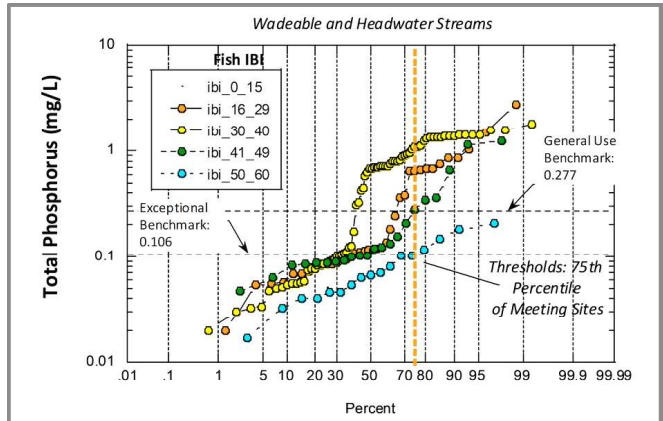


DuPage River/Salt Creek Special Conditions Report

March 30, 2023



Physical Enhancement, Klein Creek, West Branch DuPage River



Probability Plot for Phosphorous and Fish Index of Biotic Integrity



Master Plan for Salt Creek at Fullersburg Woods. Graue Dam with draw down gates in operation.



DuPage River Salt Creek Workgroup

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Introduction and Participation DuPage/Salt Creek Special Conditions Report, March 30, 2023.

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. These requirements are provided in the DRSCW Special Conditions (Attachment 1) and the LDRWC Special Conditions. (Attachment 2 – Note: As the LDRWC Special Conditions differ between permit holders, the Special Conditions for Bolingbrook STP#3 is included in the Attachment as a representation of the Workgroup's Special Conditions Language.)

The Special Conditions are in the NPDES permits identified in Table 1 and Table 2. Listed permittees are required to ensure the completion of projects and activities set out in the Special Conditions, while a few other permittees are required to participate only in identified watershed level studies and the chloride reduction program. Table 1 identifies the status of funding for these activities by each permittee in the DRSCW; and Table 2 identifies the status of funding for these activities by each permittee in the LDRWC.

All listed permittees participate in the DRSCW and/or LDRWC and are working 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 DRSCW watersheds.

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. Map 1 and Map 2 show the locations of the physical projects to be realized under the Special Conditions.

Negotiations with IEPA to extend the Special Conditions were concluded in early 2022, with permits containing the new language being issued shortly after the publication of the 2021 Annual Report. The new language extends the implementation schedule for Total Phosphorous (TP) by three years in return for a further three years of project assessments. Members could choose the new conditions or remain with the original schedule depending on the cost profiles of their individual agencies. Four (4) DRSCW members chose to remain with the original language and will be implementing a TP limit of 1 mg/l monthly average between 10/1/2025 and 8/2/2026. Members Bensenville and Itasca are already treating to 1 mg/l following plant expansions.

Twelve (12) agencies running sixteen (16) POTWs have opted to adopt the new conditions. The assessments between 2023 and 2025 (valued at \$3,998,832) will be used to fund an expansion of the Fullersburg Woods Dam removal and stream restoration, the lower East Branch Stream Enhancement, and an as yet unidentified project on the West Branch of the DuPage River. The

MWRD (running two (2) POTWs) permits are running 6 years behind the majority of the others and negotiations with them is ongoing.

On the lower DuPage, three (3) agencies are already at 1 mg/l monthly average and two (2) agencies, 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 1 in the 2023 report will reflect these updates.

Special Conditions Permit Holder Forum

A meeting of the special condition permit holders was held on September 29, 2022 at the Addison Village Hall. The meeting was held to detail the central strategy for the Nutrient Implementation Plan (see Chapter 3), including effluent limits and schedules. The core of the discussion was the adoption of the 0.11 to 0.28 mg/l Total Phosphorus (TP) target as a warm weather watershed goal (equivalent to a 0.35 mg/l TP effluent standard).

Table 1. Participation in the DRSCW Special Conditions permit 2022-2023

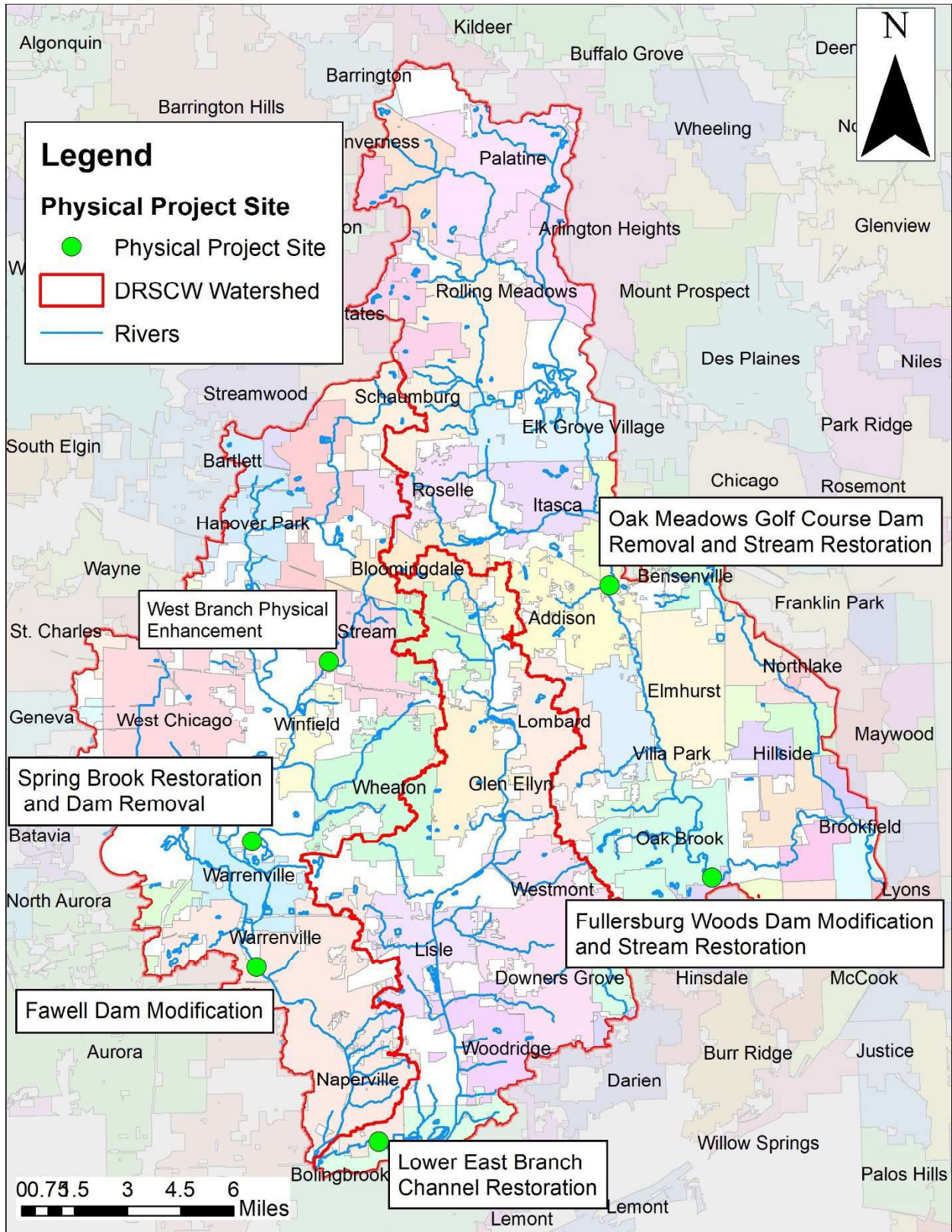
POTW Owner/ Facility Name	NPDES No.	Membership Dues Paid 2022-23	Assessment Paid for Paragraph 2 Table Project Funding*	Assessment Paid for Chloride Reduction/NIP/QUAL 2k/Trading Program
Addison North STP	IL0033812	YES	YES	YES
Addison South - AJ LaRocca	IL0027367	YES	YES	YES
Bartlett WWTP	IL0027618	YES	YES	YES
Bloomington-Reeves WRF	IL0021130	YES	YES	YES
Bolingbrook STP#1	IL0032689	YES	YES	YES
Bolingbrook STP#2	IL0032735	YES	YES	YES
Carol Stream WRC	IL0026352	YES	YES	YES
Downers Grove SD	IL0028380	YES	YES	YES
DuPage County Woodridge	IL0031844	YES	YES	YES
Elmhurst WWTP	IL0028746	YES	YES	YES
Glenbard WW Authority STP	IL0021547	YES	YES	YES
Glendale Heights STP	IL0028967	YES	YES	YES
Hanover Park STP#1	IL0034479	YES	YES	YES
Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) – Egan WRP	IL0036340	YES	YES	YES
MWRDGC – Hanover Park WRP	IL0036137	YES	YES	YES
Roselle-Devlin STP	IL0030813	YES	YES	YES
Roselle-J Botterman WWTF	IL0048721	YES	YES	YES
Salt Creek SD	IL0030953	YES	YES	YES

POTW Owner/ Facility Name	NPDES No.	Membership Dues Paid 2022-23	Assessment Paid for Paragraph 2 Table Project Funding*	Assessment Paid for Chloride Reduction/NIP/QUAL 2k/Trading Program
West Chicago Regional WWTF	IL0023469	YES	YES	YES
Wheaton SD	IL0031739	YES	YES	YES
Wood Dale North STP	IL0020061	YES	YES	YES
Wood Dale South STP	IL0034274	YES	YES	YES
Bensenville South STP	IL0021849	YES	N/A	YES
Itasca STP	IL0079073	YES	N/A	YES

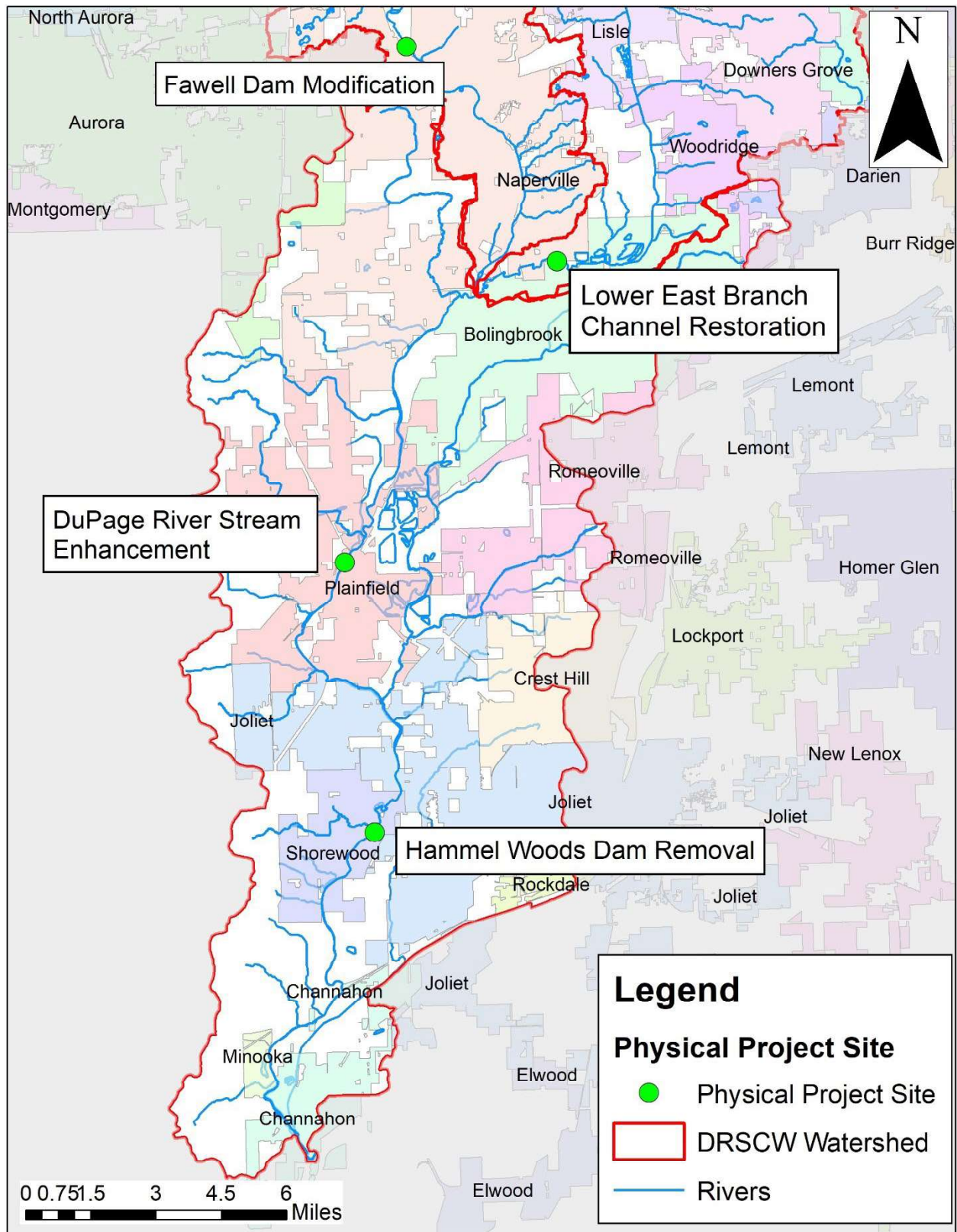
Table 2. Participation in the LDRWC Special Conditions Permit 2021-2022

POTW Owner/ Facility Name	NPDES No.	Membership Dues Paid 2022-2023	Assessment Paid for Paragraph 2 Table Project Funding*	Assessment Paid for Chloride Reduction/NIP/QUAL 2k/Trading Program
Naperville Springbrook WRC	IL0034061	YES	YES	YES
Bolingbrook STP#3	IL0069744	YES	YES	YES
Plainfield STP	IL0074373	YES	N/A	YES
Joliet Aux Sable Plant	IL0076414	YES	N/A	YES
Crest Hill West STP	IL0021121	YES	N/A	YES
Minooka STP	IL0055913	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 2023-24 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 for the Summer of 2027.

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 2027.

1.2 Fawell Dam Modification

- Special Conditions Listed Completion Date – December 31, 2024 (updated December 2022)
- Status – In permitting and fabrication phase

The objective of the project is to allow fish passage for twelve (12) target species through the Fawell dam.

1.2.1. Site Description

The 2017 Annual Report provided a site description.

1.2.2. Design Characteristics

A detail of the core design was provided in the 2020 and 2021 Annual Reports. The basic elements of providing fish passage have not changed. The system relies on a series of regularly spaced side mounted baffles to provide low to no flow pockets for the length of the structure. The ladder would be in three sections, moving from downstream to upstream, a section to allow movement through the downstream splash pad lip, a second section that mounts the inside of the culvert proper, and a movable swing section extending upstream of the culvert that can be moved to allow for floodgate movement (detailed below). All three sections would be 3' tall by 2' wide and would be mounted in the eastern most culvert and wing wall.

Feedback from DuPage County Stormwater Management (DC SWM) has been integrated into the design in several areas but most of the design efforts in the last year have been improving the “swing section” at the upstream end of the ladder system. This section can be hinged out to create a 4' opening in the ladder allowing the flood control gates to fully close. These gates do not usually need to fully close during the normal course of operations but may have to do so if one of the other gates encountered mechanical issues. A solution has been agreed on with DC SWM which would include leaving the swing section open during the winter ensuring gate operations are unencumbered for a substantial part of the year. The team does not believe this will impact annual fish passage totals. Water elevations under this design are currently being modelled.

1.2.3. Permitting Requirements

The listed permits below are required for the Fawell Dam Modification. Status as of March 15, 2023 is included.

- U.S. Army Corps of Engineers Nationwide Permit
 - Application submittal pending
 - Illinois Historic Preservation Agency Section 106 Clearance – Not applicable
 - U.S. Fish & Wildlife Service Section 7 Consultation – Completed USFWS self-documenting Section 7 Consultation in Summer 2021
- Illinois Department of Natural Resources
 - EcoCat Request – Signoff received (submitted in summer 2021 expires in 2023)
 - Major Modification of Existing Dam Permit – Application submittal pending
Based on past discussions and the revised design, this permit may be combined with the Floodway Construction Permit.

- Floodway Construction Permit
 - Expected to be delegated to DuPage County Stormwater
 - Application submittal pending
- DuPage County Stormwater Management Certification and Building Permit
 - Application submittal pending

1.2.4. Design Progress Report

The DRSCW has negotiated a memorandum of understanding (MOU) with DC SWM and the Forest Preserve District of DuPage County (FPDDC). The MOU sets out the responsibilities for each party at each stage, including construction, transport installation, monitoring and maintenance. DC SWM is the owner of the dam and the land parcel it sits on. The FPDDC owns the property surrounding the dam parcel, including the area under the downstream riprap. The MOU covers:

- 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 joins and anchors)
- Winter opening of swing section and placement of winter debris screens
- Ad hoc operation of the hinged section where the ladder exits the upstream end of the culvert to allow the ladder to be moved aside if the gate needs to be closed
- Maintenance of instream elevation of the downstream riffle

The MOU is in its final round of edits after a number of discussions between DC SWM and DRSCW over the last 4 months.

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.

There are several possibilities for additional direct instream monitoring for fish movement through the system which are being evaluated based on the final design.

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 2 of post-project monitoring was completed in 2022. Year 3 of post-project monitoring is scheduled for 2023.

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 two (2) 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 the Project's design characteristics.

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, 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. 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 water quality 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 north of the existing channel 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. Prior to 2020, WB10 was located on the original channel. As such, as part of the post-project monitoring, WB10 was relocated to the new constructed channel immediately upstream of the pedestrian bridge. Table 3 is a summary of pre- and post- project biological and habitat data collected at Spring Brook Phase 2 in 2018, 2021, and 2022. Table 4 and Table 5 include the color codes to IBI and habitat scores. 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.

Table 3. Pre- (2018) and Post-(2021 & 2022) Project Biological and Habitat Data collected at Spring Brook Phase 2

Site ID	River Mile	Drainage Area (sq mi.)	fIBI	mIBI	QHEI	Attainment Status
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	28	29.5	54.0	Non-Fair
WB10C*	1.12	6.30	18	29.1	34.0	Non-Poor
WB10*	0.71	6.80	2	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

*Sites are located within the project footprint.

See Tables 4 and 5 for the color key to IBI and QHEI scores.

Table 4. Color Key to IBI Scores

Legend: Biological Indicators	
Green	Good
Yellow	Fair
Red	Poor
*	Significant departure from biocriterion
NS	Nonsignificant departure from biocriterion

Table 5. Color Code to QHEI Scores

Legend: QHEI	
Blue	Excellent
Green	Good
Yellow	Fair
Orange	Poor
Red	Very Poor

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

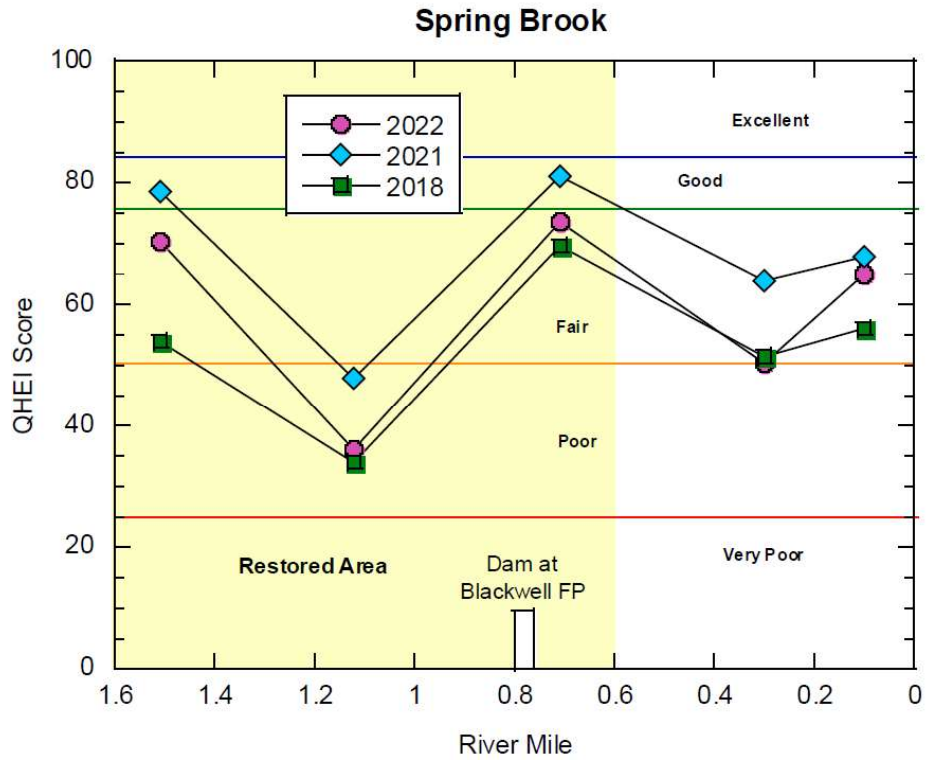


Figure 2. Pre- (2018) and Post-Project (2021 and 2022) mIBI Scores at Spring Brook Phase 2

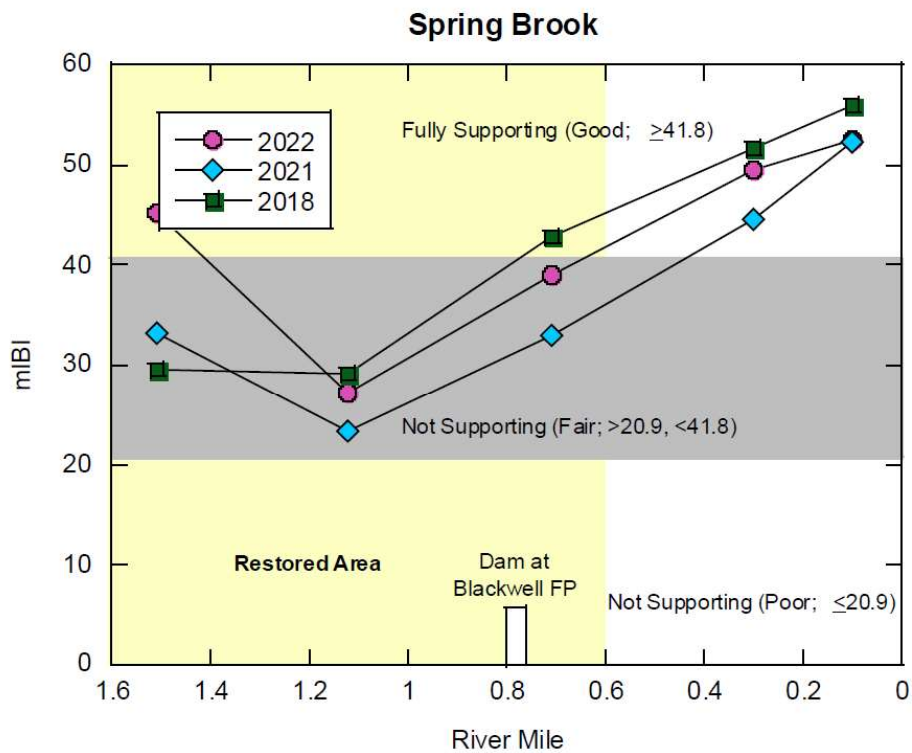
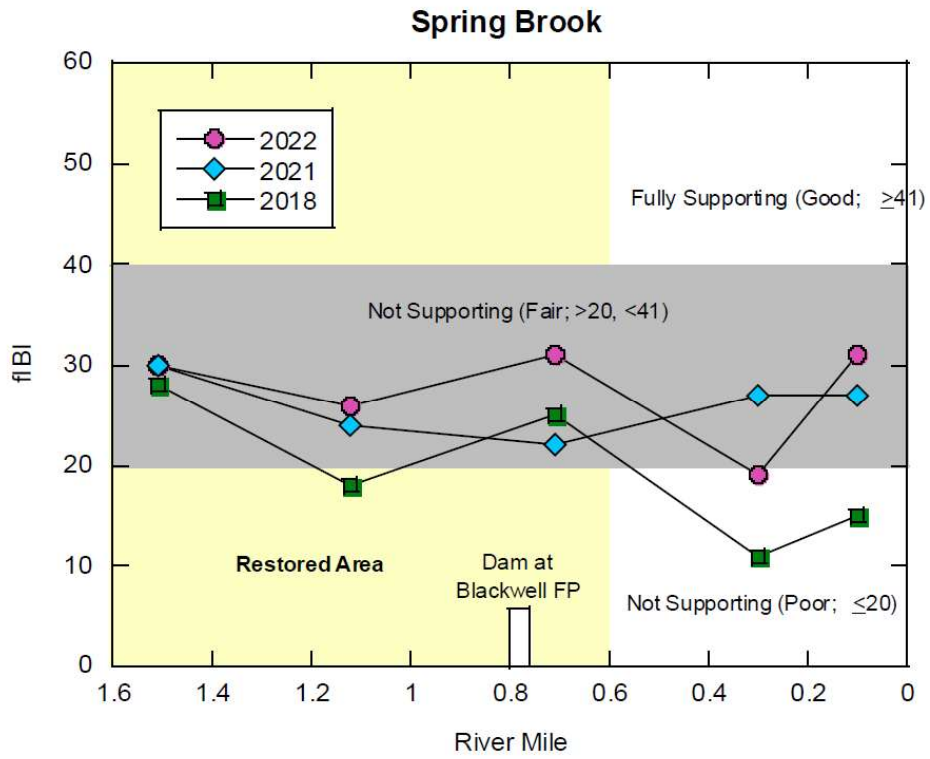
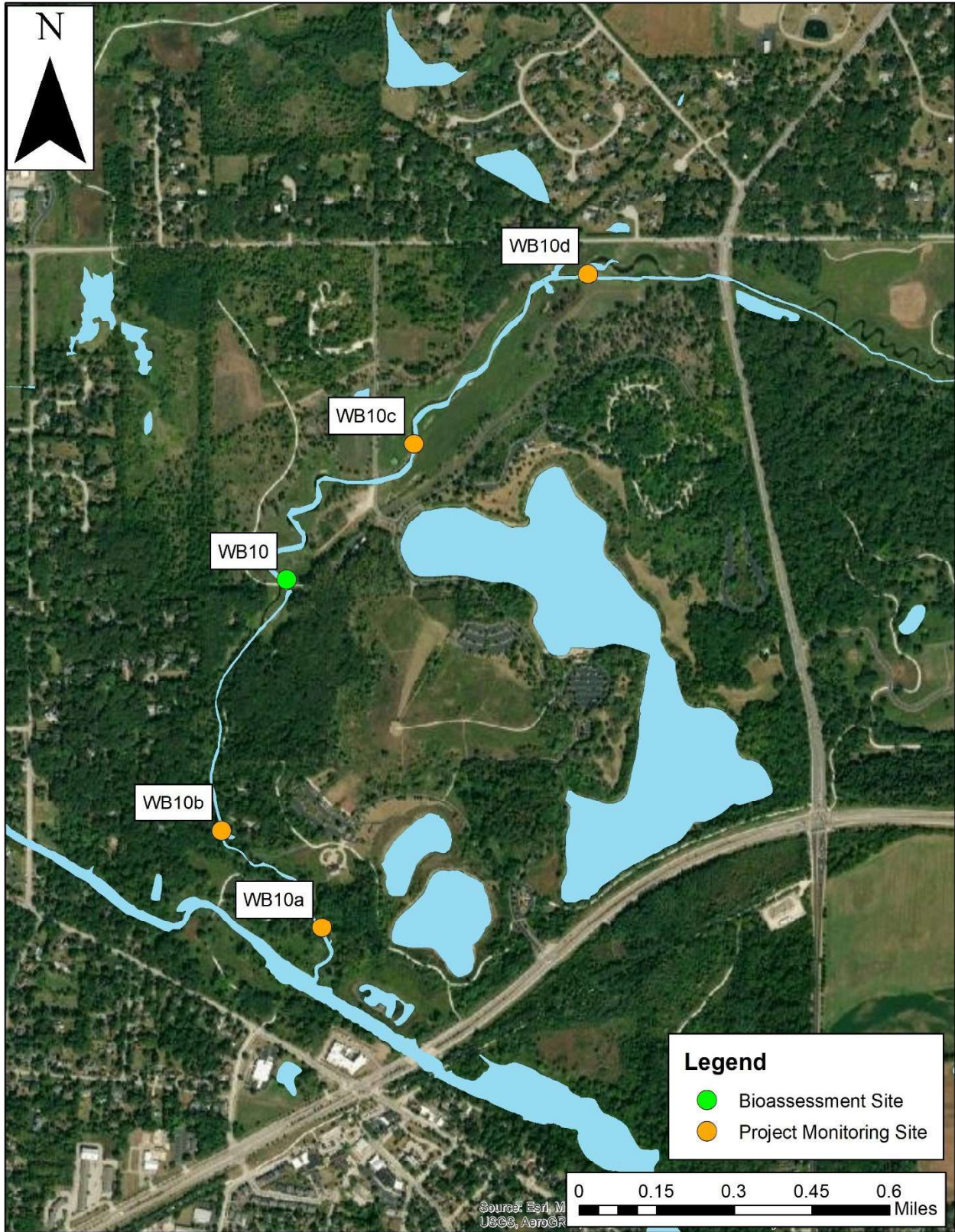


Figure 3. Pre- (2018) and Post-Project (2021 and 2022) fIBI Scores at Spring Brook Phase 2





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

- Special Conditions Listed Completion Date – December 2021/December 2022
- 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 in progress and is scheduled for completion in early-2023. Construction is expected to begin in late 2023.

The Fullersburg Woods Dam Modification and Stream Restoration Project is located on the Salt Creek within the Fullersburg Woods Forest Preserve, Village of Oak Brook, DuPage County, Illinois. The Project's objectives are to raise QHEI above its current average of 47.45, raise fIBI at the sites upstream of the dam above its current average score of 14.0, raise mIBI above its current 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 on this project. DRSCW has budgeted \$6,458,000 for this project.

1.5.1. Site Description

The 2018 Annual Report provide 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 can be found at RestoreSaltCreek.org.

1.5.3 Design Characteristics

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

1.5.4 Permitting Requirements

The permits listed below are required for the Fullersburg Dam Removal and Stream Restoration Project. Status as of March 16, 2023 is included.

- U.S. Army Corps of Engineers Individual Permit (LRC-2021-977)

- Application submittal pending. Public Notice closed on February 22, 2023.
- Illinois Historic Preservation Agency Section 106 Clearance – Pending
- U.S. Fish & Wildlife Service Section 7 Consultation – Completed USFWS self-documenting Section 7 Consultation in 2022
- Illinois Department of Natural Resources
 - EcoCat Request – Signoff received
 - Dam Removal Permit – Pending
 - Floodway Construction Permit
 - Delegated to DuPage County Stormwater
 - Application submittal pending
- Illinois Environmental Protection Agency
 - 401 Water Certification (C-0192-22) – Pending. Public Notice issued on March 16, 2023.
 - NPDES Permit for Construction (ILR10)
 - Notice of Intent – Will be submitted by contractor upon award
- Kane DuPage Soil and Water Conservation
 - Soil erosion and sediment control (SESC) review submittal – Pending
- DuPage County Stormwater Management Certification and Building Permit
 - Application submittal – Pending
- DuPage County Highway Access Permit
 - Application submittal – Pending

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 and can be found at

http://restoresaltcreek.org/wp-content/uploads/2020/09/concept-master-plan_09.17.20-final.pdf

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

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 Concept Master Plan for Salt Creek at Fullersburg Woods. Work in 2022-2023 focused on coordination with permitting agencies and preparation of construction bid documents.

The project will require authorization under Section 404 of the Clean Water Act from the US Army Corps of Engineers (ACOE) for the proposed impacts to 2.19-acres of jurisdictional wetland/Waters of the U. S. In April 2022, an application for a Nationwide Permit 53 for low-head dam removal, Nationwide Permit 58 for the water intake for the raceway pumps, and a

Nationwide Permit 27 for the aquatic and riparian habitat restoration work was submitted to the ACOE. However, on August 4, 2022, the permit application was escalated to an Individual Permit (IP). The 30-day public notice for the IP was held from January 21, 2023 to February 22, 2023. It is expected that the Section 404 IP will be issued by May 2023.

Due to the elevation of the Section 404 Permit to an IP, a 401 Water Quality Certification from the Illinois Environmental Protection Agency (IEPA) will be required for the project. The request for the 401 Water Quality Certification was submitted in January 2023 and it is expected that the certification will be issued by mid-May 2023. The 401 Certification was posted for 30-day public notice on March 16, 2023.

The project will also require authorization from DuPage County under their Flood Plain and Stormwater Ordinance, Building Permit, and Department of Transportation programs. The initial permit applications were submitted to DuPage County in June and July 2022. Multiple meetings were held with DuPage County to address comments on the submittals during 2022 and 2023 and final permit applications were submitted in February of 2023. It is expected that permits from DuPage County will be issued by May 2023.

The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) will lead the bid and award of the contract and provide construction oversight of the project. It is expected that the project will go to bid in June 2023 with construction to start in Fall of 2023.

1.5.6 Project Impact Evaluation

The 2021 Annual Report details the pre-project sampling completed to date. Post-project sampling will be conducted for a minimum of three (3) consecutive years upon completion of construction and stabilization activities.

1.6 West Branch Physical Enhancement – Klein Creek Streambank Stabilization Project

- Special Conditions Listed Completion Date – December 2022
- Status — Construction was completed in 2022. Plugs, trees, and shrubs will be planted in May/June 2023. Post-project monitoring is scheduled to begin in 2024.

The DRSCW has entered in a Memorandum of Understanding (MOU) with the Village of Carol Stream to fund the river resource improvement elements of the Klein Creek Section I Stream Bank Stabilization. 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.

1.6.1. Site Description

The 2021 Annual Report provide 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 contract was awarded on May 2, 2022, but the contractor did not mobilize to the site until mid-August 2022. The work began with a few weeks for tree removal and clearing and grubbing throughout the entire project limits of Section I.

A temporary diversion channel was constructed on each end of an existing compensatory storage basin. A sheet pile cofferdam was placed a few hundred feet downstream of the wastewater treatment plant's outfall and began diverting the flow into the diversion channel on September 20th.

Excavation of the new channel proceeded from upstream to downstream. The streambed and rock toe installation occurred in parallel and just behind the excavation. Gaps were left for later installation of the toe wood. The upstream rock substrate area and associated boulder weir were installed "in-the-dry", while the boulder weir for the downstream rock substrate area was installed after streamflow was introduced into the new channel.

The flow was temporarily stored in the compensatory storage basin while the downstream end of the diversion channel was removed and the last stretch of streambank stabilized. Flow was officially re-introduced into the newly constructed channel on October 14th.

Work continued on the rock toe, as well as backfilling the toe wood areas with the same rock. The handful of stream barbs at the downstream end were installed "in-the-wet". The habitat boulders and habitat wood were also placed "in-the-wet" as directed by the designer-of-record in the field.

Except for the "Economy Prairie" seed mix, which was installed with a rangeland seed drill, the other seed mixes were hand-broadcast and covered with an erosion control blanket. Work was substantially completed by mid-November. The additional plantings, including plugs, shrubs, and trees are required to be planted by May 31, 2023. Monitoring and management of the native plants will occur thru 2025.

Photographs of the Klein Creek Streambank Stabilization Project with detailed descriptions are provided in Plate 1 to Plate 11.

Plate 1. Aerial photograph of Klein Creek Streambank Stabilization Project (October 2022)

By mid-October 2022 approximately $\frac{2}{3}$ of the new channel had been excavated, with about $\frac{1}{2}$ having also been filled with the new streambed material. Construction proceeded from upstream to downstream (east-to-west; right-to-left). The temporary diversion channel is to the south and partially cuts thru an existing compensatory storage basin to save costs.



Plate 2. Aerial photograph Looking upstream (east) on Klein Creek from Kuhn Road (September 16, 2022)

Most of the undesirable woody species have been removed. Most of the trees in the foreground will be used later for creating the toe wood. A dump truck uses the temporary bridge on its way towards an excavator constructing the temporary diversion channel.



Plate 3. Photograph of vegetation management at the Klein Creek Streambank Stabilization Project
Good weather in early November allowed for additional herbiciding to the numerous teasel (Dipsacus) rosettes.



Plate 4. *Photograph of seeding and stabilization at the Klein Creek Streambank Stabilization Project*
Seeding and blanketing began after completion of the earthwork in mid-October and continued through mid-November. A rangeland seed drill was used for the larger areas planted with an “Economy Prairie” seed mix.



Plate 5. *Photograph of streambank construction at the Klein Creek Streambank Stabilization Project*
The streambank is lined with sandy-cobble up to the estimated bankfull elevation. The streambed is constructed with a 12 inch thick layer of a cobbly-sand mixture. The contractor imported river run material sourced from a local quarry.



Plate 6. *Photograph of toe wood installation at the Klein Creek Streambank Stabilization Project*
The areas for toe wood were excavated before the rootwads were placed; then they were backfilled with the same sandy-cobble mixture used on the rock toe. All rootwads used in the toe wood were harvested from onsite. Sand has also been added to the rock toe along the streambank in order to provide the growing medium for the plugs.



Plate 7. *Photograph looking upstream on Klein Creek from Kuhn Road (October 12, 2022)*
Photograph looking upstream (east) from Kuhn Road at the downstream end of the temporary diversion channel. The temporary channel was filled and flow was diverted back into the new channel on October 14, 2022.



Plate 8. *Photograph of a rock substrate area at the Klein Creek Streambank Stabilization Project*
The rock substrate areas were designed to mimic a rock riffle by placing a weir of large boulders followed by a downstream stretch (photo left) of cobbled substrate. Due to the flat gradient, this boulder weir was installed “in-the-wet” to ensure that their tops were above the normal water level.



Plate 9. Looking downstream (west) on Klein Creek at the Kuhn Road culverts.

Stream barbs were placed to maintain the thalweg near the center of the stream before reaching the culverts. They were constructed out of a line of large boulders set at a shallow angle to the bank and gradually dropping below the water line. In the foreground is the overflow weir for a constructed wetland.



Plate 10. Aerial photo upstream view on Klein Creek from Kuhn Road (December 1, 2022).

Aerial photograph taken looking upstream (east) from Kuhn Road. Section I-A extends to the Village of Carol Stream Water Reclamation Center's outfall, which is few hundred feet upstream of the first constructed meander.



Plate 11. Aerial photograph of looking downstream on Klein Creek from Section 1-A (December 1, 2022)

Aerial photograph taken looking downstream (west) from the upstream end of Section I-A. A couple of the constructed wetlands are holding water after a ¼” rain event earlier in the week.



1.6.5. Project Impact Evaluation

As the Project was under construction during the 2022 sampling season, no pre- or post-project sampling was conducted. Post-project sampling is schedule to begin in the Summer of 2024.

1.7 Southern East Branch Stream Enhancement

- Special Conditions Listed Completion Date – December 2023
- Status – Final Design/Construction is in progress and is scheduled for completion in 2022-2023.

The Southern East Branch Stream Enhancement Project is located on the East Branch DuPage River between Royce Road and Weber Road in the Villages of Bolingbrook and Naperville, Will County, Illinois. The Project’s 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 Villages of Bolingbrook and Naperville, and the Bolingbrook and

Naperville Park Districts for this project (referred to collectively as the partners). The DRSCW has budgeted \$2,500,000 for 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 provide 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. The project is on hold until the federal funding is available to the DRSCW.

1.7.5. Project Impact Evaluation

The 2021 Annual Report provide details on the pre-project monitoring conducted for the Lower East Branch DuPage River Stream Enhancement Project. Post-project monitoring will be conducted for three (3) consecutive years following the construction of the project.

1.8 Hammel Woods Dam Modification

- Special Conditions Listed Completion Date – December 2023
- 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 2023.

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 DuPage 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 Midwest Biodiversity Institute (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. Three (3) of the sites (LD07, LD36, and LD36A) are located upstream of the Hammel Woods dam location with LD36 and LD36A located within the former impoundment behind the dam. An additional site (LD06) located downstream of the dam was also monitored as part of the pre- and post-project monitoring. Historical biological (fish and macroinvertebrates) and habitat data is also available for LD06 and LD07 as these sites are included in the bioassessment program and were sampled in 2012, 2015, and 2018. The downstream site (LD07) serves as a control site that is typical of Lower DuPage River water quality and habitat and as representative of pre-restoration water quality conditions. Table 7 is a summary of pre- and post- project biological and habitat data collected at the Hammel Woods Dam Removal Project in 2012, 2015, 2018, 2019, 2021, and 2022. Figure 4 to Figure 6 depict the pre-project QHEI (Figure 4); mBI scores (Figure 5); and fIBI scores (Figure 6) for the Hammel Woods Dam Removal Project in 2012, 2015, 2018, 2019, 2021, and 2022. A map of sampling locations is included in Map 4.

Average fIBI scores upstream of the former dam location have increased from 38 to 45 and both sites (LD36 and LD36A) located in the dam's former impoundment are now meeting its designated aquatic life use for fish (fIBI \geq 41). Monitoring will resume in 2023.

Table 6. Pre- (2012, 2015, 2018, and 2019) and Post-Project (2021 and 2022) Biological and Habitat Data collected at the Hammel Woods Dam Removal Project

Site ID	River Mile	Drainage Area (sq mi.)	fIBI	mIBI	QHEI	Attainment Status
DuPage River 2022						
LD07*	11.40	321.00	38*	45	78.8	PARTIAL
LD36A*	11.25	323.00	42	-	81.8	(FULL)
LD36*	10.93	323.00	48	-	85.8	(FULL)
LD06	9.60	323.20	36*	46.7	77.5	PARTIAL
DuPage River 2021						
LD07*	11.40	321.00	37*	47.6	88.8	PARTIAL
LD36A*	11.25	323.00	36*	-	84.8	(NON)
LD36*	10.93	323.00	41	-	90.3	(FULL)
LD06	9.60	323.20	41	46.7	80.0	FULL
DuPage River 2019						
LD07*	11.40	321.00	37*	46.2	75.8	PARTIAL
LD36A*	11.25	323.00	39*	-	76.0	(NON)
LD36*	10.93	323.00	38*	-	75.5	(NON)
LD06	9.60	323.20	40*	47.5	74.5	PARTIAL
DuPage River 2018						
LD07*	11.40	321.00	39.5*	54.8	78.0	PARTIAL
LD06	9.60	323.20	43.5	64.9	73.5	FULL
DuPage River 2015						
LD07*	11.40	321.00	36*	44.6	74.0	PARTIAL
LD06	9.60	323.20	39.5*	47.3	83.5	PARTIAL
DuPage River 2012						
LD07*	11.40	321.00	32.5*	46.7	75.0	PARTIAL
LD06	9.60	323.20	40.5	54.2	76.0	PARTIAL

*Site is located upstream of the former Hammel Woods dam.

See Tables 4 and 5 for the color key to IBI and QHEI scores.

Figure 4. Pre- (2012, 2015, 2018, and 2019) and Post-Project (2021 and 2022) QHEI Scores at the Hammel Woods Dam Removal Project

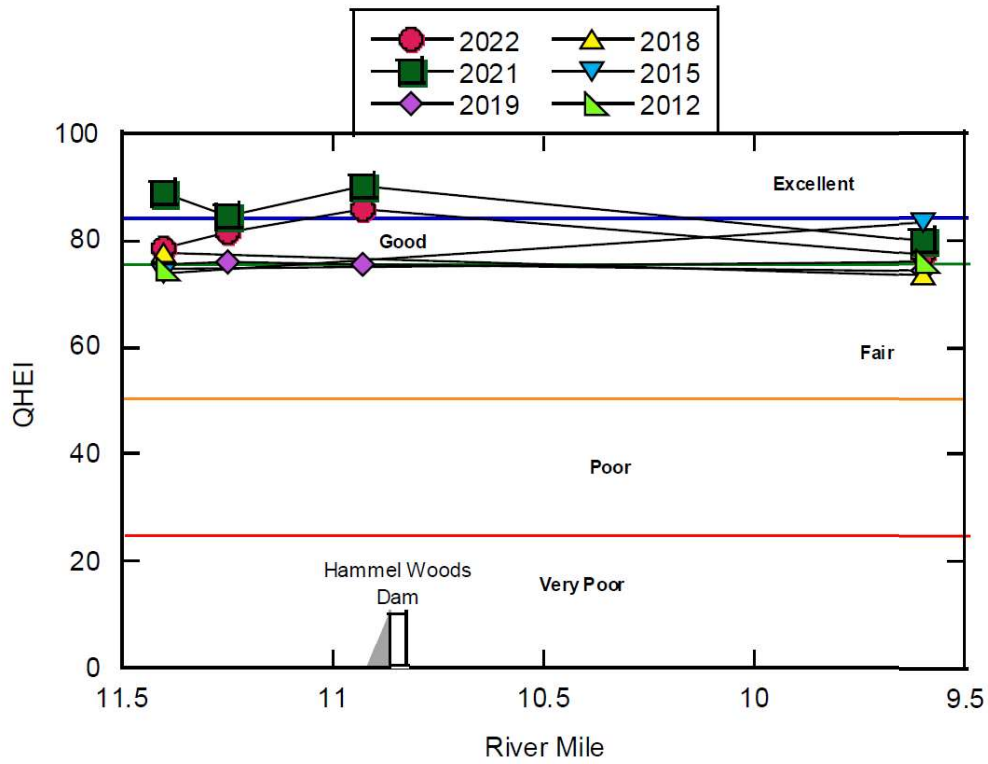


Figure 5. Pre- (2012, 2015, 2018, and 2019) and Post-Project (2021 and 2022) mIBI Scores at the Hammel Woods Dam Removal Project

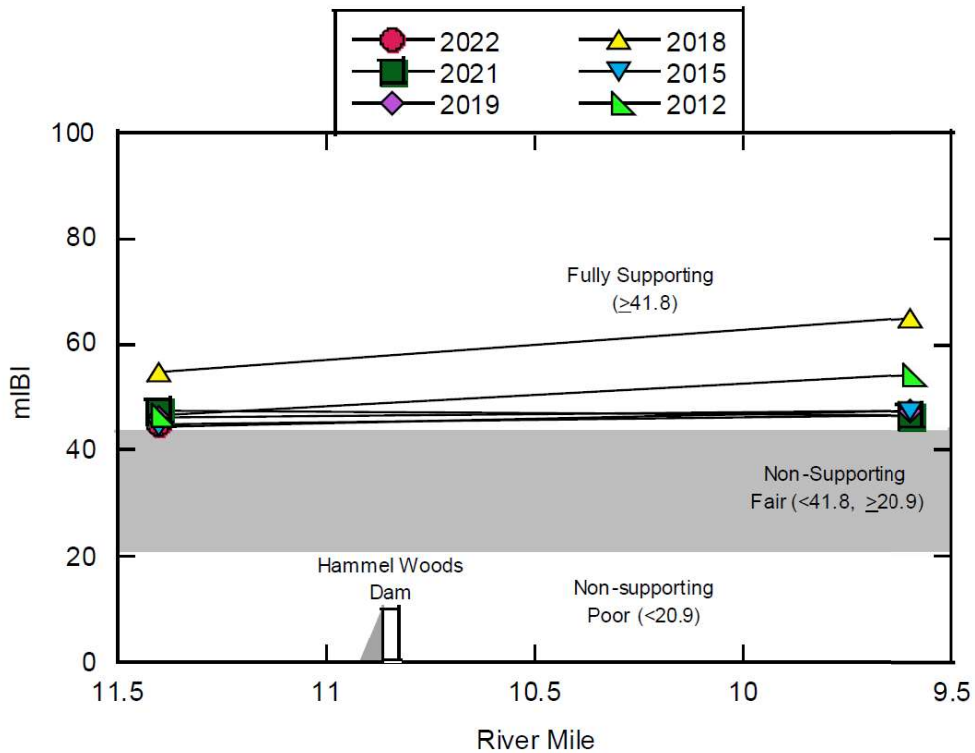
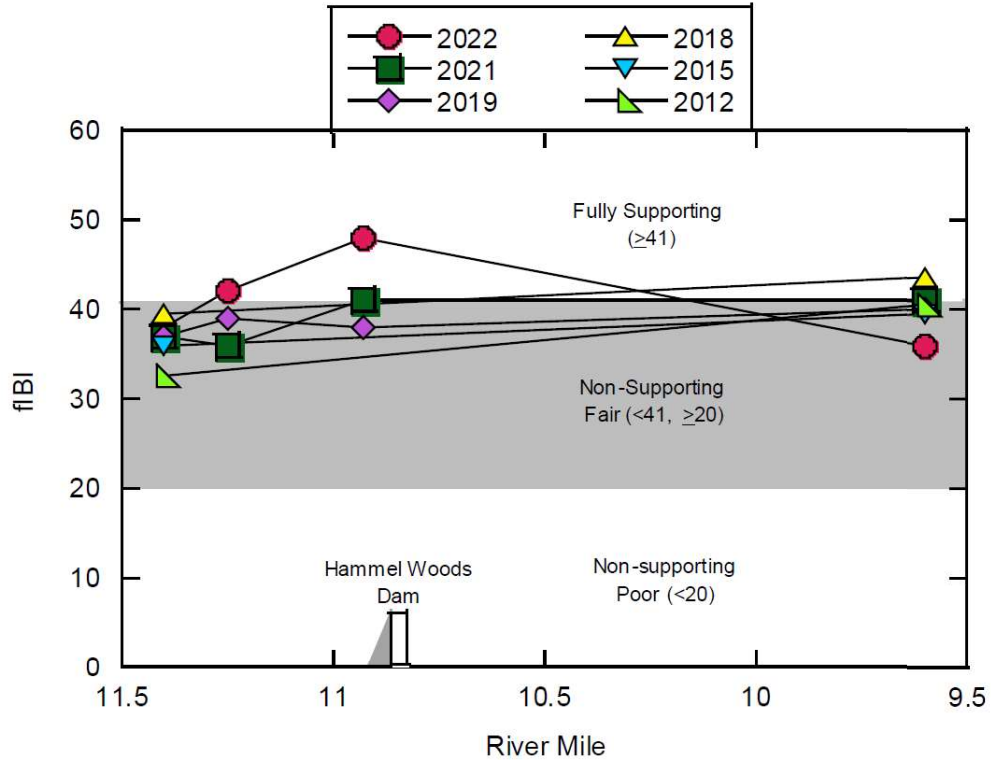


Figure 6. Pre- (2012, 2015, 2018, and 2019) and Post-Project (2021 and 2022) fIBI Scores at the Hammel Woods Dam Removal Project





Map 4. Pre- and Post-Project Monitoring Sites at the Hammel Woods Dam Removal Project

1.9 DuPage River Stream Enhancement

- Special Conditions Listed Completion Date – December 2023
- Status – Final Design and Preparation of Contract Bid Documents is on-going. Construction is expected to begin in Winter 2023.

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 \$2,740,000.00 for 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 under review by Project Committee. Plate 12 is the draft concept plan prepared by Hey and Associates for the DuPage River Stream Enhancement Project. Once concept plans are approved final engineering and permit applications will be completed. Project will be bid and managed by the Village of Plainfield.

1.9.3. 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

1.9.4. Design Progress Report

In late 2021, the LDWRC 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 entered into a contract 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.

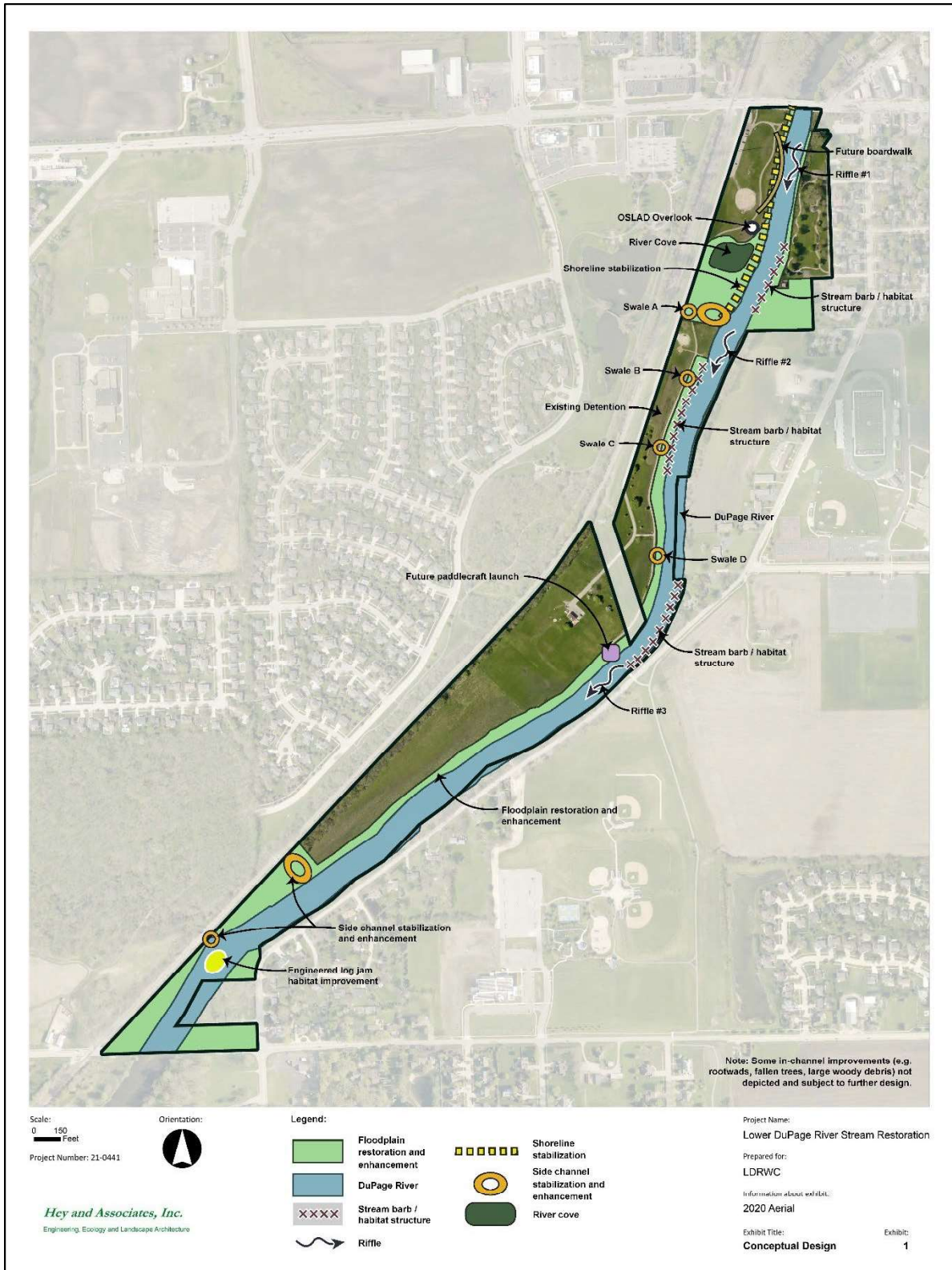


Plate 12. Concept Plan for the DuPage River Stream Enhancement

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 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 is ongoing.

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 is ongoing.

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
- Will-Cook Soil and Water Conservation District

Task 5 is scheduled to begin in 2023.

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. will also provide Bid Assistance by addressing contractor questions during the public bid process. Task 6 is scheduled to begin 2023.

Task 7 – Coordination Meetings

Task 7 includes six (6) meetings with Hey and Associates, Inc, LDRWC, and project stakeholders. These meetings will include: 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 ongoing.

1.9.5. Project Impact Evaluation

The LDRWC and Midwest Biodiversity Institute (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. Two (2) of the sites (LD10A and LD10B) are located within the proposed project footprint. A site (LD10) located upstream of the project and a site (LD09) located downstream of the project were also monitored as part of the pre-project monitoring. Historical biological (fish and macroinvertebrates) and habitat data is also available for LD10 and LD09 as these sites are included in the bioassessment program and were sampled in 2012, 2015, 2018, and 2021. The upstream (LD10) and downstream (LD09) sites serve as control sites that are typical of Lower DuPage River water quality and habitat and as representative of pre-restoration water quality conditions. Table 8 is a summary of pre-project biological and habitat data collected at the DuPage River Stream Enhancement Project in 2012, 2015, 2018, 2021, and 2022. Figure 7 to Figure 9 depict the pre-project QHEI (Figure 7); mIBI scores (Figure 8) and fIBI scores (Figure 9) for the DuPage River Stream Enhancement Project in 2012, 2015, 2018, 2019, 2021, and 2022. A map of sampling locations is included in Map 5.

Table 7. Pre-Project Biological and Habitat Data collected at the DuPage River Stream Enhancement Project in 2012, 2015, 2018, 2019, 2021, and 2022

Site ID	River Mile	Drainage Area (sq mi.)	fIBI	mIBI	QHEI	Attainment Status
DuPage River 2022						
LD10	18.50	249.00	35*	44.8	67.8	PARTIAL
LD10A*	18.10	249.36	37*	36.4*	60.5	NON
LD10B*	17.50	250.07	44	54.0	57.0	FULL
LD09	17.00	250.00	35*	47.4	68.5	PARTIAL
DuPage River 2021						
LD10	18.50	249.00	31*	47.7	81.3	PARTIAL
LD10A*	18.10	249.36	No Data Collected			
LD10B*	17.50	250.07				
LD09	17.00	250.00	31*	25.3*	81.0	NON
DuPage River 2018						
LD10	18.50	249.00	38*	50.0	64.5	PARTIAL
LD10A*	18.10	249.36	No Data Collected			
LD10B*	17.50	250.07				
LD09	17.00	250.00	35*	49.3	73.5	PARTIAL
DuPage River 2015						
LD10	18.50	249.00	30*	42.5	76.5	PARTIAL
LD10A*	18.10	249.36	No Data Collected			
LD10B*	17.50	250.07				
LD09	17.00	250.00	27*	36.0*	71.5	NON
DuPage River 2012						
LD10	18.50	249.00	27*	37.5*	62.5	NON
LD10A*	18.10	249.36	No Data Collected			
LD10B*	17.50	250.07				
LD09	17.00	250.00	29*	39.8*	59.0	NON

*Sites are located within the proposed project footprint.

See Tables 4 and 5 for the color key to IBI and QHEI scores.

Figure 7. Pre-Project QHEI Scores at the DuPage River Stream Enhancement Project in 2012, 2015, 2018, 2019, 2021, and 2022

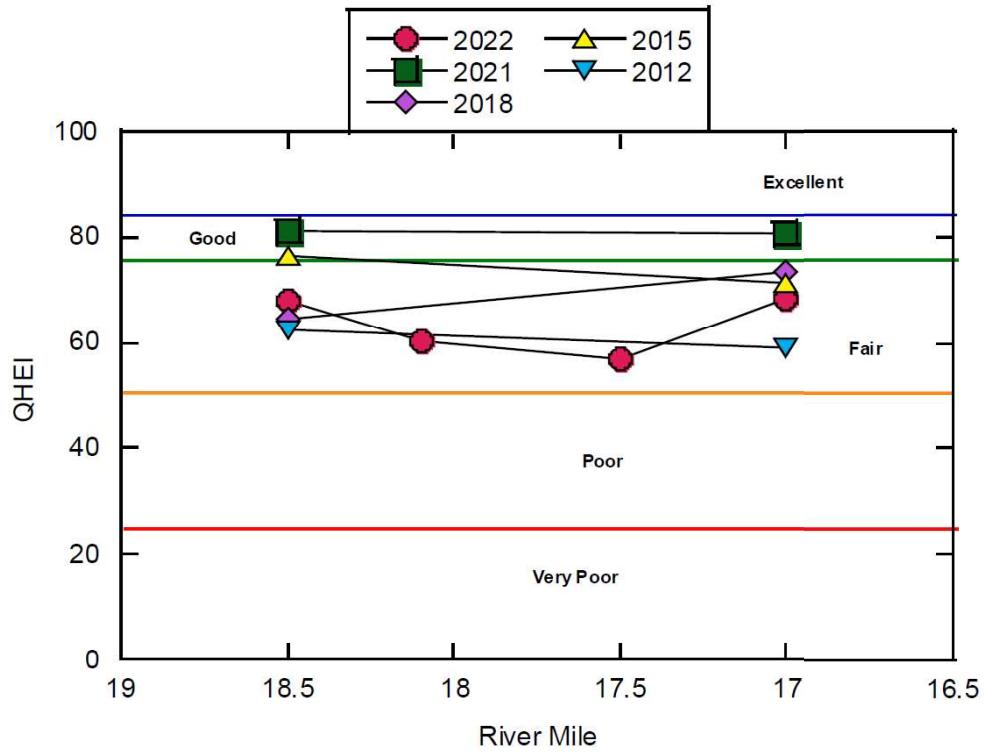


Figure 8. Pre-Project mIBI Scores at the DuPage River Stream Enhancement Project in 2012, 2015, 2018, 2019, 2021, and 2022

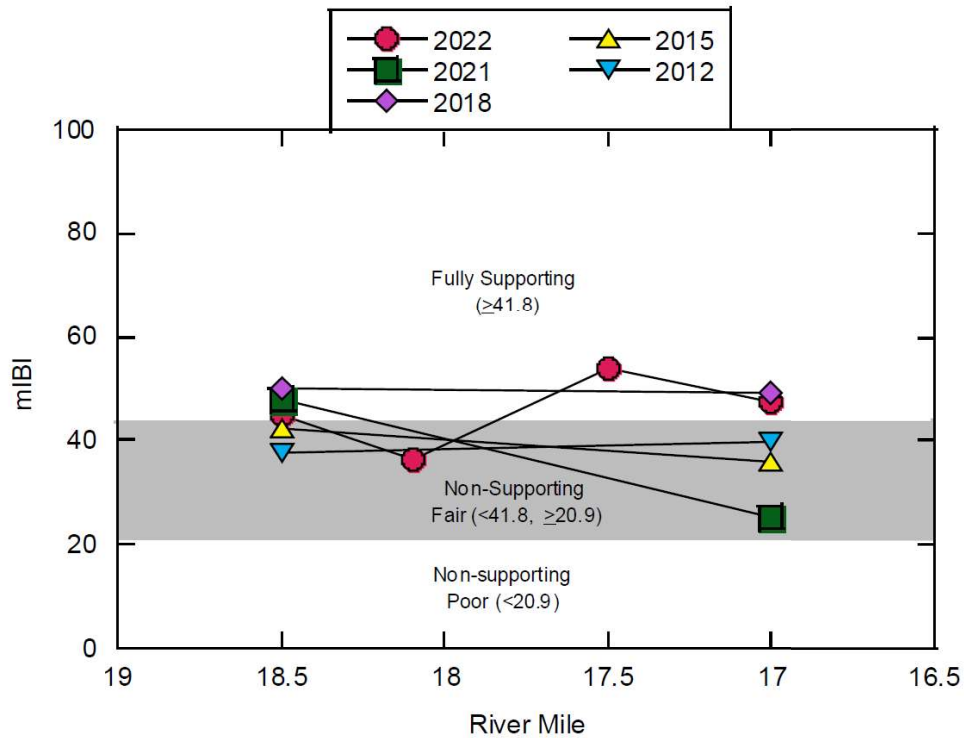
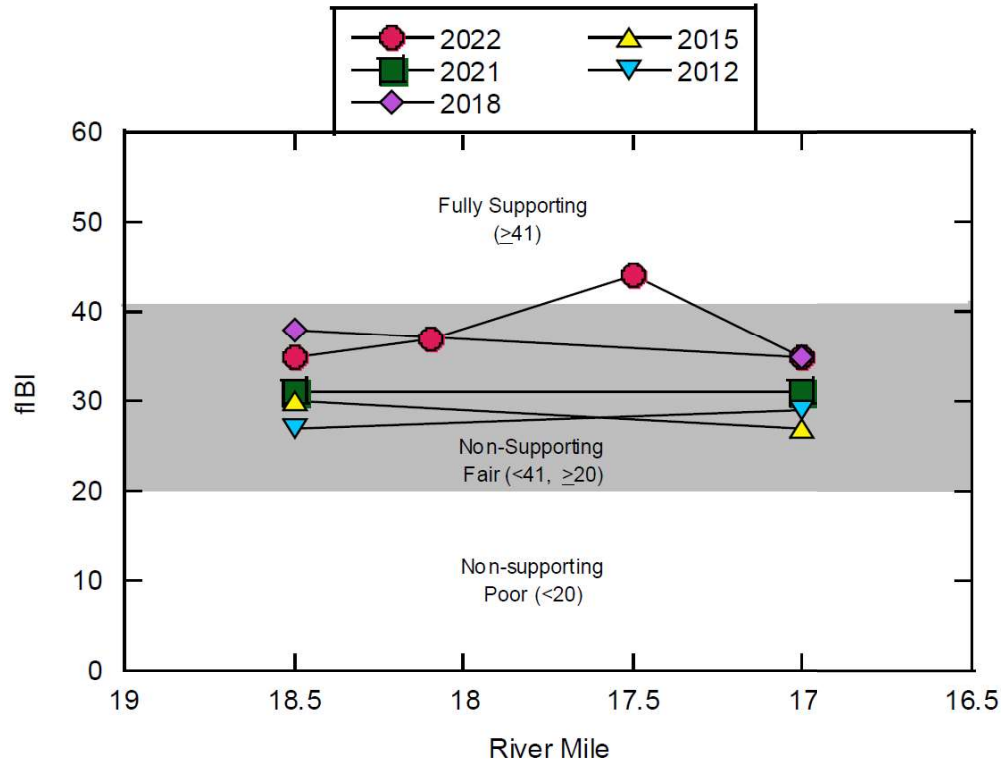


Figure 9. Pre-Project fIBI Scores at the DuPage River Stream Enhancement Project in 2012, 2015, 2018, 2019, 2021, and 2022





Map 5. Pre-Project Monitoring Sites at the DuPage River Stream Enhancement Project

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 2022-2023.

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. In 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 at various agencies (Plate 13).

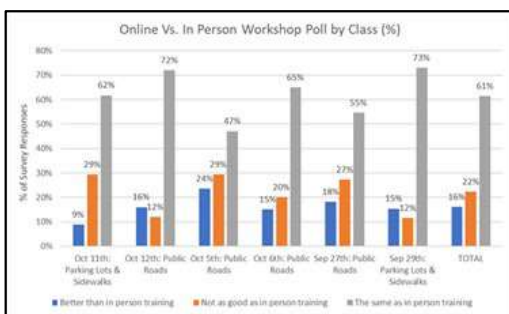
Plate 13. PowerPoint Slide from September 27, 2022 Public Roads Workshop



In 2022 the deicing workshops were held again as webinars. 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 Boone, Cook, DuPage, Kane, Lake, Will, and Winnebago counties, as well as Milwaukee, WI.

Plate 14. Online vs In-Person Workshop Poll



Public Roads Deicing Workshops were held on September 27, October 5, October 6, and October 12, 2022. Staff from Bolton-Menk, Inc. (formerly at Fortin Consulting, Inc.) from Minnesota were engaged to present the material. A registration fee was required per agency in order to view the webinar. The 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. The survey

results indicated that a minimum of 644 persons attended the four 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.

The Parking Lot and Sidewalk Deicing Workshop webinars were held on September 29 and October 11, 2022 with Bolton-Menk, Inc. presenting. The survey results indicated that there was a minimum of 262 persons who viewed the webinars. Certificates of attendance were provided to those who requested them. The surveys provided an opportunity to provide an evaluation on the webinars (Plate 14). A link was sent to each registrant for the *Minnesota Pollution Control Agency Winter Parking Lot & Sidewalk Maintenance Manual*.

Additionally, during this reporting period, the LDRWC shared seasonal outreach materials for members to use in residential outreach efforts (Plate 15). 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. A winter checklist was also included to assist communities in tracking the use of outreach materials for MS4 reporting. Both websites also advertise the winter deicing workshops.

Plate 15. Outreach Poster/Handout on Keeping Streets Clear For Snow Plows, 2022



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 2023.

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 PLOTS). 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 was:

- 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 is being finalized and will be complete by April 2023.

2.3 Continuous Chloride Monitoring

When chlorides are present in elevated concentrations in rivers, they harm aquatic invertebrates, fish, and aquatic and terrestrial plants. High chloride concentrations 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 rather than 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 LDWRC 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.

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 2022 are presented in Figure 10.

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 2007-2021 for six (6)

sites are depicted in Figure 11 to Figure 16, 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. The weather data for the Naperville site on the southern West Branch has not yet been extracted and will be on the future graphics.

Figure 10. *Calculated Chloride Concentrations - Winter Months (2020-2022) for the Lower DuPage River at Shorewood*

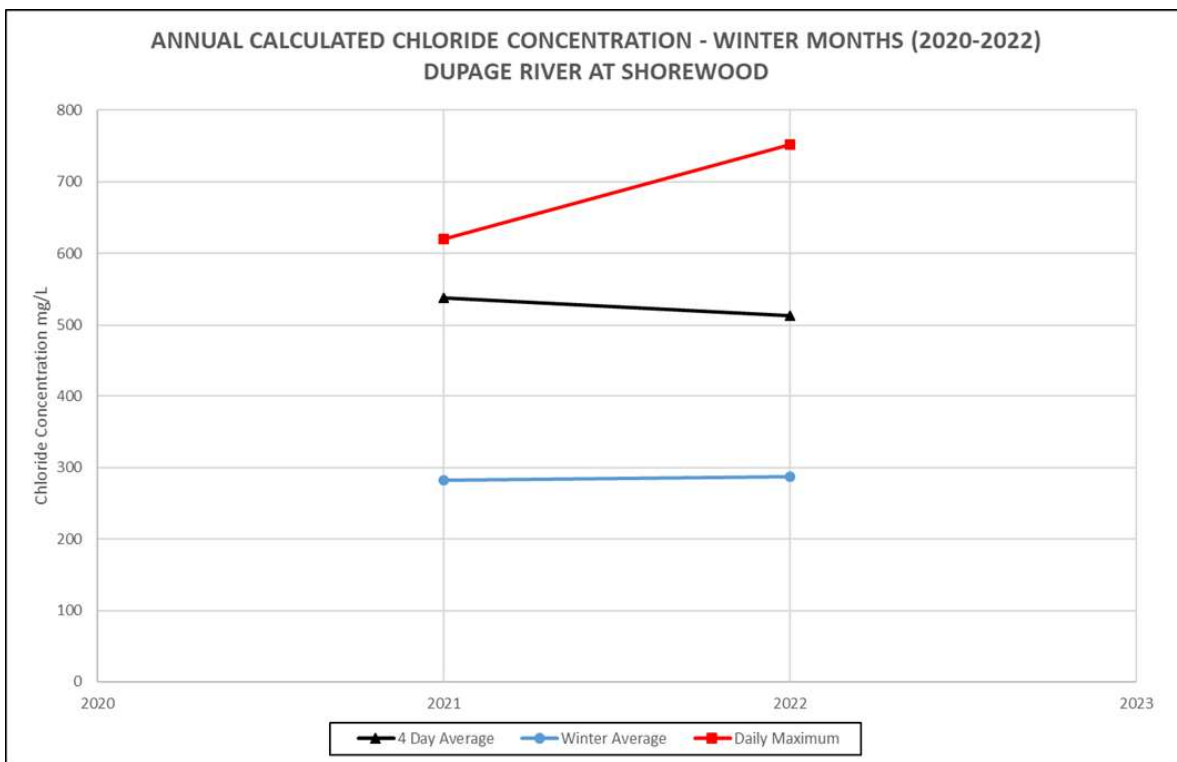


Figure 11. Calculated Chloride Concentrations - Winter Months (2007-2022) for Salt Creek at Busse Woods Main Dam. Data was not collected in 2021.

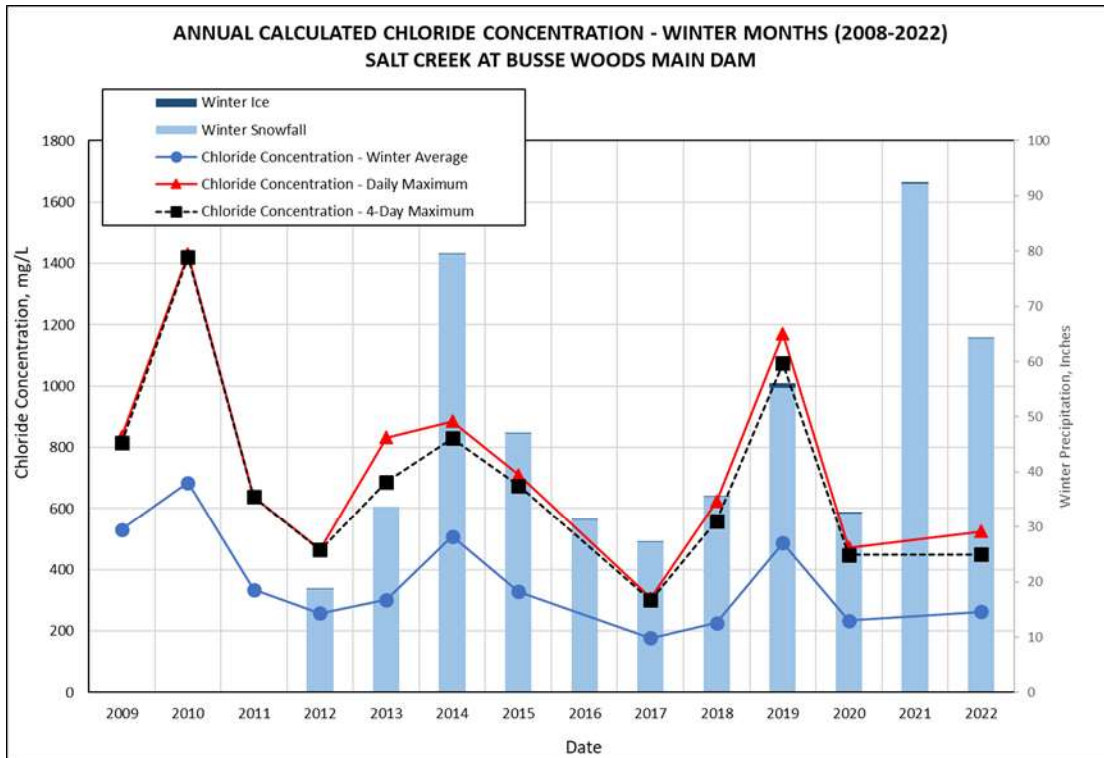


Figure 12. Calculated Chloride Concentrations - Winter Months (2007-2022) for Salt Creek at Wolf Road

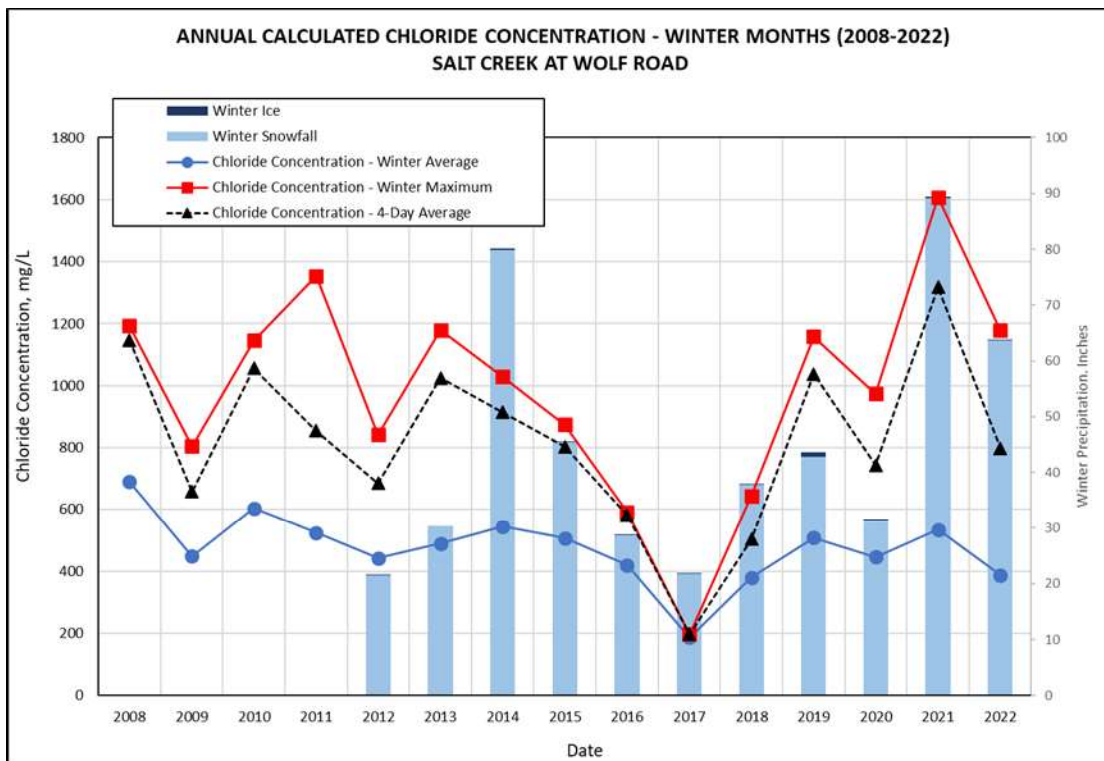


Figure 13. Calculated Chloride Concentrations - Winter Months (2007-2022) for the East Branch DuPage River at Army Trail Road

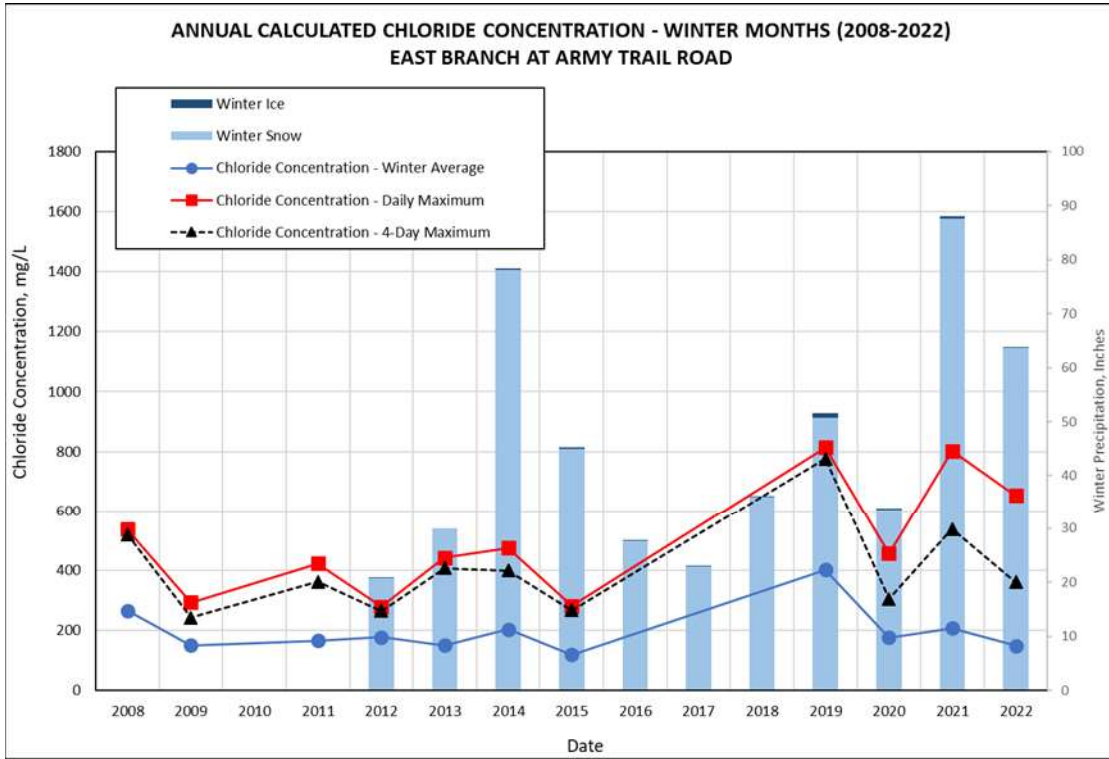


Figure 14. Calculated Chloride Concentrations - Winter Months (2008-2022) for the East Branch DuPage River at Hobson Road

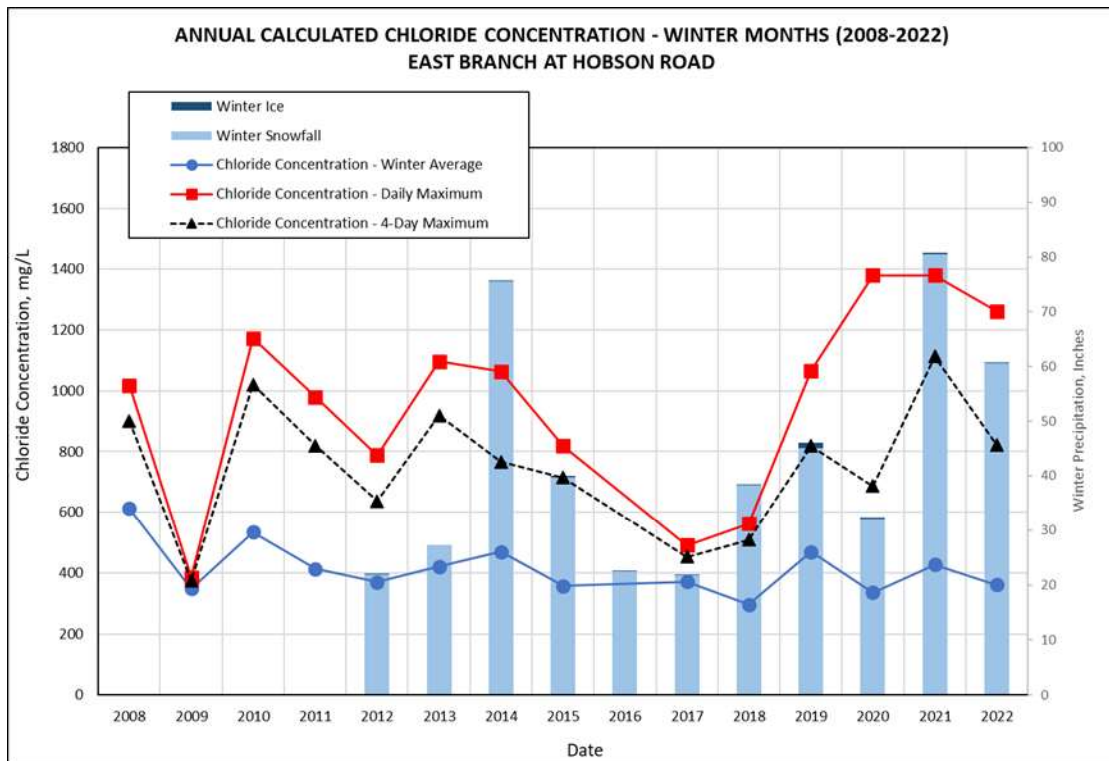


Figure 15. Calculated Chloride Concentrations - Winter Months (2007-2022) for the West Branch DuPage River at Arlington Drive

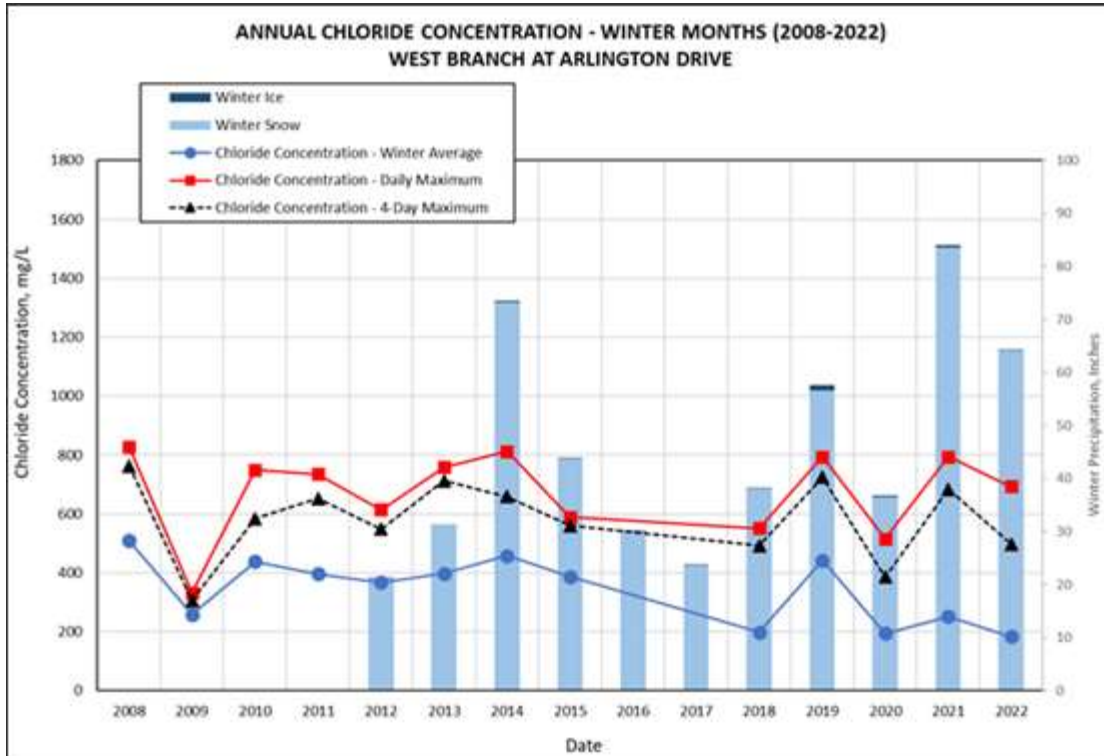
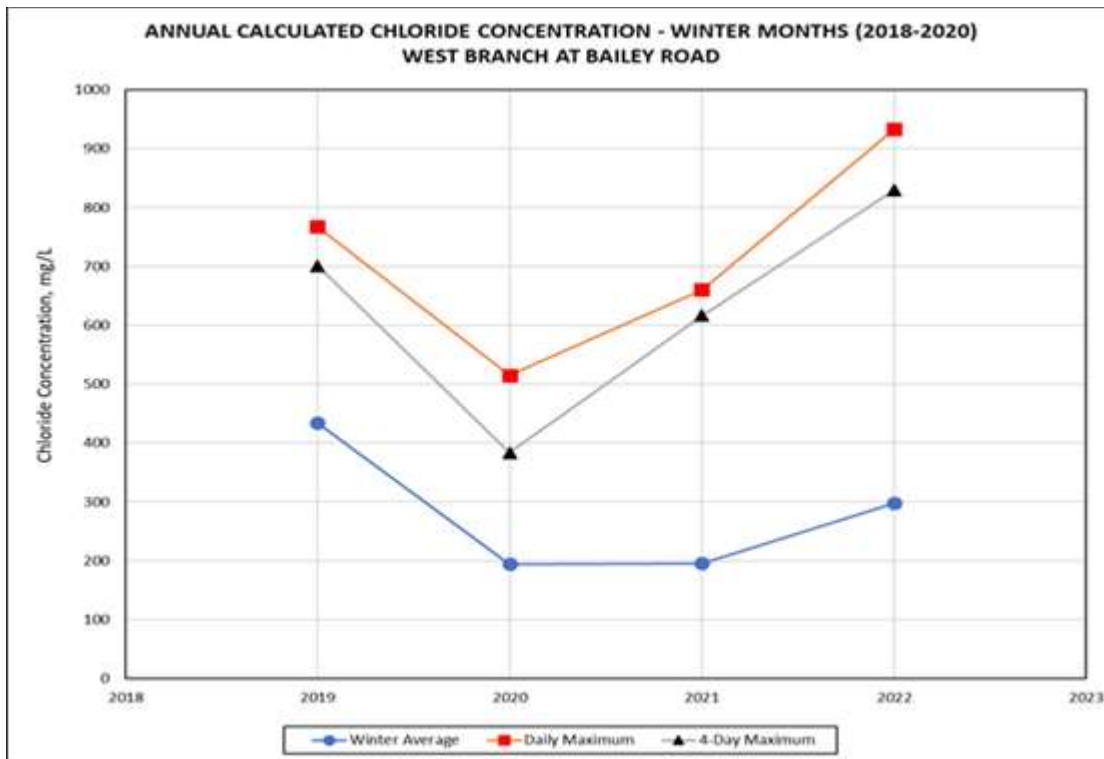


Figure 16. Calculated Chloride Concentrations - Winter Months (2018-2022) for the West Branch DuPage River at Bailey Road



Chapter 3 Nutrient Implementation Plan

The Special Conditions 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 following section summarizes the DRSCW and LDRWC work on the studies in 2022-2023.

3.1 IPS Model/Project Identification Study

- Special Conditions Listed Completion Date – Complete
- Status – Staff is still amending final report and database for release. The methodology, results, database, and a user manual all exist in draft final form and are under review. It is expected the final documentation will be completed in early 2023.

The IPS Model/Project Identification Study is a collaboration between the DRSCW, LDRWC, Des Plaines River Watershed Workgroup (DRWW), North Branch Watershed Workgroup (NBWW), Lower Des Plaines River Watershed Group (LDWG), and Midwest Biodiversity Institute (MBI).

3.1.1 Background on the IPS Model

The development of the IPS was completed in 2018. The 2019 – 2021 Annual Reports provide detailed descriptions on the IPS Model's inputs, set-up, and outputs.

3.1.2. Next Steps in IPS Modeling

The consortium of watershed workgroups is currently completing the following steps:

- Continue reviewing and testing the Power BI database and interface
- Review of nutrient outputs and thresholds with members and IEPA
- Finalize reviewing the results and editing the user manual and model narrative
- Incorporating final results into ongoing programs (NIP, physical projects, permit planning)
- Final review of the updated list of priority projects

The results of these efforts will be included in the Nutrient Implementation Plan due to the IEPA on December 31, 2023.

3.2 QUAL2Kw Updated for East Branch and Salt Creek

- Special Conditions Listed Completion Date – December 2023

- Status – On-going. All models have been calibrated and validated. Additionally, sensitivity analysis has been performed on all four (4) models. Model scenario runs are on-going.

The DRSCW originally budgeted \$183,000 for this effort. Additionally, the LDRWC budgeted \$68,000 for this effort. In 2022, the DRSCW authorized two (2) contract extensions totaling \$30,000 bringing the total project budget to \$281,000. The additional monies will be utilized for additional scenario analysis. All contract work is anticipated to be completed by October 31, 2023. Note: The Special Conditions Permit language only requires the update of the existing QUAL2K models for Salt Creek and the East Branch DuPage River. The DRSCW and LDRWC have decided to pursue similar models for the West Branch DuPage River and Lower DuPage River to assist with the development of the NIP.

3.2.1. Data Collection

3.2.1.1. *Continuous Dissolved Oxygen (DO) Sonde Network*

In 2022-23, the DRSCW gathered continuous DO data via water quality sondes at four (4) sites on Salt Creek, five (5) sites on the East Branch DuPage River, and five (5) sites on the West Branch DuPage River that will be utilized in the calibration and verification of the updated QUAL2Kw models. The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) also monitors one (1) additional locations on Salt Creek. Additionally, the LDWRC maintained a sonde network of five (5) sondes on the Lower DuPage River. All sondes are deployed from May through October and collected DO, temperature, conductivity, and pH on an hourly basis.

In the winter of 2022-23, the DRSCW and LDWRC extended the continuous DO monitoring to year round monitoring at all sites where the sonde is placed in a casing that is bridge-mounted. This includes two (2) sites on each of the four mainstem rivers: Salt Creek, East Branch DuPage River, West Branch DuPage River, and Lower DuPage River.

3.2.1.2. *Expanded Dissolved Oxygen Monitoring Program*

In 2019, the DRSCW and LDWRC began their expanded DO Monitoring Program as a means to collect additional data to support the calibration/validation of the QUAL2Kw models and to support the development of the NIP. This program is coordinated with the Bioassessment Program (see Table 8 for schedule). As no bioassessment sampling was completed in the Summer of 2022, no Expanded DO sampling was completed in 2022.

Details on the Expanded DO Monitoring Program, including the sampling methodology and parameters sampled, were included in the 2021 Annual Report. The results of the Expanded DO monitoring program will be included in the Nutrient Implementation Plan due to the IEPA on December 31, 2023.

Table 8. Schedule for Expanded DO Monitoring

Basin	Year of Expanded DO Monitoring
East Branch DuPage River	2019
West Branch DuPage River	2020
Salt Creek	2021
Lower DuPage River	2021

3.2.2. QUAL2Kw Modeling

In November 2019, the DRSCW and LDRWC entered into a contract with Tetra Tech to update the existing QUAL2K models for the East Branch DuPage River and Salt Creek and to prepare water quality models for the West Branch DuPage River and the Lower DuPage River. The water quality model selected for all four (4) watersheds was QUAL2Kw. The suite of QUAL models (most recently QUAL2K and QUAL2Kw) is a well-established modeling framework that is appropriate for steady-state (with diel variability) representation of critical condition DO and algal responses in flowing streams and run-of-river impoundments. The QUAL2Kw model improves upon the QUAL2K model in several ways, such as including hyporheic and surface transient storage zones and kinetics, variable options related to simulating sediment diagenesis, enhanced phytoplankton and bottom algae simulation and parameterization, options for a continuous dynamic modeling periods, and the built-in feature for automatic calibration using an algorithm for parameter optimization 1. However, unlike QUAL2K, QUAL2Kw does not allow for multiple headwaters or branching. Transitioning an existing steady state QUAL2K model into the dynamic continuous QUAL2Kw environment would allow for more accurate simulation of existing conditions throughout the DuPage River and Salt Creek watersheds.

Task 1: Review of Existing and Identification of Data Needs

Task 1 was completed for all four (4) watersheds in 2020. The 2020 Annual Report includes a summary of the findings of Task 1.

Task 2A: Model Re-Calibration/Re-Validation for Salt Creek and East Branch DuPage River

Task 2A was completed for the Salt Creek and East Branch DuPage River QUAL2Kw models in 2020. The 2020 Annual Report includes a summary of the calibration and validation of these two (2) models. The final QUAL2Kw Modeling Reports for both watersheds can be found at <https://drscw.org/activities/project-identification-and-prioritization-system/>.

Task 2B: Model Calibration/Validation for the West Branch DuPage River and Lower DuPage River

Task 2B was completed for the West Branch DuPage River and Lower DuPage River QUAL2Kw models in 2021. The final QUAL2Kw Modeling Reports for both watersheds can be found at <https://drscw.org/activities/project-identification-and-prioritization-system/>.

Task 3: Sensitivity Analysis

Task 3 was completed for the Salt Creek and East Branch DuPage River QUAL2Kw models in 2020 and the West Branch DuPage River and Lower DuPage River QUAL2Kw models in 2021. Details on the sensitivity analysis for each of the models can be found in the final QUAL2K Modeling Reports at <https://drscw.org/activities/project-identification-and-prioritization-system/>.

Task 4: Model Scenarios

Scenarios analysis is ongoing. Details on the scenario analysis as well as results will be included in the Nutrient Implementation Plan due to the IEPA on December 31, 2023.

3.3 NPS Phosphorus Feasibility Analysis

- Special Conditions Listed Completion Date – December 31, 2021
- Status – Complete. The NPS Phosphorus Reduction Feasibility Analysis Report was submitted to the IEPA on December 24, 2021.

3.3.1. Consultant Roundtable

Details on the 2018 Consultant Roundtable were included in the 2019 Annual Report.

3.3.2. Evaluation of Leaf Removal as a Means to Reduce Nutrient Concentrations and Loads in Urban Stormwater (USGS)

Details on the work conducted by William Selbig with the United States Geological Survey (USGS) and sponsored by the DRSCW were included in the 2019 Annual Report.

3.3.3. NPS Phosphorus Reduction Feasibility Analysis Report

Details on the NPS Phosphorus Reduction Feasibility Analysis Report were included in the 2021 Annual Report. The NPS Phosphorus Reduction Feasibility Analysis Report can be found at <https://drscw.org/activities/project-identification-and-prioritization-system/>.

3.4 Development of a Basin Wide Nutrient Trading Program

The development of a basin wide nutrient trading program for the DRSCW and LDRWC watersheds has been suspended indefinitely. Details on all work efforts on the development of a basin wide nutrient trading program have been included in the 2017-2021 Annual Reports.

3.5 NIP Related Items

3.5.1 Chlorophyll a Sampling

The DRSCW bioassessment program began in 2007 with sampling in the West Branch DuPage River, East Branch DuPage River and Salt Creek watersheds. From 2006-2016, each watershed was sampled on a 3-year rotation beginning with the West Branch DuPage River watershed in 2006. Beginning in 2017, the watersheds will be sampled in a 4-year rotation to allow time for

the report writing and program assessment. The LDRWC began in 2012 and is sampled every 3-years.

The DRSCW and LDRWC bioassessment program utilizes standardized biological, chemical, and physical monitoring and assessment techniques employed to meet three major objectives:

- 1) determine the extent to which biological assemblages are impaired (using IEPA guidelines)
- 2) determine the categorical stressors and sources that are associated with those impairments; and
- 3) add to the broader databases for the DuPage River and Salt Creek watersheds to track and understand changes through time in response to abatement actions or other influences

The data collected as part of the bioassessment is processed, evaluated, and synthesized as a biological and water quality assessment of aquatic life use status. The assessments are directly comparable to previously conducted bioassessments such that trends in status can be examined and causes and sources of impairment can be confirmed, amended, or removed. A final report is prepared following each bioassessment and contains a summary of major findings and recommendations for future monitoring, follow-up investigations, and any immediate actions that are needed to resolve readily diagnosed impairments. The bioassessment reports are posted on the DRSCW website at <https://drscw.org/activities/bioassessment/> . Data obtained from the bioassessments are a key source of data for all NIP projects discussed in Chapter 3.

In 2019, the DRSCW expanded its chemical monitoring to include sestonic chlorophyll a sampling beginning with the East Branch DuPage River in 2019. The West Branch DuPage River was sampled in 2020. Salt Creek and the Lower DuPage River watersheds were sampled in 2021. Sampling of sestonic chlorophyll a will continue to be included in all future bioassessment sampling efforts.

ATTACHMENT 1

DRSCW Special Condition

DuPage/Salt Creek Special Condition XX.

1. 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.

2. The Permittee shall ensure that the following projects and activities set out in the DRSCW Implementation Plan (April 16, 2015), are completed (either by the permittee or through the DRSCW) by the schedule 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	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
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

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. 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. 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 to prepare a single annual progress report that is common among DRSCW 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 to prepare a single annual progress report that is common among DRSCW 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 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 watersheds, providing for reallocation of allowed phosphorus loadings between two or more POTWs in the DRSCW 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 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 permittees. The NIP shall be submitted to the Agency by December 31, 2023.

ATTACHMENT 2

LDRWC Special Conditions

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 119 th 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.