2020 DuPage River Salt Creek Workgroup Implementation Plan

DRSCW Special Condition Proposed Extension 1

January 2021

Spring Brook Phase 2 Dam Removal and Stream Restoration

Chlorides and Winter Management

Rendering of the Removal of Graue Mill Dam

DuPage River Salt Creek Workgroup

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1. Background

The DuPage River Salt Creek Workgroup (DRSCW) and the Lower DuPage River Watershed Coalition (LDRWC) are non-profit organizations made up of publicly owned treatment works (POTWs), MS4 communities, citizen advocacy groups, and professional firms focused on meeting Clean Water Act (CWA) goals in the basins of Salt Creek and the DuPage River (see Maps 1 &2). Their primary objective is attainment of the designated use for aquatic life.

The organizations are funded by membership dues from local government agencies, based on POTW design average flow and their drainage area within the watersheds. These funds are used to conduct intensive monitoring and analyses (M&A) which the groups rely on to identify efficient managerial interventions. Following the acceptance of the special conditions in 2015, the groups were able to allocate financial resources to implementing and assessing projects designed to realize these managerial interventions. These projects are identified and evaluated using an adaptive management approach informed by the organizations' Identification and Prioritization System (IPS) Model. See Figure 1.

The DRSCW's adaptive management approach focuses on high resolution, comprehensive monitoring of chemical, biological, and physical characteristics of the watersheds on a rotating basis. This monitoring provides the data needed to execute the 'Plan-Do-Check-Act' methodology inherent to adaptive management. To inform this process, the groups employ their Identification and Prioritization System Model (which borrows elements from the USEPA's CADDIS system).

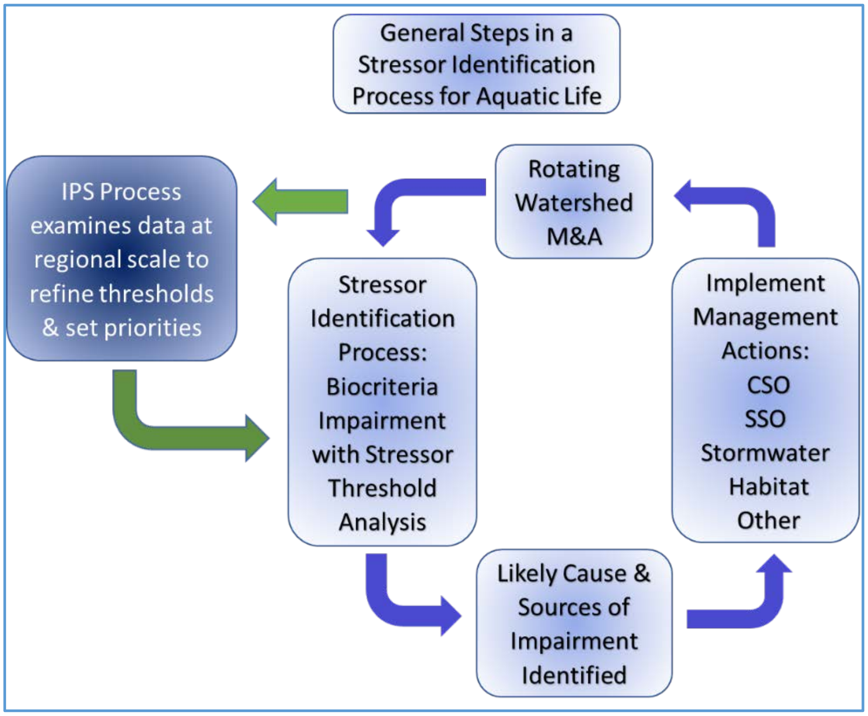


Figure 1. Integrating the IPS process with the 'Plan-Do-Check-Act' methodology of adaptive management. The system is used by the watershed groups to identify stressors at the watershed scale and then plan, implement and evaluate managerial interventions aimed at alleviating them.

The 2015 condition used the methodology detailed above to demonstrate to regulatory partners that point source loading offered an insufficient explanation for the inability of local streams to support aquatic life and meet water quality standards/targets. Based on the empirical evidence, physical anthropomorphic modifications to stream corridors and nonpoint source pollution provided much more compelling explanations. The organizations proposed implementing an adaptive management plan aimed at improving aquatic life in return for an extended compliance period on meeting permit phosphorous targets. The projects included in the adaptive management plan were set out in the 2015 NPDES permit which covered two permit cycles with members to meet the phosphorous removal targets of 1 mg/l monthly average at the end of the second permit cycle (Attachment 2).

2. Evaluating Implemented Projects

To date, two of the eight physical projects listed in the 2015 permit have been fully implemented. Currently, project impact monitoring data is available for one of these (Oak Meadows Dam removal and stream restoration completed 2016). The Spring Brook dam removal and stream restoration Phase II was completed in 2020 and post project impact monitoring will commence in 2021. A detailed report on all of the projects can be found at https://drscw.org/activities/project-identification-and-prioritization-system/ (DRSCW Special Conditions annual report).

Three years of intensive monitoring are available at Oak Meadows. The projections and the observed results are summarized in Table 1.

Project objectives (from 2015 Implementation Plan) based on 2 monitoring sites	Project Results (mean for 4 intensive monitoring sites in 2019)
Raise QHEI from 46.5 to >70.0	Mean QHEI increased from 57.25 to 71.25
Raise mIBI from 21 to > 35	Mean mIBI increased from 23.6 in 2015 to 40.85
Raise fIBI from 19 to 25*	Mean fIBI increased from 14.5 in 2015 to 17

Table 1. Mean pre and post project habitat and IBI scores for the project at Oak Meadows.

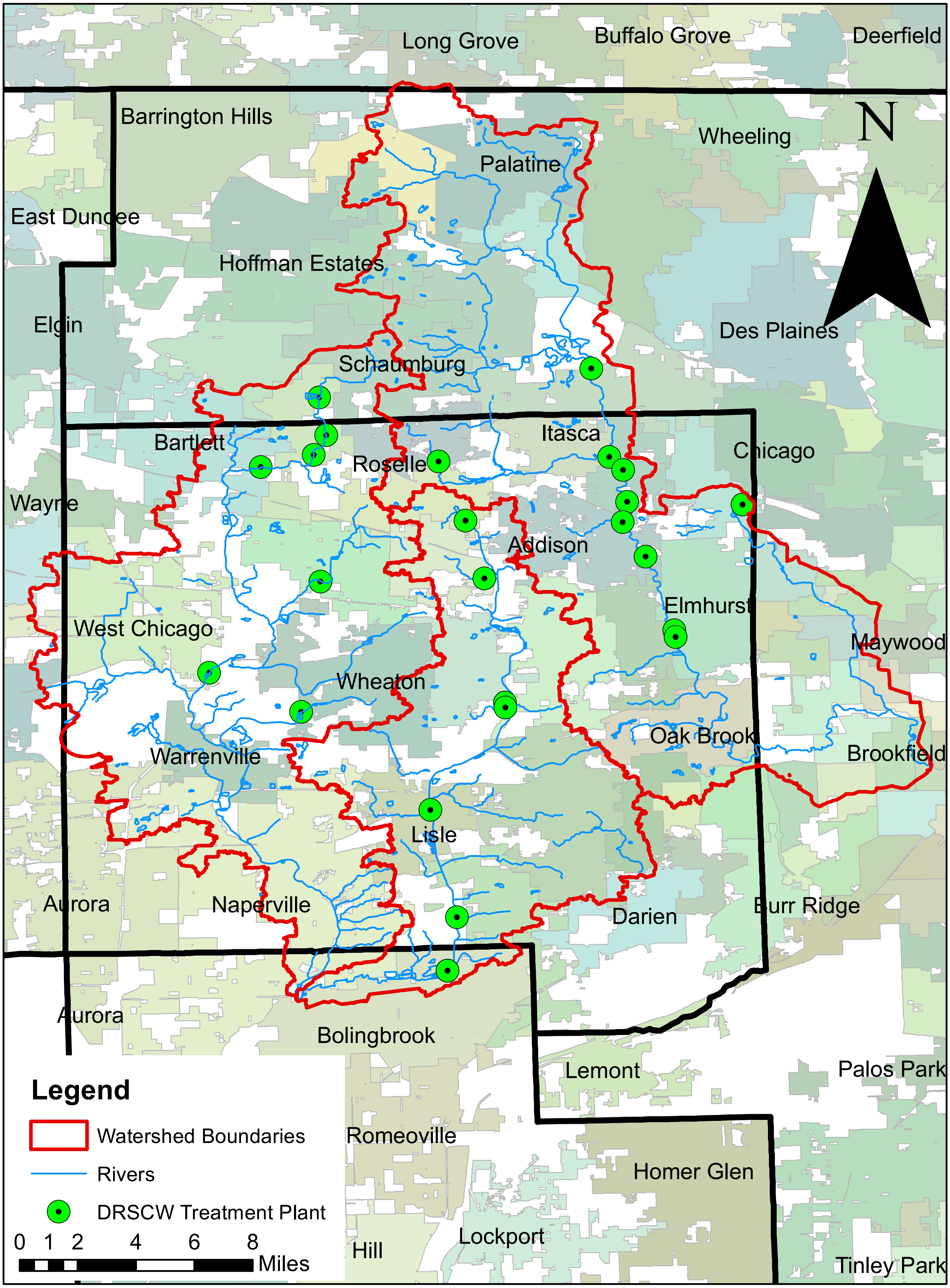
** fish IBI score is dependent on the removal of the dam at Fullersburg Woods scheduled for 2022.*

Biological and habitat data from the previous watershed surveys conducted by Midwest Biodiversity Institute (MBI) in Salt Creek prior to 2016 were used as the pre-restoration condition baseline. Post-restoration biological and habitat sampling added two new sites

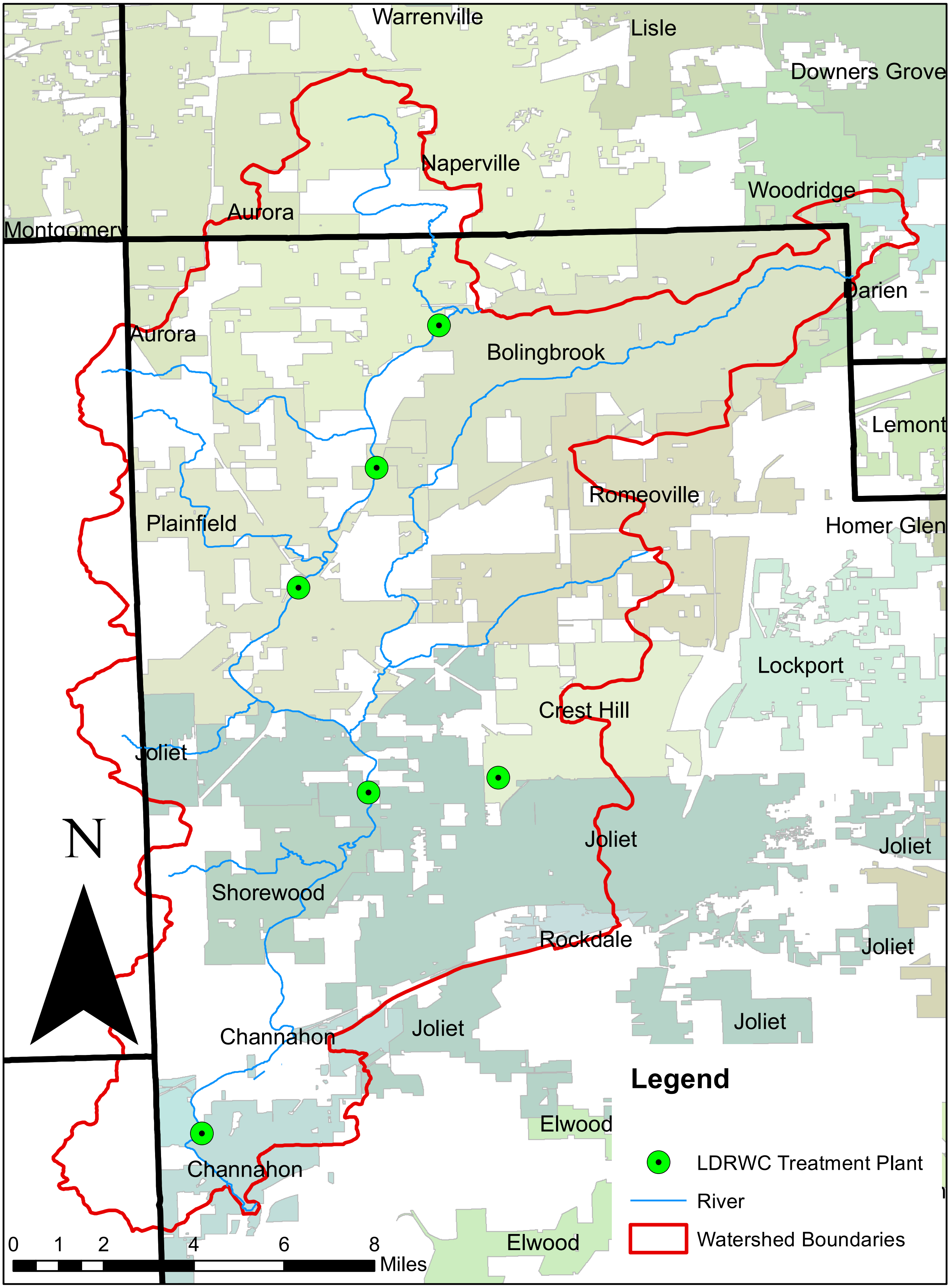
IPS AND ADAPTIVE MANAGEMENT

Monitoring and analysis provides empirical insights into the highest priority stressors affecting stream health in order to identify projects or initiatives with the greatest potential to attain stream use goals. Monitoring also provides the feedback needed to properly assess the impacts of stream restoration projects and water quality initiatives to better formulate future activities.

In the analysis phase, within/using the IPS Model, a large number of variables (“dimensions”) are examined and benchmarks assigned based on their measured association with sensitive aquatic species/taxa and aquatic life assemblage data (i.e., Fish IBI, mIBI). Many of these parameters can be highly correlated (“multicollinearity”) with one another and a combination of weight-of-evidence approaches and certain statistical approaches (e.g., classification and regression tree) can be used to help identify the stressors most likely to contribute causally to the impairment and threat. This information can be used to adjust measures of restorability, susceptibility, and threat and to inform selection of best management practices (BMPs) to treat observed impairments. A more detailed summary of the updated IPS Model is included in Attachment 1.



Map 1. Watersheds of the (from left to right) West Branch DuPage River, East Branch DuPage River and Salt Creek



Map 2. Watershed of the Lower DuPage River

within the project's footprint beginning in late August 2017 and continuing in 2018 and 2019 to assess project effectiveness. In total, the post-restoration assessment included four biological monitoring sites, with a fifth site located upstream at Lionwood Park (SC40) serving as an upstream control site that is typical of Salt Creek water quality and habitat and representative of pre-restoration water quality conditions.

Habitat scores at the Oak Meadows Project Site were mostly fair during the pre-construction surveys (2007-2014) at SC34 and SC35 (SC35A and SC35B were not yet established). Silt or muck substrates, fair to poor development, and a stream channel recovering from channelization were among the 6-8 modified attributes consistently recorded at each site through 2014. The stream banks were lined with A-jacks and steel sheet piling and the riparian corridor was narrow and detached from Salt Creek. The resulting poor instream habitat lacked root wads and root mats, coarse substrates, and riffles such that only 3-5 good attributes were recorded. The pre-restoration Oak Meadows project area had elevated ratios of modified:good habitat attributes at each site which included at least one high and multiple moderate influence modified habitat attributes in 2007-14.

Post-restoration QHEI scores were higher at all four sites in the restoration area, but remained fair at the upstream control site (SC40). Now all four sites within the Preserve at Oak Meadows offer cobble/gravel riffles, deep runs, root wads, boulders and, other than SC35A, good to excellent channel morphology. Fine sediments are no longer the predominant substrates at any of the sites, the constructed riffles have low embeddedness, and the channel has recovered from historic modifications. Post-restoration surveys recorded no high influence modified attributes, fewer moderate influence modified attributes (3-4 down from 6-8), an increased number of good habitat attributes (7 up from 3-5), and lower modified:good habitat ratios each of which is a distinct indication of improved habitat for aquatic life.

Ideally, these efforts were expected to first result in an increase in the diversity and abundance of macroinvertebrate populations associated with the enhanced habitat features. The expectations for fish are presently tempered by comparison given that their ingress to this reach is eliminated by downstream barriers (the Graue Mill and Old Oak Brook Dams at Fullersburg Woods) which was further documented in 2019. However, the 2019 survey yielded the highest mIBI scores ever recorded in the Oak Meadows project area and a signal of incremental improvement. The historically limited fish assemblage in Salt Creek plus remaining downstream barriers have blunted the potential improvements in the post-restoration fish assemblage for this project which is why the focus for the interim is on macroinvertebrate assemblage attributes.

Indicators of incremental improvement in the macroinvertebrate assemblage included using the occurrence of rheophilic taxa (i.e., taxa that prefer current) and/or taxa that prefer coarse, erosional substrates. Twenty-one (21) rheophilic taxa were identified and used to evaluate trends. The majority of these taxa were found only during post-project sampling and at the more riverine SC40 control site. Since the dam removal and habitat enhancement efforts were completed in 2016, the presence of rheophilic taxa has increased substantially at the affected Salt Creek sites. Prior to construction, only 8 of the 21 rheophilic taxa were collected from project area sites and two (Stenacron and Nectopsyche diarina) were exclusive to the formerly impounded sites. Following construction, taxa richness within the group averaged nearly 3 times the number found prior to construction (mean 7.8 vs. 2.75). In addition, the highest numbers at each monitoring site were found post-construction. The net effect is that 13 new rheophilic taxa have appeared post-construction in the project area. Total taxa richness at the monitoring sites was also the highest following construction when compared to pre-dam removal. The highest mIBI scores for each monitoring site were also found during the most recent sampling in 2019. Project area scores now routinely meet or exceed the SC40 control and meet the Illinois mIBI biocriterion at all except the SC35 location (this stretch did not have a riffle in it).

The post-remediation increases in the abundance of rheophilic macroinvertebrate taxa in Salt Creek naturally corresponds with improved macroinvertebrate assemblage performance as measured by the mIBI. These positive indicators increased following dam removal and habitat enhancement. While the trend is not unexpected, it demonstrates the positive relationship between improved stream quality (as reflected by higher mIBI scores) and the physical attributes associated with free-flowing habitats such as shallower depths, increased current speed and habitat diversity, erosional (vs. depositional) substrate types and reduced siltation. It also points to the potential successes that can be achieved by carefully targeted and designed managerial interventions.

3. 2015 (Current) Permit and Project Status (Attachment 2)

The current Special Condition permit was accepted by all parties in 2015 and runs for two permit cycles. The first of the two permit cycles is currently complete for a number of agencies with one more 5-year permit cycle yet to go (see Attachment 3). The permit gives participating POTWs 10 years from the date of issuance to meet a limit of 1 mg/l monthly if they are using Chemical Phosphorous Removal (CP) and 11 years if they are using Biological Phosphorous Removal (BPR). Participating agencies were tasked with funding and implementing the IPS Adaptive Management plan list of priority projects (Tables 2 & 3 below).

Project Name	**Status**
Oak Meadows Dam removal and stream restoration	Complete
Spring Brook phase II Dam removal and stream restoration	Complete
Fawell Dam Fish Passage	A proposal to mount a fish ramp in the culvert is with the dam's owner for approval. Construction is scheduled for 2021
Fullersburg Woods / Graue Mill Dam removal and stream restoration	The dam's owner has signed a license agreement with the DRSCW to allow execution of the Master Plan to remove the dam. Construction is scheduled to begin in 2022
Lower East Branch	In planning
West Branch	In development
Hammel Woods Dam	Construction is scheduled for Winter/Spring 2021.
DuPage Stream Enhancement south of 119^{th} Street	In planning
Nutrient Implementation Plan (NIP including QUAL 2w modelling, trading, and non-point source feasibility analysis)	Under development due December 2023

Table 2. IPS Adaptive Management plan list of priority projects and current status

Year	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26
Permit Cycle	Permit 1					Permit 2					Permit 3
Current 2015 Permit Assessment	✓	✓	✓	✓	✓	✓	✓	✓			TP Limit CP

Table 3. Median timeline for 2015 permit. Under the implementation of the permit, assessments are to be paid through 22-23 (✓)with 21-21 & 22-23 still due (✓). Plant upgrades are scheduled to occur in 23-25. Individual permits' timelines may vary depending on the date of issuance of their permit. A table showing the individual timeline by plant is included as Attachment 3.

3.1 Nutrient Implementation Plan

The Nutrient Development Plan (NIP) is the product to a number of parallel studies run by the DRSCW.

- Identification and Prioritization System Tool – A 2017-2020 update of the 2012 CADDIS-based analysis of the statistical correlations between biological communities and a wide array of watershed stressors. Study developed area specific thresholds and probability plots for stressors (including nutrients), specific remedial targets at site, reach and watershed levels, and a variety of methods to prioritize managerial interventions. The IPS may be used to inform end points for the NIP.
- QUAL 2w – Expanded monitoring including the collection of benthic algae and detailed cross-section and flow information is underway across the program area. The data will be used to update the DO models for Salt Creek and East Branch, and build the models for the West Branch and Lower DuPage. The model will be used to identify problems and test managerial actions before they are accepted into the NIP.
- Trading – Marginal costs of abatement for TP have been developed for all POTWs in the program area. This may allow the NIP to recommend an efficient allocation of TP abatement between POTWs, and between TP reduction and in-stream improvements.
- Non-point Source Feasibility Analysis - A program-wide analysis of canopy cover, leaf litter management practices and street sweeping is underway.

4. 2020 Addendum (Proposed) DRSCW Special Condition Extension 1 (Attachment 4):

The 2020 Proposed Special Condition Extension 1 would allow participating agencies to modify their upcoming permit to extend the schedule to implement TP removal to 1 mg/l monthly average for a further 3 years. Participating agencies would fund and implement phase 2 of the IPS plan. Agencies that decide not to participate would continue on the current 2015 permit for the duration and adopt the 1 mg/l monthly average TP permit limit on the schedule set out in the preceding paragraph. This is summarized in Table 4 below. Assessment by POTW and in aggregate is shown in Attachment 5.

Members electing to participate in the Proposed Special Condition Extension 1 would agree to implement a second phase of physical projects. These projects would build on the projects implemented in Phase 1 (Attachment 4). They would include the expansion of the Lower East Branch Project and the Fullersburg Woods project along with a further intervention on the West Branch. These projects have not been fully detailed at this time as negotiations with landowners are ongoing.

If a chosen project is determined to be non- executable, it would be replaced with a similar project within the same watershed based on the IPS Model output.

Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30
Permit Cycle	Permit 2					Permit 3				
Current 2015 Permit Assessment	✓	✓	✓			TP Limit CP	TP Limit BPR			
Proposed Permit Assessment	✓	✓	✓	✓	✓	✓			TP Limit CP	TP Limit BPR

Table 4. Median proposed condition. Proposed assessment payments are shown in in green (✓)

Funding would be used to implement projects selected as priority by the Identification and Prioritization System (IPS) Model. Due to ongoing negotiations with the property owners the projects will be described generally:

A) Approximately quarter of a mile of Klein Creek will be naturalized to meet the QHEI targets of the IPS model (project is in negotiation with FPDDC and Carol Stream).

B) An additional quarter to half a mile of East Branch will be added to the Lower East Branch Project (project phase one in original Special Conditions) to meet the QHEI targets of the IPS model.

C) An additional quarter to half a mile Salt Creek will either be added to the Fullersburg Dam removal project (there is a second smaller dam upstream of the original phase one phase 1) or, if the owner of the secondary dam is not amenable to the project, a new project developed on the river south of the Fullersburg Project. Project will be designed to meet the QHEI targets of the IPS model.

If any of the above projects proved to be unachievable another project will be generated by the IPS model and proposed to the IEPA for approval as a replacement.

5. Necessity of Continuing the Special Conditions

The need to maximize Improvements in Aquatic Life (IPS Rankings)

The central objective of the Special Conditions is to maximize improvements in aquatic life. This is necessary to reach long-term compliance and to rationalize the regulated entities' expenditures. The major addressable stressor on aquatic life in the target watersheds is habitat, as identified by both the original IPS model and the 2020 update. In the model both QHEI and its component pieces were identified as principle major limiter to aquatic life in the program area. The predicted and then-observed success of the Oak Meadows Project demonstrates the model's accuracy and ability to guide interventions at a watershed (i.e. reach prioritization) and site (i.e. managerial action such as riffle creation) levels. Projects in both the pilot phase and the proposed stage were principally selected by using the restorability score generated by IPS. This score is an aggregate of the sites' deviation from the aquatic life threshold, proximity to open space, and the number of stressors present at the sites. Both the strong correlation to QHEI and its components and the demonstrated success of projects to date assure the high probability of these projects meeting their ecological improvement goals.

As in our pilot phase project list, projects added to the condition by the proposed amendment have been chosen to maximize aquatic life improvement. In addition to directly addressing the principle stressor such projects tackle multiple pollutants at once (physical form, pollutants caused by eroding banks, increase in shading limiting algae lifecycles).

NIP (Nutrient Implementation Plan)

The group's NIP is due in December 2023. The NIP will include recommendations on treatment plant management including possible trading, non-point source nutrient controls, and landscape-level interventions. The groups are examining the possibility of negotiating to forgo interim levels of additional TP limits in exchange for implementing specific limits which would result in meeting the watershed water quality target developed by the 2020 IPS model update. Requiring the majority of plants move to 1 mg/l by 2025/2026 (Column 6 of attachment 3), as required by our current permit, may compromise the possibility of implementing an optimized plan using a watershed-specific target projects/activities and a trading system based on varying marginal costs of treatment.

The proposed amendment will create an interim condition that will allow members to organize themselves optimally to implement the most effective and efficient long term plan for implementing TP removal at the POTWs and improving nutrient related water quality issues in the watershed.

Cost for Regulated Entities

The cost of the proposal to individual POTWs is shown in Attachment 5 (this amount was negotiated based on the costs of phase one, the financial needs of the target projects, and the expectation of participants and the groups' environmental partners). The method allows members to select to either stay on the current permit or to move to the proposed condition. This is done mainly by comparing the annual costs of treatment for TP to the costs of paying the additional annual assessment to provide an incentive to self-fund the implementation of the Special Condition projects. If a POTW ascertains that the costs of treatment are lower than the costs of the assessment, it would likely opt to stay in the current condition and meet the TP effluent limit on schedule. If the POTW ascertains that the costs of treatment are higher than the costs of the assessment, it would likely opt for adoption of the proposed condition. POTWs might also chose to remain in the condition even if the costs are the same or slightly higher based on the proven ability of the targeted projects to elevate long-term aquatic life scores in the watersheds.

A minimum level of participation is needed to make sure the groups have sufficient funds to implement viable projects.   A threshold of 2.8 million dollars has been set for the viability of the proposed Special Condition Extension 1.

IPS 2020 Model / Identification and Prioritization Model (IPS)

Background

The objective of this project is to update the DRSCW's Integrated Prioritization System model (IPS) and develop a new list of prioritized projects for both the DRSCW and LDRWC watersheds. The original IPS Model was developed by the DRSCW with its consultant (MBI) in 2010.

The updated IPS Model geographically covers the watersheds of Northeastern Illinois including the Upper Des Plaines River and tributaries (DuPage River, Salt Creek) in all or parts of DuPage, Cook, Will, and Lake Counties (Figure 1). Data from outlying watersheds including the Kishwaukee River, Kankakee River, and the Fox River were used in order to expand the stressor and response gradients. Qualifying data from more than 650 IEPA/IDNR, DRSCW, LDRWC, and the Des Plaines River Watershed Workgroup (DRWW) sites draining <350 sq. mi. were used in the analyses. This is a significant expansion over the original IPS 120 sites. A future effort will include sites >350 sq. mi.

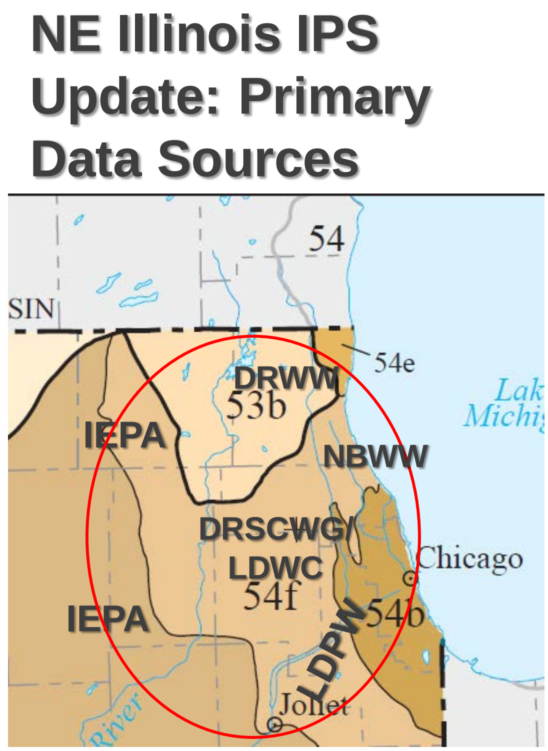


***Figure 1**. The Northeastern Illinois IPS study area showing level IV subregions and participating watershed groups and entities from which data was obtained.*

Paired data supplied by these organizations included the dependent variables of fish, macro-invertebrates, habitat, and stressor variables including water quality and land use data (Table 1). This includes such data as road density, canopy cover, land cover and land use types which were used at various landscape scales.

What is the 2020 IPS?

The IPS is a framework that merges high resolution monitoring data and assessment results with water quality management goals and objectives in order to guide decision-making at regional and local watershed scales. The model is designed to provide accurate quantitative indicators (biological response measures and chemical, habitat and land use stressor measures) and data-driven tools to Watershed groups to guide and inform their restoration and protection efforts. Unlike modeling efforts that tend to focus on a very few parameters, the IPS examines many stressor variables including habitat and land use variables, thus it provides a comprehensive view of the factors potentially limiting aquatic life.

Table 1. IPS Stressor Categories	
Physical Habitat	QHEI and metrics, HydroQHEI, watershed scale habitat
Nutrients	TP, nitrate, Max. DO, DO Flux
Organic Enrichment	DO, BOD, total ammonia, TKN
Dissolved Materials	Chloride, sulfate, conductivity, TDS
Suspended Materials	TSS, VSS, Turbidity
Water Column Toxics	Metals, organics
Sediment Contaminants	PAHs, metals, PCBs
Catchment Landuse	Impervious surface, Developed land uses, road density
Buffer Landuse	Impervious surface, Developed land uses, road density

***Table 1**. Categories of stressor variables with corresponding parameters and indicators used to develop the stress:response relationships as part of the IPS Model development.*

The IPS Model includes analyses about the effects that chemical and physical variables have on the measured and potential condition of the biota and water quality at the site, reach, river, and watershed scales (Figure 2). The data used in the analyses was drawn from high resolution datasets collected at the local watershed scale of resolution (e.g., HUC 10-12). These datasets employed combined geometric (stratified-random) and targeted-intensive pollution surveys. This design was employed to determine the status of aquatic life at the same scale at which pollution sources are being managed within the NE Illinois watersheds. This design supplies the empirical data for resolving WQS attainability issues ahead of determining the extent and severity of WQS impairments. Importantly, compared to spatially less intense sampling designs, it provides data that can also address the influence of cumulative impacts on biological condition.

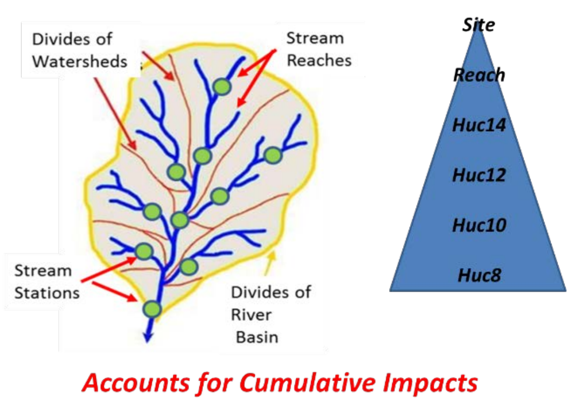


***Figure 2**. The fundamental role of spatial scale in the density and positioning of monitoring sites at the site, reach, and watershed levels for paired biological, physical, and habitat data used in the development of the IPS Model.*

Critically, the datasets for DuPage, Salt Creek, and the Upper Des Plaines consist of standardized "paired data". These data are comprised of biological indicator data (species, taxa, and IBI) that are spatially and temporally congruent with detailed habitat and water chemistry data. This allows for the development of more accurate and complete stressor relationships between the biological (i.e., the response) and the stressor data critical to determining the extent and severity of stream and river impairments and for developing stressor thresholds. Paired data from the IEPA/IDNR was also used to supplement the stressor analysis to increase the breadth of the stressor gradient (e.g., increased high quality sites) at a wider geographical scale.

Like the original IPS, the updated model generates a Restorability Ranking for impaired sites, reaches, and watersheds and relates them to the primary limiting factors associated with impaired biota. This can then be used to design and prioritize where restoration actions are likely to be the most successful and support choosing the most appropriate restoration actions. The updated model also provides guidance on protecting high quality sites, reaches, and watersheds from further degradation. For high quality sites that currently meet or exceed conditions considered to be in attainment, the updated IPS produces a Susceptibility and Threat ranking that can be used to develop protective actions for streams and their watersheds aimed at minimizing and eliminating the impact of increased or new stressors. Thus measurement of biological condition and stressor conditions is used in a consistent and comparable manner that provides measures of restorability, susceptibility and threat (Figure 3).

On projects implemented under the original model pre- and post-project monitoring was used to establish the baseline, clarify stress/response relationships, evaluate and predict impacts, identify restoration actions, and improve the design of future actions based on the empirical testing of the methodology (adaptive management). The outputs provided by the IPS can be used for an array of watershed management applications and programs, regulatory and non-regulatory alike.

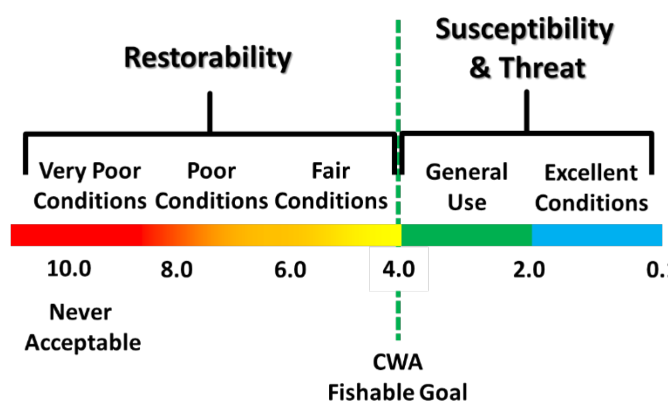


Figure 3. *Schematic diagram of the 0-10 common scale for measuring condition and scaling stressors relative to the Illinois General aquatic life use and a narrative scale of quality and the relationship between restorability, susceptibility and threat.*

The first iteration of the IPS in 2010 was originally supported in Excel, but the inherent data and information storage and calculation demands made it difficult to maintain and also make it readily available to a wide spectrum of users. Without a mapping function and graphical interface, the original IPS was difficult to use. The updated version is housed in Microsoft Power BI. Power BI is a more promising analytics solution that is easy to develop (inward and outward facing dashboards of data, indicators, maps, graphs, photos, etc.) while making the underlying data and information readily available (Figure 4). Users can “drill down” from tools and indicators to the underlying data at the site level. Most importantly Power BI does not limit uses of the data to only the Power BI platform. Power BI allows users to export data and information from visualization tools (e.g., charts, tables, and maps) as summarized or underlying data. Power BI is available as a free desktop version or advanced versions for a fee.

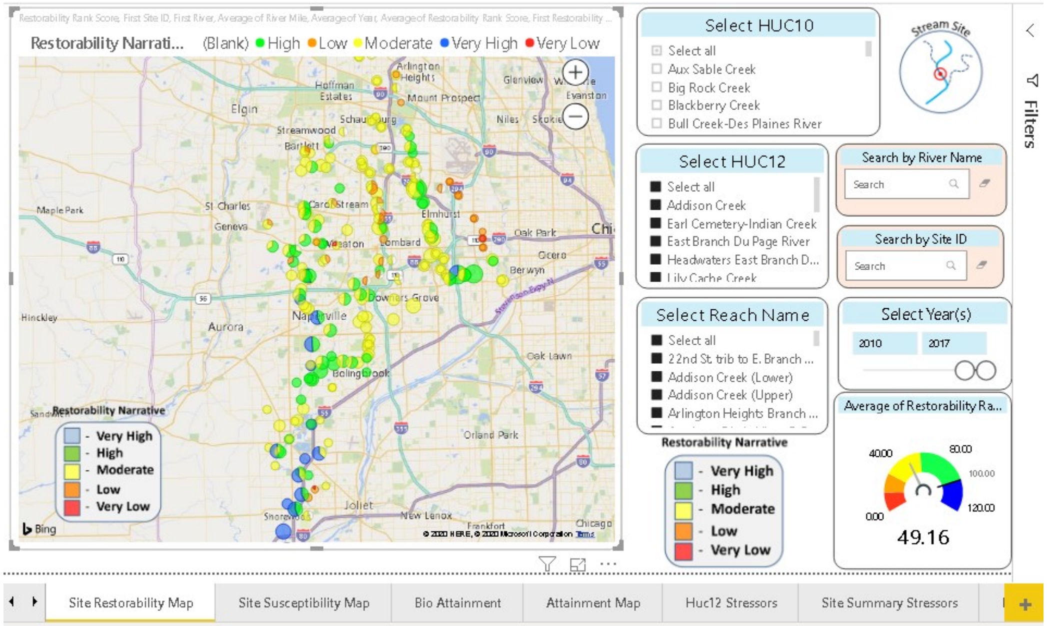


Figure 4. Example page from the NE IL IPS illustrating the use of maps, tables, and charts to provide data for exploration in NE IL.

Key Steps in the IPS Methodology

Building a Comprehensive Watershed Database

The paired datasets from the DRSCW, LDRWC, and DRWW, along with basin assessment datasets from IEPA/IDNR, were used to populate the IPS database. The dataset was complemented with detailed landscape data on canopy coverage, transportation surfaces, imperviousness and land use types. This produces an informative database that can be queried at the watershed, reach, and site-specific scales by various users who are focused on specific water quality management issues. The watershed monitoring supported by the watershed groups is the first step towards and IPS framework (Figure 5) and was initiated first by the DRSCW in 2006 and then followed by the LDRWC in 2012 and DRWW in 2016. Two new groups, the North Branch Chicago River Watershed Workgroup (NBWW) and the Lower Des Plaines

Watershed Workgroup (LDWG) will also be incorporated in to the IPS framework in 2020 and beyond.

Causal Analysis

The initial identification of stressors associated with measured biological impairments relied on the combined use of the Illinois WQS, available regional analyses of stressor thresholds (not from Illinois), and the 2010 IPS for parameters that did not have criteria in the IL WQS. Water quality criteria are typically reliant on laboratory toxicity testing results for a wide enough range of species to develop protective criteria that are usually applied statewide. However, the effects of pollutants can vary by waterbody based on the sensitivity of the species that actually inhabit said waters. Also, water quality criteria either simply do not exist for a wide range of stressors that are included in the IPS analyses or they have become outdated. It is therefore vital to account for the species likely to be resident in categories of waterbodies and effects from unaccounted for stressors to ensure that criteria or thresholds are protective but not exaggerated.

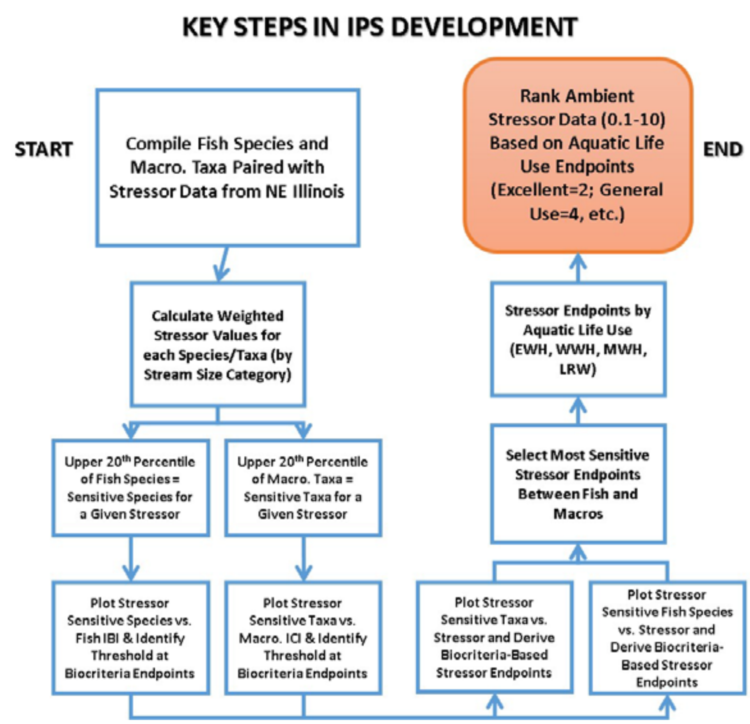


***Figure 5**. The key steps in the development of the IPS that initiate with the development of stressor relationships and indexing them to a common scale linked to narrative quality descriptions (excellent, good, fair, poor, and very poor).*

For many of the parameters that do not have aquatic life criteria (e.g., nutrients, habitat, bedded sediments, ionic strength parameters), application of a National or even statewide benchmark could likewise be either over or under protective of the aquatic resource. These are mostly "naturally occurring" constituents that may have optimum levels at sites, but when elevated (e.g., chloride) or depressed (e.g., habitat) can lead to aquatic life impairments. For such parameters, regionally derived thresholds can better account for differences among stream and river typology (e.g., watershed size, gradient) and provide more robust thresholds than ones derived at too large a spatial scale (e.g., National, statewide) and that might not be appropriate for NE Illinois streams and rivers. The derivation of NE IL IPS thresholds reflects a modernization in linking biological impairments to causes and sources (Figure 5).

Following the identification of an impairment, the model helps to identify the responsible causes and sources. Adequate stressor analyses are important, in part due to the high costs of the traditional POTW/SSO and stormwater remediation solutions and the failure to account for ecological conditions, whose correction can be the underlying key to meeting biological objectives. Rather than a stressor by stressor approach the IPS model uses a weight-of-evidence approach where multiple types of data (e.g., biological responses, water quality criteria or other benchmarks, habitat data, land use, etc.,) are used in a "stressor identification" process (SI) to identify associated causes/sources and their relative contributions to the observed impairment.

The fish IBI (fIBI) and macroinvertebrate IBI (mIBI) are the key integrated multimetric indices that Illinois uses to measure attainment and non-attainment of aquatic life uses. These indices are designed to integrate the effects of all stressors, partly by having individual metrics that may respond along different parts of the stressor gradient or to different categories of stress (habitat, toxics, nutrients, dissolved solids, etc.).

While the fIBI and mIBI have a strong general relationship with aggregate stressors they are not the most discriminating way for gauging the most sensitive assemblage responses to specific stressors. To remedy this the IPS Model first identified suites of stressor sensitive fish species and macroinvertebrate taxa for individual stressors using ambient field data to calculate Weighted Stressor Values (WSVs, i.e., average stressor values weighted by the abundance of taxa or species) as more accurate measures of sensitivity. When ranked these yield Sensitive Species Distributions (SSD) which were, in turn, linked back to the fIBI or mIBI thresholds for each of five narrative categories (Table 2). The relationship between the results of the SSD and linkage back to the fIBI for chloride is illustrated in Figure 6. These thresholds are then used for conducting causal analyses as part of a watershed assessment (Figure 7).

A traditional toxicity-based water quality criterion is assumed to protect ~95 percent of the species in an assemblage. The IPS approach is designed to protect the species needed to support the Illinois General Use for aquatic life use and adding thresholds that are representative of the highest quality sites ("excellent" narrative category) and thresholds that represent increasing departures from the General Use or good threshold. This provides a framework by which both attainment and impairment can be framed beyond a binary "pass-fail" assessment to a tiered approach. Other added advantages of this approach is that it controls for other conditions that commonly occur in the environment (e.g., temperature, other pollutants, etc.) and that many of the parameters most limiting to aquatic life today do not have water quality criteria (e.g., nutrients) or which are non-toxic in their mode of effect (bedded sediments, siltation, habitat, altered flow regime). This approach combines the strength of integrating multimetric indices (fIBI, mIBI) and species/taxa stressor-sensitivity inherent to a species-based SSD approach. It can also deal with the concept of use attainability that can be obscured by a binary framework and an identification of "excellent" or high quality waters that may need greater levels of protection to maintain.

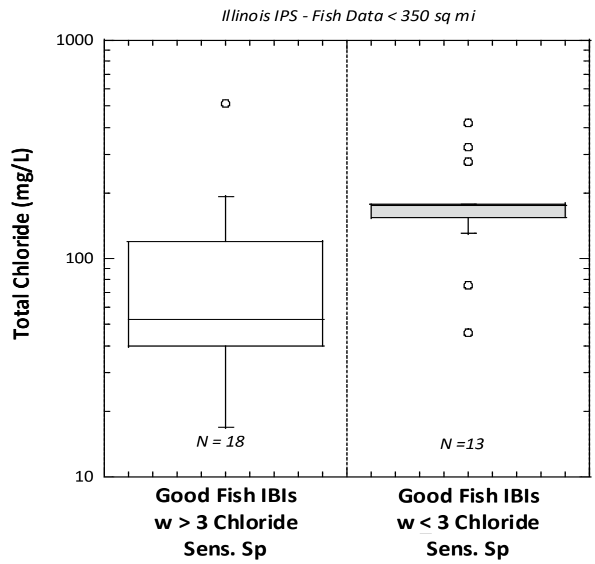


Figure 6*. Box-and-whisker plot showing the relationship between chloride sensitive fish species and the fIBI.*

Least impacted reference conditions were the basis for deriving the IL General Use Fish IBI and Macroinvertebrate IBI thresholds. However least impacted reference sites may include some level of stress so the General Use stressor thresholds were controlled by defining stressor levels at the 75th percentile of the stressor levels at sites that achieve General Use IBI scores ***and*** have greater than the 25th percentile stressor-specific sensitive species/taxa associated with these sites. As was illustrated for chloride (Figure 6) this can account for situations where elevated chlorides may exist at sites with good fIBIs (and likely threaten the fIBI), but limit populations of chloride sensitive fish species. It can therefore offer a "safety factor" beyond the fIBI alone.

Table 2*. Illinois fIBI and mIBI thresholds and ranges for each of the five narrative categories at which stressor thresholds were set using the WSV and stressor sensitive species approach.*

Narrative	fIBI	mIBI
Excellent	$\geq$50	$\geq$73.0
Good (Attains General Use)	41.0-49.9	41.8-72.9
Fair	30.0-40.9	30.0-41.7
Poor	15.1-29.9	15.1-29.9
Very Poor	$\leq$15.0	$\leq$15.0

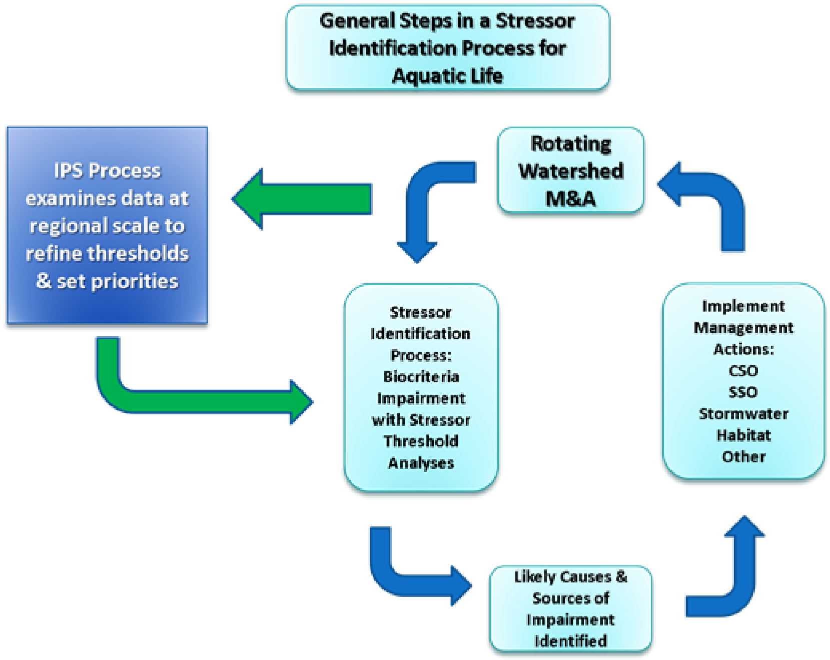


***Figure 7**. The key steps in a stressor identification process for aquatic life based on the implementation of a systematic approach to monitoring and assessment and a rotating watershed approach and its relationship to an IPS framework.*

A key aspect of derivation of IPS thresholds is the ability to distinguish variables likely to be stronger causal stressors from ones that have less serious threshold exceedances and not likely responsible for an observed biological impairment. The IPS model accounted for varying strength of causal effects between stressors by calculating a strength of fit measure (FIT) between stressors and sensitive fish and/or macroinvertebrate taxa and conducting multivariate statistical analyses (random forest models) that provide inferences into the most important causal variables. These analyses were used to weight the IPS model assessment of responsible stressors. The results in the IPS model are designed to support the assignment of causes and sources of stressors at the site, reach, and watershed scales. Identification of sources relies on strong local knowledge that lies with active watershed managers. Additionally, the IPS model will grow more powerful over time as continued monitoring on a rotating watershed cycle provides feedback for the IPS model (Figure 7). Future monitoring efforts in NE IL will also add missing elements such as benthic chlorophyll, continuous D.O., more sediment PAH data in higher quality sites, and new generation pollutants that will allow for the refinement of the stressor analyses. Implementation of habitat restoration and other abatement actions should provide some "un-layering" of complex multiple stressor impacts that may reveal other underlying stressor impacts.

Project Selection

Projects were selected using a composite score from three factors which were applied to each site on a watershed basis:

Restorability Factor – This is a factor based on a number of weighted values such as site IBI , mean IBI (all years surveyed), local and watershed level QHEI, QHEI parameters, ionic strength

<table>
<tr><th>Restorability Factors</th><th>Score</th><th>Weighting Factor (Most Limiting Parameter)</th></tr>
<tr><td>XLocal fIBI</td><td>1-10</td><td>1</td></tr>
<tr><td>XLocal mIBI</td><td>1-10</td><td>1</td></tr>
<tr><td>X% Biological Attainment at Huc12 Levels (Year Range?)</td><td>1-10</td><td>1</td></tr>
<tr><td>XMean Huc12 fIBI</td><td>1-10</td><td>1</td></tr>
<tr><td>XMean Huc12 mIBI</td><td>1-10</td><td>1</td></tr>
<tr><td>XLocal QHEI(Habrank)</td><td>1-10</td><td>1</td></tr>
<tr><td>XHuc12 QHEI</td><td>1-10</td><td>1.5</td></tr>
<tr><td>XChannel State</td><td>1-10</td><td>2</td></tr>
<tr><td>XLand Use</td><td>1-10</td><td rowspan="8">FIT (< 0.10) X 1;
FIT (≥ 0.10 – <0.3) X 0.8
FIT (≥ 0.30 – < 1.0) X 0.6
FIT (≥ 1.00 – < 3.0) X 0.5
FIT (≥ 3.00 – < 10.0) X 0.2
FIT (≥ 10 0) X 0.1</td></tr>
<tr><td>XIonic Strength</td><td>1-10</td></tr>
<tr><td>XPAH Sediment</td><td>1-10</td></tr>
<tr><td>XMetals Sediment</td><td>1-10</td></tr>
<tr><td>XSuspended Sed</td><td>1-10</td></tr>
<tr><td>XNutrients</td><td>1-10</td></tr>
<tr><td>XOrganic Enrichment</td><td>1-10</td></tr>
<tr><td>XMetal Water Column</td><td>1-10</td></tr>
<tr><td>XAmmonia</td><td>1-10</td><td>1</td></tr>
<tr><td>XNo. Very Poor Stressor Categories</td><td># (0.6 FIT weighting or higher)</td><td>3</td></tr>
<tr><td>XNo. Poor Stressor Categories</td><td># (0.6 FIT weighting or higher)</td><td>2</td></tr>
<tr><td>XNo. Fair Stressor Categories</td><td># (0.6 FIT weighting or higher)</td><td>1</td></tr>
</table>

Table 3. *Components of the IL IPS Restorability Ranking Score and weighting factors*

and nutrients.   Each of these was weighted according to its value in the FIT analysis. The parameters and their weighting is shown in table 3.

Open Space- Physical open space proximate to the site was calculated from the 2013 CMAP land-use layer. This included public and private open space including non-conservation coded vacant land.   This was used as a proxy for both room for buffers and meanders as well as access for construction teams.   This was expressed as a percentage of a 400,000 square foot envelope around the sample point.   This was viewed both as a single score and multiplied by the restorability score to create a priority score.

QHEI – All Sites were then graded according to their QHEI scores. QHEI and its component pieces along with impervious surface within 500m of the sample point were the best correlate with aquatic life. QHEI and its component items (embeddedness, QHEI, substrate, QHEI Good Attributes, channel, silt, riffle/pool, cover and buffer, listed in order of descending importance). These component habitat items were normalized in a score of 1-10 with a 1-2 signifying a "natural condition" equivalent to a reference (necessary for supporting the IBI necessary for attaining General use or higher), and 10 signifying the most modified condition.

After scoring, priority sites were cross-referenced with existing DRSCW projects and projects with potential funding partners. Table 4 and Figure 7 show the selected projects. Table 5 shows the rehabilitation actions selected by the model for each draft prioritized site.

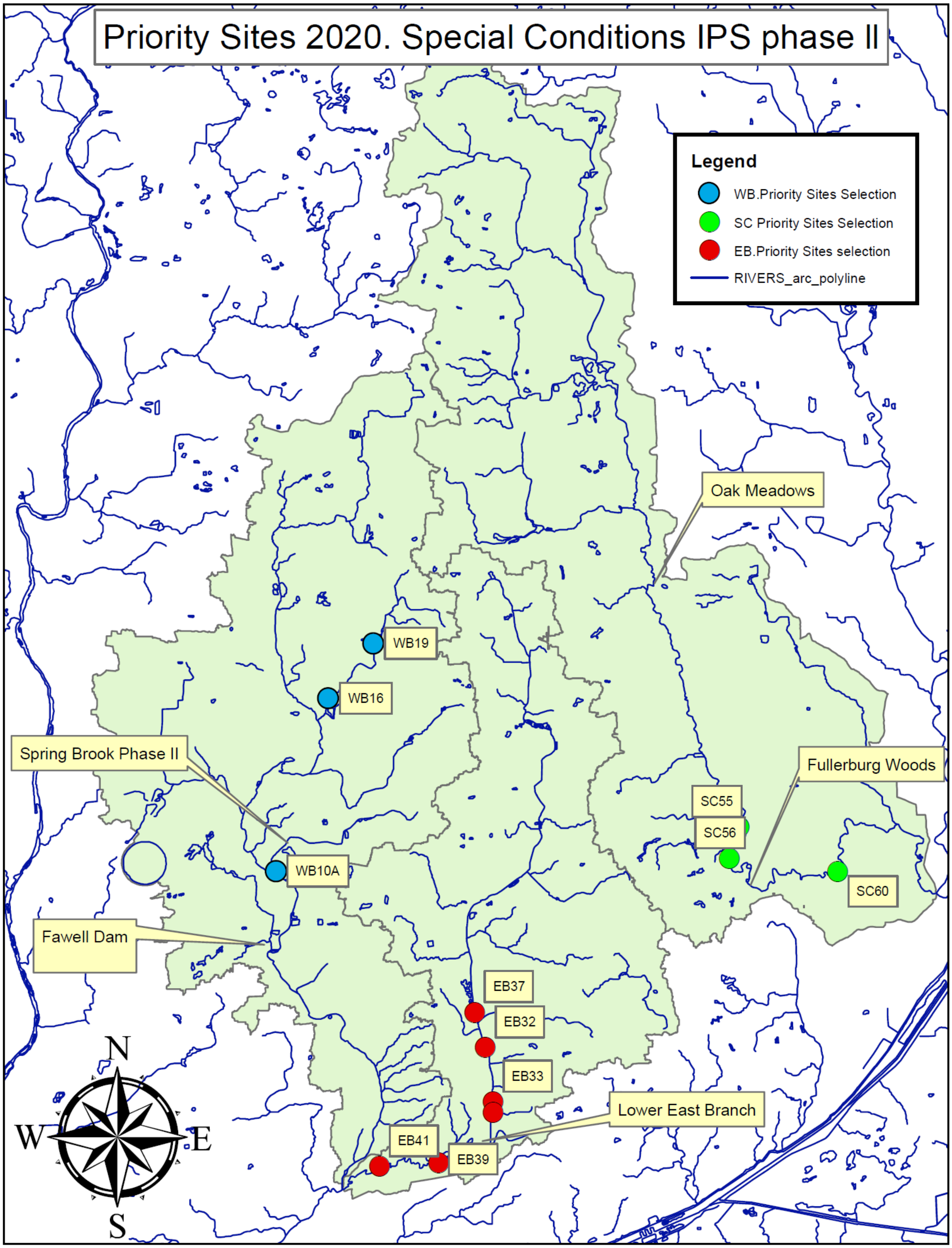
Project Name	**Short Term Objectives**	**Long Term Objectives**
Lower East Brach Phase II (EB37, EB32, EB33,EB39, EB41)	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Dam Removal (Old Oak Brook) and channel restoration (SC55 &SC56)	Improve aquatic habitat (QHEI), remove fish barrier, reduce inputs of nutrients and sediment	Raise miBi and fiBi
Phase 3 or 4 Spring Brook Restoration and barrier (WB 10A)	Improve aquatic habitat (QHEI), remove fish barrier, reduce inputs of nutrients and sediment	Raise miBi and fiBi
Salt Creek stream enhancement (SC60)	Improve aquatic habitat (QHEI), remove fish barrier, reduce inputs of nutrients and sediment	Raise miBi and fiBi
Klein Creek Phase 1 (WB19 &16)	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi

Table 4. Draft Selected Projects for IPS implementation phase 2. Locations are shown on the map in Figure 7.

Site ID	Watershed	River Mile	QHEI Factors
SC55	Salt Creek	13.5	channel, substrate, embeddedness, silt, riparian, riffle, pool
SC56	Salt Creek	12.5	channel, substrate, embeddedness, silt, riparian, riffle, pool, silt
SC60	Salt Creek	7.2	substrate, embeddedness, silt, riffle, silt
EB32	East Branch DuPage River	8.5	channel, substrate, embeddedness, silt, cover, riffle, pool
EB33	East Branch DuPage River	7	channel, substrate, cover, riffle, embeddedness
EB34	East Branch DuPage River	5	channel, substrate, embeddedness, silt, riffle, embeddedness
EB37	East Branch DuPage River	9.5	channel, substrate, embeddedness, silt, cover, riparian, riffle, embeddedness
EB39	East Branch DuPage River	4	channel, substrate, embeddedness, silt, cover, riparian, riffle, embeddedness
EB41	East Branch DuPage River	1.3	QHEI, channel, riffle
EB43	East Branch DuPage River	6.6	channel, substrate, embeddedness, riffle, pool
WB10A	Spring Brook	0.1	substrate, channel, cover, riffle, pool
WB16	Klein Creek	1	riffle
WB19	Klein Creek	3.6	substrate, channel, cover, riparian, riffle, pool, embeddedness

Table 5. Proposed Sites with IPS generated remedial actions

Figure 7. Map showing Draft Priority Sites for Phase ll. Projects from Phase 1 are shown in the call outs.



Attachment 2

Draft 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
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 3. Summary of NPDES Permit Effective Dates and Estimate Dates for TP Implementation

Agency Members	IL NPDES	Special Condition Permit				Proposed Condition	
		Final Effective Date	Expiration Date (Permit Cycle 1)	Expiration Date (Permit Cycle 2)	TP limit enforced	TP (1.0 mg/L monthly average) Implementation Date- Chemical	TP (1.0 mg/L monthly average) Implementation Date- BPR
DuPage River Salt Creek Workgroup (DRSCW)							
Addison - AJ LaRocca	IL0027367	1/1/2016	1/1/2021	1/1/2026	1/1/2026	1/1/2029	1/1/2030
Addison - North	IL0033812	1/1/2016	1/1/2021	1/1/2026	1/1/2026	1/1/2029	1/1/2030
Bartlett	IL0027618	10/1/2015	10/1/2020	10/1/2025	10/1/2025	Going to 1.0 mg/l	
Bensenville	IL0021849	Already at 1.0 mg/L					
Bloomingdale	IL0021130	10/1/2015	10/1/2020	10/1/2025	10/1/2025	10/1/2028	10/1/2029
Bolingbrook #1	IL0032689	9/23/2015	9/23/2020	9/23/2025	9/23/2025	9/23/2028	9/23/2029
Bolingbrook #2	IL0032735	7/1/2016	7/2/2021	7/2/2026	7/2/2026	7/2/2029	7/2/2030
Carol Stream	IL0026352	10/1/2015	10/1/2020	10/1/2025	10/1/2025	10/1/2028	10/1/2029
Downers Grove SD	IL0028380	8/1/2015	8/1/2020	8/1/2025	8/1/2025	8/1/2028	8/1/2029
DuPage County Greene Valley	IL0031844	9/1/2015	9/1/2020	9/1/2025	9/1/2025	9/1/2028	9/1/2029
Elmhurst	IL0028746	8/1/2018	8/1/2023	8/1/2028	8/1/2028	8/1/2031	8/1/2032
Glenbard WW Authority	IL0021547	9/23/2015	9/23/2020	9/23/2025	9/23/2025	9/23/2028	9/23/2029
Glendale Heights	IL0028967	10/1/2015	10/1/2020	10/1/2025	10/1/2025	10/1/2028	10/1/2029
Hanover Park	IL0034479	10/1/2015	10/1/2020	10/1/2025	10/1/2025	10/1/2028	10/1/2029
Itasca	IL0026280	Already at 1.0 mg/L					
MWRDGC	IL0036340	*					
MWRDGC	IL0036137	*					
Roselle - Botterman	IL0048721	9/23/2015	9/23/2020	9/23/2025	9/23/2025	9/23/2028	9/23/2029
Roselle - Devlin	IL0030813	9/23/2015	9/23/2020	9/23/2025	9/23/2025	9/23/2028	9/23/2029
Salt Creek SD	IL0030953	5/1/2016	5/2/2021	5/2/2026	5/2/2026	5/2/2029	5/2/2030
West Chicago	IL0023469	10/1/2015	10/1/2020	10/1/2025	10/1/2025	10/1/2028	10/1/2029
Wheaton SD	IL0031739	8/1/2016	8/2/2021	8/2/2026	8/2/2026	8/2/2029	8/2/2030
Wood Dale - North	IL0020061	8/1/2018	8/1/2023	8/1/2028	8/1/2028	8/1/2031	8/1/2032
Wood Dale - South	IL0034274	1/1/2017	1/2/2022	1/2/2027	1/2/2027	1/2/2030	1/2/2031
Lower DuPage River Watershed Coalition (LDRWC)							
Bolingbrook STP #3	IL0069744	7/1/2016	6/30/2021	6/30/2026	6/30/2026	6/30/2029	6/30/2030
Crest Hill West STP	IL0021121	10/1/2015	9/30/2020			9/30/2020	9/30/2021
Joliet Aux Sable WWTP	IL0076414				Already at 1.0 mg/L		
Naperville Springbrook WRC	IL0034061	1/1/2019	12/31/2023	12/31/2028	12/31/2028	12/31/2031	12/31/2032
Plainfield N STP	IL0074373	9/1/2019	8/31/2024	8/31/2029	Already at 1.0 mg/L		
Village of Minooka STP	IL0055913	5/1/2016	4/30/2021	4/30/2025	Already at 1.0 mg/L		

* Final Permit has not been issued.

(Shaded rows) Already at 1 mg/l

DuPage River/Salt Creek Special Requirements

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 Revised DRSCW Implementation Plan (XXXXX, 2020), are completed (either by the permittee or through the DRSCW) by the scheduled dates set forth below; and that the short term objectives are achieved for each by the time frames identified below:

Project Name	Completion Date	Short Term Objectives	Long Term Objectives
Oak Meadows Golf Course dam removal	December 31, 2016 (Completed)	Improve DO	Improve fish passage
Oak Meadows Golf Course stream restoration	December 31, 2017 (Completed)	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi
Fawell Dam Modification	December 31, 2021	Modify dam to allow fish passage	Raise fiBi upstream of structure
Spring Brook Restoration and dam removal	December 31, 2020	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Fullersburg Woods dam Modification concept plan development	December 31, 2016 (Completed)	Identify conceptual plan for dam modification and stream restoration	Build consensus among plan stakeholders
Fullersburg Woods dam modification	December 31, 2023	Improve DO, improve aquatic habitat (QHEI)	Raise miBi and fiBi
Fullersburg Woods dam Modification area stream restoration	December 31, 2023	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, 2024	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. Prioritize DO improvements projects for years beyond 2024.
NPS Phosphorus Feasibility Analysis	December 31, 2021	Assess NPS performance from reductions leaf litter and street sweeping	Reduce NPS contributions to lowest practical levels

*

Lower East Brach Phase II	December 31 2028	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Dam Removal (Old Oak Brook) and channel restoration	December 31 2028	Improve aquatic habitat (QHEI), remove fish barrier, reduce inputs of nutrients and sediment	Raise miBi and fiBi
Klein Creek Phase 1	December 31 2028	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi

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 continue to implement its written Phosphorus Discharge Optimization Plan in accordance with the schedule set forth in that Plan. Annual progress reports on any ongoing activities identified in the Plan for the optimization of the existing treatment facilities shall be submitted to the Agency by March 31 of each year.

6. 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 8 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 or limit pursuant to paragraphs C, D, E, F, G, or H below.

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 9 years after the effective date of this permit unless the Agency approves and reissues or modifies the permit to include an alternate phosphorus

* Highlighted Projects added by this Implementation Plan

reduction program or limit pursuant to paragraph C, D, E, F, G, or H below.

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

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

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

F. If the DRSCW has developed and implemented a trading program for POTWs in the DRSCW watersheds, providing for reallocation of allowed phosphorus loadings between two or more POTWs in the DRSCW and Lower DuPage Watershed Coalition watersheds, that delivers the same results of overall watershed phosphorus point-source reduction and loading anticipated from the uniform application of the applicable 1.0 g/L monthly average effluent limitation, or other allocation identified in the Nutrient Implementation Plan, among the POTW permits in the DRSCW watersheds and removes DO and offensive condition impairments and meets 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; or

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

H. If the Limit is demonstrated not to be technologically or economically feasible by the date herein stipulated, but is feasible within a longer timeline, then the Limit shall be met as soon as feasible.

7. 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.

8. 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 5

Agency Member Project Fund Assessments
Phase 1 and Proposed Phase 2

Current Agency members	Phase 1 (current) Eight Year Totals	FY 23-24 Estimated	FY 24-25 Estimated	FY 25-26 Estimated	Phase 2 Five Year Totals	MGD	
DRSCW Members with no p limit							
Addison	$852,591	$137,952	$137,952	$137,952	$413,856	8.50	
Bartlett	369,122						*
Bloomingdale	346,051	55,993	55,993	55,993	$167,979	3.45	
Bolingbrook	505,536	81,797	81,797	81,797	$245,391	5.04	
Carol Stream	541,646	87,640	87,640	87,640	$262,920	5.40	
Downers Grove SD	1,103,353	178,527	178,527	178,527	$535,581	11.00	
DuPage County	1,253,810	202,871	202,871	202,871	$608,613	12.50	
Elmhurst	802,439	129,838	129,838	129,838	$389,514	8.00	
Glenbard WW Authority	1,606,883	259,999	259,999	259,999	$779,997	16.02	
Glendale Heights	527,604	85,369	85,369	85,369	$256,107	5.26	
Hanover Park	242,739	39,276	39,276	39,276	$117,828	2.42	
MWRDGC	4,212,805	681,647	681,647	681,647	$2,044,941	42.00	
Roselle	341,037	55,181	55,181	55,181	$165,543	3.40	
Salt Creek SD	331,006	53,558	53,558	53,558	$160,674	3.30	
West Chicago	766,328	123,995	123,995	123,995	$371,985	7.64	
Wheaton SD	892,713	144,445	144,445	144,445	$433,335	8.90	
Wood Dale	310,944	50,312	50,312	50,312	$150,936	3.10	
Subtotal	$15,006,607	$2,368,400	$2,368,400	$2,368,400	$7,105,200	145.93	
DRSCW Members with p limit of 1.0 mg/l							
Bartlett		2,437	2,437	2,437	$7,312	3.68	
Bensenville	27,673	3,113	3,113	3,113	$9,339	4.70	
Itasca	15,306	1,722	1,722	1,722	$5,166	2.60	
Subtotal	$42,979	$4,835	$4,835	$4,835	$14,505	10.98	
Subtotal - all DRSCW members	$15,049,586	$2,373,235	$2,373,235	$2,373,235	$7,119,705	156.91	

* Green highlight shows implementation of TP limit

LDRWC Members with no p limit						
Bolingbrook	334,933	54,194	54,194	54,194	$162,582	2.8
Naperville	3,139,995	508,063	508,063	508,063	$1,524,189	26.25
Subtotal	$3,474,928	$562,257	$562,257	$562,257	$1,686,771	29.05
LDRWC Members with p limit of 1.0 mg/l						
Plainfield	34,800	3,915	3,915	3,915	$11,745	7.5
Joliet	14,848	1,670	1,670	1,670	$5,010	7.7
Crest Hill	6,032	679	679	679	$2,037	1.3
Minooka	10,208	1,148	1,148	1,148	$3,444	2.2
Subtotal	$65,888	$7,412	$7,412	$7,412	$22,236	18.7
Subtotal - all LDRWC members	$3,540,816	$569,669	$569,669	$569,669	$1,709,007	47.75
Total Project Assessments	$18,590,402	$2,942,904	$2,942,904	$2,942,904	$8,828,712	204.66