride management workshops. Historically the public roads and parking lots/sidewalks workshops have covered the following practices:

- Winter weather tracking and planning
- Behavior of commonly used deicing compounds
- Product and chemical alternatives
- Equipment calibration training
- Application rates
- Equipment and salt application advancements
- Salt usage, storage and deicing best management practices
- Example salt use policies and management plans

The questionnaires also help identify topics for future workshops and form suppositions about salt use per unit of service expended inside the program area relative to 2006 levels. Questionnaires were distributed in 2007, 2010, 2012, 2014, 2016, and 2018. They were sent to approximately 80 municipal highway operations and public works agencies. A new questionnaire was due to be distributed in 2022 but was not completed due to a need to rework elements of the questionnaire. It is now due to be issued in March/April 2025.

2.2.2 Ambient Impact Monitoring

DRSCW's Chloride Education and Reduction Program has performed an in-depth analysis to detect trends in chloride loading within the water quality data collected since the beginning of program efforts.

The goal of the analysis is to gauge the impact, if any, of the chloride education program on chloride loadings and concentrations generated from DRSCW water quality data collected from 2009 to present. Such an analysis is challenging due to the influences of other variables that dictate the magnitude of chloride impact on water quality data, principally winter weather (see Figure 7 to Figure 13). The analysis is needed to account for this inherent variability to as great a degree as possible. To help accomplish this the DRSCW purchased 10 years of weather data (snow and ice precipitation data for numerous locations) from Weather Command / Murray and Trettel, Inc. The analysis steps for each site where winter chloride concentration data was available were:

- Calculation of estimated chloride concentration from winter conductivity data
- Calculation of a warm weather regression value from summer concentration data and summer conductivity measures
- Calculation of estimated chloride summer concentrations
- Creation of loading data (in pounds per day) from the estimated concentration data using USGS flow data
- Identification of ice events from the weather command data and "replacement" of such events with loadings observed under snow events with the same accumulation
- Graphing of loading and concentration data for each site

This analysis has been completed and phase one results have been produced. The report was completed in 2024. Study results indicate that chloride concentrations have decreased over the study period in almost all DRSCW stream monitoring locations in both warm and cold weather conditions. The study suggests that the education and reduction efforts, the resulting community chloride application rate reductions, and enhanced community salt management best management practices (BMPs) have resulted in lower local chloride concentrations over the past decade. However, as Figures 7 through 10 show, weather is still the largest determinant of instream chloride concentrations.

When chlorides are present in elevated concentrations in rivers, they harm aquatic invertebrates, fish, and aquatic and terrestrial plants. High chloride concentrations in stormwater also corrode structures like bridges, increasing maintenance costs; and chlorides are very difficult to remove from water through treatment. In the DRSCW and LDRWC watersheds, the main source of elevated chlorides in the rivers is from winter deicing applications. In an effort to understand and track chloride levels in the watershed, year-round conductivity monitoring is carried out.

Ambient monitoring of conductivity is carried out at seven (7) locations. All conductivity sites were originally installed to collect continuous DO and are situated for that effort rather than for chlorides. Six (6) locations are in the DRSCW program area (5 sites monitored by the DRSCW and 1 site monitored by MWRD), and one (1) site in the LDRWC program area (monitored by the LDRWC). DRSCW chloride sites are positioned in the upper and lower sections of each watershed. The LDRWC site is located near the confluence of the Lower DuPage and the Des Plaines.

The upstream Salt Creek chloride site (Busse Woods) is at the upstream-most point of the Lower Salt Creek watershed (this site isn't placed further upstream as it was selected to measure DO upstream of the watersheds POTWs). MWRD did not conduct ambient winter conductivity monitoring at the Salt Creek at Busse Woods site in 2021. The site was taken over by DRSCW for conductivity monitoring during the winter of 2022.

For the sites located within the DRSCW watersheds, conductivity concentrations are used to calculate chloride concentrations based on a linear relationship established by the DRSCW. Calculated Annual chloride concentrations for the winter months from 2008-2024 for six (6) sites are depicted in Figure 7 to Figure 12. The Daily Max represents the highest chloride daily value calculated from that year's winter season. The Winter Average is the average of all measurements from the winter season. The Four-Day Average is the maximum value of the year's four-day averages. Also shown are seasonal totals for winter snow and ice data. This data is generated from data supplied by a contract with Weather Command/ Murray and Trettel, Inc. The data is specific to the areas proximate to the relative conductivity monitoring site.

In the LDRWC watershed, conductivity data was only recently collected as of Winter 2021 (Fall 2020 to Winter 2021) at Shorewood. For the site at Shorewood, conductivity concentrations are used to calculate chloride concentrations based on a linear relationship established by the LDRWC. It should be noted that only limited chloride grab samples were available to develop the linear relationship and the LDRWC is collecting additional chloride grab samples to further refine this relationship. Calculated Annual chloride concentrations at Shorewood for the winter months from 2020 to 2024 are presented in Figure 13.

Figure 7. Calculated Chloride Concentrations - Winter Months (2009-2024) for Salt Creek at Busse Woods Main Dam. Data was not collected in 2021.

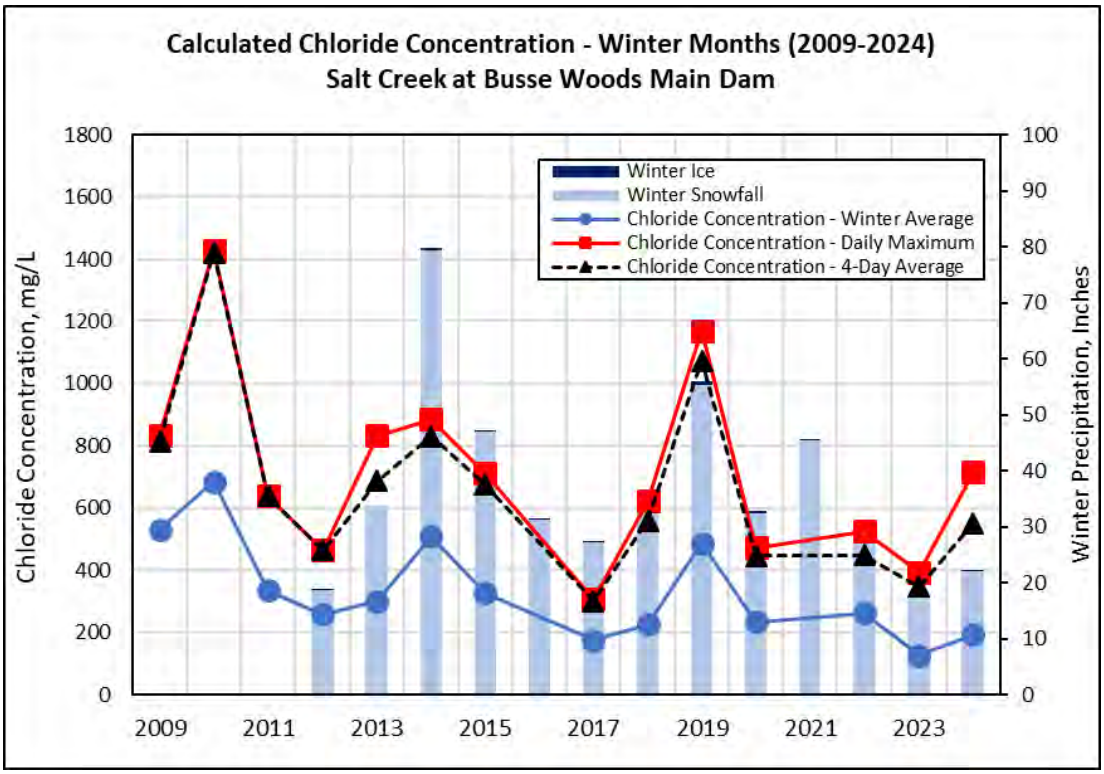


Figure 8. Calculated Chloride Concentrations - Winter Months (2008-2024) for Salt Creek at Wolf Road

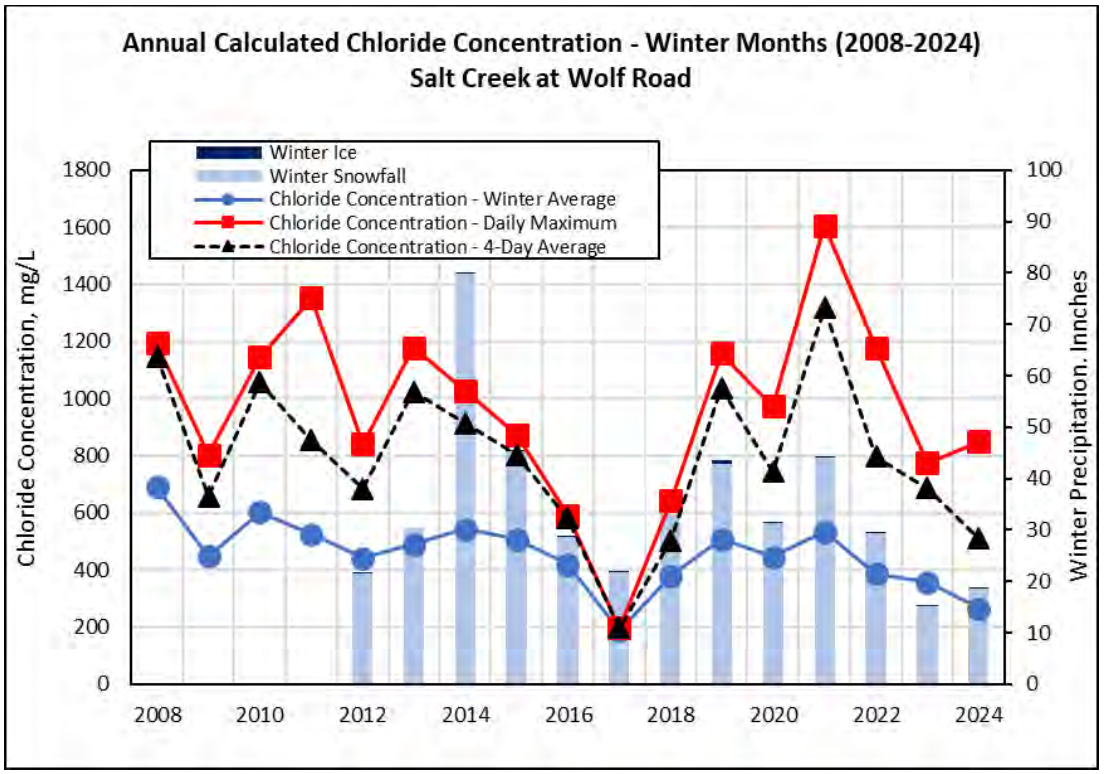


Figure 9. Calculated Chloride Concentrations - Winter Months (2008-2024) for the East Branch DuPage River at Army Trail Road

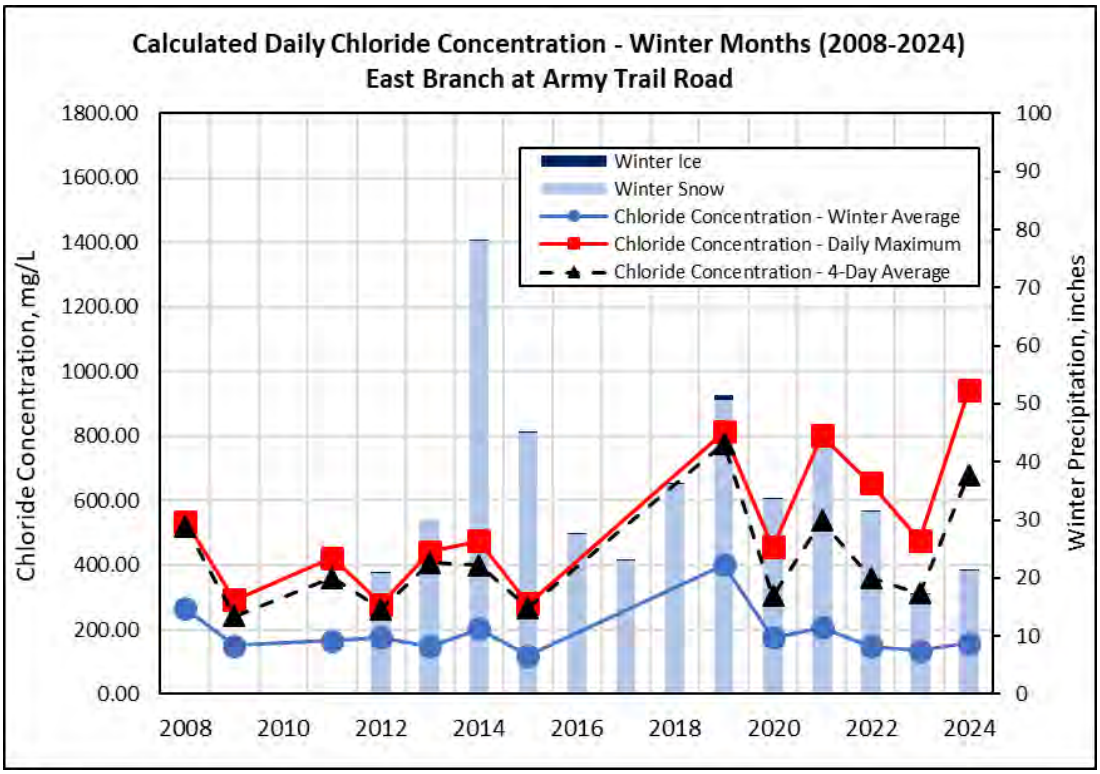


Figure 10. Calculated Chloride Concentrations - Winter Months (2008-2024) for the East Branch DuPage River at Hobson Road

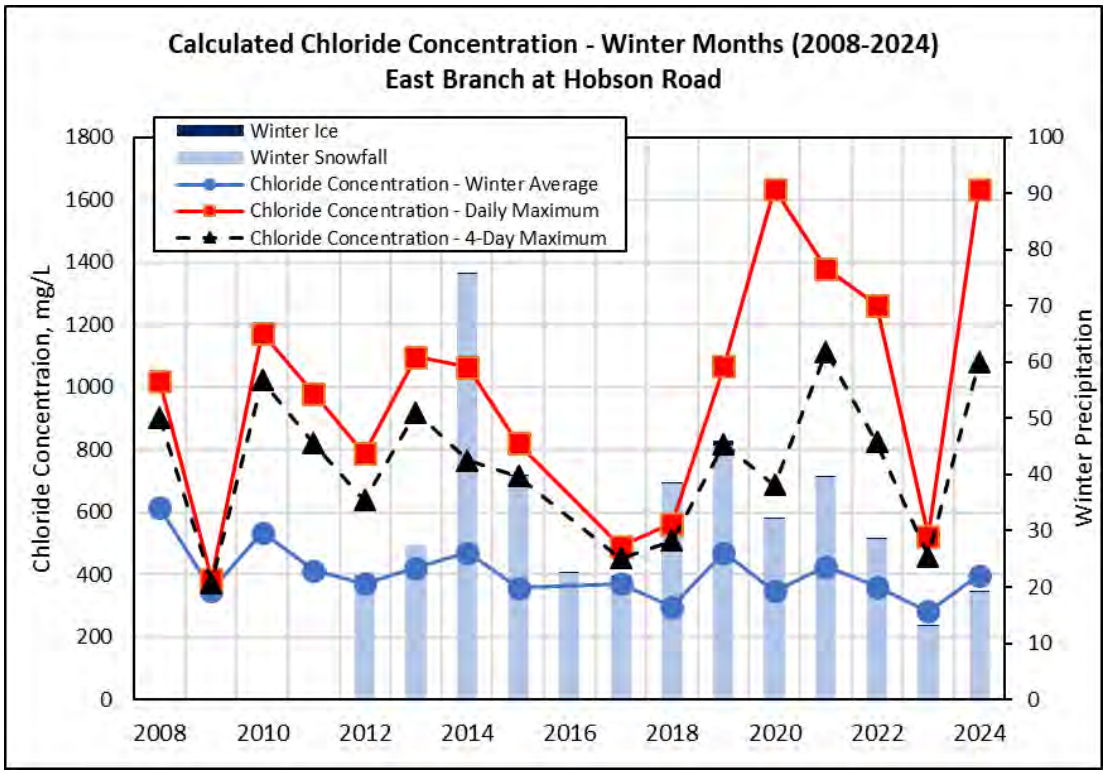


Figure 11. Calculated Chloride Concentrations - Winter Months (2008-2024) for the West Branch DuPage River at Arlington Drive

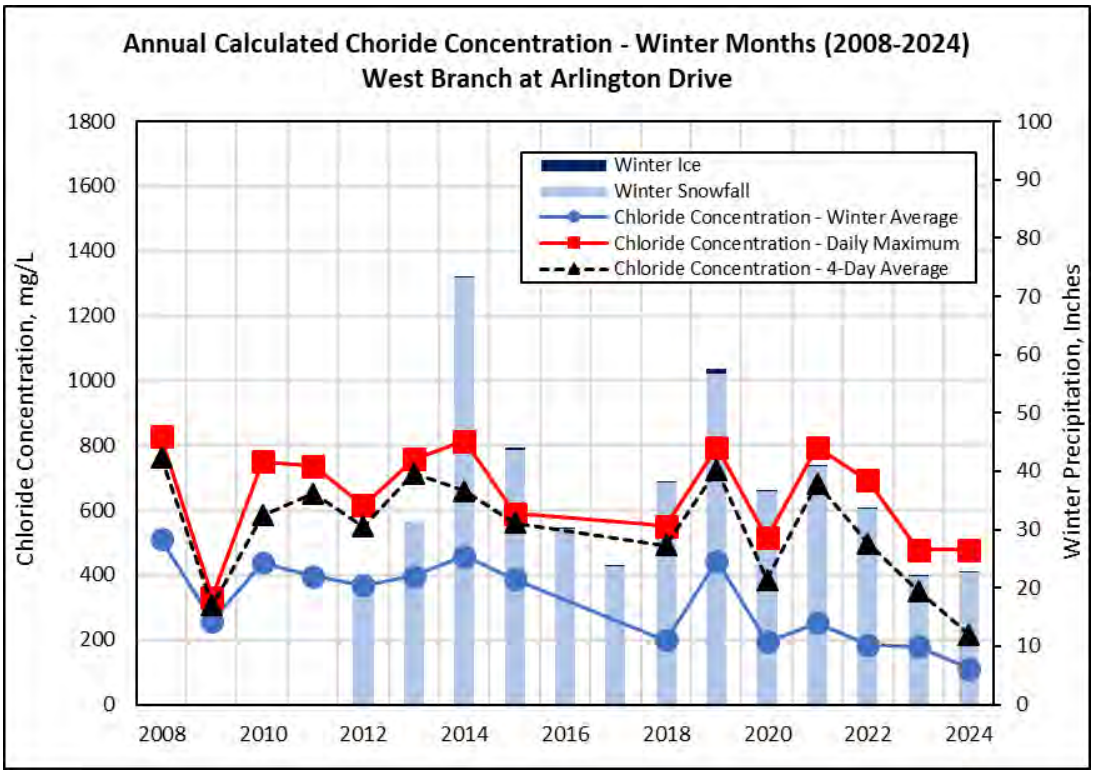


Figure 12. Calculated Chloride Concentrations - Winter Months (2019-2024) for the West Branch DuPage River at Bailey Road

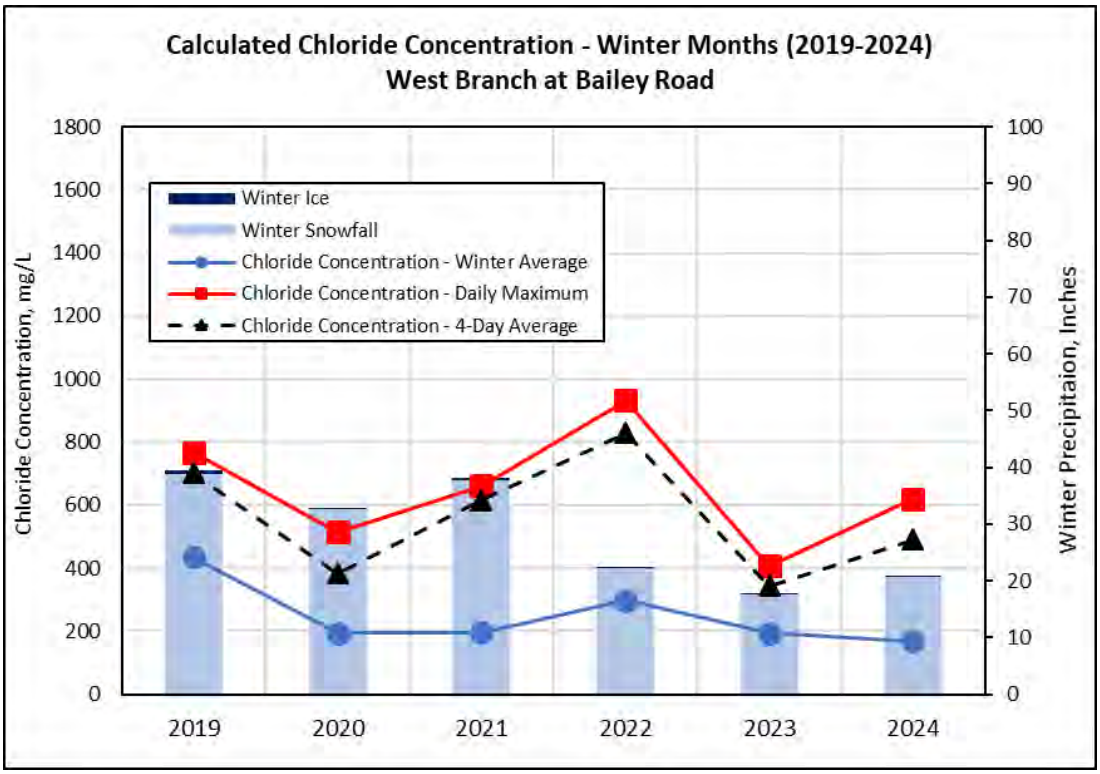
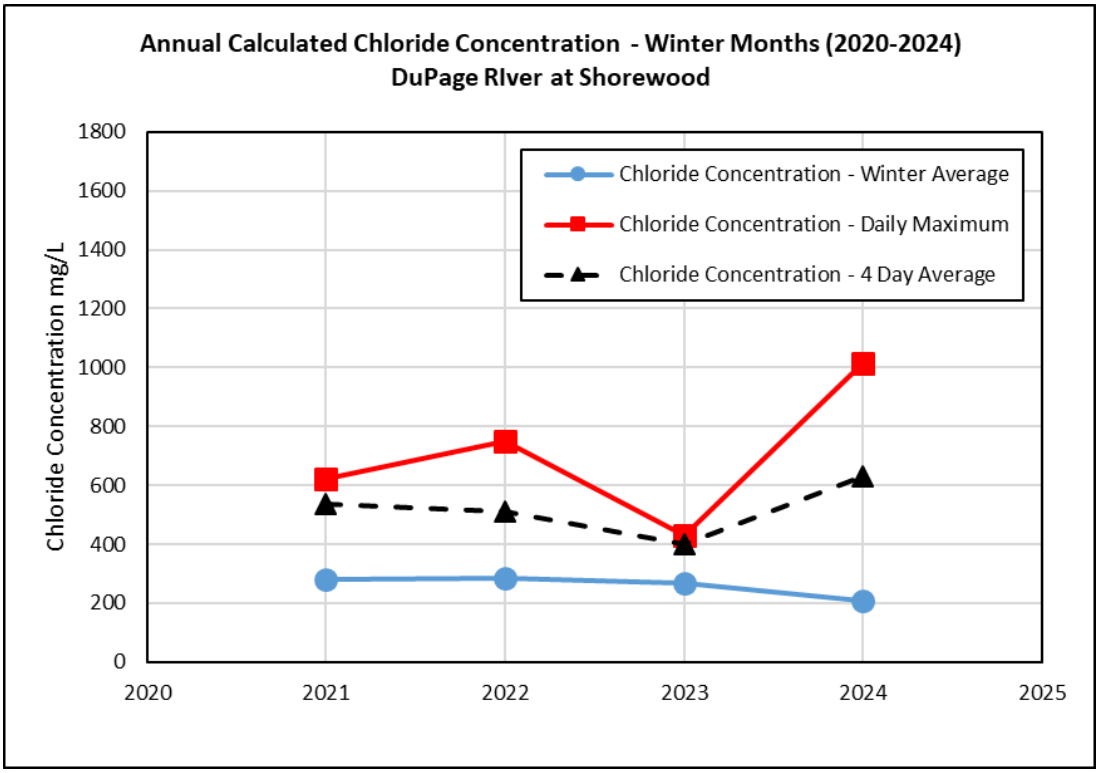


Figure 13. Calculated Chloride Concentrations - Winter Months (2020-2024) for the Lower DuPage River at Shorewood



2.2.3 Measuring Chloride Concentrations in Street Sweeping Debris

Can street sweeping reduce chloride loading to area waterways? Street sweeping is potentially one of the primary methods a municipality has to reduce non-point source pollution from transportation surfaces in its jurisdiction. In theory the removal of accumulated pollutants from roadways would prevent their transport into rivers and streams via storm sewers during storm events. Chloride is a pollutant of particular interest to the DRSCW as it accumulates in roadways during winter deicing events, and evidence shows it can linger well into the spring and summer. DRSCW conducted a pilot study to quantify chloride/salt capture by street sweeping practices and evaluate the feasibility of street sweeping as a practice for reducing in-stream chloride concentrations. Chlorides may be particularly addressable by street sweeping since winter deicing is applied directly to roads and sidewalks.

DRSCW partnered with three municipalities, Carol Stream, Itasca, and Wood Dale, to sample their street sweeping debris for chlorides. Samples were taken monthly in 2022-2024. (Wood Dale did not collect samples in 2023, their Public Works facility was undergoing a build out and samples were disposed of offsite.) The monthly sampling typically coincided with a complete sweeper pass of the entire city.

Debris piles were sampled in multiple places (7 jabs) to create a composite sample for that date. This was done in order to account for expected heterogeneity in the street sweeping debris. The composite samples were then analyzed for chloride concentration. Total mass of the debris collected by the sweeper was procured from LRS Waste Management Services who dispose of the street sweeping debris. The three sample municipalities were selected due to the fact that their contracts included generation of this total mass figure. With the mass data total and a chloride concentration figure, the mass of chloride collected could be estimated. Carol Stream, Itasca, and Wood Dale also provided Right-Of-Way information regarding the surface area of roadways swept. With that, pounds of road salt and chloride collected per mile of roadway swept could be estimated.

The concentrations of chloride in street sweeping debris varied widely. Median chloride concentration across all agencies and years was 260 mg Cl- per kg of street sweeping debris. (Average concentration was 543 mg/kg). Concentrations varied from as low as 25 mg/kg to as high as 8700 mg/kg. Duplicate samples were taken and tested; and results did not match the sample concentration, suggesting that the composite process was not accounting for the in-pile variation in concentrations. Based on the sampled chloride concentrations measured and the reported total mass of street sweeping, the three agencies collect a median mass of 237 lbs. of road salt per year (average annual mass of 294 lbs.) Using the Right-Of-Way information provided by the agencies and extrapolated across all roadways in the DRSCW Watershed, it is estimated that all agencies would be capturing 1440 lbs. of road salt annually in the DRSCW Watersheds.

Measuring recovered salt in the order of thousands of pounds pales in comparison to application rates that are measured in thousands of tons. However, nearly all agencies drastically reduce street sweeping frequency in the winter, and modifications to current programs may provide a large increase in effectiveness. Also, recovering winter chlorides before they can dissolve into spring flows may have an outsized impact on fragile spring lifecycles of aquatic macroinvertebrates. DRSCW has ceased collection of data to analyze the initial results and present them to the Board and membership in order to determine if preliminary data warrants expansion of this study.

Chapter 3 Nutrient Implementation Plan

The Special Condition's Paragraph 10 requires NPDES holders in the DRSCW and LDRWC to develop a Nutrient Implementation Plan (NIP) for the watershed that identifies phosphorus input reductions by point source discharges, non-point source discharges, and other measures necessary to remove DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 IL Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 IL Adm. Code 302.203. Special Conditions Paragraph 2 and Special Conditions Paragraph 8.c. identify additional studies to be completed by the watershed workgroups. The NIP was submitted to the Illinois Environmental Protection Agency (IEPA) on December 28, 2023 and a can be found at https://drscw.org/activities/project-identification-and-prioritization-system/ and https://ldpwatersheds.org/about-us/lower-dupage-river-watershed-coalition/our-work/narp/

3.1 NIP Summary and Next Steps

The NIP submitted to the IEPA by the DRCSW and the LDRWC on December 28, 2023 identified an instream watershed threshold concentration for TP that is protective of aquatic life. A relationship between TP concentrations and fish species and macroinvertebrate taxa and their indices of biotic integrity was established by 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 TP concentration variation than the macroinvertebrate taxa and the Macroinvertebrate Index of Biotic Integrity (mIBI). 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 TP concentration of 0.277 milligrams per liter (mg/L).

Modeling was conducted using the QUAL2Kw platform to identify potential management scenarios that would decrease ambient instream TP concentrations below the identified TP watershed threshold. Ultimately, the suite of scenarios modeled demonstrated that an effluent TP permit limit of 0.35 mg/L (for an effective effluent concentration of 0.28 mg/L) for wastewater treatment plants (WWTPs) along Salt Creek and the West and East Branches of the DuPage River and 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 NIP recommended that the following effluent limits be adopted:

- WWTPs discharging to Salt Creek and the East and West Branches of the DuPage River adopt an effluent limit of 0.35 mg/L TP (leading to an effective mean effluent concentration of 0.28 mg/L, assuming a 20% margin of safety) seasonal geometric mean

for warm weather months (May–October) as part of an annual 0.50 mg/L TP geometric mean;

- WWTPs discharging to the mainstem of the Lower DuPage River adopt an effluent limit of 0.50 mg/L TP (leading 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, rolling 12-month basis; and
- The Crest Hill STP, which discharges to a tributary on the Lower DuPage River, adopt the 0.35 mg/L TP limit.

Additionally, as the modeled reductions of effluent TP concentrations did not show meaningful improvements in predicted minimum and mean DO concentrations due in part to localized persistence of low gradients or flow restrictions which also factor into existing DO impairments, the NIP also recommends that targeted physical projects focused on eliminating DO sags and improving instream habitat continue to be implemented in the DuPage River and Salt Creek watersheds.

A schedule for the implementation of TP removal at each of WWTPs is included in the NIP. A schedule of special assessments to fund the physical projects is also included in the NIP.

Throughout 2024, the DRSCW and LDRWC continued discussions with the IEPA and environmental advocacy groups (EAGs), including the Sierra Club and the Mississippi River Collaborative, on integrating the NIP recommendation into member WWTP's NPDES permits.

On April 10, 2024, DRSCW/LDRWC staff and a representative of the DRSCW Executive Board met with Board members of the River Prairie Group of the Sierra Club to discuss the DRSCW/LDRWC NIP proposal. Staff provided an overview of the proposal and answered their questions. Additionally on April 30, 2024, DRSCW/LDRWC staff meet with the Clean Water Team of the Illinois Sierra Club to present the recommendation and schedule included in the NIP proposal. Following these presentations, calls on July 18, 2024 and August 16, 2024 were held with representatives from EAGs to further discuss the DRSCW/LDWRC proposal. Emails and phones calls were also exchanged between the DSRCW/LDRWC staff and EAGs to further the discussions.

On August 16, 2024, representatives of the Sierra Club and the Environmental Law and Policy Center (ELPC) submitted Informal comments on nutrient assessment and reductions plans (NARPs) to the Illinois Environmental Protection Agency (IEPA) (Attachment 3). The Sierra Club/ELPC letter raised concerns as to various nutrient plans that have been submitted to IEPA by watershed groups. The DRSCW/LDWRC prepared and submitted a response letter to this comment letter on November 6, 2024 (Attachment 4). An electronic response to the DRSCW/LDRWC comments was received from the EAGs in mid-December 2024 and the DRSCW/LDRWC response was provided verbally during a call in late December 2024.

In early February 2025, the DRSCW/LDRWC received draft permit language that incorporated the NIP recommendations into the Special Conditions for the Wood Dale North, Elmhurst and Naperville WWTPs from the IEPA. This language is currently under review by DRSCW/LDRWC Special Condition Permit Holders. Additional discussions with the IEPA, US EPA, and the EAGs regarding the permit language are ongoing. It is the goal of the DRSCW and the LDRWC to have the NIP recommendation included in member NPDES permits by the end of second quarter 2025.

Attachment 1

DRSCW Special Condition

SPECIAL CONDITION 17. DuPage River/Salt Creek Special Requirements

A. The Permittee shall participate in the DuPage River Salt Creek Workgroup (DRSCW). The Permittee shall work with other watershed members of the DRSCW to determine the most cost-effective means to remove dissolved oxygen (DO) and offensive condition impairments in the DRSCW watersheds.

B. The Permittee shall ensure that the following projects and activities set out in the Revised DRSCW Implementation Plan (June, 2021), are completed (either by the permittee or through the DRSCW) by the scheduled dates set forth below; and that the short term objectives are achieved for each by the time frames identified below:

Project Name	**Completion Date**	**Short Term Objectives**	**Long Term Objectives**
Oak Meadows Golf Course dam removal	December 31, 2016 (Completed)	Improve DO	Improve fish passage
Oak Meadows Golf Course stream restoration	December 31, 2017 (Completed)	Improve aquatic habitat (QHEI), reduce Inputs of nutrients and sediment	Raise miBI
Fawell dam Modification	December 31, 2024	Modify dam to allow fish passage	Raise fiBi upstream of structure
Spring Brook Restoration and dam removal	December 31, 2020 (Completed)	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and flBi
Fullersburg Woods Dam modification concept plan development	December 31, 2016 {Completed)	Identify conceptual plan for dam modification and stream restoration	Build consensus among plan stakeholders
Fullersburg Woods Dam modification	December 31, 2024	Improve DO, improve aquatic habitat (QHEI)	Raise miBi and fiBi
Fullersburg Woods area stream restoration	December 31, 2024	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
West Branch Physical Enhancement (Klein Creek)	December 31, 2023 {Completed)	Improve aquatic habitat (QHEI)	Raise miBi andfiBi
Southern East Branch Stream Enhancement	December 31, 2024	Improve aquatic habitat (QHEl), reduce inputs of nutrients and sediment	Raise miBi andfiBi
QUAL 2w West Branch, East Branch and Salt Creek	December 31, 2023	Collect new baseline data and update model	Quantify improvements in watershed. Prioritize DO Improvement projects for years beyond 2024.
NPS Phosphorus Feasibillty Analysis	December 31, 2021 (Complete)	Assess NPS performance from reductions leaf litter and street sweeping	Reduce NPS contributions to lowest practical levels
East Branch Phase II	December 31, 2028	Improve aquatic habitat (QHEI), reduce Inputs of nutrients and sediment	Raise miBi andFiBi
Lower Salt Creek Phase 2	December 31, 2028	Improve aquatic habitat (QHEI), Remove fish barrier, reduce inputs of nutrients and sediment	Raise miBi and fiBi
West Branch Restoration Project	December 31, 2028	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi

C. The Permittee shall participate in implementation of a watershed Chloride Reduction Program, either directly or through the DRSCW. The program shall work to decrease DRSCW watershed public agency chloride application rates used for winter road safety, with the objective of decreasing watershed chloride loading. An annual report on the annual implementation of the program identify ing the practices deployed, chloride application rates, estimated reductions achieved, analyses of watershed chloride loads, precipitation, air temperature conditions and relative performance compared to a baseline condition shall be submitted electronically to EPA.PrmtSpecCondtns@illinois.gov with "IL0028380 Special Condition 17.C" as the subject of the email and posted to the DRSCW's website by March 31 of each year. The annual report shall reflect the Chloride Abatement Program performance for the preceding year (example: 2019-20 winter season report shall be submitted no later than March 31, 2021). The Permittee may work cooperatively with the DRSCW to prepare a single annual progress report that is common among DRSCW permittees and may be submitted as part of a combined annual report with paragraph D below.

D. The Permittee shall submit an annual progress report on the projects listed in the table of paragraph B above. The report shall be submitted electronically to EPA.PrmtSpecCondtns@illinois.gov with "IL0028380 Special Condition 17.D" as the subject of the email and posted to the DRSCW's website by March 31 of each year. The report shall include project implementation progress. The Permittee may work cooperatively with the DRSCW to prepare a single annual progress report that is common among DRSCW permittees.

E. The Permittee shall maintain and implement any recommendations from its Phosphorus Discharge Optimization Plan in accordance with the schedule set forth in the Plan. Annual progress reports on the optimization of the existing treatment facilities shall be submitted electronically to EPA.PrmtSpecCondtns@illinois.gov with "IL0028380 Special Condition 17.E" as the subject of the email and posted to the permittees website by March 31 of each year. If the permittee's plan does not already include a schedule, the permittee shall include a schedule for the implementation of any optimization measures recommended by the plan in the permittee's annual progress report due the March 31 one year after the permit becomes effective. As part of the plan, the Permittee shall continue to evaluate a range of measures for reducing phosphorus discharges from the treatment plant, including possible source reduction measures, operational improvements, and minor facility modifications that will optimize reductions in phosphorus discharges from the wastewater treatment facility. The Permittee's evaluation shall include, but not be limited to, an evaluation of the following optimization measures:

1. WWTF influent reduction measures.
    a. Evaluate the phosphorus reduction potential of users.
    b. Determine which sources have the greatest opportunity for reducing phosphorus (i.e., industrial, commercial, institutional, municipal and others).
        i. Determine whether known sources (i.e., restaurant and food preparation) can adopt phosphorus minimization and water conservation plans.
        ii. Evaluate implementation of local limits on influent sources of excessive phosphorus.

2. WWTF effluent reduction measures.
    a. Reduce phosphorus discharges by optimizing existing treatment processes without causing non-compliance with permit effluent limitations or adversely impacting stream health.
        i. Adjust the solids retention time for biological phosphorus removal.
        ii. Adjust aeration rates to reduce dissolved oxygen and promote biological phosphorus removal.
        iii. Change aeration settings in plug flow basins by turning off air or mixers at the inlet side of the basin system.
        iv. Minimize impact on recycle streams by improving aeration within holding tanks.
        v. Adjust flow through existing basins to enhance biological nutrient removal.
        vi. Increase volatile fatty acids for biological phosphorus removal.

F. Total phosphorus in the effluent shall be limited as follows:

1. If the Permittee will use chemical precipitation to achieve the limit, the effluent limitation shall be 1.0 mg/L on a monthly average basis, effective XXXX, or in accordance with the implementation schedule included in the Nutrient Implementation Plan unless the Agency approves and reissues or modifies the permit to include an alternate phosphorus reduction program or limit pursuant to paragraphs F.3 thru F.8 below.

2. If the Permittee will primarily use biological phosphorus removal to achieve the limit, the effluent limitation shall be 1.0 mg/L monthly average to be effective XXXX, or in accordance with the implementation schedule included in the Nutrient Implementation Plan unless the Agency approves and reissues or modifies the permit to include an alternate phosphorus reduction program or limit pursuant to paragraphs F.3 thru F.8 below.

3. The Permittee demonstrates that the Limit is not technologically feasible; or

4. The Permittee demonstrates the Limit would result in substantial and widespread economic or social impact. Substantial and widespread economic impacts must be demonstrated using applicable USEPA guidance, including but not limited to any of the following documents: 1. Interim Economic Guidance for Water Quality Standards, March 1995, EPA-823-95-002; 2. Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development, February 1997, EPA-832—97-004; 3. Financial Capability Assessment Framework for Municipal Clean Water Act Requirements, November 24, 2014; or

5. If the Nutrient Implementation Plan determines that a greater phosphorus reduction is necessary, then the Permittee shall meet the phosphorus limit identified in the Nutrient Implementation Plan in accordance with the schedule set out therein, prioritized

among all watershed needs; or

6. If the DRSCW has developed and implemented a trading program for POTWs in the DRSCW watersheds, providing for reallocation of allowed phosphorus loadings between two or more POTWs in the DRSCW and Lower DuPage Watershed Coalition watersheds, that delivers the same results of overall watershed phosphorus point-source reduction and loading anticipated from the uniform application of the applicable 1.0 mg/L monthly average effluent limitation, or other allocation identified in the Nutrient Implementation Plan, whichever is more stringent, among the POTW permits in the DRSCW watersheds and removes DO and offensive condition impairments and meets the applicable dissolved oxygen criteria in 35 Ill. Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 Ill. Adm. Code 302.203.; or

7. If the DRSCW has demonstrated and implemented an alternate means of reducing watershed phosphorus loading to a comparable result that removes DO and offensive condition impairments and meets the applicable dissolved oxygen criteria in 35 Ill. Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 Ill. Adm. Code 302.203.; or

8. If the Limit is demonstrated not to be technologically (e.g., no space available) or economically feasible, which shall be determined by an economic feasibility analysis by the date herein stipulated, but is feasible within a long timeline, then the permit shall include a compliance schedule requiring the discharger to comply with the phosphorus effluent limit as soon as possible, consistent with 40 C.F.R. § 122.47 (1), made applicable to Illinois at 40 C.F.R. § 123.25 (a)(18).

G. The Permittee shall monitor the wastewater effluent, consistent with the monitoring requirements on Page 2 of this permit, for total phosphorus, dissolved phosphorus, nitrate/nitrite, total Kjeldahl nitrogen (TKN), ammonia, total nitrogen (calculated), alkalinity and temperature at least once a month. The Permittee shall monitor the wastewater influent for total phosphorus and total nitrogen at least once a month. The results shall be submitted on electronic DMRs (NetDMRs) to the Agency unless otherwise specified by the Agency.

H. The Permittee shall submit electronically to EPA.PrmtSpecCondtns@illinois.gov with “IL0028380 Special Condition 17.H” as the subject of the email and post to the DRSCWs website by December 31, 2023 a Nutrient Implementation Plan (NIP) for the DRSCW watersheds that identifies phosphorus input reductions by point source discharges, non-point source discharges and other measures necessary to remove DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 Ill. Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 Ill. Adm. Code 302.203. The NIP shall also include a schedule for implementation of the phosphorus input reductions and other measures. The Permittee may work cooperatively with the DRSCW to prepare a single NIP that is common among DRSCW permittees. Progress reports shall be submitted every year until completion and submission of the NIP. The DRSCW may prepare a single progress report for all DRSCW permittees and may be submitted as part of a combined annual report with paragraph D above. The Agency will renew or modify the NPDES permit as necessary to incorporate NIP requirements.

Attachment 2

LDRWC Special Condition

Bolingbrook STP#3 Special Condition XX.

1. The Permittee shall participate in the DuPage River Salt Creek Workgroup (DRSCW) and the Lower DuPage River Watershed Coalition (LDRWC). The Permittee shall work with other watershed members of the DRSCW and LDRWC to determine the most cost effective means to remove dissolved oxygen (DO) and offensive condition impairments in the DuPage River Salt Creek watershed.

2. The Permittee shall ensure that the following projects and activities set out in the DRSCW and LDRWC Implementation Plan (April 16, 2015), are completed (either by the permittee or through the DRSCW/LDRWC) by the schedule dates set forth below; and that the short term objectives are achieved for each by the time frames identified below. This condition may be modified to include additional projects due to participation in the Lower DuPage River Watershed Coalition.

Project Name	**Completion Date**	**Short Term Objectives**	**Long Term Objectives**
Oak Meadows Golf Course dam removal	December 31, 2016	Improve DO	Improve fish passage
IPS Tool/Project Identification Study	December 31, 2017	Improve DO	Improve fish passage
Oak Meadows Golf Course stream restoration	December 31. 2017	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi
Fawell Dam Modification	December 31, 2018	Modify dam to allow fish passage	Raise fiBi upstream
Hammel Woods Dam removal	December 31, 2019	Improve DO, reduce nuisance algae	Raise miBi and fiBi
Spring Brook Restoration and dam removal	December 31, 2019	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Fullersburg Woods dam modification concept plan development	December 31, 2016	Identify conceptual plan for dam modification and stream restoration	Build consensus among plan
Fullersburg Woods dam modification	December 31, 2021	Improve DO, improve aquatic habitat (QHEI)	Raise miBi and fiBi
Fullersburg Woods dam modification area stream restoration	December 31, 2022	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Southern West Branch Physical Enhancement	December 31, 2022	Improve aquatic habitat (QHEI)	Raise miBi and fiBi

Southern East Branch Stream Enhancement	December 31, 2023	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Hammel Woods Dam to 119th Street in Plainfield Stream Enhancement	December 31, 2023	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
QUAL 2K East Branch and Salt Creek	December 31, 2023	Collect new baseline data and update model	Quantify improvements in watershed. Identify next round of projects for
NPS Phosphorus Feasibility Analysis	December 31, 2021	Assess NPS performance from reductions leaf litter and street sweeping	Reduce NPS contributions to lowest practical levels

3. The Permittee shall participate in implementation of a watershed Chloride Reduction Program, either directly or through the DRSCW/LDRWC. The program shall work to decrease DRSCW/LDRWC watershed public agency chloride application rates used for winter road safety, with the objective of decreasing watershed chloride loading. The Permittee shall submit an annual report on the annual implementation of the program identifying the practices deployed, chloride application rates, estimated reductions achieved, analyses of watershed chloride loads, precipitation, air temperature conditions and relative performance compared to a baseline condition. The report shall be provided to the Agency by March 31 of each year reflecting the Chloride Abatement Program performance for the preceding year (example: 2015-16 winter season report shall be submitted no later than March 31, 2017). The Permittee may work cooperatively with the DRSCW/LDRWC to prepare a single annual progress report that is common among DRSCW/LDRWC permittees.

4. The Permittee shall submit an annual progress report on the projects listed in the table of paragraph 2 above to the Agency by March 31 of each year. The report shall include project implementation progress. The Permittee may work cooperatively with the DRSCW/LDRWC to prepare a single annual progress report that is common among DRSCW/LDRWC permittees.

5. The Permittee shall develop a written Phosphorus Discharge Optimization Plan. In developing the plan, the Permittee shall evaluate a range of measures for reducing phosphorus discharges from the treatment plant, including possible source reduction measures, operational improvements, and minor low cost facility modifications that will optimize reductions in phosphorus discharges from the wastewater treatment facility. The permittee's evaluation shall

include, but not necessarily be limited to, an evaluation of the following optimization measures:

a. WWTF influent reduction measures.
    i. Evaluate the phosphorus reduction potential of users.
    ii. Determine which sources have the greatest opportunity for reducing phosphorus (e.g., industrial, commercial, institutional, municipal, and others).
        1. Determine whether known sources (e.g., restaurant and food preparation) can adopt phosphorus minimization and water conservation plans.
        2. Evaluate implementation of local limits on influent sources of excessive phosphorus.

b. WWTF effluent reduction measures.
    i. Reduce phosphorus discharges by optimizing existing treatment processes without causing non-compliance with permit effluent limitations or adversely impacting stream health.

        1. Adjust the solids retention time for biological phosphorus removal.
        2. Adjust aeration rates to reduce DO and promote biological phosphorus removal.
        3. Change aeration settings in plug flow basins by turning off air or mixers at the inlet side of the basin system.
        4. Minimize impact on recycle streams by improving aeration within holding tanks.
        5. Adjust flow through existing basins to enhance biological nutrient removal.
        6. Increase volatile fatty acids for biological phosphorus removal.

6. Within 24 months of the effective date of this permit, the Permittee shall finalize the written Phosphorus Discharge Optimization Evaluation Plan and submit it to IEPA. The plan shall include a schedule for implementing all of the evaluated optimization measures that can practically be implemented and include a report that explains the basis for rejecting any measure that was deemed impractical. The schedule for implementing all practical measures shall be no longer than 36 months after the effective date of this permit. The Permittee shall implement the measures set forth in the Phosphorus Discharge Optimization Plan in accordance with the schedule set forth in that Plan. The Permittee shall modify the Plan to address any comments that it receives from IEPA and shall implement the modified plan in accordance with the schedule therein.

   Annual progress reports on the optimization of the existing treatment facilities shall be submitted to the Agency by March 31 of each year beginning 24 months from the effective date of the permit.

7. The Permittee shall, within 24 months of the effective date of this permit, complete a feasibility study that evaluates the timeframe, and construction and O & M costs of reducing phosphorus levels in its discharge to a level consistently meeting a limit of 1 mg/L, 0.5 mg/L and 0.1 mg/L utilizing a range of treatment technologies including, but not necessarily limited to, biological phosphorus removal, chemical precipitation, or a combination of the two. The study shall evaluate the construction and O & M costs of the different treatment technologies for these limits on a

monthly, seasonal, and annual average basis. For each technology and each phosphorus discharge level evaluated, the study shall also evaluate the amount by which the Permittee's typical household annual sewer rates would increase if the Permittee constructed and operated the specific type of technology to achieve the specific phosphorus discharge level. Within 24 months of the effective date of this Permit, the Permittee shall submit to the Agency and the DRSCW/LDRWC a written report summarizing the results of the study.

8. Total phosphorus in the effluent shall be limited as follows:

    a. If the Permittee will use chemical precipitation to achieve the limit, the effluent limitation shall be 1.0 mg/L on a monthly average basis, effective 10 years after the effective date of this permit unless the Agency approves and reissues or modifies the permit to include an alternate phosphorus reduction program pursuant to paragraph c or d below that is fully implemented within 10 years of the effective date of this permit.
    b. If the Permittee will primarily use biological phosphorus removal to achieve the limit, the effluent limitation shall be 1.0 mg/L monthly average to be effective 11 years after the effective date of this permit unless the Agency approves and reissues or modifies the permit to include an alternate phosphorus reduction program pursuant to paragraph c or d below that is fully implemented within 11 years of the effective date of this permit.
    c. The Agency may modify this permit if the DRSCW has developed and implemented a trading program for POTWs in the DRSCW/LDRWC watersheds, providing for reallocation of allowed phosphorus loadings between two or more POTWs in the DRSCW/LDRWC watersheds, that delivers the same results of overall watershed phosphorus point-source reduction and loading anticipated from the uniform application of the applicable 1.0 mg/L monthly average effluent limitation among the POTW permits in the DRSCW watersheds and removes DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 IL Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 IL Adm. Code 302.203.
    d. The Agency may modify this permit if the DRSCW/LDRWC has demonstrated and implemented an alternate means of reducing watershed phosphorus loading to a comparable result within the timeframe of the schedule of this condition and removes DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 IL Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 IL Adm. Code 302.203.

9. The Permittee shall monitor the wastewater effluent, consistent with the monitoring requirements on Page 2 of this permit, for total phosphorus, dissolved phosphorus, nitrate/nitrite, total Kjeldahl nitrogen (TKN), ammonia, total nitrogen (calculated), alkalinity and temperature at least once a month. The Permittee shall monitor the wastewater influent for total phosphorus and total nitrogen at least once a month. The results shall be submitted on NetDMRs to the Agency unless otherwise specified by the Agency.

10. The Permittee shall submit a Nutrient Implementation Plan (NIP) for the DRSCW watersheds that identifies phosphorus input reductions by point source discharges, non-point source discharges and other measures necessary to remove DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 IL Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 IL Adm. Code 302.203. The NIP shall also include a schedule for implementation of the phosphorus input reductions and other measures. The Permittee may work cooperatively with the DRSCW to prepare a single NIP that is common among DRSCW and LDRWC permittees. The NIP shall be submitted to the Agency by December 31, 2023.

Attachment 3

EAG Comments on NARP

Submitted to IEPA (08/16/2024)

To: Joey Logan-Pugh, Darin LeCrone, Brant Fleming
From: Albert Ettinger, Mila Marshall, Rob Michaels
Re: Informal comments on nutrient assessment and reductions plans (NARPs) that have been submitted to IEPA
August 16, 2024

I. Introduction and Recommendations

We have reviewed the nutrient assessment and reduction plans (NARPs) and related documents (the Chicago Area Waterways phosphorus assessment and reduction plan (PARP), nutrient implementation plans (NIPs) and Fox River Study Group reports) that appear on the IEPA website at https://epa.illinois.gov/topics/water-quality/watershed-management/narps.html.

We believe that many of these NARP documents contain important data. In some cases, some very useful analysis was performed. Also, without regard to the NARPs, we know much useful work has also been done relating to nutrient pollution and cultural eutrophication with regard to sewage treatment plan upgrades and dam removal.

However, understandably given the novelty of the task, the lack of existing data, the need to address PFAS, chloride and other pollutants, and the Covid 19 pandemic that occurred during much of the time in which the NARPs were to be prepared, none of the NARPs that have been submitted fulfill the requirements of the permit conditions of NPDES permits requiring the preparation of NARPs.

In addition, we oppose relying on the current NARP documents to write NPDES permits due to the lack of community outreach and stakeholder engagement as to almost all of the NARPs. It is unacceptable for decisions regarding implementation of projects that impact the quality of surface water and resources of surrounding and downstream communities to wastewater treatment facilities. This kind of top-down approach only serves to alienate and disenfranchise the very people who should have a say in shaping their shared environments. We ask that proper consultation and engagement be conducted before NARPS are accepted. We further urge IEPA to explicitly interpret meaningful stakeholder engagement using the documents we have provided and finally provide an updated calendar for NARP public outreach opportunities.

Although the permit language varied somewhat among the two or three dozen NPDES permits requiring the preparation of NARPs, all of the NARP conditions required essentially that the permittee was to:

- With stakeholders,
- determine a "target value" for phosphorus (P) in the water body or bodies which it affects that will eliminate the P impairment or "risk of eutrophication," and
- develop a plan for getting P levels in the water body or bodies down to the target value or lower.[i]

Unfortunately, most of the permittees and their consultants did not involve stakeholders despite efforts by the Sierra Club to help them do so. Further, with the exception of the NARPs developed by the Conservation Foundation, Tetratech and Midwest Biodiversity Institute ("CF/Tetra/MBI") that will be discussed further below, the NARPs set no target criteria for ambient phosphorus levels. Without a target, those NARPs necessarily developed at most vague plans to reduce P loadings and contain no analysis of how to get phosphorus levels down in rivers and streams to where they do not present risk of eutrophication.

To cut to the chase, we believe that the Agency should reject all of the NARPs that have been submitted and give all of the permittees with NARP requirements until the end of 2025 to fulfill the NARP requirements.[ii] This should allow the work to be completed with the benefit of science and data that can be developed over the coming year. The agency appears to have already begun moving in that direction as shown by the draft NPDES permit for the Village of Deerfield.

As to almost all the NARPs, community outreach and engagement experiences were either not completed or poorly reported and represented. IEPA should give direction and take affirmative steps to support collaboration and development of watershed groups for NARP holders to work together.

Further, we believe that each permittee with NARP requirements should be required to present a draft revised NARP to stakeholders in their watershed no later than several months before they are due to be sent to the Agency. They should involve stakeholders, including our organizations, well before that.

II. Some General Problems

Some of us have already commented on specific NARPs (see attached comments) but we would like to point out general problems that we have seen in a number of the NARPs.

<u>Stakeholder process</u>

While we do not wish to belabor the past, we believe that a greater effort must be made in the future to bring community, environmental, agricultural and business interests into the NARP process up front. Without doing this, it is impossible to formulate a reduction plan that has any level of detail or that will work.

We recognize that it is not possible to force non-permittees to come to the table but both local organizations and state organizations that may be in a position to give input regarding NARPs should be clearly invited to participate. It is not acceptable for those writing NARPs to keep the process as something between the permittee and its consultant until it is sent to IEPA, perhaps after being flashed by a local committee. Also, promises to involve stakeholders in the future do not satisfy the requirement to involve stakeholders in the development of the NARPs.

Target Levels

As mentioned above, except for the CF/Tetra/MBI NIPs, none of the NARPs identify specific water quality targets for the affected rivers and streams and, thus, they necessarily fail to provide specific steps to reach such targets. Indeed, these NARPs fail to provide details for any reductions beyond the reduction to 0.5 mg/L total phosphorus (TP) in sewage treatment plant effluent, to which sewage treatment plants are already committed.

Under the NARP special permit conditions, a proper NARP must identify the numeric phosphorus per liter target *for the water body* that will prevent eutrophication. Modeling based on uncalibrated or inadequate data will not set an ambient target for point and nonpoint sources.[iii]

Further, NARP targets cannot rest solely on consideration of the proper effluent levels of sewage treatment plants, although, of course, selecting acceptable treatment plant phosphorus effluent levels will be very important in developing a plan to get TP levels down to the NARP target and to making the necessary case for a variance to the Illinois Pollution Control Board under 35 Ill. Adm. Code 104 subpart E.

It is probably easiest and most correct to use the science-based Wisconsin target of 0.1 mg/L. Further, we must caution that it is highly improbable that a proper target level can be set much above 0.1 mg/L total phosphorus. That was the level adopted in Wisconsin after much study of the waters of that neighboring state. See also Dodds, Jones and Welch, Suggested Classification of Stream Trophic State: Distribution of Temperate Stream Types for Chlorophyll, Total Nitrogen and Phosphorus, Wat. Res. Vol 32 No.5 (1998) p. 1457 (streams with over .075 mg/L TP eutrophic.

A study that looked at numerous Illinois waters found that there was a close correlation between phosphorus levels and sestonic algae levels at sites with sufficient sunlight up to a level of 0.2 mg/L but that there was no relationship above .2 mg/L. Royer, T., Gentry, L., Mitchell, C., Starks, K., Heatherly II, T. and Whiles, M., Assessment of Chlorophyll a as a Criterion for Establishing Nutrient Standards in the Stream and Rivers of Illinois, Journal of Environmental Quality, Vol. 37 March-April 2008 p. 440-41. In other words, above 0.2 mg/L Illinois water bodies are essentially phosphorus saturated.

We should not expect, then, to see a difference in unnatural plant or algal growth between waters with 0.3 mg/L and 0.6 mg/L or expect that models will predict substantial differences in dissolved oxygen levels or unnatural plant or algal growth if they do not consider ambient levels of phosphorus well below 0.2 mg/L TP. A protective standard will limit pollution at levels well below the level at which it does not matter anymore.

For impounded waters, it is likely that the protective level for phosphorus will be far below 0.2 mg/L TP. The Illinois lake phosphorus standard is 0.05 mg/L and recently developed U.S. EPA criteria guidelines suggest still lower numbers for lakes.[iv] For this reason, dam removal may be an important component of a NARP.

The NARPs that were prepared by the DuPage River Salt Creek Workgroup and the Lower Des Plaines do attempt to set a target level.[v] However, as further explained in attached comments, these CF/Tetra/MBI NIPs:

- Do not address dissolved oxygen levels or unnatural plant or algal growth, which are underlying water quality standards at issue,[vi] but instead attempt to relate phosphorus levels to the health of the aquatic community,[vii]
- Protection of aquatic life is certainly an important goal but these NARPs are not in fact protective of aquatic life because the criteria set for TP, 0.28 mg/L, is set well above the level at which damage to aquatic life is evident assuming the validity of the CF/Tetra/MBI study.

Although the line drawn for protection of aquatic life is far higher than anything that could be called “protective,” we have no reason to challenge the validity of the data collected or the relation between phosphorus levels and the health of certain aquatic life. A properly chosen number based on this CF/Tetra/MBI work should place a ceiling on the phosphorus water quality criteria necessary to protect aquatic life for at least Northeast Illinois rivers and streams.[viii]

Reduction Plans

A NARP "shall identify phosphorus input reductions from point sources and non-point sources in addition to other measures necessary to remove the risk of eutrophication characteristics that will cause or may cause violation of a water quality standard."[ix] This requires at a minimum a real plan as to how to achieve the target value. If, for example, it is found that DO violations caused by phosphorus or unnatural plant or algal growth may occur if total phosphorus levels are greater than 0.08 mg/L, a plan should be developed by stakeholders as to how to reduce phosphorus loadings from all sources in order to reach that level.

Obviously, in watershed in which the vast bulk of the phosphorus comes from non-point sources, it will not be possible to reach the target level simply by tightening permit limits. However, as the permit language makes clear, even in the case of watersheds where most phosphorus comes from non-point sources, NARPs must include a detailed plan as to how to get P levels in affected water bodies down to target levels.

In this regard, we note that animal feeding operations (AFOs) have been found to be a major source of phosphorus in some areas. Phosphorus from AFOs may be point source pollution and, in any case, a NARP should attempt to identify situations where AFOs are a significant source of phosphorus in the watershed.

Whatever the sources the phosphorus pollution, it may well take time, money and effort to implement a proper NARP. Indeed, it may be necessary to obtain, through evidence presented to the Illinois Pollution Control Board, a variance, pursuant to 40 CFR 131.14 and 35 Ill. Adm. Code 104 subpart E, based on the scientific and economic factors that have been identified by the U.S. Environmental Protection Agency, IEPA and the IPCB.

The agency cannot know if a variance is necessary if the NARP does not set a proper target, identify the highest attainable use for waters affected by phosphorus pollution, and develop a detailed plan for attaining the target as soon as it is attainable. A NARP or a variance that delays meeting the target for years or decades must be supported by economic studies showing that earlier compliance is not attainable. 40 CFR 131.14(b)

In any event, we look forward to working with the Agency and other Illinois residents who seek to restore and maintain Illinois waters to eliminate impairments and cultural eutrophication to the extent possible.

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i For example, SPECIAL CONDITION 20 of the NPDES permit for Pontiac states.

The Agency has determined that the Permittee's treatment plant effluent is located upstream of a waterbody or stream segment that has been determined to be at risk of eutrophication due to phosphorus levels in the waterbody. This determination was made upon reviewing available information concerning the characteristics of the relevant waterbody/segment and the relevant facility (such as quantity of discharge flow and nutrient load relative to the stream flow).

A waterbody or segment is at risk of eutrophication if there is available information that plant, algal or cyanobacterial growth is causing or will cause violation of a water quality standard.

The Permittee shall develop, or be a part of a watershed group that develops, a Nutrient Assessment Reduction Plan (NARP) that will meet the following requirements:

1. The NARP shall be developed and submitted to the Agency by December 31, 2024. This requirement can be accomplished by the Permittee, by participation in an existing watershed group or by creating a new group. The NARP shall be supported by data and sound scientific rationale. Annual progress reports shall be submitted by March 31 each year.
2. The Permittee shall cooperate with and work with other stakeholders in the watershed to determine the most cost-effective means to address the risk of eutrophication. If other stakeholders in the watershed will not cooperate in developing the NARP, the Permittee shall develop its own NARP for submittal to the Agency to comply with this condition.
3. In determining the target levels of various parameters necessary to address the risk of eutrophication, the NARP shall either utilize the recommendations by the Nutrient Science Advisory Committee or develop its own watershed-specific target levels.
4. The NARP shall identify phosphorus input reductions from point sources and non-point sources in addition to other measures necessary to remove the risk of eutrophication characteristics that will cause or may cause violation of a water quality standard. The NARP may determine, based on an assessment of relevant data, that the watershed does not have a risk of eutrophication related to phosphorus, in which case phosphorus input reductions or other measures would not be necessary. Alternatively, the NARP could determine that phosphorus input reductions from point sources are not necessary, or that phosphorus input reductions from both point and nonpoint sources are necessary, or that phosphorus input reductions are not necessary and that other measures, besides phosphorus input reductions, are necessary.

5. NARP shall include a schedule for the implementation of the phosphorus input reductions and other measures. The NARP schedule shall be implemented as soon as possible and shall identify specific timelines applicable to the permittee.
6. The NARP can include provisions for water quality trading to address the phosphorus related risk of eutrophication characteristics in the watershed. Phosphorus/Nutrient trading cannot result in violations of water quality standards or applicable antidegradation requirements.
7. The Permittee shall request modification of the permit within 90 days after the NARP has been completed to include necessary phosphorus input reductions identified within the NARP. The Agency will modify the permit if necessary.
8. If the Permittee does not develop or assist in developing the NARP and such a NARP is developed for the watershed, the Permittee will become subject to effluent limitations necessary to address the risk of eutrophication. The Agency shall calculate these effluent limits by using the NARP and any applicable data. If no NARP has been developed, the effluent limits shall be determined for the Permittee on a case-by-case basis, so as to ensure that the Permittee's discharge will not

cause or contribute to violations of the dissolved oxygen or narrative offensive condition water quality standards.

[ii] Further extensions might be granted by IEPA to permittees that collect new data shown necessary to complete their NARP.

[iii] More discussion of this problem is provided in the attached comments on the Chicago Area Waterways PARP, the FRSG report and the Upper Des Plaines River NARP.

[iv] https://www.epa.gov/nutrientpollution/ambient-water-quality-criteria-address-nutrient-pollution-lakes-and-reservoirs

[v] It is our understanding that the model for the Lower Des Plaines is being developed further.

[vi] Specifically, the relevant DRSC permits state, "*The Permittee shall submit electronically to EPA.PrmtSpecCondtns@illinois.gov with "IL0028380 Special Condition 17.H" as the subject of the email and post to the DRSCWs website by December 31, 2023 a Nutrient Implementation Plan (NIP) for the DRSCW watersheds that identifies phosphorus input reductions by point source discharges, non-point source discharges and other measures necessary to remove DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 Ill. Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 Ill. Adm. Code 302.203."*

[vii] Because unnatural plant and algal growth can cause problems in addition to harm to aquatic life, aquatic life cannot be the exclusive focus. Such unnatural plant and algal growth can also render water bodies less suitable for recreation and as a source of drinking water.

[viii] The concentration to prevent unnatural plant or algal growth might be much lower than 0.1 mg/L but we do not know because no one apparently has looked.

[ix] See note I above.

Attachment 4

DRSCW/LDRWC Response Letter

to EAG Comments (11/04/2024)

DuPage River Salt Creek Workgroup

November 4, 2024

Ms. Joey L. Logan-Pugh
Chief of the Bureau of Water
Illinois EPA, Bureau of Water
1021 N. Grand Ave. East
Springfield, Illinois 62794-9276

Dear Ms. Logan-Pugh,

On behalf of the DuPage River Salt Creek Workgroup (DRSCW) & Lower DuPage River Watershed Coalition (LDRWC) (collectively referred to as the Workgroups or DRSCW/LDRWC), I am writing regarding the letter titled "Informal comments on nutrient assessment and reductions plans (NARPs) that have been submitted to IEPA", sent to IEPA on August 16, 2024 by representatives of the Sierra Club and the Environmental Law and Policy Center (referred to herein after as "the SC/ELPC letter"). The SC/ELPC letter raises concerns as to various nutrient plans that have been submitted to IEPA by watershed groups. The DRSCW & LDRWC submittal was called the Nutrient Implementation Plan for the East Branch DuPage River, West Branch DuPage River, Lower DuPage River, and Salt Creek (Illinois) and is called the "NIP" in this response. Regarding the NIP, several statements made within the SC/ELPC letter are incorrect. This response explains why that is the case.

In summary, the DRSCW and LDRWC have the following responses to the SC/ELPC letter:

Outreach

The SC/ELPC letter's statement that the Workgroups did not work with stakeholders is incorrect. Both groups engaged in extensive outreach and communication on the NIP at multiple stakeholder levels. These are detailed in Attachment 1 but in short:

Members of the DRSCW & LDRWC are public agencies that answer to elected officials. These agencies have already reviewed the budget and schedule outline included in the NIP and how it would be integrated into the agencies' budgets.

- We had multiple meetings with all watershed workgroup members who hold the permit condition (public agencies) to design, review and approve the NIP.
- We had multiple presentations at the general meetings of both groups that included members of the Sierra Club and other environmental groups (Salt Creek Watershed Network, Prairie Rivers Network, and The Conservation Foundation).
- We made several dedicated presentations on individual NIP components to members and parallel groups (other watershed groups and Illinois Association of Wastewater Agencies etc.).

- Several individual members conducted outreach to their elected officials/oversight committees and their customers (see Attachment 2).
- Presentations were made to DuPage Mayors and Managers and the DuPage County Stormwater Committee.
- We had several meetings with representatives of the Sierra Club and other environmental groups (see bullet 3 above) on the subject of the NIP.
- The NIP was posted to the DRSCW and LDRWC websites and was featured in our newsletter that was directly mailed to all member mayors and managers, DuPage Stormwater Committee members and MWRD Board.

This was far from a "top-down" or workgroup only process, as was suggested in the SC/ELPC letter. Of note The DRSCW and LDRWC special conditions identified in the National Pollution Discharge Elimination System (NPDES) issued by the Illinois EPA calls for the workgroups to "work with other watershed members of the DRSCW *(or LDRWC)"*. Other outside stakeholders are not mentioned. However, both the approach adopted by the Workgroups, and the nature of the document, demanded that outreach be done.

Target Levels

From the SC/ELPC letter; "Under the NARP special permit conditions, a proper NARP must identify the numeric phosphorus per liter target for the water body that will prevent eutrophication. Modeling based on uncalibrated or inadequate data will not set an ambient target for point and nonpoint sources." And; "The concentration to prevent unnatural plant or algal growth might be much lower than 0.1 mg/L but we do not know because no one apparently has looked."

As detailed below, the NIP conclusions rely on a calibrated water quality model that was used to examine ambient DO responses to changes in ambient TP concentrations. It was also used to model the input reductions necessary to meet the identified watershed target level. While a DO response to changes in ambient TP concentrations was not observed, a statistical analysis of aquatic life across the spectrum of ambient TP concentrations did find a robust relationship.

The relevant NDPES Special Condition permit language for the agencies who wrote the NIP reads as follows:

"The Permittee shall submit… a Nutrient Implementation Plan (NIP) for the DRSCW/LDRWC watersheds that identifies phosphorus input reductions by point source discharges, non-point source discharges and other measures necessary to remove DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 Ill. Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 Ill. Adm. Code 302.203."

SC/ELPC letter indicates a simple causal relationship between decreasing phosphorus loading and improving ambient dissolved oxygen (DO) conditions. The assumption in the SC/ELPC letter is that

instream total phosphorus (TP) concentrations are a reasonable proxy for determination of DO and offensive condition impairments. In practice, in our waterways, we did not find this to be the case. DO was not predicted to be significantly impacted at any of the plausible ambient TP concentration floors created by scenarios placed in the QUAL 2Kw models.

Before looking at how the NIP's target level was developed it should be noted that the SC/ELPC letter infers these TP target levels should be treated as a water quality standards (WQS). This is not the spirit in which the initiative was launched, which was one of open-ended cooperation between the agency, environmental advocacy groups, and permittees to resolve the TP issue by developing an informal watershed target. WWTP agencies would have contested its inclusion if this had been discussed as a possibility.

As documented in the NIP, the DRSCW/LDRWC pursued and developed two different approaches in order to address the specific NIP requirements and to meet the underlying designated uses (notably aquatic life).

> **Approach A: Identify the DO Impacts of Reducing Ambient TP Concentrations and Physical Instream Interventions (contractor Tetra Tech)**
>
> **Step 1:** Develop a calibrated QUAL 2Kw model for each of the mainstems of the four basins using the extensive topography, nutrient and continuous DO data available for each respectively.
>
> **Step 2:** Predict the outcomes of various management inventions including reducing or eliminating WWTP loadings or manipulating physical instream conditions.
>
> **Approach B: Identify the Aquatic Life Impacts of Reducing TP Concentrations on Fish and Macroinvertebrates (as measured by species/taxa and Indexes of biointegrity, contractor Midwest Biodiversity Institute and Tetra Tech)**
>
> **Step 1:** Use IEPA and Northeastern Illinois Workgroups data to develop relationships between nutrients and ambient TP in order to ascertain an ambient TP threshold for local waterways that is protective of aquatic life with emphasis on the biointegrity needed to meet the General Aquatic Life use.
>
> **Step 2:** Apply the calibrated model developed under Step A 1 to determine what an appropriate TP concentration permit limit for local point and nonpoint sources would be to meet the TP threshold identified in Step B 1.

Approach A - Calibrated Qual2Kw Model Development and DO Response Scenarios

Quantifying a relationship between TP and DO is a task that the State has spent decades trying to solve and has proven to be enormously complex. This complexity stems from the fact that eutrophication and the related measure, DO, are multivariate problems that resist simple analysis and solutions. The interplay of sun light, flow, habitat, and residency time (biostimulatory conditions) with biostimulatory substances (Nitrogen (N) as well as TP) have led many states and the scientific literature, to note "the

shortcomings of using ambient nutrient concentrations alone to diagnose eutrophication" (Mazor et al. 2022). This observation is why techniques that consider multiple variables such as the Stream Nutrient Assessment Procedure (SNAP, Ohio EPA) have been developed. From a watershed management perspective, solving multivariate problems by focusing on only one variable is likely to be both ineffective and inefficient. To match this complexity, solutions to these problems also need to be multivariate.

Working with Tetra Tech, a QUAL2Kw model was developed and calibrated for each of the four mainstems to capture simulation of an entire calendar year. The model drew on and was calibrated to the waterways extensive data sets including grab samples for nutrients, channel geometry, sestonic and benthic algae (as available) and abundant continuous DO data. The calibrated QUAL 2Kw model was then used to run a number of TP reduction scenarios including reducing WWTP effluent concentrations to 0.5 mg/L, 0.35 mg/L, and 0 mg/L. Even significant changes in TP loading did not have a significant impact on simulated ambient DO concentrations. This result was consistent with the model sensitivity testing. Sensitivity testing of the calibrated QUAL2Kw models indicated that various, interconnected variables have different and variable impacts on DO concentrations both temporally and spatially. Of the parameters tested in the QUAL2Kw models, ambient DO concentrations were least sensitive to changes in TP loading from boundary conditions and more sensitive to other parameters such as changes in sediment oxygen demand (SOD) and shade.

In refence to the SC/ELPC comment that no one looked at ambient TP concentrations lower than 0.1 mg/L, the NIP reports on ambient TP modeled down to 0.075 mg/L (East Branch DuPage River calibrated to 2019 condition). This was performed under a scenario where WWTP loadings were set to zero but their effluent flow was maintained. Under this scenario the model did not predict notable improvement in daily minimum DO levels compared to baseline DO conditions. Application of this scenario to the other three basins achieved ambient TP concentrations between 0.14-0.19 mg/L, and again no significant improvement in DO concentrations was predicted.

The ambient concentrations in these "Zero WWTP loadings" scenarios are unachievable. Any realistic WWTP TP effluent concentration will be above 0 mg/l TP, and background mean annual concentration ranges for urban flow (stormwater and instream sources such a stream banks) is in the 0.09-0.20 mg/l range with the most effective stormwater Best Management Practices (BMPs) already fully implemented.

The SC/ELPC letter seems to recognize the implausibility of obtaining the ambient concentrations it espouses in stating that WWTPs will need variances (page 3 paragraph 5) if they were to be adopted.

It should be noted that although continuous DO data sets show occasional anomalies in DO concentrations throughout these systems, the overall DO concentrations observed and simulated (based on model calibration to capture generalized conditions across reaches) do not violate the water quality standards for DO. DO concentrations that are observed to be anomalies with no known cause (e.g., illicit discharge, monitored CSO event, localized algal bloom due to stagnant unshaded waters, periodic discharge from detention ponds, etc.) cannot be captured by a model like QUAL2Kw that can only predict responses based on known inputs. Some segments do however experience relatively high algal growth (measured as gross

primary productivity) that does impact DO concentrations within the model. These are associated with the impoundment behind the Fullersburg Woods Dam (on Salt Creek, and since removed), Churchill Lagoon (East Branch, scheduled for culvert modification under the NIP program) and the Hammel Woods Dam (Lower DuPage, since removed). Elimination (accomplished or planned) of these impoundments would fall under the "other measures necessary to remove DO and offensive condition impairments" in the permit language.

Faced with the complexity of explaining DO concentrations, the Workgroups used both their own and IEPA statewide continuous DO data to review the factors that appear to influence DO. The study looked at fifteen years of seasonal data (from July 15 - September 30) (MBI 2024). This study explored monitored relationships between minimum DO, maximum DO, diel DO swing, and mean DO concentrations, and it was determined that the lowest DO concentrations (5th percentile) was the most explanatory variable associated with biological assemblage performance. The statistical evaluation also found no significant correlation between chlorophyll-a concentrations, fIBI, and mIBI at study sites. This finding is consistent with other Illinois studies in waters with elevated nutrient concentrations which similarly found relatively low benthic chlorophyll-a concentrations (Royer et al 2008, Figueroa-Nieves et al 2006). A third critical finding of this evaluation indicated the prevalence of co-occurring factors which are most explanatory or predictive of the influence of nutrients on the DO regime, such as modified stream geomorphology and physical habitat quality.

These evaluation results were mirrored in the QUAL2Kw model results as well, such that decreasing TP alone had a very small impact on DO concentrations. However, DO did have a significant and positive simulated response to the removal of physical barriers/improvement of habitat at Churchill Woods Dam and Fullersburg Woods Dam. From a NIP implementation standpoint, physical projects like dam removals tackle several DO drivers simultaneously (reduction in SOD, decreased exposure to light, improved flow velocities, and decreased residence times). The DO plots provided in the NIP show the average of daily minimums for the period and suggest that the DO problems are typically localized instead of systematic (sags seen at Churchill Woods Lagoon, East Branch, West Branch headwaters, Fullersburg Dam, Salt Creek, and upstream, upstream of Channahon Dam DuPage River, each of these areas has other problems (impounded, low flow, etc.).

The NIP makes recommendations to improve instream DO by addressing several of these DO sags via improving channel conditions. Such actions show a significant positive DO response in the model. As well as identifying projects the NIP also provides a funding method to implement these improvements while meeting the NIP TP target set out below. This would be accomplished by continuing the Workgroups' successful funding model to conduct channel restoration projects. Aggregate funding for both groups is predicted to be as high as $28 M for the years 2026-2035.

Computer models are helpful tools in decision-making (e.g., indicating whether changes to TP in/at boundary conditions are most likely to impact instream TP concentrations), but they do not incorporate local and regional co-variables such as stream geomorphology and stream and floodplain habitat conditions. As already discussed herein, a future modelled condition with TP boundary conditions significantly reduced did not predict a response in improved DO concentrations. Mean DO concentrations are already generally observed (and simulated) around the saturation point, meaning there is little that

could be done to improve baseline DO concentrations aside from decreasing the observed daily range. The DRSCW/LDRWC QUAL2Kw model was calibrated and parameterized based on existing conditions, and it is possible that the model's predictive ability declines as the scenario increasingly departs from the calibration baseline. It is probable that the model for these waterways will require recalibration with different parameterization following the substantial reduction in TP loading that would occur as a result of the NIP implementation. A dramatic decrease in TP loading may impact various model parameter inputs (which were not changed for model scenarios because there is not enough empirical information) such as the following terms which are uniquely input for both phytoplankton and benthic algae: maximum growth rate, respiration rates, death rates, subsistence quota for phosphorus, external phosphorus half saturation constant, phosphorus uptake fraction of the water column, and many more.

Approach B – Identifying a TP Threshold Protective of Aquatic Life

Based on a number of watershed management objectives, DRSCW/LDRWC determined that aquatic life scores, expressed mainly as Indexes of Biointegrity, are the most scientific and useful indicator of protective concentrations for TP. This argument is developed in Chapter 4 of the NIP. This finding is consistent with the Workgroups' strategy as their principle objective is to create ambient conditions conducive to supporting aquatic biota that meet the Illinois General Use standard criteria for aquatic life. While the NIP waterways are impaired for the Aquatic Life General Use standard, it is unknown whether these waterways ever met the General Use standard due to a lack of historical data before and during the urbanization of the region.

DRSCW/LDRWC worked with Midwest Biodiversity Institute (MBI) to investigate the possibility of developing a TP threshold relationship with local fish and macroinvertebrate communities. Through application of our Integrated Prioritization System (IPS) tool, MBI mapped regional biological communities and their observable responses to TP across a spectrum of TP concentrations. The analysis drew on multiple years of IEPA data for wadable streams across Northeastern Illinois, including reference reaches, as well as data generated by watershed groups.

Ultimately, the analysis found that fish species showed higher sensitivity to variation in TP concentrations than did macroinvertebrate taxa. Based on this result, DRSCW/LDRWC concluded that an ambient TP concentration range that was protective of the more sensitive fish species would also be protective be protective of macroinvertebrate taxa.

The IPS analysis identified an ambient TP concentration of 0.110 – 0.277 mg/L as being protective of aquatic life meeting the General Use standard as defined by the State of Illinois. This result may be judged conservative as it was based on sites that also had two or more of the most TP sensitive species identified in the data set. Sensitive species are those in the lowest quartile of all fish species in the data set that showed the most precipitous decline in abundance as TP concentrations increased.

DRSCW/LDRWC then worked with Tetra Tech to explore the relationship between TP sources relative to instream concentrations using the calibrated QUALKw model. Through data preparation for model boundary conditions, it was possible to quantify the relative contributions of TP loading to each waterway between point sources (WWTPs) and nonpoint sources (non-specific watershed runoff and tributaries).

WWTPs were clearly identified to provide approximately 75 – 80% of current TP loading based on existing discharge conditions. The remaining loads are based primarily on stormwater-driven TP associated with organic matter in leaf litter (Selbig 2016). Leaf litter management can reduce nonpoint source TP loading from stormwater. However, street sweeping and leaf litter collection are already fully adopted practices across the watersheds; and their impact is already accounted for in monitoring data. While urban (nonpoint source) mean TP concentrations ranged from 0.09 – 0.2 mg/L, WWTPs, on average, discharge treated effluent with TP concentrations on the order of 0.48 mg/L – 5.46 mg/L. Note that the range of urban concentrations are already inside the range identified as protective of General Use and Aquatic Life by the IPS. The analysis points to the centrality of WWTPs reductions to meeting the target identified by the IPS.

Modelling found that, along with a 20% margin of safety, a WWTP TP effluent concentration of 0.50 mg/L for the Lower DuPage in tandem with 0.35 mg/L, West Branch, and East Branch DuPage, and 0.35 mg/L for Salt Creek would deliver the target ambient TP concentration for all four waterways. Predicted ambient TP concentrations for the four basins is as follows: East Branch 0.19 mg/L, West Branch 0.20 mg/L, Lower DuPage 0.19 mg/L, and Salt Creek 0.21 mg/L. Post NIP implementation, the mean concentrations at the terminus of the Lower DuPage River and Salt Creek are predicted at 0.17 mg/L. All are well below the threshold identified by the NIP of 0.277 mg/L TP.

There are many unknowns about how various future implementation management scenarios will impact the DRSCW/LDRWC receiving waters. However, as the TP regime shifts, there is likely to be a positive impact. The true impact of these changes may be best monitored by looking for observable changes in types and quantities of phosphorus-sensitive species and improvements in diatom assemblage structures and algal biomass that will positively impact diel DO ranges systemwide. This underscores the commitment of the Workgroups to continue collecting and analyzing data beyond the implementation of the NIP.

Is the Identified TP Target Level Protective?

The SC/ELPC letter's statement that the threshold identified by the DRSCW/LDRWC NIP is not protective of aquatic life rests on the definition of protective. In conversations with the SC/ELPC letter's authors they asserted that protective, both in legal and common parlance, meant protective of 100% of individuals of all species and taxa. The range derived for use in the NIP uses the definition from the 1985 EPA document "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (Stephens et al 1985) that thresholds/standards need to be protective of 95% of the aquatic fauna. This is set out in the NIP support document (Page 44 NE Illinois IPS document):

"There are a number of ways by which effect thresholds have been derived for various stressors and each has its advantages and limitations. For many of the most common toxic pollutants, laboratory derived toxicity testing has been the conventionally accepted approach for deriving water quality criteria. The goal of this approach is to derive the concentration of a pollutant that is protective of representative species/taxa, that is assumed to protect 95% of all species, including untested ones, for a general class of waters (i.e., freshwater or marine; Stephan et al. 1985). In developing a criterion, a curve is fit to ranked

toxicity data and a value is generated that represents a parameter value that will protect the most sensitive of the tested species. An advantage of this approach is that it is based on experimental data derived under controlled conditions (e.g., untreated control tests, standard temperature, water hardness, pH, etc.). A disadvantage is the uncertainty about whether the results are ecologically and/or environmentally relevant. For example, other substances present in the ambient environment could interact with a stressor in an additive, synergistic, or antagonistic manner resulting in under or overly protective thresholds. However, traditional water quality criteria are assumed to protect ≥95% of all species in a region or class of waters, but they cannot account for different complements of species and taxa that reflect different levels of assemblage sensitivity. Naturally occurring factors, some of which can be unrelated to chemical activity, could reduce or amplify the effects of a pollutant leading to under or over-protective criteria. This is a particularly vexing issue with naturally occurring parameters and substances (e.g., nutrients, ionic strength compounds, sediment, attributes of habitat) where natural background factors (e.g., soils, stream size, ecotype, gradient, base flows, etc.,) can influence the exposure regimen (magnitude, exposure, and fate) of such parameters. The application of water quality criteria for toxicants, however, has contributed much to the documented improvement in ambient aquatic assemblage conditions via pollution controls. This is especially true for the discharge of pollutant loads from point sources on a water quality basis (Yoder et al. 2005, 2019; Happel and Gallagher 2021) that were resolved via point source regulation. The apparent success of applying water quality criteria for common pollutants such as biochemical oxygen demand (BOD), ammonia-N, and common heavy metals has in itself validated how those water quality criteria have been applied, the majority via NPDES permitting."

Our approach is consistent with Stephan et al. (1985). In essence it is more stringent than the basic biological endpoints for the Illinois General Use standard for Aquatic Life since it uses ambient data to derive the TP criteria at sites attaining the General Use standard biological endpoints while also having two or more TP sensitive fish species. The IPS methodology also derived an "Excellent" criterion (≤0.11 mg/l) for sites that achieve excellent biological thresholds (fIBI 50-60) which also harbor more TP sensitive species. The NIP is recommending the 0.11- 0.277 mg/l range as this supports attainment of the General Use standard level of biology.

Reduction Plans and Next Steps

DRSCW/LDRWC stand by their approach to developing the NIP and believe they met the NPDES permit requirements. The NIP clearly identified a target concentration, identified the sources of TP and allocated reductions in a manner that will predictably meet the target. It relies on proven practices supported by 15 years of data, robust statistical analysis and calibrated models.

DRSCW and the LDRWC will continue to run their monitoring and assessments both to verify that the TP goals of the NIP are met and to allow the IPS analysis and DO model to be calibrated for the new condition once it is achieved.

The current language in the DRSCW/LDRWC permits reads:

> "F5. If the Nutrient Implementation Plan determines that a greater phosphorus reduction is necessary, then the Permittee shall meet the phosphorus limit identified in the Nutrient Implementation Plan in accordance with the schedule set out therein, prioritized among all watershed needs;"

DuPage River Salt Creek Workgroup

The DRSCW and LDRWC respectfully request that the IEPA issue permits that adhere to the schedule and limits set out in the NIP. DRSCW and LDRWC have drafted permit language for the agency's consideration (see chapter 9 of the NIP).

Thank you for considering our responses.
Stephen McCracken

Director

cc: LDRWC

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