DuPage River Salt Creek Workgroup

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DuPage/Salt Creek Special Conditions Report
March 31, 2018

Salt Creek, the Preserve at Oak Meadows 2016, image courtesy of Chuck Cherney

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Introduction and Participation DuPage/Salt Creek Special Conditions Report March 31, 2018.

This report is intended to fulfill 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 as provided in the DRSCW Special Conditions (Attachment 1) and the LDRWC Special Conditions (Attachment 2 – Note: As the LDWRC Special Conditions differ between permit holders, the Special Conditions for Bolingbrook STP#3 is included the Attachment as a representation of the Special Conditions Language).

The Special Conditions are contained 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 only participate 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 identified 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 2 show the locations of the physical projects to be realized under the special conditions.

Special Condition Permit Holder Forum

On February 1, 2018, a Special Conditions Permit Holder Forum for DRSCW and LDRWC Permit Holders was held at the Village of Lombard. Fifteen member agencies, eight affiliate members and representatives from the IEPA and USEPA Region V attended. The objective of the meeting was to review and discuss what was learned from the Phosphorus Discharge Optimization Plans and Feasibility Studies completed by member agencies during 2017. The meeting agenda is included below.

9:00 Welcome and Introductions (Dave Gorman, President DRSCW, Village of Lombard)
9:15 IEPA Update (Scott Twait and Jaime Rabans, IEPA)
9:30 Lessons Learned from PDOPs and Feasibility Studies (Christopher Buckley, Baxter and Woodman; Mark Halm, Duechler Environmental Inc; and Chris J. Marschinke and Scott Trotter, Trotter and Associates, Inc.)

10:30 Update on the Trading Framework Development – What do the PDOPs/Feasibility Studies tell us about trading feasibility? (Vic D'Amato, TetraTech)

11:00 Mixing Zones – How can them be utilized? (Adrienne Nemura and Rashab Mahajan, Geosyntec Consultants)

11:30 Questions/Wrap-Up (Nick Menninga, Downs Grove Sanitary District)

Table 1. *Participation in the DRSCW Special Condition permit 2017-2018.*

POTW Owner/ Facility Name	NPDES No.	Membership Dues Paid 2017-2018	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
Bloomingdale-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
Roselle-Devlin STP	IL0030813	YES	YES	YES
Roselle-J Botterman WWTF	IL0048721	YES	YES	YES
Salt Creek SD	IL0030953	YES	YES	YES

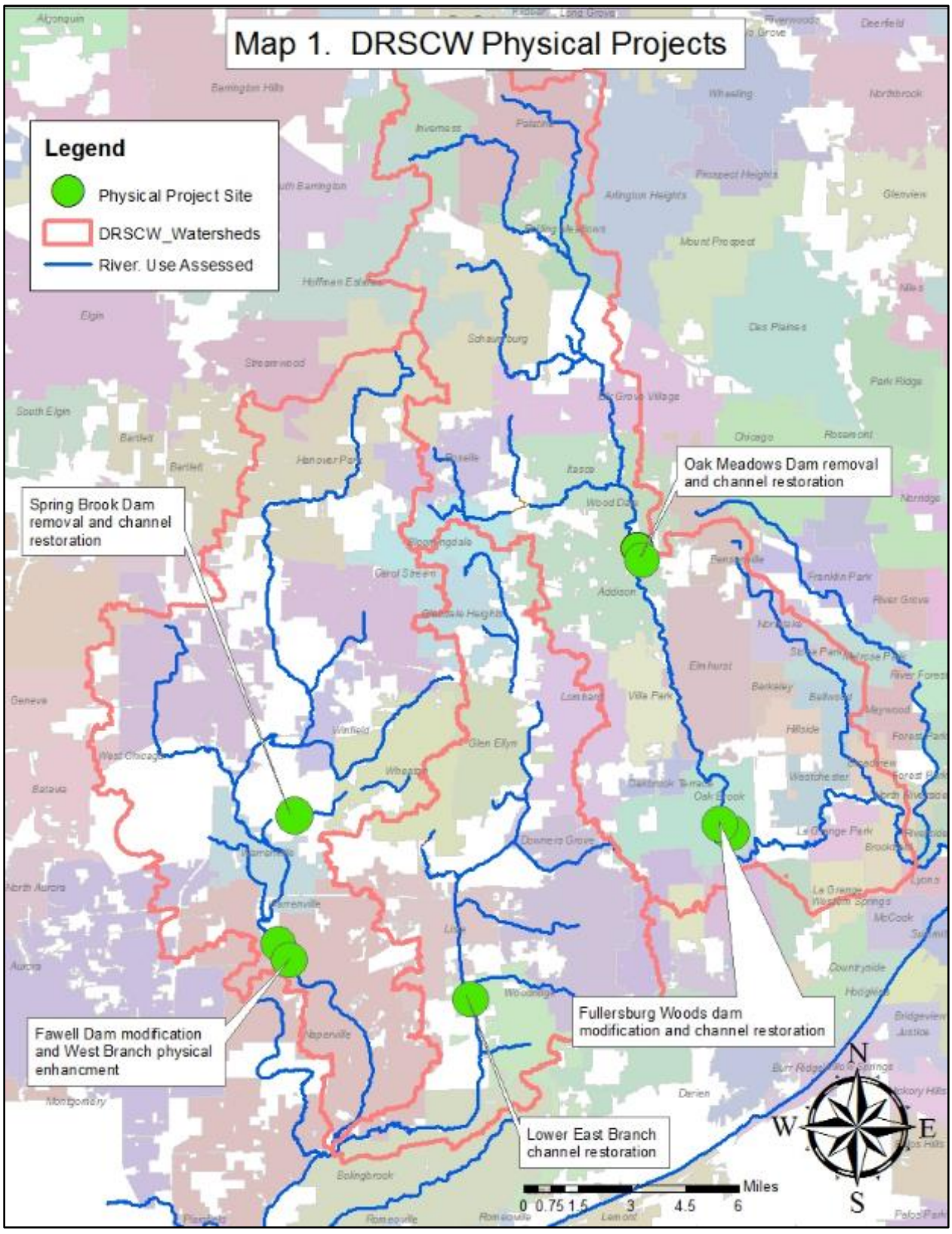
West Chicago STP	IL0023469	YES	YES	YES
Wheaton SD	IL0031739	YES	YES	YES
Wood Dale North STP	IL0020061	YES	YES	YES
Wood Dale South STP	IL0034274	YES	YES	YES
Bensenville South STP	IL0021849	YES	N/A	YES
Itasca STP	IL0079073	YES	N/A	YES

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

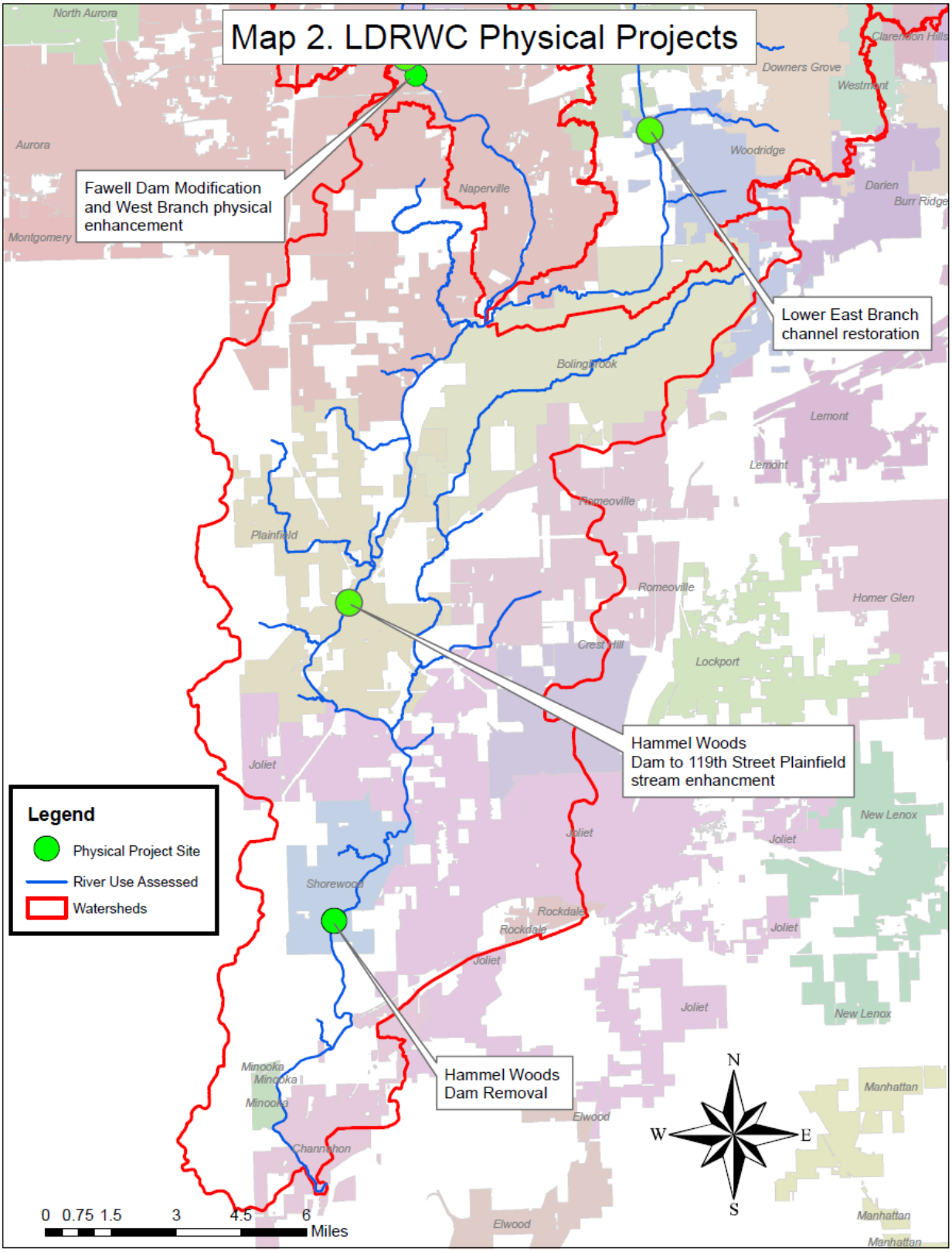
Table 2. *Participation in the LDRWC Special Condition Permit 2017-2018.*

POTW Owner/ Facility Name	**NPDES No.**	**Membership Dues Paid 2017-2018**	**Assessment Paid For Paragraph 2 Table Project Funding***	**Assessment Paid for Chloride Reduction/NIP/QUAL 2k/Trading Program**
Naperville Springbrook WRC	IL0034061	YES	Not required until permit is signed	Not required until permit is signed
Bolingbrook STP#3	IL0069744	YES	NO	NO
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 their permit.



Map 1. *Map of DRSCW physical projects set out in the Special Condition.*



Map 2. *Map of the LDRWC physical projects set out in the Special Condition.*

Progress on Projects Listed in Special Conditions Paragraph 2

Project expenses and funds allocated for project activities are identified in the current DRSCW Five-Year Financial Plan and the LDRWC Five-Year Financial Plan. 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 Dam Removal and Stream Restoration

- Special Condition Completion Date – December 31, 2016 (dam removal), December 31, 2017 (stream restoration)
- Project Status – Dam removal and stream restoration complete. In impact monitoring phase.

Summary of Results – 2017 post project survey results: mean QHEI increased from 57.25 to 69.3, mean mIBI increased from 23.6 (based on 2013 data) to 33.2. Five (5) new, high-value species were present at the project location and two (2) species present in previous surveys were not.

1.1.1. Site Description and Project Design

A site description and the design plan were provided in the 2016 report.

1.1.2. Project Implementation

Details on Project Implementation were provided in the 2017 report.

1.1.3. Project Impact Evaluation

As construction is complete, the project is in its impact evaluation phase. The short and long-term objectives for the project were:

- To improve Qualitative Habitat Evaluation Index (QHEI, a measure of physical stream habitat quality) scores in a 1.3-mile stretch of the Salt Creek mainstem. QHEI measures sinuosity, bed and bank conditions, map gradient, riparian zone, and pool and riffle conditions. Four sites were surveyed for QHEI within the project footprint.

Plate 1. *Contractor sampling macroinvertebrates at SC35A in 2017.*

Plate 2. *Contractor and staff sampling fish and QHEI at SC34 in 2017.*

- Fish Passage - Measured by removal of the dam. No improvement in fish IBI or presence of new species is predicted because of the project. Fish biodiversity is constrained by a downstream barrier, Fullersburg Woods Dam.

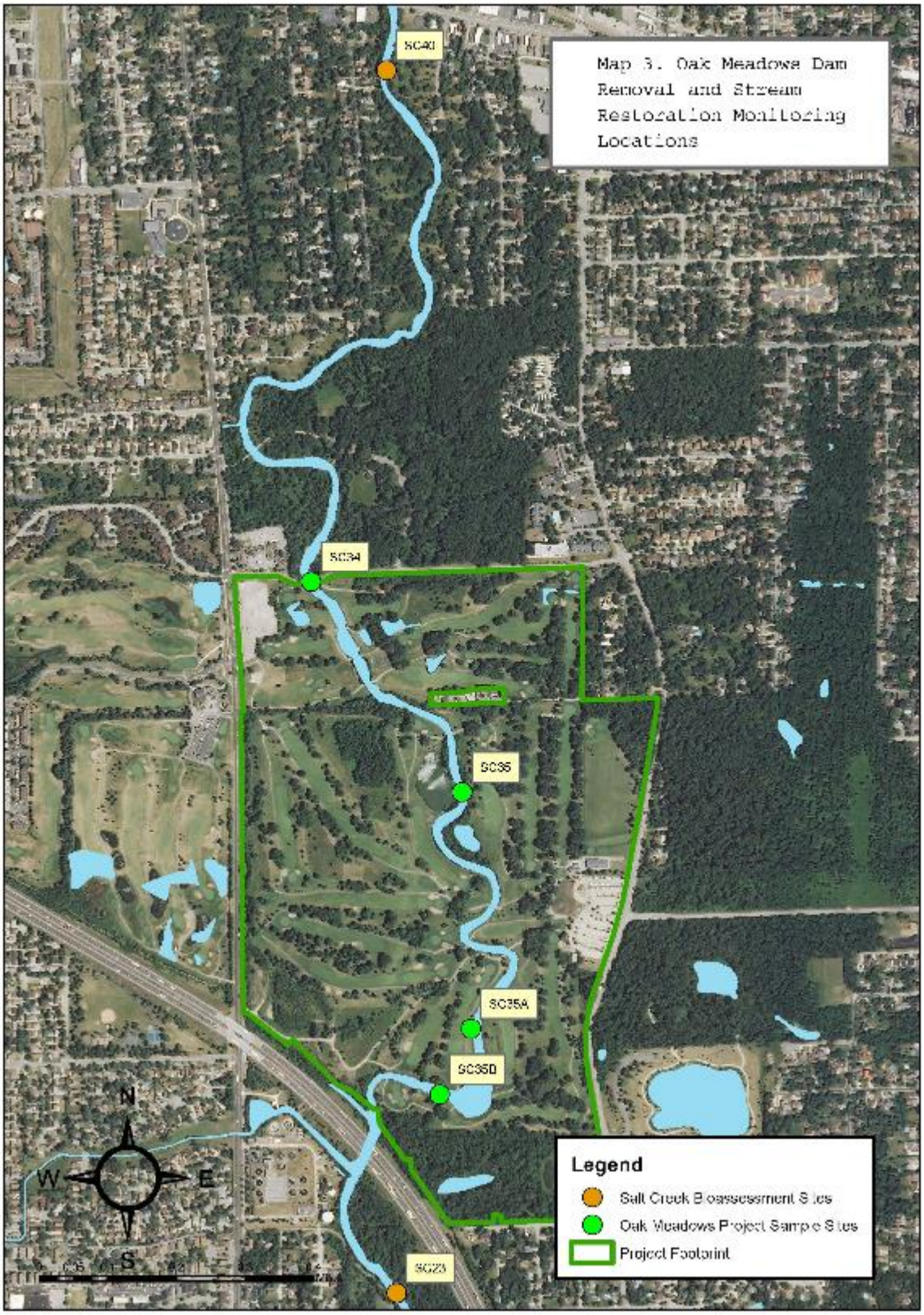
- To a) increase macroinvertebrate Index of Biological Integrity scores (mIBI) and b) increase the presence of specific high value taxa in the 1.3-mile stretch of Salt Creek main stem contained in the project footprint. The potential post project high value taxa list was compiled from taxa lists from two Salt Creek sites with a performing macro-invertebrate community. Fourteen (14) rheobiotic and hard or coarse substrate associated taxa were identified at the sites listed in Table 7. All 14 taxa were found at one or both of the high mIBI sites (lower Salt Creek), but only six (6) were collected inside the project footprint.

- Improve dissolved oxygen (DO) scores directly upstream of the Oak Meadows dam. The DRSCW recorded continuous DO data at the site 2009-2013. Data collection resumed in June 2017. Diel variation and daily and monthly average and minimums will be compared in the pre and post project data sets.

2017 Project Monitoring

Post construction project monitoring began at Oak Meadows in the summer of 2017. Physical habitat and biological data was collected at four monitoring locations within the footprint of the project and two outside of it (see Map 3 and Table 3). Of the four sites located within the project footprint, two are part of the DRSCW's regular Salt Creek basin assessment program (SC34 & SC35). SC35A was added in 2014 and SC35B was added in 2017. SC35A and SC35B were added to increase the resolution of the data generated by the project. No monitoring at the site was done in 2015 and 2016 as construction was on going. The sites outside of the project footprint are included as a form of controls.

Dissolved oxygen (DO) was recorded at SCOM directly upstream of the Oak Meadows dam in the project footprint June 15- August 30, 2017. Data was gathered by a data logger using luminescent dissolved oxygen every hour during the months of June, July and August. Unfortunately, during this period in 2017, two weeks of data at the end of July were lost due to a probe malfunction and high flows hindering retrieval of the instrument.



Map 3. *Oak Meadows Project footprint showing monitoring in footprint (green) and outside (orange).*

Table 3. *Physical Habitat and Biological Monitoring location at Oak Meadows.*

Site Data		Relevant Parameters Collected			
Site ID	**River Mile**	**2010**	**2013**	**2014**	**2017**
SC40	24.5	mIBI, QHEI	mIBI, QHEI		mIBI, QHEI
SC34	23.5	mIBI, QHEI	mIBI, QHEI	mIBI, QHEI	mIBI, QHEI
SC35	23	mIBI, QHEI	mIBI, QHEI	mIBI, QHEI	mIBI, QHEI
SC35B	22.8				mIBI, QHEI
SC35A	22.7			mIBI	mIBI, QHEI
SC23	22.5	mIBI, QHEI	mIBI, QHEI		

* Sites in the project footprint are highlighted in green; sites outside the footprint are in orange.

Results - Physical Habitat/QHEI

Figure 1 shows QHEI scores at the project location relative to other main stem sites surveyed as part of the regular basin-wide assessment surveys conducted in 2007, 2010 and 2013. Data for 2014 and 2016 are not included in Figure 1 (Oak Meadows project location was not included in the 2016 basin assessment as it was under construction and 2014 data was limited to the project footprint). 2014 data is included in Figures 2 & 3.

As Figure 1 shows the basin-wide assessment surveys identify a consistent pattern of QHEI sags on Salt Creek. These sags are found in three stretches: RMs 10-14 (Fullersburg Woods Dam Impoundment), RMs 22-24 (Oak Meadows Impoundment) and RMs 31-33 (Busse Woods Impoundment). Notably, the principle aquatic habitat sags on the Salt Creek main stem occur on public property owned by Forest Preserve Districts of DuPage or Cook Counties.

Figure 2 shows QHEI scores pre and post project relative to the observed QHEI in 2010, 2013 and 2014 (pre project surveys for habitat and macroinvertebrates were carried out at project locations in 2014). Table 4 summarizes the data shown in Figure 2.

Figure 1. *Salt Creek main stem basin QHEI assessment results for 2007, 2010 and 2013.*

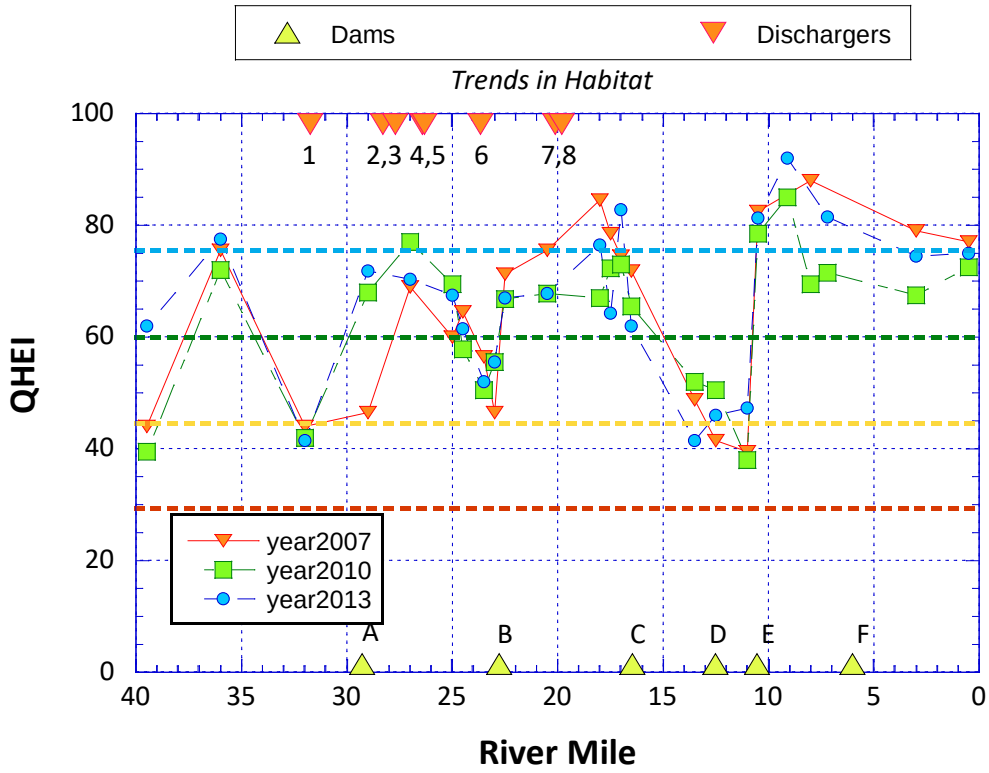


Figure 2. *QHEI scores pre-(2010, 2013, and 2014) and post-project (2017) at Oak Meadows.*

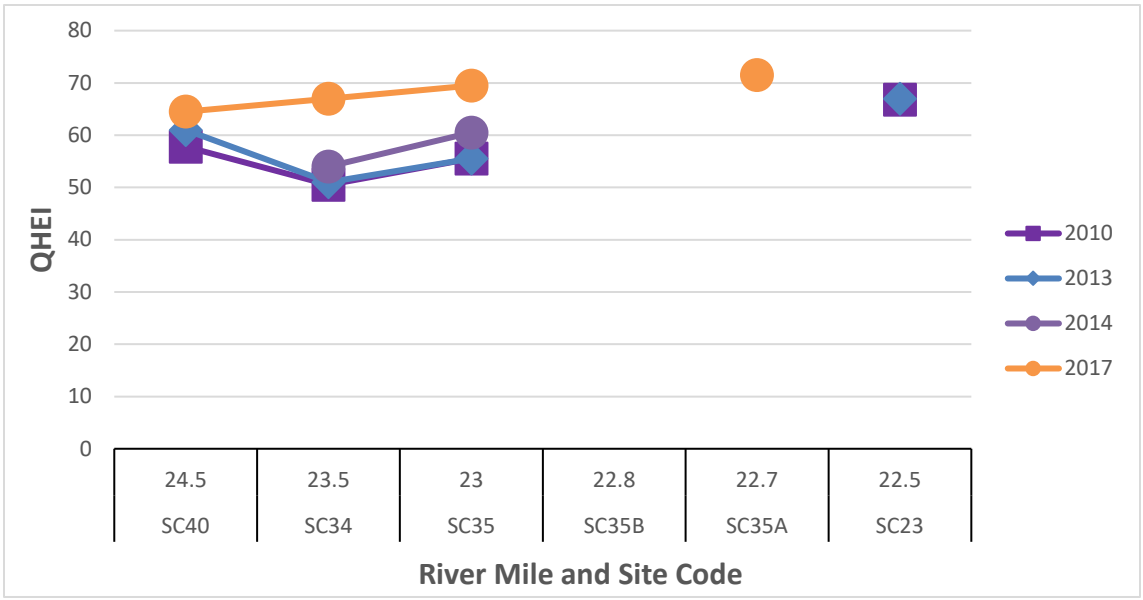


Table 4. *QHEI Results for 2017 at Oak Meadows.*

Site Data		QHEI			
Site ID	**River Mile**	**2010**	**2013**	**2014**	**2017***
SC34	23.5	50.5	51	54	67
SC35	23	55.5	55.5	60.5	69.5
SC35B	22.8				
SC35A	22.7				71.5
Mean		53	53.25	57.25	69.3

*2017 is the post project condition. The Key is below in table 5.

Table 5*. Color code to QHEI scores depicted in Table 4.*

Legend: Site Data		**Legend: QHEI**	**Numeric Range**
	Basin Assessment Site	Excellent	≥ 75
		Good	60-74
	Ad hoc Project Assessment Site	Fair	45-59
		Poor	<45

Post project QHEI increased at all sites with improvements in substrate, riparian, pool and riffle scores. Mean QHEI at the project location increased 12 points to 69.3 (or 68.5 if we discount SC35A, surveyed for QHEI post project only). All QHEI scores were within the "good" range (>60 QHEI points). The DRSCW is optimistic its QHEI goal of >70 will be reached as riparian vegetation at the site matures. Post-project monitoring will continue in 2018 and 2019.

Results – Macroinvertebrates (mIBI)

Post-project, both mIBI and individual species taxa biodiversity improved at the site. As Table 6 shows the 2017 post-project mean mIBI (33.2) increased 9.6 points compared to the 2013 score. The project's objective is to increase the mean mIBI to 35.

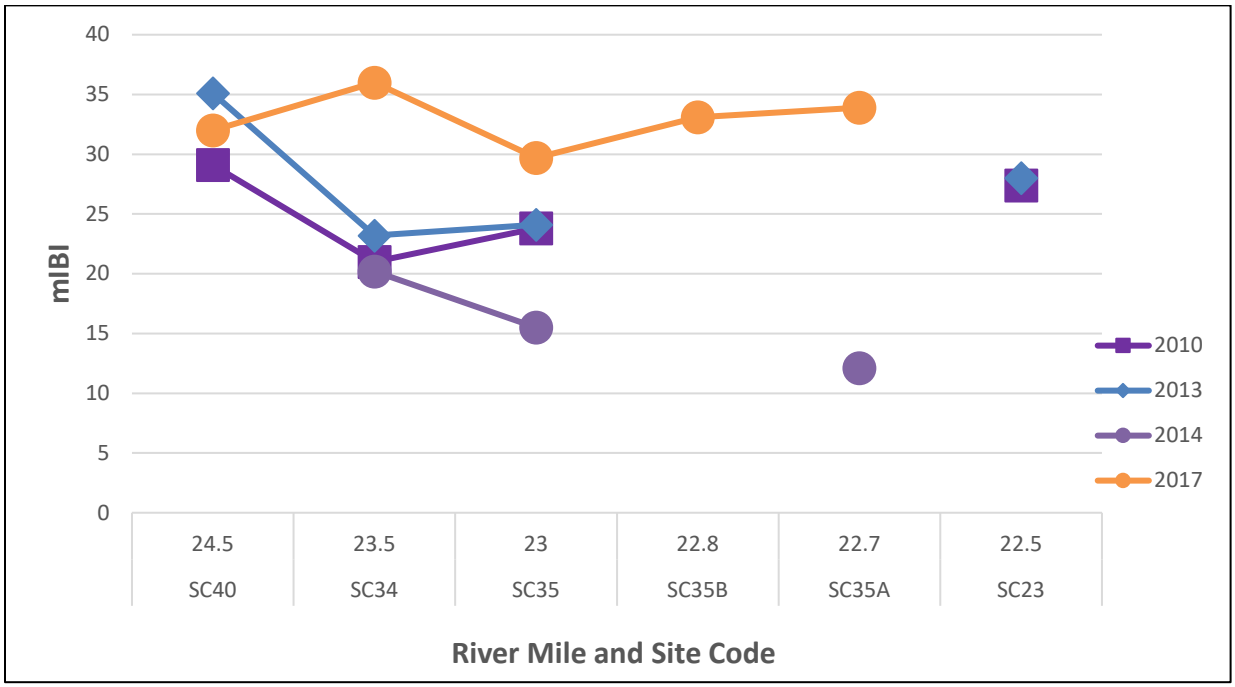
The data are represented graphically in Figure 3. Two sites (RM 24.5 SC40 and RM 22.5 SC23) from outside the project footprint are included for reference (see Map 3).

Table 6. *MIBI results from 2010-2017 for the project footprint at Oak Meadows.*

Site ID	River Mile	mIBI			
		2010	2013	2014	2017*
SC34	23.5	21	23.2	20.2	36
SC35	23	23.8	24.1	15.5	29.7
SC35B	22.8				33.1
SC35A	22.7			12.1	33.9
Mean		**22.40**	**23.6**	**15.9**	**33.2**

*2017 is the post project condition.

Figure 3. *mIBI results for 2010-2017. 2017 is post-project at Oak Meadows.*



The potential post-project high value taxa list included fourteen (14) species. Six (6) species were previously recorded at the site. Post-project, five (5) species not found in previous surveys (2007-2014) were recorded (Table 7). Two species previously recorded at the site were absent in 2017. Future sampling will confirm if these two species have left the site or their absence is temporary.

Based on the list of fourteen (14) species, there are potentially still five (5) additional species that will populate the site. Sampling will continue in 2018 and 2019.

Table 7. *High value species pre- and post-project at Oak Meadows.*

Taxa code	Taxa	Pre Project		Post Project 2017			
		SC34	SC35	SC34	SC35	SC35A	SC35B
Mayflies							
11130	*Baetis intercalaris*		X	X	X	X	X
13400	*Stenacron sp*	X					
Caddisflies							
52200	*Cheumatopsyche sp*	X	X	X	X	X	X
52431	*Ceratopsyche morosa group*						
52521	*Hydropsyche bidens or H. orris*						
52570	*Hydropsyche simulans*			X	X	X	X
53800	*Hydroptila sp*	X	X				X
Beetles							
69400	*Stenelmis sp*			X		X	X
Diptera/flies							
74100	*Simulium sp*			X		X	X
81825	*Rheocricotopus (Psilocricotopus) robacki*						X
82141	*Thienemanniella xena*	X					
84450	*Polypedilum (Uresipedilum) flavum*	X	X	X	X	X	X
84700	*Stenochironomus sp*						
85625	*Rheotanytarsus sp*			X		X	X

***** Species appearing post project are highlighted in green, species not present post project are in salmon.

Results – Fish (fIBI)

The 2017 post-project monitoring included fish surveys at all four project sites. As predicted, no change in fIBI scores was recorded. Fish populations are constrained by downstream barriers (see Fullersburg Woods).

Results - Dissolved Oxygen

DO is a function of a number of other environmental variables including sunlight, wet weather, water temperature, sediment oxygen demand, BOD, reaeration rates, nutrients, algae and macrophyte biomass. Impacts of these variables vary in time and are themselves interdependent. Improvements in DO are measured here by looking at mean DO during the sampling period, number of sample points under 5 mg/l and 3.5 mg/l as a percentage of total datums, and mean and median DIEL. The data for 2009 -2014 (pre project condition) and post project (2017) are shown in table 8.

***Table 8**. Dissolved Oxygen collected upstream of the dam at Oak Meadows.*

Parameter	2017	2014	2013	2010	2009
# of data points for Jun/Jul/Aug	1457	1171	1675	2190	2088
Whole Period - Mean Temp (°C)	23.53	21.88	23.83	24.79	22.24
Whole Period - Mean LDO mg/l	6.11	4.32	5.04	6.31	6.82
Whole Period - Median LDO mg/l	6.01	4.71	4.66	6.1	6.63
Whole Period - # of times < 5mg/L	211	670	866	352	163
Whole Period - # of times < 3.5mg/L	20	365	144	9	1
Whole Period - # of times < 5mg/L as percentage of total # of samples	14 %	57%	52%	16%	8%
Whole Period - # of times < 3.5mg/L as percentage of total samples	1.4%	31.2%	8.6%	0.4%	0.0%
Mean DIEL Swing Whole Period mg/l	2.91	3.36	2.78	3.40	3.50
Median DIEL Swing Whole Period mg/l	2.71	3.06	2.52	3.41	3.45

*Scores have been coded green, orange and yellow in descending order of their ranking for the top three scores in the data set for each category respectively.

While post project condition did not score best in any category the data would suggest a modest improvement in the DO regime with a probable improvement in mean DO and a probable contraction in DIEL. Notable is that all but 4 of the datums below 3.5 mg/l in 2017 were associated with two wet weather events (DO has been observed to fall precipitously during some high flow events at other locations). Such influences were not observed in the pre project data set but are unlikely to be a function of the project but rather of flow variability. Future monitoring is essential to show if this improvement is real.

1.2 Fawell Dam Modification

- Special Condition Listed Completion Date – December 2018. The extensive permitting associated with this project may necessitate construction be moved to 2019
- Status – In the design and permitting phase

The objective of the project is raise the fish index of biological integrity scores (fIBI) above its current average 18.5 for the three mainstem survey sites immediately upstream of the dam. To accomplish this, the dam's spillway, which consists of three box culverts, will be redesigned to allow fish passage at river mile 8.1 on the West Branch DuPage River. The dam is a flood control structure operated by DuPage County Stormwater Management and must be fully functional post project. The DRSCW budgeted $780,391 for this project.

1.2.1. Site Description

The dam itself is located on the West Branch DuPage River at river mile 8.1 in the McDowell Grove Forest Preserve. The dam consists of a set of three gate structures that can control flow through three-barrel concrete box culverts to impound water, as necessary, upstream within the McDowell Grove Forest Preserve. The existing three-barrel concrete box culverts consist of an 11'-10" wide by 10' high center barrel and 10' by 10' side barrels. The culvert barrels are 80' long and the bottom slopes down at 5% from the upstream end to the downstream end. There are concrete wing walls on the upstream side of the culvert structure, and a 50' long concrete stilling basin structure on the downstream side. Atop the culvert, the grade slopes up from the ends to a 25' wide path running perpendicular to the structure, which is approximately 10' above the top elevation of the barrels. During low water events, the upstream end of the culvert features a concrete sill set above the natural bed elevation of the river. The earth embankment is approximately 1000' in length. The project is a collaborative effort with DuPage County Stormwater Management (SWM, the dam owner and operator), the Forest Preserve District of DuPage County (FPDDC, the property owner) and the DRSCW. A boulder "riffle" downstream of the stilling basin also influences flow through the culverts. The team includes V3 Companies, Inter-Fluve and SWM is providing modeling expertise.

The DRSCW's previous 2016-2017 special condition report provided the following reports: Hydraulic, Detailed Channel Topographic Survey, wetland survey, and sediment depth of refusal and quality survey for upstream deposits.

Plate 3. *Fawell Dam viewed downstream of the dam looking north towards the dam.*
The three-culvert system is visible in the center of the photograph.

1.2.2. Design Characteristics

Successful fish passage depends on variables such as water velocity, depth, distance between resting positions for the fish, and each fish's ability to swim against the current. Initially, the design team proposed lowering one culvert to improve fish passage; further analysis made it apparent that lowering two culverts provides a higher degree of confidence that fish passage would improve.

To ensure fish passage, the project seeks to mimic as closely as possible the depth, velocity and distance requirements encountered by the target fishes in an unmodified system during their spawning or migration periods (March – August). An optimal design would allow fish passage for all flows between the 10% and 95% exceedance levels during this migratory period. The flow duration analysis indicated that these target flows are between 42 and 397 cfs.

A literature review of appropriate target average velocity throughout the stream cross section suggested a target for northern pike and walleye of approximately 123 cm/s (4 ft/s), and an appropriate target average velocity for smallmouth bass, and white suckers of approximately 148 cm/s (4.9 ft/s). Smaller fishes tend to be weaker swimmers; most will be able to take

advantage of the lower velocities in the boundary layers adjacent to rocks that can be used as resting places behind and between rocks in natural stream. The exception is the black stripe top minnow, which may not be able to use the boundary layer near the stream bottom, as it is a surface swimmer.

The project aims to have a minimum of 8 inches in the deepest water at any cross section.

1.2.3. Permitting Requirements

The proposed improvements will require a stormwater management certification demonstrating compliance with the DuPage County Countywide Stormwater Ordinance. Additionally, the improvements will require a Dam Major Modification Permit from the Illinois Department of Natural Resources – Office of Water Resources (IDNR-OWR). It is anticipated that a separate Floodway Construction permit will not be required by IDNR-OWR but will be reviewed as part of the County permitting process. Since Fawell Dam is a flood control facility with historical concerns regarding flooding upstream and downstream of the dam, the proposed design and permitting processes will include demonstrating that the proposed improvements will not adversely impact flooding conditions or the structural integrity of the dam.

In addition to the floodway/floodplain regulatory requirements, the proposed improvements will also need to comply with both the DuPage County and US Army Corps of Engineers (USACE) requirements associated with wetlands, Waters of the U.S., buffers, and sediment and erosion control. It is anticipated that the proposed improvements qualify for USACE Regional Permit (RP) 5, Wetland and Stream Restoration and Enhancement, which also typically requires submittal of a Stormwater Pollution Prevention Plan (SWPPP) to Kane-DuPage Soil & Water Conservation District as part of the permitting process.

1.2.4. Design Progress Report

Modeling

Modifying Fawell Dam to meet fish passage and permitting criteria has proven to be more difficult to model than originally anticipated. The primary model being used, FEQ, uses a utility program called FEQUTL to create all the files necessary to describe various hydraulic structures within an FEQ model. As Fawell Dam is a very specific structure in both shape and operation methodology, a specific utility program was coded in order to model the hydraulics through the dam that incorporate the operation rules for the gates. As this function was specifically built for use with Fawell Dam, there is very little documentation available for how this function works. The team spent several months consulting with various FEQ experts in an attempt to run the model with the modified culverts. The team determined that it was necessary to identify a different, yet comparable way to model the dam.

Instead of modeling Fawell Dam as one structure with three box culverts, each with sluice gates, the dam was broken into three separate culverts, with the gates modeled separately for each individual culvert. An additional function was added to account for the expansion and contraction of water as it moves through each culvert. Since this was a different method, the modelers had to ensure that this model produced similar results as the model that had been approved by Illinois DNR. This was done by adjusting several different parameters and coefficients within the FEQUTL model as well as within the main FEQ model.

The project team coordinated with IDNR-OWR regarding the proposed improvements, including the modeling methodology and the initial modeling results. After the modeling methodology was accepted by IDNR-OWR, the project team moved forward with evaluating different alternatives.

The basis of the project is to remove the physical barrier created by the dam and to reduce velocities through the culverts to a favorable level for fish passage. This is achieved by lowering two of the three box culverts to allow for a nearly flat slope through the culverts, which also results in a lower velocity. However, since Fawell Dam functions as a flood control structure along the West Branch DuPage River, any modification to the dam must not result in increases in flood elevations upstream or downstream of the dam. The impacts shown from lowering two of the box culverts, which increase the flow area, were counteracted by modifying the gate operations of the dam. Initial scenarios suggested as many as 20 gate operations, too many to be practical. The proposed gate operation plan adds only two additional steps to the existing management plan and has the first gate operation beginning at a slightly lower elevation. Under the proposed condition, the frequency in initial operation will remain about the same.

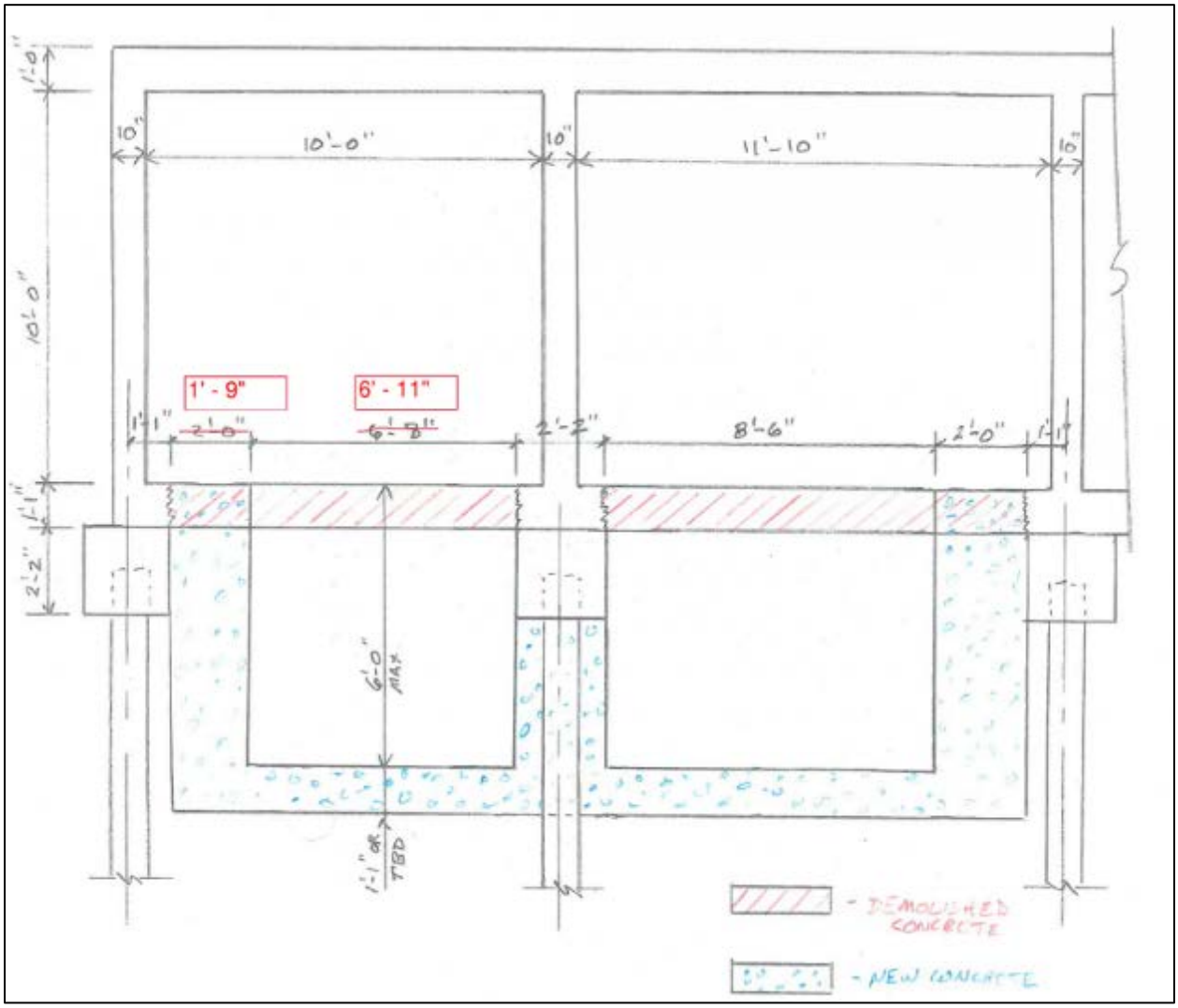
The proposed alternative, lowering two culverts and modifying the gate operations, increases peak stage downstream of the dam, but it is either contained within the banks of the river, or only applicable to smaller storm events. In large storm events, there is no impact on flood stages. The project team submitted documents detailing the proposal with these preliminary results to IDNR-OWR in November 2017 to ensure the hydraulic impacts are within the acceptable range before compiling a complete permit submittal. At the time of this report, IDNR is still reviewing the proposal.

The project team previously met with both DuPage County (regulatory department) and the local representative from the USACE to discuss wetland/ waters permitting. The team confirmed the proposed improvements likely qualify for a USACE Regional Permit. The team also discussed indirect wetland impacts with the County regulatory staff and some initial modeling was done to evaluate the potential impact.

Structural and Geotechnical Design Considerations

As described in the modeling section, the initial conceptual design considered modifications to one box culvert; however as the design study progressed, it was determined that two box culverts needed to be modified to achieve the desired velocity limit (less than 4 fps). The current preliminary design includes modifications to the larger center box culvert and the eastern outer box culvert (see Figure 4). The design attempts to maximize the flow area within the box culvert while providing enough concrete thickness to adequately transfer the lateral loads through the structure (see detail below).

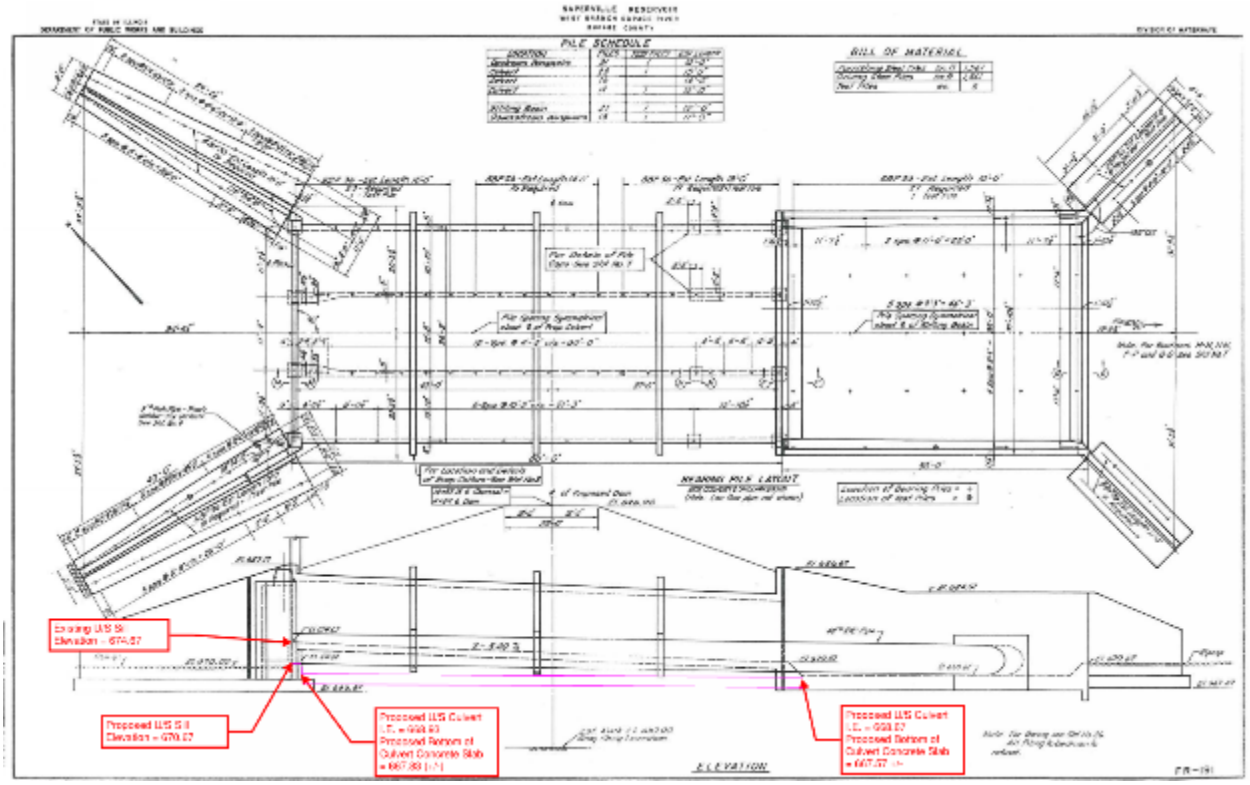
***Figure 4**. Preliminary Structural Modification Detail cross section for Fawell Dam.*



Although the proposed structural modifications lower the existing culvert bottom by approximately 6 feet, the upstream sill will only be lowered by 4 feet (see annotated in Figure 5). The difference in sill elevation and culvert elevation was the result of hydraulic modeling

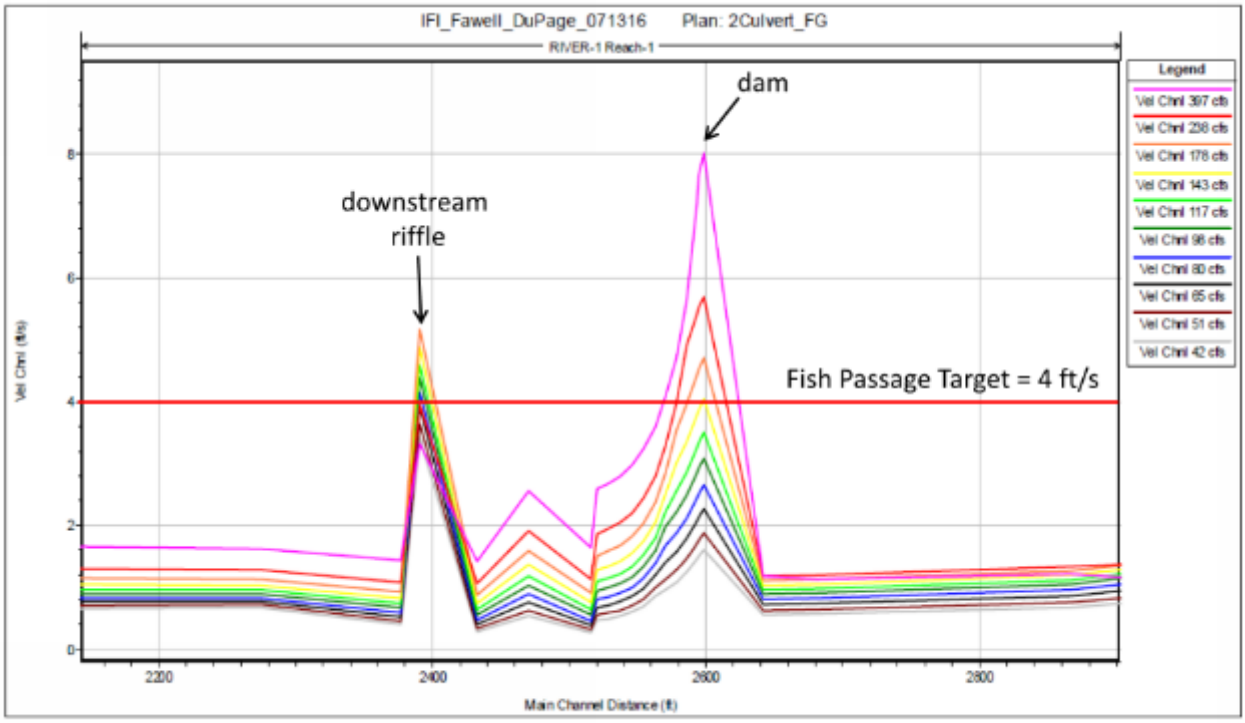
constraints. Although the two box culverts and upstream sill will be modified, the downstream stilling basin will not be modified and will provide a "tailwater" impact on the lowered culverts that help achieve the desired velocities and flow depths over the lowered sill. As such, the elevation difference between the upstream end of the culverts and the lowered sill are not predicted to create a new barrier to fish passage.

Figure 5. *Preliminary Structural Modification Detail for Fawell Dam, plan view.*



The hydraulic modeling associated with the proposed modifications suggest that flow velocities of less than 4 fps can be achieved (see Figure 6). However instead of the optimal range of flow between the 10% and 95% exceedance levels (approximately 40 cfs to 400 cfs) during the migratory period, the velocities would be achieved for a smaller range of flows between the 40% and 95% exceedance levels (approximately 40 cfs to 150 cfs). As shown in Figure 6 below, it is likely that modifications to the downstream existing riffle will also be required as part of the proposed improvements.

Figure 6. *Flow velocities at various flow stages with the middle and eastern culvert of Fawell Dam lowered.*



Flow velocities with two Fawell Dam culverts lowered.

As part of the design process, constructability issues/ questions identified the need for additional geotechnical evaluation and design. The conceptual/ preliminary design recently underwent a peer review process related to geotechnical and structural concerns to confirm and/or identify additional constructability issues and to help identify potential solutions. Recommendations from this process are currently under review. The structural design and water management approach will be modified as needed. DRSCW is also reviewing the utility and necessity of additional geophysical boring at the site prior to final design.

Channel Management

An adaptive management plan for the channel post modification was prepared for the project and is currently under review by SWM (dam owner and operator) and the FPDDC (property owner). Lowering the culvert invert elevation at Fawell Dam will likely alter the channel geomorphology of the base flow impoundment (i.e., the area inundated during flows that can pass through the culverts without creating backwater). Based on the channel evolution model and existing conditions it is anticipated that the channel will drop mechanically once the culverts are lowered and will incise down to the resistant cobble-gravel layer. The incision

point will migrate upstream along one or more headcuts through the overlying silt, sand, and finer gravel, increasing the slope within the channel until it equilibrates with the sediment and flow. The final bed position will likely be similar to the depths of refusal profile representing the pre-dam channel (Figure 7), with a slope around 0.0007 ft/ft. The incision width during this stage will likely be similar to the combined width of the lowered culverts, and the incision depth will also likely be similar to the depths of refusal (0-2ft).

The presence of the dam and the constraints presented by the gate structure and continued flood management operations are predicted to continue to impact the river upstream of Fawell Dam. Given the decrease in energy available to transport accumulated sediment and new sediment from upstream, evolution of the channel upstream is expected to be slowed.

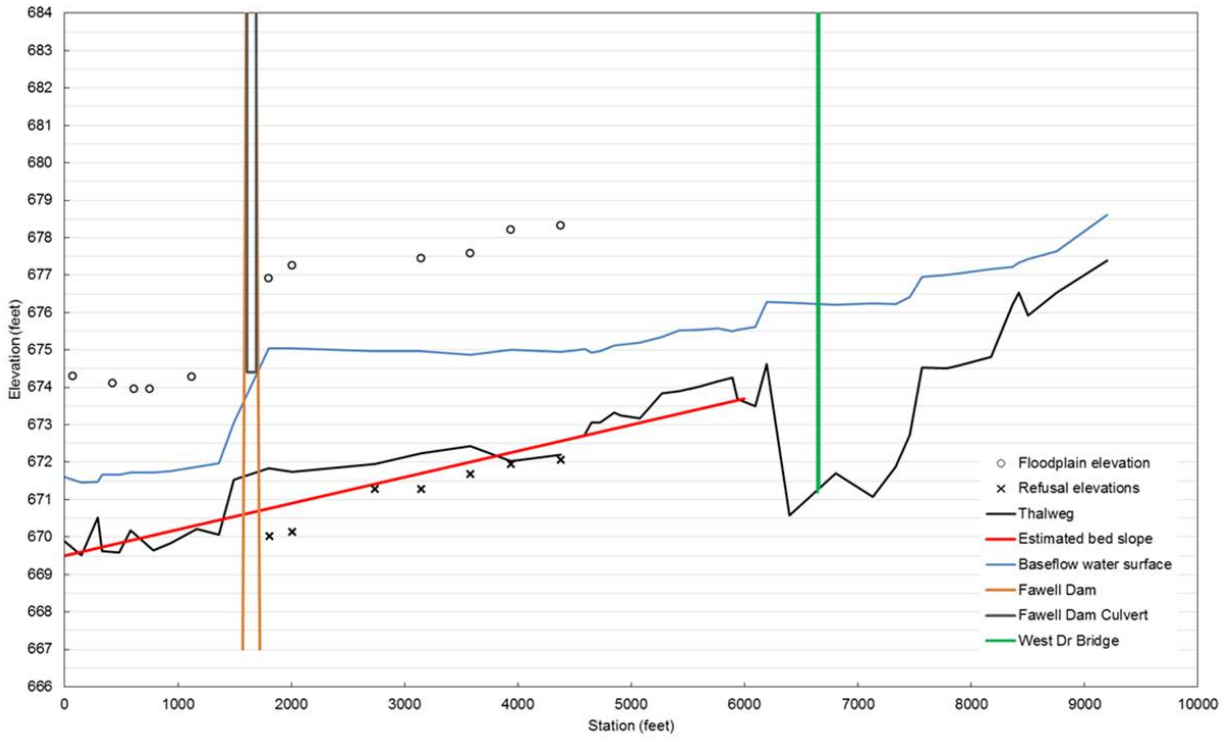
Further, given the potential deposition of material carried into the impounded reach from upstream during high flows, there may be episodic siltation followed by transport as the river cycles between high and lower flows – keeping the evolution process going at a small scale after each major flow and (or) depositional event, and possibly creating a dynamic equilibrium that fluctuates around a "normal" condition as opposed to a more static channel. This creates uncertainty with respect to both the final form (i.e., plan form and cross section, including final inset floodplain elevations) and the timeline for achieving a stable river. However, it is likely that the impoundment reach will have completed major adjustments to the dam modifications within one to ten years of modification, depending on flows and sedimentation rates.

DRSCW is working with its partners to put in place a set of indictors for channel equilibrium (little change to the low flow channel and floodplain over two contiguous average or wet years (annual flows > 1.5YR flow)). These will include at least two significant storm events equivalent to the 1.5 YR flood. Equilibrium indicators will include

- The disappearance or stabilization of nickpoints,
- Minimal change in vertical bed position; little to no change in low flow bank migration along most of the reach (some local erosion will be expected),
- Evacuation of sediment down to the refusal surface, and
- Established vegetation on upper banks and floodplain.

The factors that constitute "equilibrium" may need to be adjusted based on frequency and duration of impoundment, and any associated fluctuations in deposited sediment. Bed elevation, sediment distribution, bank positions, and channel size will need to be analyzed for trends to determine equilibrium, with "no trend" being the desired trigger for future work.

Figure 7. *Longitudinal profile of the West Branch DuPage River reach surrounding the Fawell Dam.*
The water surface elevation (blue line) was surveyed during base flow conditions (flow exceeded 80% of the time) and shows that the dam creates about 3 ft of backwater. The channel bed (black line) and bank tops (open circles) indicate some sediment deposition upstream from the dam.



1.2.5. Impact Evaluation

Post project, both fIBI and fish taxa will be sampled upstream of the site and compared to historical data. Additional instream monitoring for fish movement through the system is being evaluated.

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

- Special Condition Listed Completion Date – December 2019
- Status – in the design and permitting phase. Permits have been submitted. Construction is due to start in early 2019

The objective of the project is to raise QHEI above its current 64, raise fIBI above its current score of 21.5 and to raise mIBI above its current score of 30.1. The project is being managed by the FPDDC and construction is being funded by a consortium of agencies including the FPDDC, the Illinois State Toll Highway Authority and the DRSCW. The project is in the second phase of the remediation of the river. DRSCW has budgeted $1,000,000 for this effort.

1.3.1. Site Description

The Phase 2 Project is located in unincorporated DuPage County in Blackwell Forest Preserve. The project footprint limits are entirely on Forest Preserve District of DuPage County (FPDDC) property. The project runs along Spring Brook #1. The downstream limit is approximately 400' downstream of the existing unnamed pedestrian bridge, which runs south from Mack Road. The upstream limit is Winfield Road. The project is immediately downstream of the Spring Brook #1 Stream and Wetland Restoration Project (Phase 1), which was constructed in 2015.

1.3.2. Existing Conditions

The existing stream alignment is 4,430 ft. long. Of that length, a low head dam located at Arrow Road, which is located approximately in the center of the project reach, impounds approximately 2200 ft. The channel outside the impoundment is incised with bank full flow around 120 cfs. The Wetlands Initiative (TWI) performed the initial wetland delineation of the Spring Brook # 1 Stream and Wetland Restoration Project - Phases 1 and 2, which has now expired. Huff and Huff, under contract to the Illinois State Toll Highway Authority, re-delineated the project site for Phase 2, and found differences in the boundary. The new delineation has been verified now by the USACE and DuPage County. Within the project limits for the Phase 2 project, within Blackwell Forest Preserve, there were 16.38 acres of wetland and 17.69 acres of waters of the United States. The total wetland acreage is comprised of 12 separate wetlands. All on-site wetlands are under the jurisdiction of the USACE.

1.3.3. Proposed Conditions

The impounding structure will be removed and the channel realigned into the adjacent floodplain in order to increase sinuosity and mimic more natural geomorphology. The proposed stream length will increase to approximately 5,515 ft with the additional sinuosity. The proposed channel will have slopes ranging from 2.5:1 to 20:1. The design bank full condition is 120 cfs. This is intended to increase the frequency of overbank flooding, reconnecting the floodplain, within the project site to facilitate desired habitats in the floodplain. There will be 1.42 acres of USACE/DuPage County jurisdictional wetland impacts, and another 3.99 acres of temporary impacts. The wetland impacts are attributable to the excavation and fill placement for the restored stream channel meander and to replace a service road bridge and pedestrian bridge. The project will create 22.8 acres of wetland. There are 15.5 acres of the impoundment area that are converted to wetland with the dam removal in the project.

1.3.4. Impact Evaluation

Post-project fIBI, mIBI and QHEI will be monitored and compared to historical survey data.

1.4 Fullersburg Woods Dam Modification Concept Plan Development

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

The Fullersburg Woods Dam Modification Concept Plan was submitted to the IEPA in December 2016 and discussed in the Annual Report submitted in 2017.

1.5 Fullersburg Woods Dam Modification and Stream Restoration

- Special Condition Listed Completion Date – December 2021
- Status – Outreach and Education Campaign (started 2017). Design/Construction (Not started yet)

The project is on the Salt Creek mainstem; its objectives are to raise QHEI above its current score of 39.5, raise fIBI above its current score of 19.0, raise mIBI above its current score of 17 for approximately 1.5 river miles and to improve dissolved oxygen in the impoundment, as compared to the 2007-2014 data set. The DRSCW will be collaborating with FPDDC and DuPage County Stormwater Management on this project. DRSCW has budgeted $2,985,000 for this project.

Modification of the Fullersburg Woods dam will likely encounter significant public opposition. The concept plan prepared in 2016 included a framework for reaching out to stakeholders, listening to their concerns and soliciting feedback so that the final design proposal can incorporate features based on their input. The DRSCW hired Bluestem Communications to facilitate the development and implementation of the stakeholder outreach and engagement plan. The stakeholder outreach and engagement plan includes three phases. Each phase and the work completed in FY 2017/2018 are described below.

<u>Phase 1: Internal Research and Planning</u>

Bluestem Communications conducted a literature review of existing public opinion research on dam modification projects in order help define the project's target audience and goals for the public opinion research. The review covered dam removal and modification projects across the Midwest. The literature review was completed in 2017 and identified 9 key takeaways that will be used to guide Phase 2 and 3.

1. Successful projects highlight the economic and public safety justifications for dam modification or removal.

2. Reaching consensus with the public on the importance of river health first, then the team can move forward from there. A majority of Americans support the protection of water quality.

3. The necessity of shifting the public's focus from the dam's past to the river's future. It is important to emphasize the potential of the project. If the historical narrative persists, the team can reiterate the river's timelessness.

4. River recreation, environmental, and local business stakeholders may be important allies throughout the dam modification project. A leader from one of those groups could be an effective messenger.

5. It is an error to underestimate the importance of effective public outreach. Team should be sure all voices are heard and avoid arguing with citizens about their emotional connection to the dam. Instead, it should frame the discussion as one of financial responsibility and improvement - an investment to protect their emotional connection.

6. Outside the context of dealing with a historically-designated or functional dam, the design option that requires minimal additional construction and upkeep is the best one.

7. Paint the big picture: removing this dam will bring us one step closer to reconnecting our tributary to the Mississippi River.

8. In addition to large public meetings, the project team should host small, informal presentations and publish editorials that educate the public on the problems that dams cause.

9. The main reasons for opposition to dam modification or removal are 1) historical/aesthetic significance, 2) downstream impacts, and 3) recreational impacts.

<u>Phase 2: Public Opinion Research and Input Process</u>

Understanding what a targeted audience thinks, knows and feels about an issue is critical to designing an effective engagement campaign. Public opinion research can identify audience values; current opinions; current knowledge; history of experience with the creek; motivators; ideal language to use; and language to avoid, all correlated to demographic data. Most important, this phase will also gather input that will directly influence the final design of project.

The public opinion research and input process includes three methods to ensure that everyone who wants to will have the ability to participate: meetings with priority stakeholders, a survey, and public workshops.

Meetings with priority stakeholders

The DRSCW has identified Tier 1 and Tier 2 stakeholders for engagement. Tier 1 stakeholders are those with direct interest in the project and include adjacent municipalities (Oak Brook and Elmhurst), Fullersburg Woods Historical Foundation, Salt Creek Greenway Association, Robinson Ranch Homeowners Association, Salt Creek Watershed Network, Sierra Club-Prairie Rivers, DuPage County, and the FPDDC (property owner). In FY 2017/2018, DRSCW conducted the in-person meetings included in Table 9 to introduce the project to and obtain feedback from Tier 1 stakeholders.

Table 9. *Meetings with Fullersburg Woods Project Tier 1 Stakeholders held in 2017-2018.*

Date	Stakeholder(s)
July 11, 2017	Forest Preserve District of DuPage County
August 8, 2017	Oak Brook Village Board
August 9, 2017	Sierra Club-Prairie Rivers
August 18, 2017	Representatives of the Fullersburg Woods Historical Foundation
October 2, 2017	Salt Creek Watershed Network
October 17, 2017	Representatives of the Fullersburg Woods Historical Foundation

In addition to the in-person meetings listed above, numerous phone and electronic correspondence occurred with Tier 1 stakeholders. Communication with Tier 1 stakeholders will continue throughout the outreach and engagement period and project design/construction.

Tier 2 stakeholder expands our reach beyond the Tier 1 stakeholders and include the remaining Salt Creek municipalities, IL Paddling Council, League of Women Voters, Trout Unlimited and other environmental and recreation associations. During FY 2017/2018, numerous phone and electronic correspondence occurred with Tier 2 stakeholders.

Survey

Preliminary work on draft survey text began in FY2017/2018. The survey is expected to be completed and disseminated in late FY 2018/2019.

Public Workshops

No action in FY 2017/2018. Public workshops are scheduled for FY 2019/2020.

Phase 3: Develop Communications Strategy and Message

The communications strategy will guide the DRSCW through a public communications process aimed at building support for dam modification and showcasing the benefits and eventual design that the dam modification will take. No action on Phase 3 in FY 2017/2018. Work on Phase 3 is expected to begin in FY 2018/2019 with the development of a project website.

1.6 Southern West Branch Physical Improvement

- Special Condition Listed Completion Date – December 2022
- Status – Concepts are being developed along with the Fawell Dam Modification Plan.

The DRSCW budgeted $500,000 for the period 2018 to 2020. The project will likely focus on enhancing the channel around the Fawell Dam following its modification.

1.7 Southern East Branch Stream Enhancement

- Special Condition Listed Completion Date – December 2023
- Status – In planning

The DRSCW has budgeted $2,500,000 for this project and anticipated expenditures will be made from 2021-2023.

In 2017, DRSCW staff and representatives from the DRSCW Executive Board canoed the southern portion of the East Branch DuPage River and conducted a physical characteristic survey. Data collected included areas of significant streambank erosion and channelization, channel bottom conditions and the locations of pools and riffle sequence and outfalls. Staff also conducted a property ownership assessment of the reach to determine which parcels fall within private and public ownership. This information will be utilized to select the location of the Southern East Branch Stream Enhancement project.

1.8 QUAL 2K Updates for East Branch and Salt Creek

- Special Condition Listed Completion Date – December 2023
- Status – Not yet started

Model preparation, calibration, verification, and alternative evaluation are to begin in 2019. The DRSCW budgeted $112,000 for this effort and anticipates expenditures will be made from 2019 to 2021.

In 2017, the DRSCW gathered continuous DO data at three sites on Salt Creek and five on the East Branch DuPage River that will be utilized in the calibration and verification of the updated Qual 2K models.

1.9 NPS Phosphorus Feasibility Analysis

- Special Condition Listed Completion Date – December 2021
- Status – In planning

The DRSCW budgeted $134,500 for this effort and anticipates the majority of the expenditures will be made from 2018 to 2021.

In 2016, DRSCW contributed $2,500 to the funding of the USGS-Wisconsin Water Science Center research project, "Developing a Framework to Advance Statewide Phosphorus Reduction Credits for Leaf Collection." This study began on 9/1/2016 and was completed by 12/31/17. More information on the leaf litter project can be found at:

https://www.usgs.gov/centers/wisconsin-water-science-center/science/using-leaf-collection-and-street-cleaning-reduce?qt-science_center_objects=0#qt-science_center_objects

1.10. Hammel Woods Dam Modification

- Special Condition Listed Completion Date – December 2023
- Status – in the design and permitting phase

1.10.1 Site Description

The Hammel Woods dam is located at River Mile 10.59, about 300 feet upstream of the Illinois Route 52 bridge in Shorewood. The dam is a straight, broad crest weir approximately 110 feet across and has a total height of about 4 feet as measured from the downstream river bottom. The impoundment is approximately 1600 feet in length and covers about 5.2 acres. The dam blocks approximately 10 species of fish from passing upstream. The impoundment also creates a lake-like habitat that facilitates excess growth of macrophytes and potentially impacts

dissolved oxygen levels. The Forest Preserve District of Will County, a partner in the project, owns the dam and impoundment.

1.10.2 Design Characteristics

The 110-foot weir structure will be removed to base of streambed and footings will remain to provide grade control. A riffle will be constructed immediately downstream of remaining weir structure with added boulders extending downstream to create additional habitat and refuge.

1.10.3 Permitting Requirements

The proposed improvements will require local, state, and federal permits demonstrating compliance with the various jurisdictional regulatory agencies. More specifically, it is anticipated that the improvements will require a Will County Stormwater Management Ordinance permit, and Illinois Department of Natural Resources – Office of Water Resources (IDNR-OWR) Dam Major Modification and Floodway Construction permits.

In addition to the County and IDNR-OWR regulatory requirements, the proposed improvements will also need to comply with both the Will County and US Army Corps of Engineers (USACE) requirements associated with wetlands, Waters of the U.S., buffers, and sediment and erosion control. It is anticipated that the proposed improvements qualify for USACE Regional Permit (RP 5), Aquatic Habitat Restoration, Establishment, and Enhancement, and/or the Corps Nationwide Permit (NWP 53), Removal of Low-Head Dams. Each will also typically require submittal of a Stormwater Pollution Prevention Plan (SWPPP), state and federal threatened and endangered species consultation, and historic preservation consultation as part of the permitting process.

1.10.4 Design Progress Report

Feasibility study has been completed and project is ready to go out for bid for a design/permit/build contract. The bid process will be initiated as soon as Naperville WRC receives its permit, as the majority of funds for this project will be provided by Naperville through their special condition contribution.

1.10.5 Impact Evaluation

Bioassessment monitoring sites located above, below the dam and impoundment have been sampled in 2012 & 2015, and will be sampled again in 2018 as part of the long-term Bioassessment Program. Additional monitoring will be done post-project to evaluate project success.

1.11 Hammel Woods Dam to 119th Street in Plainfield Stream Enhancement

- Special Condition Listed Completion Date – December 2023
- Status – in planning

The LDRWC has budgeted $2,740,000.00 for this project and anticipated expenditures will be made from 2021-2023.

In 2017, LDWRC staff canoed the Lower DuPage River between Plainfield-Naperville Road and Illinois Route 126 and conducted a physical characteristic survey. Data collected included areas of significant streambank erosion and channelization, channel bottom conditions, presence of macrophytes, and the locations of pools and riffle sequence and outfalls. Staff will complete the physical characteristic survey of the Lower DuPage River between Illinois Route 126 and the Hammel Woods dam in the summer of 2018. This information will be utilized to select the location of the Hammel Woods Dam to 119th Street in Plainfield Stream Enhancement project.

1.12 IPS Tool /Project Identification Study

- Special Condition Listed Completion Date – December 2018. It should be noted that the completion date of the IPS Tool/Project Identification Study is listed in the Bolingbrook STP #3 Special Condition as December 31, 2017. This completion date is a typographical error as the completion date for this project negotiated with the IEPA is December 31, 2018.
- Status – Pre analysis database building has been completed and the team is reviewing an update of statistical techniques.

The objective of this project to update the DRSCW's Integration and Prioritization Tool (IPS) and develop a new list of prioritized projects. The update will be accomplished by:

- Including data DRSCW assessment data gathered during the period 2009-2016.
- Including the Lower DuPage River Watershed Coalition for the period 2012-2015. This allows for both a higher number of sites to be included and a wider variety of sites.
- Including IEPA assessment data for the DuPage, Fox, Des Plaines and Kankakee River basins (water quality, biological and habitat data). Data was supplied by IEPA in 2017.
- Updating of the land use and impervious surface mapping.
- Utilization of updated statistical tools.

To date, the team has compiled the database that will be used to model the causal relationships. The area covered by the model has increased from approximately 360 square miles to 530 square miles (inclusion of the Lower DuPage) but the database will include several other watersheds with higher quality sites with a lower level of anthropomorphic impacts. The increase in the number of and variety of sites valuated will increase the accuracy of the Tool.

The Lower DuPage River Watershed Coalition and the DRSCW are funding the tool development jointly.

2.0 Chloride Abatement Program

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 to reduce chlorides and costs, in collaboration with APWA Chicago Metro Chapter. The following year, the DRSCW added a second workshop that targeted contractors responsible for snow and ice management of parking lots and sidewalks into an annual rotation. The DRSCW executes two workshops every year targeting personnel responsible for 1) public roads and 2) parking lots and sidewalks. Since 2007, our program has provided training and resources for:

- Unduplicated Counts for Public Roads (2008-2017) = 788 attendees representing 173 organizations.
- Unduplicated Counts for Parking Lots & Sidewalks (2009-2017) = 452 attendees representing 144 organizations.

Additionally, the DRSCW held a third workshop on November 18, 2014, in collaboration with Monroe Truck Equipment, which focused solely on equipment calibration. Calibrating equipment is an immediate, low-cost BMPs that can be implemented without capital upgrades.

- *Unduplicated Counts for Calibration Workshop (2014) = 16 attendees representing 1 organization (*these numbers exclude attendees and organizations that participated in any of the public roads and parking lots and sidewalks workshops)

Plate 4. *Demonstrations of equipment calibration at DRSCW Chloride Management Workshops.*

Two chloride reduction workshops were held during the reporting period April 1, 2017 to March 31, 2018.

The public roads deicing workshop held at DuPage County DOT on October 12, 2017 with the following agenda:

- 7:00 - 7:25 Registration and Breakfast
- 7:25 -7:30 Welcome and Housekeeping- Mike Tuman, DuPage County DOT & Sponsor Recognition – Denver Preston, K-Tech Specialty Coatings
- 7:30 – 7:45 Salt Use & The Environment in the DRSCW Program Area - Stephen McCracken, The Conservation Foundation/DRSCW
- 7:45 – 8:00 MS4 Inspections for Public Works Facilities, Dan Bounds, Baxter & Woodman
- 8:00 – 8:45 Building an Award Winning Snowfighting Program, Bryan Beitzel, Village of Buffalo Grove
- 8:45 –9:00 BREAK (includes exhibitor mic time)
- 9:05 – 9:30 Automated Systems, Dave Kjederquist, Swenson
- 9:30– 10:00 Choosing the Right Blades, Gardi Willis, Kueper North America
- 10:00 – 10:30 Pavement Temperature Sensors, Mark DeVries, Vaisala
- 10:30 – 10:45 Break (includes exhibitor mic time)
- 10:50 – 11:20 Chloride Offset Program, Bryan Wagner, Illinois Tollway; Rick Radde, Village of Bensenville
- 11:20 – 11:55 Shared Services, Todd Hoppenstedt, Village of Montgomery
- 11:55 – 12:00 Wrap Up, Evaluations, Equipment Show

Plate 5. *DRSCW Public Road Deicing Workshop brochure, 2017.*

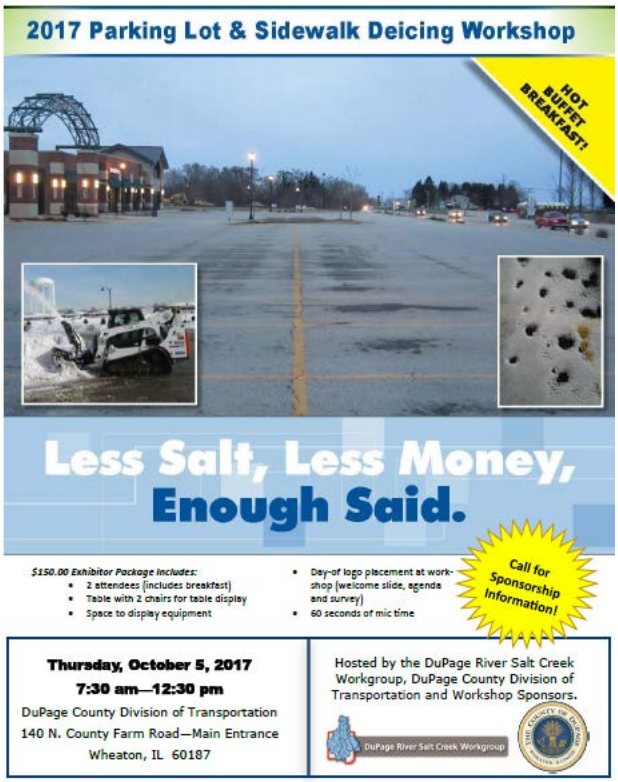
Attendance – 149 registered, 11 presenters/staff, 6 committee members/guests; 9 sponsors/exhibitors = 175 total. All participants received a certificate of attendance. We received 87 feedback forms from participants.

Plate 6. *Photographs of the DRSCW Public Roads Deicing Workshop, 2017.*

The parking lots and sidewalks deicing workshop was held at DuPage County DOT on October 5, 2017 with the following agenda:

- Ambient conditions and regulatory update: Stephen McCracken, The Conservation Foundation/DRSCW
- Information on developing efficient and cost-effective snow fighting operations, appropriate product selection, equipment selection, application rates, equipment calibration, ambient conditions monitoring. Presenters: Connie Fortin, Fortin Consulting and Chis Walsh, (former Public Works Director with City of Beloit, WI)
- Test on workshop materials.

Plate 7. *DRSCW Parking Lots and Sidewalks Deicing Workshop brochure, 2017.*



Attendance - 82 registrations, 7 presenters/staff, 6 exhibitors/staff = 95 total. All participants received a training certificate and participants who successfully completed the test are recognized on DuPage County Stormwater Management's Water Quality – Pollution Prevention/Good Housekeeping web page. The DRCCW received 65 program evaluations from participants.

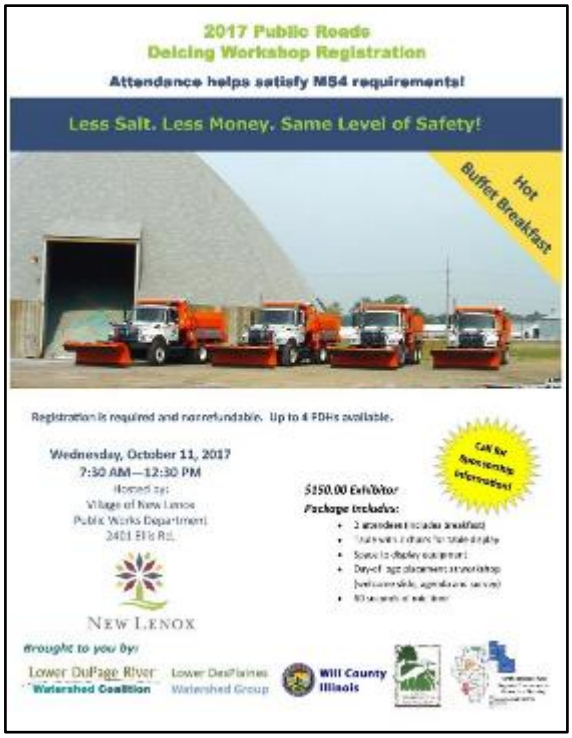
Plate 8. *Photographs from the DRSCW Parking Lots and Sidewalks Workshop, 2017.*

Lower DuPage River Watershed Coalition (LDRWC) in partnership with the Lower Des Plaines Watershed Group (LDWG) executed two chloride reduction workshops in the fall of 2017.

The public roads deicing workshop was held at the Village of New Lenox's Public Works Facility on October 11, 2017 with the following agenda:

- 7:30 – 8:00 Registration and Breakfast
- 8:00 – 8:05 Welcome/ Housekeeping, Sean Vandenbergh, Village of New Lenox
- 8:05 – 8:30 Watershed Activities/ Outreach/ Environmental Impacts, Jennifer Hammer, TCF
- 8:30 – 8:45 Time Limited Water Quality Standard, Jennifer Wasik, MWRD
- 8:45-9:00 MS4 Requirements and Recordkeeping, John Kawka, MEI
- 9:00 – 9:10 BREAK (Includes Exhibitor Mic Time)
- 9:10 –-9:55 Maximizing the Efficiency of Your Winter Maintenance Program, Wilf Nixon, Salt Institute
- 9:55 – 10:40 Incorporating Automated Systems, Dave Kjederquist, Swenson
- 10:40-10:50 BREAK (Includes Exhibitor Mic Time)
- 10:50-11:20 Choosing the Right Blades, Gardi Willis, Kueper North America
- 11:20-11:55 Temperature Sensors, Mark DeVries, Vaisala
- 11:55-12:25 Shared Services, Todd Hoppenstedt, Village of Montgomery
- 12:25-12:30 Closing Remarks/ Thank Yous/ Evaluations

Plate 9. *LDRWC Public Roads Deicing Workshop Brochure, 2017.*



Attendance – 88 registered, 9 presenters, 3 staff, 6 exhibitors = 106 total. All participants received a certificate of attendance. We received 60 feedback forms from participants.

Plate 10. *Photographs from the LDRWC Public Roads Deicing Workshop, 2017.*

The parking lots and sidewalks deicing workshop was held at the Village of New Lenox's Public Works Facility on October 4, 2017 with the following agenda:

- Ambient conditions and regulatory update and information on developing efficient and cost-effective snow fighting operations, appropriate product selection, equipment selection, application rates, equipment calibration, ambient conditions monitoring. Presenters: Connie Fortin, Fortin Consulting and Chis Walsh, (former Public Works Director with City of Beloit, WI)
- Test on workshop materials.

Attendance - 18 registrations, 2 presenters, 2 staff, 2 exhibitors = 24 total. All participants received a training certificate. The LDRWC received 18 program evaluations from participants.

Plate 11. *Photographs from the LDRWC Parking Lots and Sidewalks Workshop, 2017.*

Additionally, during this reporting period, the LDRWC developed seasonal outreach campaigns for member to use in residential outreach efforts. The winter "Salt Smart. Save More." campaign toolkit was distributed on September 28, 2018. The toolkit included social media posts; text for websites, emails and newsletters; sample letter to editor/ op-ed and press release; brochure; bill insert. A suggested implementation calendar was provided for consideration. LDRWC members purchased "Salt Smart. Save More." truck magnets for municipal operations and cups to distribute to residents.

Plate 12. *LDRWC Salt Smart logo.*

Plate 13. *LDRWC Salt Smart Cups and Vehicle Magnets.*

Plate 14. *Salt Smart Community Brochure.*

SALT SMART. SAVE MORE.

SALT SMART SAVE MORE

Midwest winters can be tough on our roads and commuters. Road salt is used to keep our roads safe, but the cost of using too much salt goes beyond the pavement.

Excess road salt damages vehicles and infrastructure, harms our pets and plants and degrades our rivers and wetlands. [Town] is using best winter practices to keep you safe while using less salt.

SALT SMART AT HOME

There is such a thing as too much salt!

Using the right amount of salt could make a big difference for our local waterways—and our pocketbooks. Using the right amount of salt keeps you safe, saves money and protects our river. Join [town] and reduce the amount of salt used on your driveways and sidewalks.

OUR COMMITMENT:
We will strive to use the best technology and practices within our means to keep roads and sidewalks safe all winter long. Smart salt use will ensure [Town] uses tax dollars responsibly and keeps our precious water resources healthy for generations to come.

SALT SMART. SAVE MORE.

Here are five tips for salting smart this winter:

1. **Shovel first.** Clear all snow from driveway and sidewalks before it turns to ice. Salt should only be used after the snow is removed and only in areas needed for safety.

2. **Size up.** More salt does not mean more melting. A 12 ounce coffee mug of salt should be enough for a 20-ft driveway or about 10 sidewalk squares.

3. **Spread.** Distribute salt evenly, not in clumps.

4. **Sweep.** If you see leftover salt on the ground after the ice melts, then you've used too much! Sweep up leftover salt to keep it out of our rivers and streams.

5. **Switch.** Rock salt stops working if the temperature is below 15 degrees. When temperatures drop that low, switch to sand for traction or choose a different deicer formulated for colder temperatures.

[City LOGO]

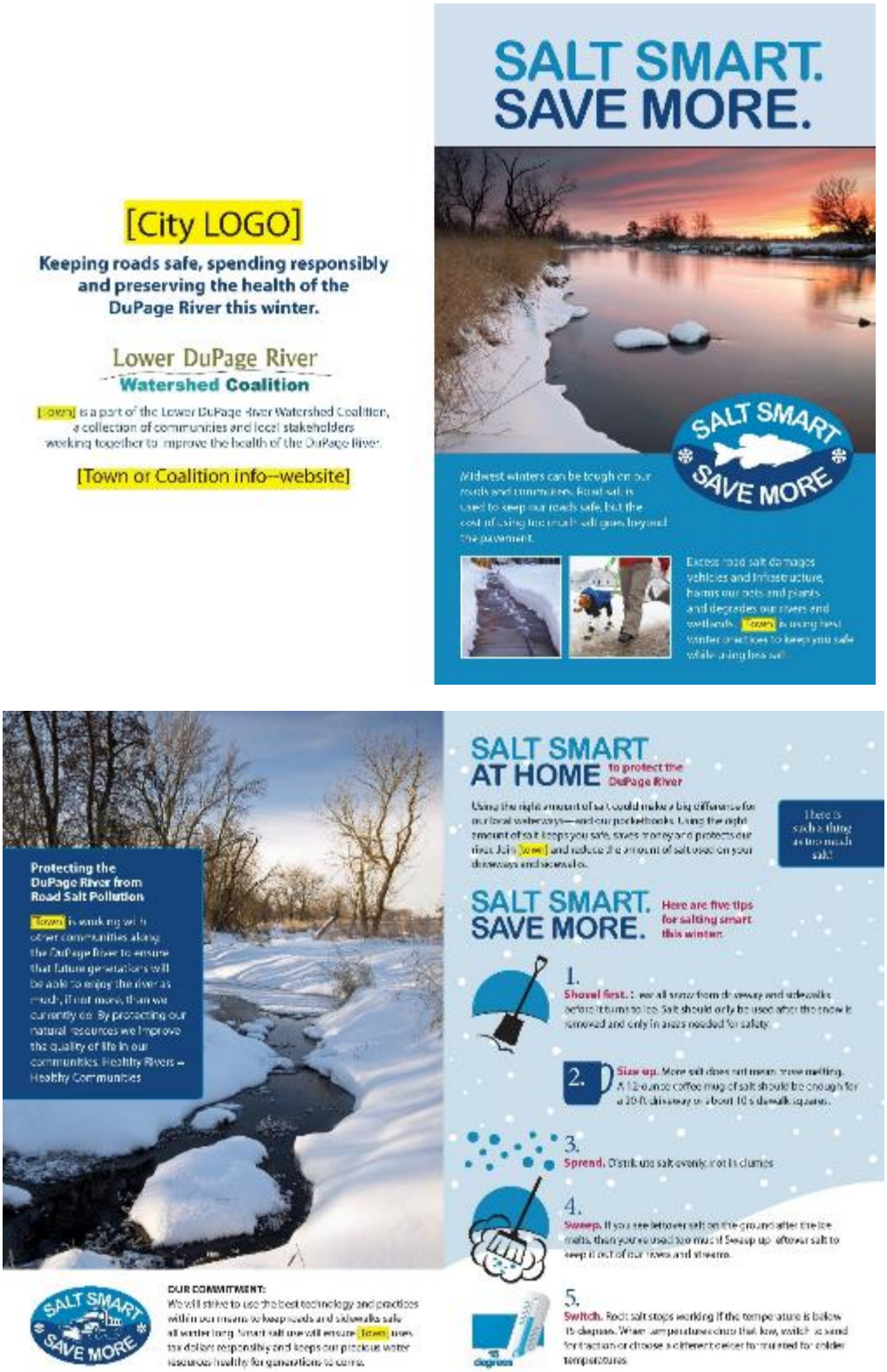
Keeping roads safe, spending responsibly and preserving the health of the DuPage River this winter.

Lower DuPage River
Watershed Coalition

[Town] is a part of the Lower DuPage River Watershed Coalition, a collection of communities and local stakeholders working together to improve the health of the DuPage River.

[Town or Coalition info--website]

Plate 15. *Salt Smart at Home Brochure.*



2.2 Tracking BMP Adoption

The DRSCW has attempted to track adoption of sensible salting BMPs in the program area since 2007. Monitoring ambient chloride concentrations has proven an imperfect metric for tracking efficiency trends in winter salt use. Tracking target BMP adoption in the program area provides opportunities to evaluate the impacts of the chloride management workshops; identify material for future workshops and form suppositions about salt use per unit of service expended inside the program area relative to 2006 levels.

In 2007, 2010, 2012, 2014, and 2016, the DRSCW distributed a questionnaire to approximately 80 municipal highway operations and public works agencies to obtain information about deicing practices throughout the program area. The findings of the 2016 questionnaires are summarized in attachment 3. A new questionnaire will be distributed in spring of 2018 and the results will be supplied in the 2019 Annual Report.

Forty-three (43) agencies responded to the 2016 survey, the highest number of agencies ever responding to a program survey. The increase in use of dry NaCl and drop in liquid NaCl were both functions of the increased participation in the survey and do not appear to reflect a move away from application BMPs.

Almost all agencies in the program area have covered permanent salt storage facilities but there still some opportunities for storage and salt handling improvements across the watersheds, notably sweeping up loading areas post loading.

The 2016 survey did show increased implementation of certain priority best management practices:

- Spreading equipment calibration
- Use of weather forecasting for deicing response decisions
- Use of pavement temperature information for deicing response decisions

The survey shows expanded use of anti-icing (pretreatment) BMPs throughout the watershed, and continued use and testing of alternative deicing materials and additives to reduce total salt usage. Agencies who are still reporting use of more than 400 pounds of salt per lane mile may be prioritized by the Chloride Reduction Program for outreach and BMP information in 2018.

The 2016 survey highlights significant local deicing program management oversite improvements, particularly with control over application rates. Recordkeeping improvements have been implemented throughout the watershed area to better manage the quantity of salt being used in different situations. Nine out of 42 responses reported changes made to their program due to local deicing program workshops. Common methods of informing the public of

policy or local program changes include the use of city or township website, newsletter, social media, and press releases.

2.3 Monitoring

Ambient monitoring of winter conductivity was carried out at six locations in the program area in 2014-15 (4 sites DRSCW and 2 MWRD) and three locations in 2016-17 (1 DRSCW and 2 MWRD). Conductivity is used to calculate chloride concentrations based on a relationship established by the DRSCW in 2007. The estimated concentrations are shown below in Figures 8- 17.

Figure 8. *Estimated Chloride Concentrations at WBMG, 12/2/15-3/23/16*

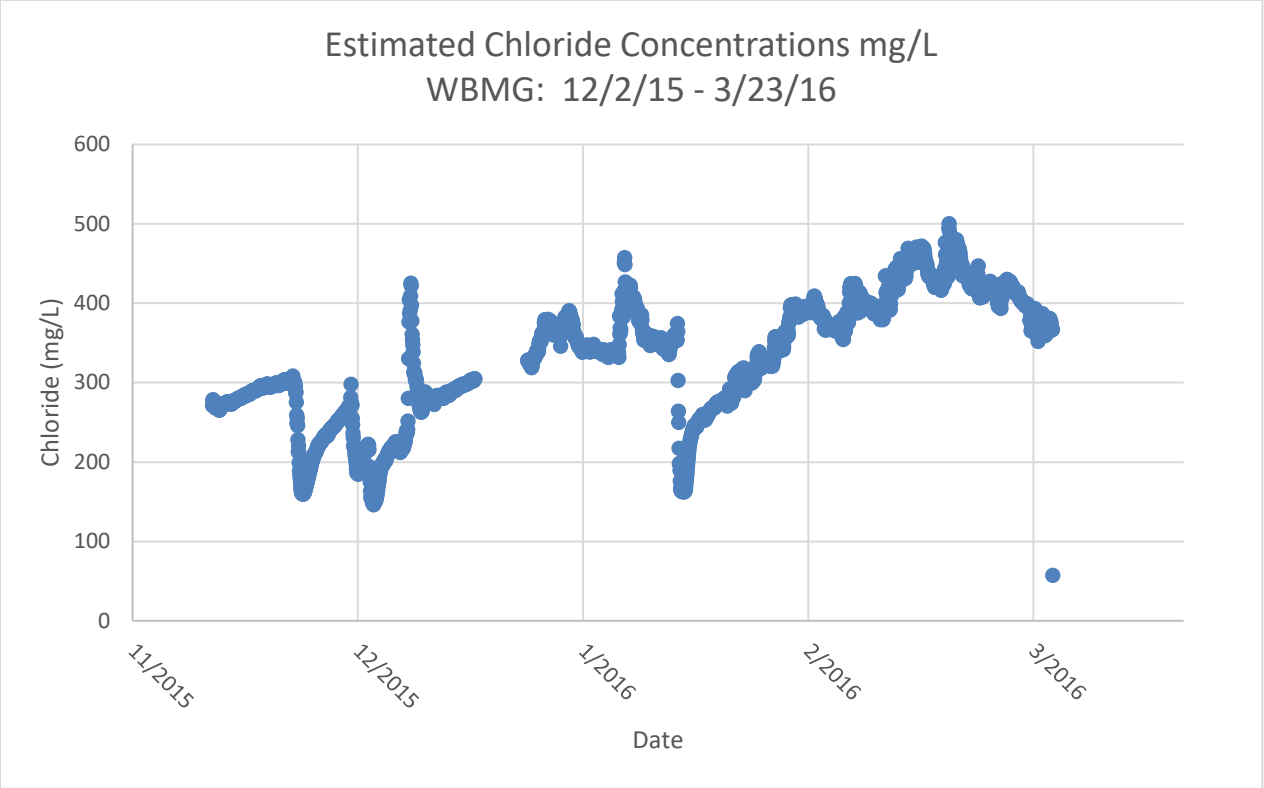


Figure 9. *Estimated Chloride Concentrations at WBAD, 12/7/15-3/24/16*

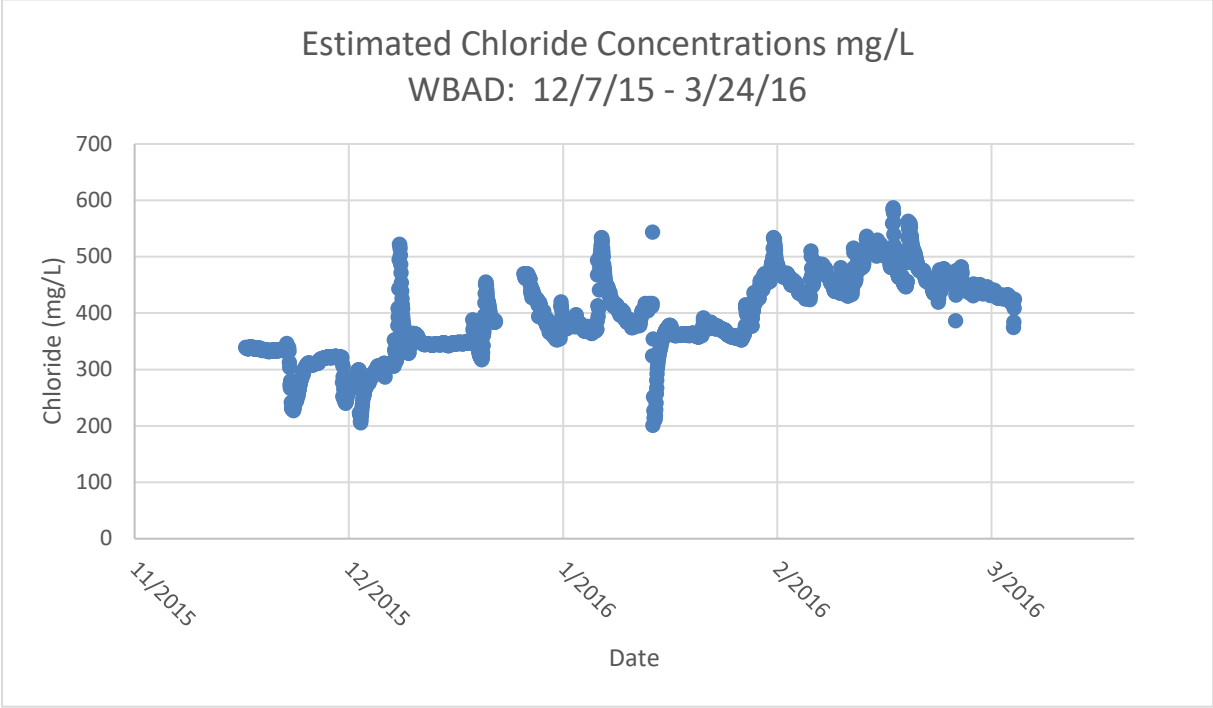


Figure 10. *Estimate Chloride Concentrations at EBAD, 12/3/15-3/24/16*

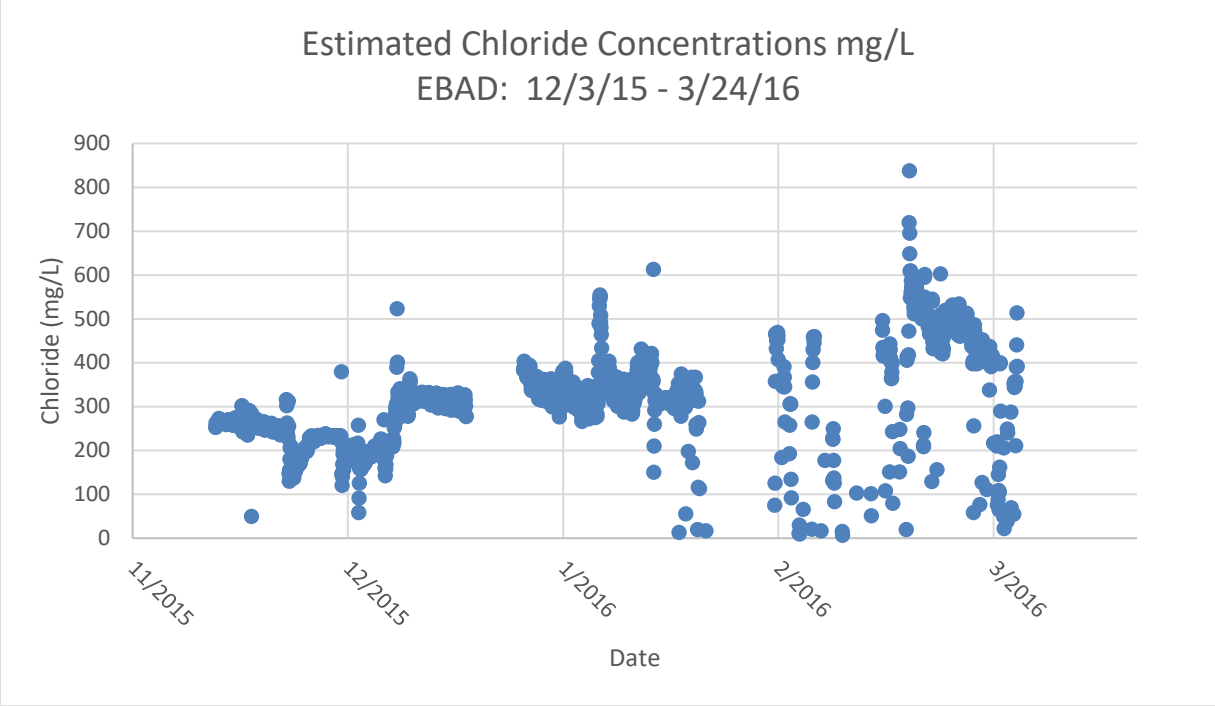


Figure 11. *Estimate Chloride Concentrations at EBHR, 12/1/15-3/4/16*

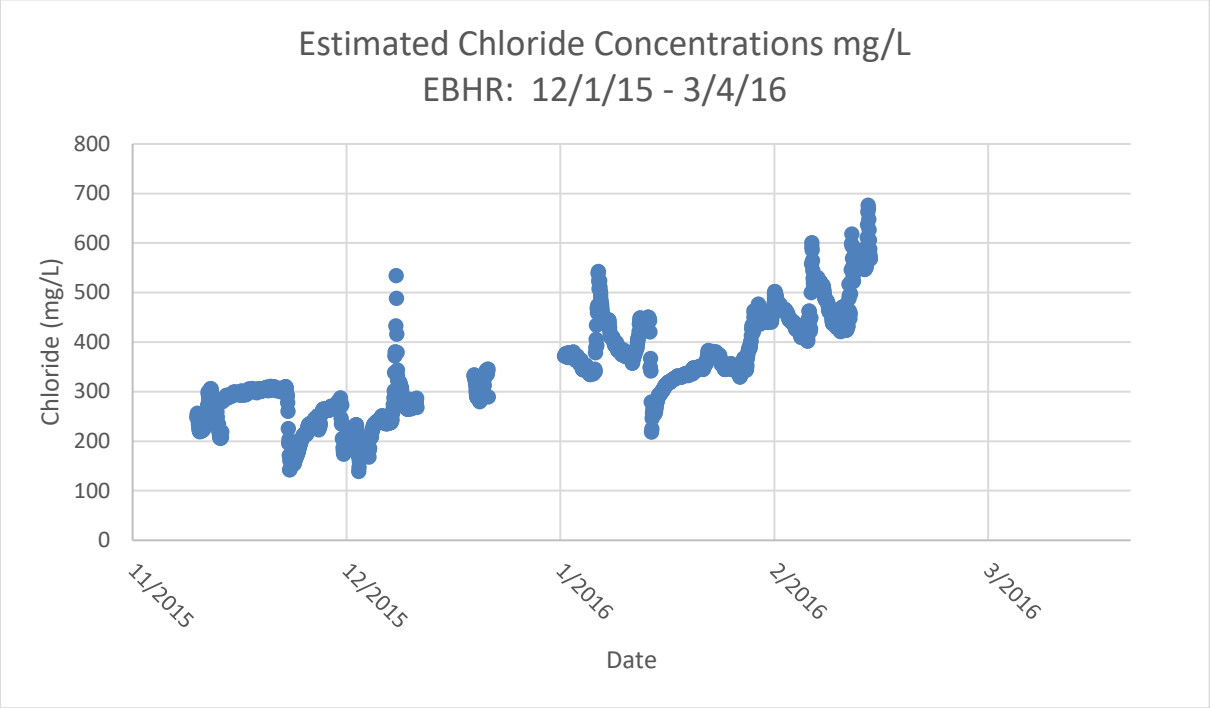


Figure 12. *Estimated Chloride Concentrations at EBHR, 12/7/16-12/22/16*

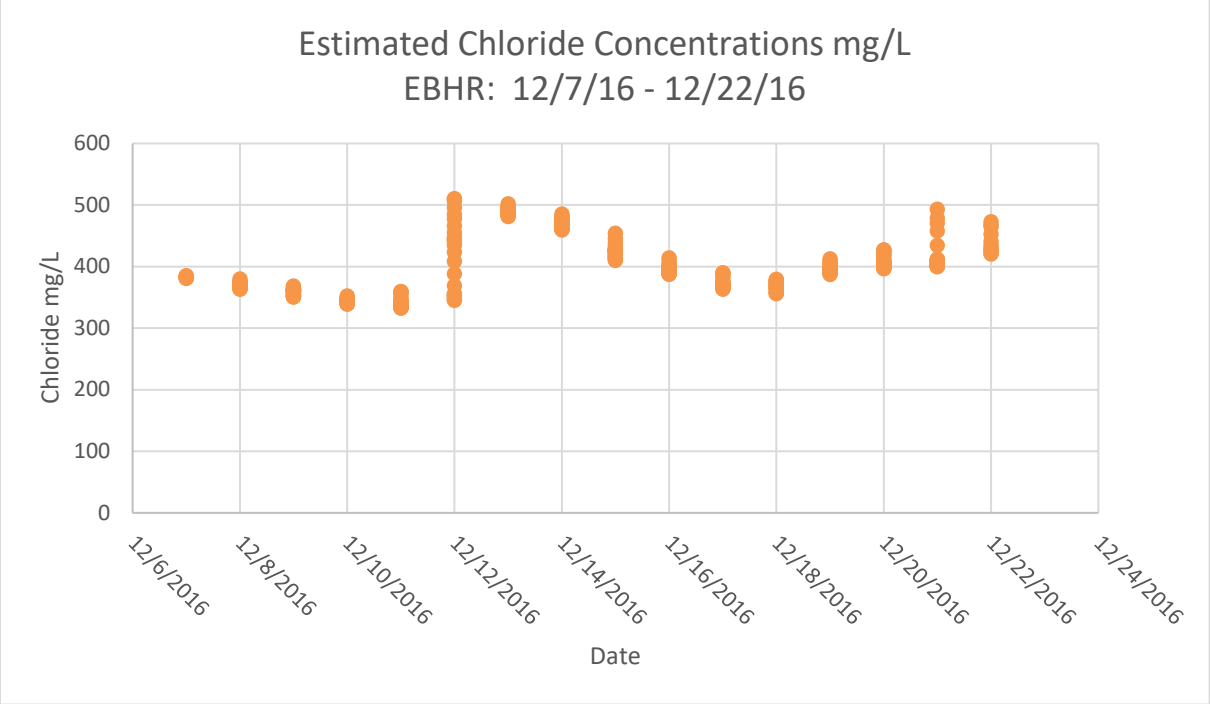


Figure 13. *Estimate Chloride Concentrations at EBHR, 1/9/17-1/30/17*

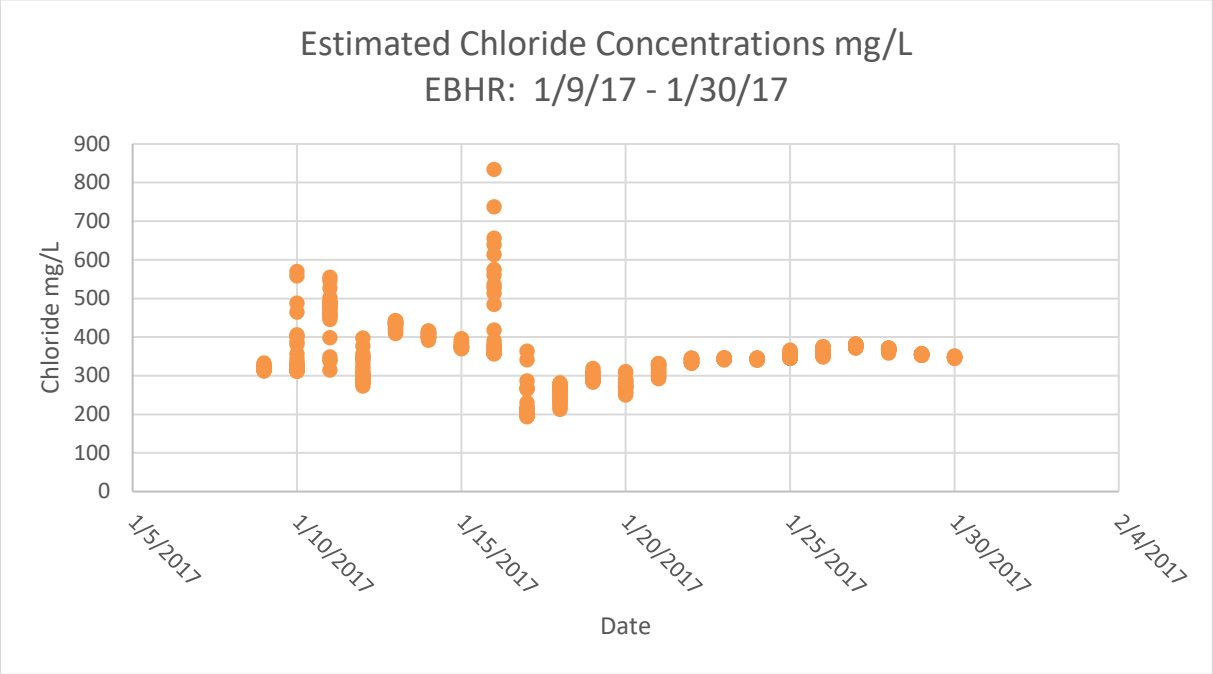


Figure 14. *Estimated Chloride Concentrations at JFK Blvd, 12/1/15-3/31/16*

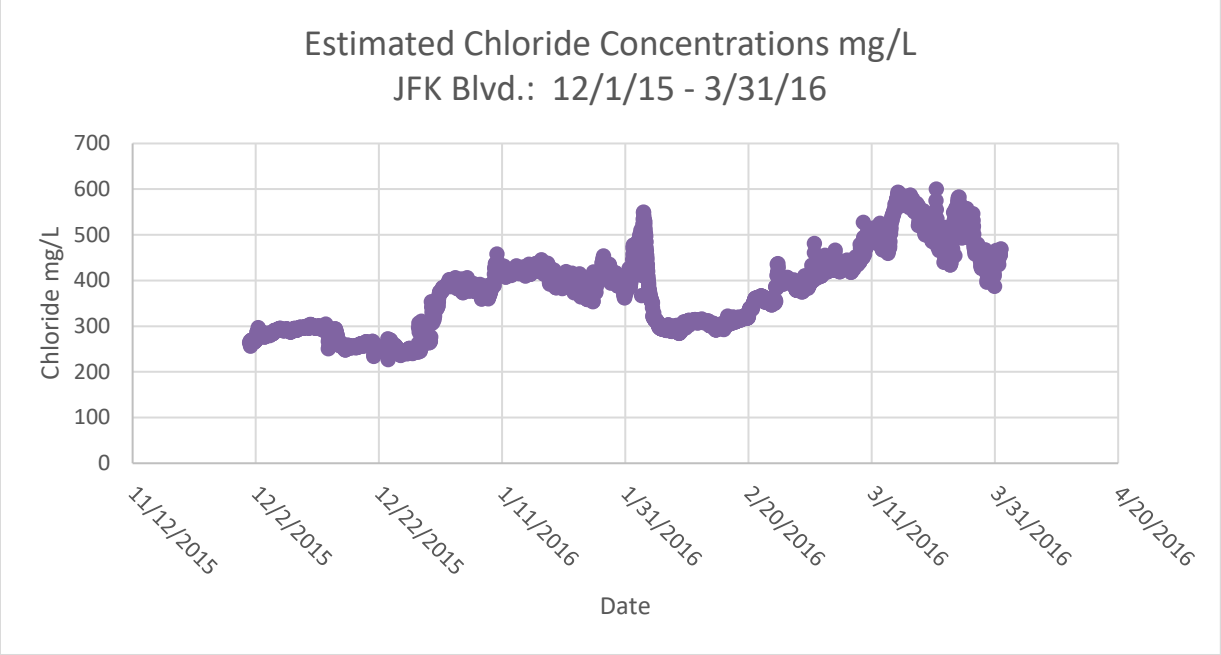


Figure 15. *Estimated Chloride Concentration at JFK Blvd, 12/1/16-1/11/17*

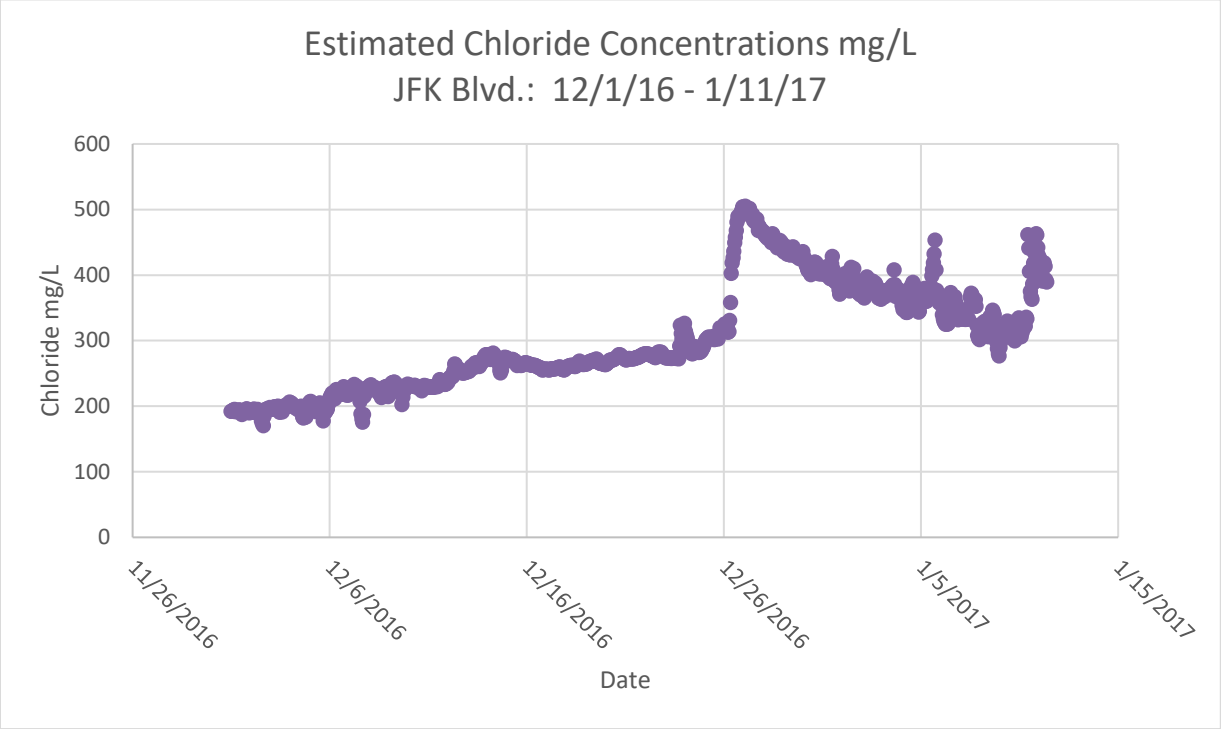


Figure 16. *Estimated Chloride Concentrations at Wolf Road, 12/1/15-3/30/16*

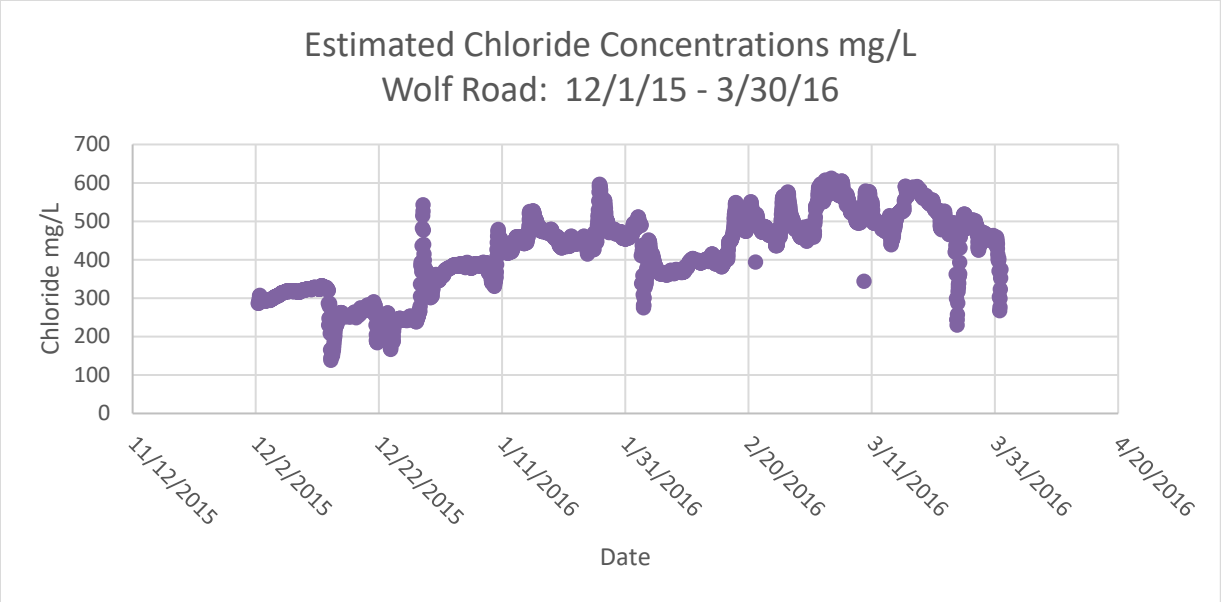
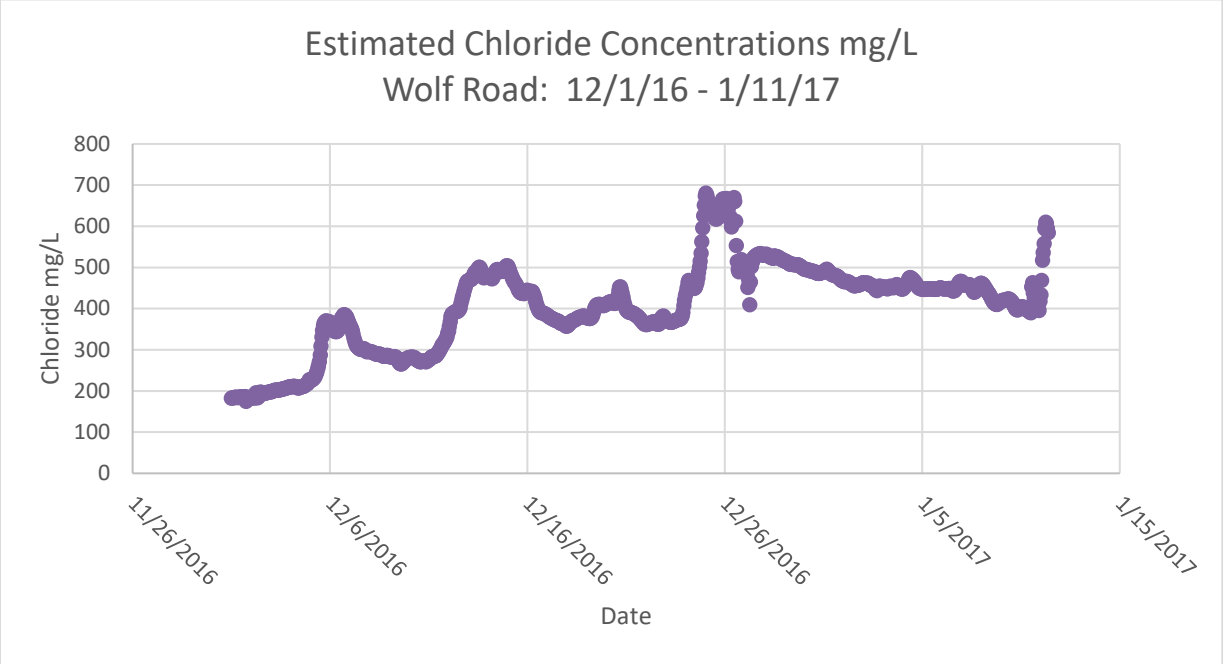


Figure 17. *Estimated Chloride Concentrations at Wolf Road, 12//1/16-1/11/17*



3.0 Nutrient Implementation Plan

3.1 Development of a Basin Wide Nutrient Trading Program

Special Condition 8.c. allows the DRSCW to develop and implement a trading program for the POTWs in the DRSCW watersheds. The nutrient trading program will allow for the re-allocation of phosphorus loadings between two or more POTWs in the DRSCW watersheds as long as the following two conditions have been met:

- The trade allocated loadings will not exceed the anticipated loading from the uniform application of the applicable 1.0 mg/L monthly average effluent limitation among the POTW permits in the DRSCW watersheds; and
- The trade allocated loadings also 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 Condition 8.c. allows for the implementation of the nutrient trading program within 10-year permit cycle by allowing the IEPA to modify the NPDES permits if the nutrient trading program meets the criteria detailed above.
- The first step identified by the DRSCW was to evaluate the feasibility of nutrient trading within the DRSCW watersheds. In order to acquire the competence to do this, the DRSCW conducted a search for an outside consultant to lead the process in late 2016/early 2017. As a result of the qualifications-based selection process, the team of TetraTech/Kieser and Assoc./Abt Assoc./Earth & Water Group was selected to lead the development of a basin wide nutrient trading program for the DRSCW watersheds.

The Project's scope of work is broken into 2 Phases and includes nine (9) tasks:

- Phase I: Determining feasibility/viability of nutrient trading
- Task 1: Project Kick-off and Schedule Analysis (completed in 2017)
- Task 2: Develop POTW Data Collection Checklist (completed in 2017)
- Task 3: Analyze and Define Eligibility Criteria (scheduled for 2018)
- Task 4: Analyze POTW Data and Fill Data Gaps (initiated in 2017)
- Task 5: Develop/Analyze POTW Nutrient Reduction Costs (initiated in 2017)
- Task 6: Evaluate PS-NPS and Stream Restoration Trading (scope change in 2017, scheduled for 2018)

Phase II: Analyzing and developing appropriate market structures

- Task 7: Develop Market Structure Recommendations (scheduled for late 2018 to 2019)
- Task 8: Prepare Nutrient Trading Framework, Guidelines and Templates (scheduled for 2019)
- Task 9: Prepare Nutrient Trading Program Final Report (scheduled for 2020)

Estimated date of completion for the basin wide nutrient trading program is FY 2020-2021. Brief descriptions of the work completed between April 1, 2017 and March 31, 2018 by Task is included below.

Task 1: Project Kick-off and Schedule Analysis

The Project Kick-off Meeting was held on August 29, 2017 at the Village of Itasca. Attendees included representatives from the IEPA, USEPA Region 5, MWRD, the Sierra Club and Prairie River Network, DRSCW Special Condition Permit Holders, and the Consultant Team. The objective of the Kick-Off Meeting was to establish common goals and expectations for the project. Minutes from the meeting including the sign-in sheet, Key Discussion Points and Action Items are included in Attachment 4.

Immediately following the Project Kick-Off meeting, representative from the DRSCW Executive Board, IEPA, USEPA, Sierra Club, Prairie Rivers Network and the Consultant Team held a round-table to further discuss nutrient trading in the DuPage River, Salt Creek and Lower DuPage watersheds.

Task 2. Develop POTW Data Collection Checklist

As required by the Special Condition Permit, 30 POTWs within the DuPage River Salt Creek and Lower DuPage River watershed will develop Phosphorus Discharge Optimization Plans (PDOPs) and Feasibility Studies (FSs) evaluating effluent limits of 1.0 mg/L, 0.5 mg/L and 0.1 mg/L of total phosphorus for monthly, seasonal and annual averages within 24-months from the date in which the permit is issued. Seventeen (17) POTWs have PDOP and FS due dates in 2017, 5 in 2018, 1 in 2019 and 7 have not been issued a final permit (Table 9).

As the PDOPs and FSs will provide detailed information on POTW characteristics and treatment costs, they will be a primary document for calculating cost differentials and determining supply and demand for Nutrient Trading. In order to not delay this analysis, a checklist/information sheet was developed for the 13 plants whose PDOPs and FSs are due in 2018 and beyond to obtain the information needed by the Consultant Team for analysis. The checklist/information

sheet was disseminated to all POTWs with PDOPs and FSs due dates later than 2018. To date, seven questionnaires have been received.

Task 4: Analyze POTW Data and Fill Data Gaps

Upon receipt, DRSCW staff and the Consultant Team reviewed the PDOPs and FSs. A memo dated November 20, 2018 was prepared by the Consultant Team summarizing their review of the available PDOPs and FSs and identified potential data needs. This memo was shared with the Project Committee at their November 27, 2017 meeting. Staff has been working with the POTWs to collect the additional data needed to complete the analysis.

Task 5: Develop/Analyze POTW Nutrient Reduction Costs

Preliminary analysis of cost differentials at each treatment level (TP of 0.1, 0.5 and 1 mg/L) has been started to determine supply and demand. Data used for this analysis was obtained from the PDOPs, FSs, and checklist/information sheets. Preliminary findings were presented to the IEPA, USEPA, and DRSCW Special Condition permit holders at the Special Condition Permit Holder Forum held on February 1, 2018 at the Village of Lombard.

Task 6: Evaluate PS-NPS and Stream Restoration Trading

The original Project scope of work had the majority of the resources focused on the development of a point source to point source nutrient trading program. The scope of work did call for the evaluation of three projects for stream restoration crediting as well as the development of a white paper to discuss the feasibility point source to non-point source (green infrastructure BMPs) trading. However, after the August 29, 2017 Project Kick-off Meeting, it was apparent that the analysis effort should be more equitably split between the point source to point source trading and stream restoration crediting. Following negotiations with the Consultant Team, on December 13, 2017, the DRSCW voted to amend the scope of work for a more equitable distribution of resources between point source to point source trading and stream restoration crediting. No change in contract value occurred as the results of the revised scope. Monies were reallocated from point source to point source trading to stream restoration crediting by scaling back the comprehensive analysis of the PDOPs and FSs, using the early PDOPs and FSs to generate representative data for the POTWs with later submittal dates and focusing on existing regulatory drivers.

Table 10. *NPDES Permit Effective Dates and Dates of Completion for the PDOP & Feasibility Studies.*

Agency Members	IL NPDES	Expiration	Final Effective Date	Date of PDOP & Feasibility Completion	Status
DuPage River Salt Creek Workgroup (DRSCW)					
Addison - North	IL0033812	12/31/2012	1/1/2016	12/31/2017	Received
Downers Grove SD	IL0028380	8/31/2012	8/1/2015	7/31/2017	Received
DuPage County Greene Valley	IL0031844	3/31/2011	9/1/2015	8/31/2017	Received
Itasca	IL0026280	8/31/2015	9/18/2015	9/17/2017	Received
Bolingbrook #1	IL0032689	9/30/2011	9/23/2015	9/22/2017	
Glenbard WW Authority	IL0021547	9/30/2011	9/23/2015	9/22/2017	Received
Roselle - Devlin	IL0030813	8/31/2011	9/23/2015	9/22/2017	Received
Roselle - Botterman	IL0048721	12/31/2012	9/23/2015	9/22/2017	Received
Bartlett	IL0027618	1/31/2015	10/1/2015	9/30/2017	Received
Bloomingdale	IL0021130	8/31/2012	10/1/2015	9/30/2017	Received
Carol Stream	IL0026352	1/31/2013	10/1/2015	9/30/2017	Received
Glendale Heights	IL0028967	3/31/2011	10/1/2015	9/30/2017	Received
Hanover Park	IL0034479	7/31/2012	10/1/2015	9/30/2017	Received
West Chicago	IL0023469	6/30/2011	10/1/2015	9/30/2017	Received
Bensenville	IL0021849	7/31/2011	11/1/2015	10/31/2017	Received
Addison - AJ LaRocca	IL0027367	12/31/2012	1/1/2016	12/31/2017	Received
Salt Creek SD	IL0030953	9/30/2015	5/1/2016	5/1/2018	Questionnaire Received
Bolingbrook #2	IL0032735	8/31/2015	7/1/2016	7/1/2018	
Wheaton SD	IL0031739	3/31/2016	8/1/2016	8/1/2018	Received
Wood Dale - South	IL0034274	4/30/2016	1/1/2017	1/1/2019	Questionnaire Received
Elmhurst	IL0028746	2/29/2016	*		Questionnaire Received
MWRDGC	IL0036340	8/31/2012	*		Questionnaire Received
MWRDGC	IL0036137	3/31/2010	*		Questionnaire Received
Wood Dale - North	IL0020061	5/31/2016	*		Questionnaire Received
Lower DuPage River Watershed Coalition (LDRWC)					
Naperville Springbrook WRC	IL0034061	4/30/2016	*		Questionnaire Received
Bolingbrook STP #3	IL0069744	10/31/2015	7/1/2016	7/1/2018	
Plainfield N STP	IL0074373	4/30/2017	*		Questionnaire Received
Joliet Aux Sable WWTP	IL0076414		*		
Crest Hill West STP	IL0021121		10/1/2015	9/30/2017	Received
Village of Minooka STP	IL0055913	4/30/2021	5/1/2016	5/1/2018	
* Final Permit has not been issued.					

Attachment 1

DRSCW SPECIAL CONDITIONS

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 CONDTIONS

Bolingbrook STP#3 Special Condition XX.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

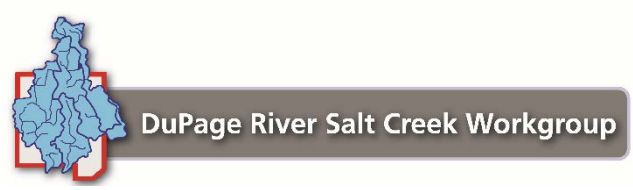
9. The Permittee shall monitor the wastewater effluent, consistent with the monitoring requirements on Page 2 of this permit, for total phosphorus, dissolved phosphorus, nitrate/nitrite, total Kjeldahl nitrogen (TKN), ammonia, total nitrogen (calculated), alkalinity and temperature at least once a month.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

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

ATTACHMENT 3

Chloride Education and Reduction Program

2016 Deicing Program Survey



BAXTER & WOODMAN Consulting Engineers

DuPage River Salt Creek Workgroup

Chloride Education and Reduction Program
2016 Deicing Program Survey

March 16, 2017

Section 1
Background and Purpose

The DuPage River Salt Creek Workgroup (DRSCW) is a coalition of communities, sanitary districts, environmental organizations, and professionals working to improve the ecological health of Salt Creek and the Upper DuPage River. DRSCW is responding to water quality requirements for chloride as the East and West Branch of the DuPage River and Salt Creek have been identified as having chloride related impairments. Total Maximum Daily Load (TMDL) analysis performed by the Illinois Environmental Protection Agency recommended significant reductions in chloride loading for each of the streams to meet the water quality standard for chloride (500 mg/L).

DRSCW formed a Chloride Committee and the Chloride Education and Reduction Program to develop and promote alternatives to conventional roadway deicing practices and guide the implementation of the alternatives. An element of the program is gathering information from municipal deicing programs via survey questionnaires to benchmark municipal activities and identify positive changes in protocols. This report serves to summarize the responses received from the 2016 deicing program survey.

Funding for the program and this report is provided in part by the Illinois Environmental Protection Agency through Section 319 of the Clean Water Act and DRSCW member dues.

1.1 Background Information

Municipal road salting was identified as a source of chloride loading to DRSCW watersheds. As a result, DRSCW distributed a survey questionnaire to about 80 municipalities and public works agencies in November 2006 and April 2007 to obtain baseline information about deicing practices throughout the watersheds. Thirty-nine responses to the survey were received, forming an informed baseline of the deicing programs implemented in the watersheds. A similar survey was distributed in 2010. Thirty-two public agencies responded to the 2010 survey which helped to note positive changes in local deicing practices. In 2012 and 2014, the survey generated 34 and 27 responses respectively, which further documented the chloride reduction practices. Forty-three (43) agencies responded to the 2016 survey, the most agencies ever responding to a program survey.

1.2 Goals of the Questionnaires

The 2016 Deicing Program Survey was conducted in the spring of 2016 to follow up with the agencies on any changes and/or improvements in their deicing programs, potentially because of DRSCW Chloride Reduction Program efforts, and any resulting effects on salt application rates.

The 2016 survey questionnaire asked for information about deicing practices and strategies per the following categories:

- General deicing and snow removal information
- Deicing and snow removal equipment

- Application rates
- Salt storage
- Equipment maintenance and calibration
- Management and record-keeping

The responses to the survey are summarized in Section 2 of this report. The responses are compared to those received in earlier surveys to determine if any changes or improvements have occurred. The survey and response data are included in **Appendix A**.

Section 2
Survey Responses

2.1 Survey Responses

Forty-three agencies responded to the 2016 survey. The following subsections summarize the responses in each of the categories described in Section 1. The survey and all responses are included in **Appendix A** of this report. Note that not all agencies provided responses to all questions, and some agencies answered some questions in different ways, resulting in some inconsistencies in survey results.

2.1.1 General Deicing and Snow Removal Information

The survey asked agencies for general deicing and snow removal information. All responding agencies provided some information. Survey responses indicated approximately 10,800 lane miles of road serviced by deicing programs throughout the watersheds.

2.1.1.1 Salt Application and Price

The majority of agencies indicated an average salt application rate of 200-300 pounds per lane mile (lbs/lm). **Figure 2-1 shows** the respondent's salt application rate distribution from 2010 to 2016.

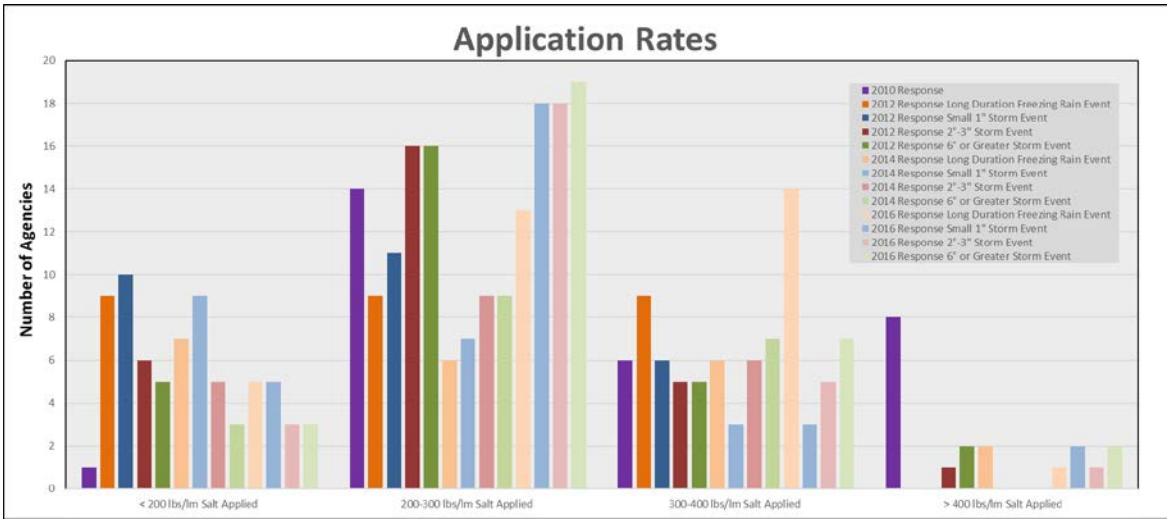


Figure 2-1 – Average Salt Application Rates

Regarding salt prices, 26 of the 43 agencies responding indicated an increase in salt or deicing product prices over the past few years. Eleven agencies reported a decrease in salt or deicing product price over the past few years. Nine agencies indicated that product prices have remained the same.

2.1.1.2 Deicing, Anti-Icing, Pre-Wetting, and Deicing Agents

Information about deicing, pre-wetting, and anti-icing practices, as well as the deicing agents used was requested by the survey. The following is a list of deicing agents used by respondents:

- Each of the 43 responding agencies reported the use of salt
- Thirty-two agencies reported the use of dry rock salt
- Twenty-two agencies used liquid calcium chloride, a significant increase from previous surveys
- Thirteen agencies reported the use of pre-manufactured liquid products

From the 43 respondents, 25 agencies indicated that they implement anti-icing practices; in most cases the anti-icing program included occasional pre-salting or liquid application in priority locations. This suggests an increase in the number of agencies implementing anti-icing practices watershed wide.

The 2016 survey asked about liquid anti-icing mixes, and in general, most respondents using liquids make a home-made mix of 70% - 90% salt brine and 10% - 30% beet juice, pre-manufactured liquid, and/or calcium chloride.

2.1.1.3 Weather and Pavement Temperature Forecasting

Out of the agencies responding, 30 agencies use a weather forecasting service (1 agency did not answer). This suggests a significant increase in the use of weather forecasting services watershed wide.

Additionally, 30 of 41 respondents are making use of a pavement temperature forecast report or similar service (2 agencies did not answer). This suggests a significant increase in the use of pavement temperature information throughout the watershed, an improvement in best management practices implementation.

2.1.2 Deicing and Snow Removal Equipment

All agencies use snow plows or similar equipment. Thirty-two agencies have mechanically controlled spreading equipment, and 33 have computer-controlled equipment. Equipment for spreading liquids is used by 25 agencies.

2.1.3 Salt Storage

The provided responses indicated the following salt storage practices:

- Forty-three responded that salt storage areas are fully enclosed storage structure or have impervious storage pads
- Forty agencies store salt on an impervious pad
- Thirty-four agencies indicated that drainage from their storage area(s) is controlled or collected

- Twenty-seven agencies indicated that they store salt in a single storage area
- Thirty-five agencies store salt in an enclosed area
- Sixteen reported that residual salt in loading areas is swept up

2.1.4 Equipment Maintenance, Cleaning, and Calibration

Forty agencies responded that equipment is washed at an indoor station draining to a sanitary sewer. Five agencies indicated outdoor washing in areas not drained to a sanitary sewer. Two respondents reported collecting and reusing wash water for brine making.

Forty-two agencies responded to the survey regarding equipment calibration. Thirty-five agencies indicated that they calibrate their de-icing equipment, an increase in the number of agencies performing calibration as a best management practice. Most of the 35 agencies providing calibration information perform calibration annually, with 1 agency calibrating 2 times per season, and 3 agencies calibrating after major maintenance or repairs.

2.1.5 Management and Record-Keeping

Twenty-one agencies indicated that operators are trained annually (or more often). Eleven of the remaining agencies train at the start of employment and one agency did not specify a training schedule.

From a management standpoint, the rate of salt application is established by the director or supervisor in 37 agencies, and solely by the operators in four agencies. This indicates a significant increase in the director or supervisor level of control over application rates from previous surveys.

During spreading, the rate of product application is controlled by the operator in 31 agencies, controlled automatically in 9 agencies and set at a fixed rate in 4 agencies.

The 2016 survey responses indicate a significant increase in record keeping best management practices in recent years. Twenty-three agencies keep records of salt usage per truck, 34 keep records for each storm event, and twenty keep records for each winter season.

2.2 Survey Analysis

The following subsections provide survey conclusions developed by comparing information from the 2016 survey to responses received from the 2014 survey or previous surveys. Forty-three (43) agencies responded to the 2016 survey, while 27 agencies responded to the 2014 survey. The number of new agencies responding to the survey is a positive for the amount of information provided for study and program participation overall, but results in some changes or inconsistencies in information trends.

2.2.1 Alternative Methods and Practices Analysis

Many of the questions in the survey focused on the use of alternative deicing agents, methods, and practices such as pre-wetting and anti-icing. **Figure 2-2** illustrates the percentage of respondents that use various deicing agents as reported on the 2007, 2010, 2012, 2014, and 2016 questionnaires.

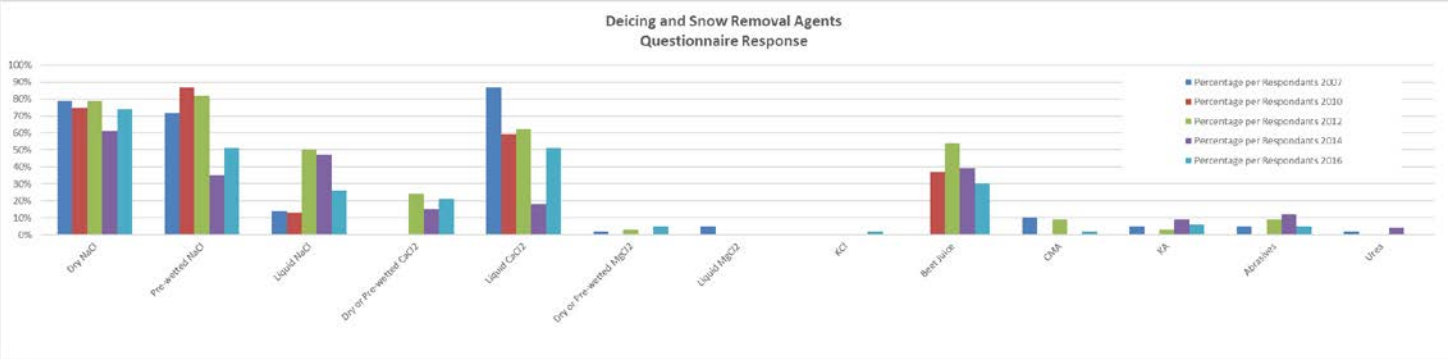


Figure 2-2 – Deicing and Snow Removal Agents

The survey results indicated that the use of dry and pre-wetted salt (NaCl) has increased. While 50% of agencies reported using pre-wetted salt, previous program information suggests that the level of pre-wetting is much higher than this throughout the watershed. The 2016 survey percentages may be skewed by the new agencies providing information this year, and inexperience with the type of information being asked by the survey. Follow up with individual agencies for future surveys may be needed.

Similarly, the 2016 survey results indicate an increase in the amount of agencies using dry salt. Previous program information suggests that fewer agencies use dry salt (not pre-wetted), and follow up with individual agencies may be needed to further detail the information being requested by the survey. The apparent decrease in the use of liquid NaCl (brine) may also be a result of the new respondent's inexperience with the survey, or may be an opportunity for the Chloride Committee to investigate further expansion of the use of brine as a BMP.

Other analysis observations include:

- Results show an increase in the use of all forms of Calcium chloride ($CaCl_2$). The increase in liquid CaCl2 is significant, roughly 30% higher.
- Results show an increase in the use of dry or prewetted Magnesium chloride ($MgCl_2$).
- No 2016 responders used liquid $MgCl_2$ and Urea.
- A few respondents used Potassium Chloride (KCl) compared to none in previous years.

- Calcium Magnesium Acetate (CMA), Potassium acetate (KA), and Abrasives have decreased since 2014.

- Beet juice as an additive continued in popularity.

Information provided about anti-icing practices that agencies may be employing indicated in 2007 that 14 agencies reported the use of anti-icing practices. In 2010, 20 agencies reported using anti-icing practices. In 2012, 20 agencies reported using anti-icing practices, and in 2014, 13 agencies used anti-icing practices. In 2016, 26 agencies used anti-icing practices. Compared to 50 percent in 2014, 60 percent of local agencies are implementing some form of anti-icing practices in 2016. This trend suggests improvement in the use of anti-icing BMPs over time, with the most widespread use in 2016.

Two of the responding agencies reuse vehicle wash-water for making brine solutions compared to none from the 2014 survey.

2.2.2 Salt Application Rates

In 2007, survey respondents were asked about their average annual salt usage. In 2012, 2014, and again in 2016, respondents were asked about annual salt usage. Respondents gave their annual usage for each winter season which provides a good benchmark for how weather has affected salt application rates. **Figure 2-3** shows an approximated annual salt usage in lbs/lane mile for each watershed in the study area reported from the 2007, 2012, 2014, and 2016 surveys. Annual salt application rates generally decreased from 2007 – 2012 in the watersheds, and increased from 2012-2014 as a result of snowfall and storm event frequency variation. The 2016 survey responses indicated that the per lane mile use of salt in the 2015-16 winter has decreased from that in most previous years. The number and type of winter storm events occurring each year and the different number of agencies providing usage information for each survey make developing direct usage trends or correlations difficult.

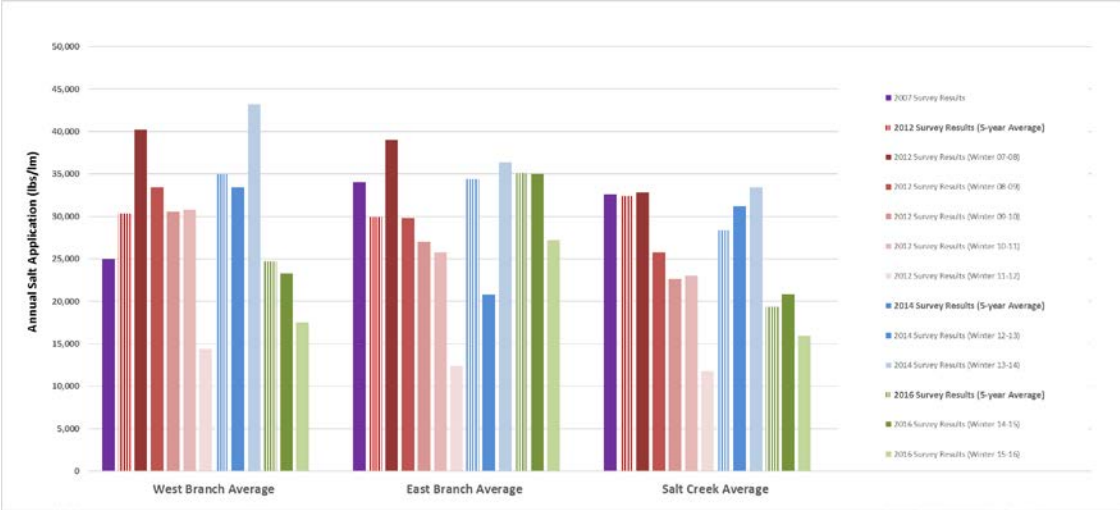


Figure 2-3 – Annual Salt Application Reported from 2007 - 2016

Survey respondents were asked about the average salt application rate per lane mile based on specific storm events. This information more comparably describes a community's salt usage, or application rate. **Figure 2-1** shows salt application rates reported from the 2010, 2012, 2014, and 2016 surveys. In general the number of agencies applying 200-300 lbs/lm has increased from 2010 to 2016. The other reported application rates have stayed relatively constant over the period. The majority of increases shown for 2016 are due to the increase in the number of agencies providing information for the 2016 survey.

Both annual salt usage data and salt application rates provide insight into individual agency programs and salt application across watersheds, as well as a valuable benchmark for future survey and Chloride Reduction Program efforts. Both of the above values will continue to be requested of agencies in future surveys to compare and report deicing program improvements, and presumed water quality improvements.

2.3 Survey Conclusions

The purpose of the 2016 survey was to gather follow-up information to determine if alternative deicing practices are being implemented in the DuPage River/Salt Creek watersheds and any resulting effects on salt application rates. Forty-three (43) agencies responded to the 2016 survey, the highest number of agencies ever responding to a program survey. As there were several new agencies providing information, the 2016 survey results may be skewed by the new agencies providing information this year, and inexperience with the type of information being asked by the survey. Follow up with individual agencies for future surveys may be needed.

Almost all agencies in the program area have covered permanent salt storage facilities; however there are still some opportunities for storage and salt handling improvements across the watersheds.

The 2016 survey shows increased implementation of best management practices for deicing program implementation for the following:

- Spreading equipment calibration
- Use of weather forecasting for deicing response decisions
- Use of pavement temperature information for deicing response decisions

The survey shows expanded use of anti-icing (pretreatment) BMPs throughout the watershed, and continued use and testing of alternative deicing materials and additives to reduce total salt usage. Agencies reporting use of more that 400 lbs of salt per lane mile are opportunity for the Chloride Reduction Program to expand outreach and BMP information.

The 2016 survey highlights significant local deicing program management oversite improvements, particularly with control over application rates. Recordkeeping improvements have been implemented throughout the watershed area to better manage the quantity of salt being used in different situations. Nine out of 42 responses reported changes made to their program due to local deicing program workshops. Common methods of informing the public of policy or local program changes include the use of city or township website, newsletter, social media, and press releases.

In order to perform a more definitive trend analysis of program improvements and reductions in salt usage, additional information will need to be collected over time. Information should continue to be collected to characterize any deicing program BMP improvements and resulting reductions in salt usage occurring within the DRSCW watersheds.

ATTACHMENT 4

MINUTES FROM THE BASINWIDE NUTRIENT TRADING PROGRAM KICKOFF MEETING

Developing a Basinwide Nutrient Trading Program Framework for the

DuPage River and Salt Creek Workgroup

August 29, 2017 Kick-Off Meeting

MEETING SUMMARY

PARTICIPANTS

Consultant Team

- Kellie DuBay, Vic D'Amato, Jennifer Olson* (Tetra Tech)
- Mark Kieser, Jim Klang (Kieser & Associates)
- Shannon Ragland* (Abt & Associates)
- Brent Fewell* (Earth & Water Group)

*On phone

DRSCW Projects Committee

- Deanna Doohaluk, Stephen McCracken (DRSCW/The Conservation Foundation)
- DRSCW Project Committee Members (see attached sign-in sheet)

Key Partners

- Sanjay Sofat, IEPA
- Scott Twait, IEPA
- George Acevedo, EPA Region 5
- Candice Bauer, EPA Region 5
- Kim Knowles, Prairie Rivers Network
- Cindy Skrukrud, Sierra Club Illinois
- Tara Neff, The Conservation Foundation
- Dan Lobbes, The Conservation Foundation
- Jennifer Hammer, Lower DuPage, The Conservation Foundation

KEY DISCUSSION POINTS AND ACTION ITEMS

Project Schedule

- The project schedule will be further refined based on a more detailed analysis of DRSCW projects to identify more opportunities for alignment.
- Deadline for completion of the overall project and integration into the Nutrient Implementation Plan up to December 2022.

Action Items:

1. Complete project schedule review with DRSCW staff.
2. Update project schedule for distribution.

Geographic Trading Areas

- Larry suggested that the project consider keeping the geographic trading area to all three watersheds, as opposed to subwatersheds, particularly if the goal is to address the DO sags. If DO sags are the water quality conditions that would influence trading area, it's necessary to consider what is driving the DO sags. It is still unclear that there is a specific relationship between P and DO sags. The geographic trading areas should consider a link between in-stream restoration and DO sags.
- Sanjay suggested considering a broader geographic trading area so as not to limit the potential market. Deanna emphasized that the current geographic focus is primarily a function of budgetary considerations for the project.
- The group discussed that different drivers/goals for nutrient trading could influence the geographic trading areas. It might be possible to have specific trading areas that focus on different goals; trading areas delineated for compliance P trading and trading areas for in-stream restoration.

Action Items:

1. Consider different trading areas based on water quality goals and understanding of factors contributing to DO sags.
2. Ensure flexibility for broader trading areas.

Baseline

- The project consulting team presented the definition of baselines and the approach to develop options for a TP compliance baseline, a TN baseline, and a possible equivalent habitat baseline.
- The issue of baseline is the most critical to the project from the perspective of IEPA.
- One DRSCW member stated the baseline boxes presented are too simplistic because they don't consider BOD or ammonia issues. Stephen mentioned that recent modeling suggested that BOD and ammonia are secondary to SOD.
- TN appears to be less of a priority among the three potential baselines; Larry stated that the project scope included TN to ensure it wasn't overlooked. However, TP is a priority from a compliance standpoint and in-stream restoration a priority from an aquatic life designated use attainment standpoint.
- Mark suggested considering phased baselines in a five year window that would allow for interim opportunities.
- Jim stated temporal considerations for baseline are something to consider. For example, any project implemented before a certain date could be eligible toward achieving the baseline.

Action Items:

1. Consider TP baseline and equivalent habitat baseline as higher priorities than TN baseline
2. Compile and review DRSCW data and modeling results on causal analysis for habitat
3. Discuss possibility of phased baselines with DRSCW staff

Creditable Restoration Projects

- Projects listed in the Special Conditions of the NPDES permits would serve as baselines; anything that might generate credits would need to go beyond what the permit requires.
- Larry mentioned that the projects listed in the Special Conditions of the NPDES permits receive funding. Without the link to the permit, funding priorities might change.
- A DRSCW member suggested considering projects that go above and beyond the original project goal. For example, if a project goal was 200 linear feet of restoration, but 400 linear feet was restored, would the additional 200 linear feet of restoration be creditable?
- Another concern is setting the bar/criteria for the quality of projects that could generate credits, as well as long-term operation and maintenance to ensure the project is functioning as intended over time.
- DRSCW has project design criteria/protocols in place that focuses on QHEI outcomes.
- Mark suggested tying the permit TP compliance schedule to habitat restoration milestones that build off of DRSCW project design criteria/protocols and allow for further evaluation and assessment that would help to establish an equivalent habitat baseline.
- EPA Region 5 encouraged the group to consider using different terminology if necessary, rather than feeling locked into water quality trading terminology to describe aspects of the framework. For example, the project could result in a trading and ecosystem services framework, where trading focuses on TP permit compliance and ecosystems services focuses on in-stream restoration and attainment of aquatic life designated uses.

  Action Items:

  1. Obtain more information from DRSCW on project design criteria/protocols that focus on QHEI score improvements.
  2. Discuss potential for a hybrid framework that ties TP compliance schedule with habitat restoration milestones.

POTW Data Collection

- The project consultant team presented the working draft of the POTW data checklist to ensure the team has the comprehensive data needed to support the nutrient trading framework development. Data in the PDOPs and feasibility studies address the checklist for TP. However, TN data will be more of a challenge to collect because there aren't permit requirements to compile TN information.
- The project consulting team will finalize the checklist with instructions and date for returning.
- POTWs with completed PDOPs/feasibility studies can indicate which checklist items are available in the documents; no need to put that information into the checklist. Where data and information are not in the PDOPs/feasibility studies, POTWs can provide additional information in the checklist or in separate files.
- A DRSCW member stated that some POTWs have 3-4 year old master plans that should have TN cost information.
- A key stakeholder participating mentioned concerns about ammonia to address mussels.
- Another DRSCW member asked how the robustness of the PDOP information, which is based on modeling, will affect trading which is based on actual POTW performance. Assumptions related to the PDOPs should be reflected in the nutrient trading framework.
- The DRSCW members in attendance confirmed that all the POTWs are activated sludge.

- Some of the POTWs with 2018 PDOP/feasibility study due dates may have these documents near completion; the project consultant team will contact these POTWs to ask where they are in the process.

  Action Items:

  1. Update data checklist with instructions
  2. Contact POTWs with 2018 deadlines to determine progress on PDOPs or ability to complete checklist
  3. Determine if TN will remain in the data analysis based on project prioritization of TN after the project kick-off meeting
  4. Determine the right data collection approach for TP data based on desire to increase emphasis on equivalent habitat baseline, habitat restoration milestones, and creditable projects

Nonpoint Source Credits/Offsets

DRSCW staff and key stakeholders discussed how DRSCW currently engages with non-POTW members, such as the Tollway and Forest Preserve District, to fund restoration projects. The group wants to consider the possibility of DRSCW members purchasing habitat restoration credits from non-POTW partners.

Action Items

1. Obtain more information about existing restoration projects funded in partnership with non-POTW DRSCW members and partners for integration in NPS-PS analysis task.

Other Key Issues and Considerations

- This is an opportunity for DRSCW to develop a program that actually works; be open-minded and innovative.
- DRSCW has successfully functioned by piloting projects and being flexible; the group is on board with creating a structure that is expandable (i.e., can be replicated and scaled-up).
- DRSCW wants a program that works to achieve local goals and solves aquatic life issues, not just focused on TP for purpose of permit compliance.
- There are still debates around the causes of low DO in the watershed, as well as sources of SOD. The framework should recognize the remaining questions in the science and promote adaptive management through continuous data collection.
- The project consulting team needs to be aware of the various conversations taking place at the state and the local level that could influence the project. This includes discussions about the TP TBEL that are underway. It is possible the targets that will drive trading will change over the course of the project.
- The project should also consider the timing of potential plant upgrades with the sequencing of projects.

DuPage River Salt Creek Workgroup

Projects Committee
Itasca Village Hall
August 29th 27, 2017
1:00 PM

Name	Organization
Dean Dahm	DRSCW
Larry Cox	DGSD
Nick Menninga	DGSD
Fred Maier	Village of Itasca
GEORGE ARGUEDO	U.S.EPA Region 5
Sue Baert	WSDI
SCOTT TWAIT	Illinois EPA
Aubree Basso	Village of Romeoville
Tara Neff	TCF
Allison Swisher	City of Joliet
Dan Lobbes	TCF
Doug Kissel	Village of Plainfield LDRWC
DAVE GUERMAN	Village of Lombard
Simon Christensen	DFCSVM
Dennis Streicher	Sierra - DRSCW
DAN ROSENWINKEL	CITY of ELMHURST
Jennifer Hammer	TCF - Lower D. Page
Rick Federighi	Village of Addison
Greg Ulreich	Village of Carol Stream
Beth Adler	DRWW
Cindy Skrukrud	Sierra Club
Matt Streicher	Deep Waterway Authority
Tom Minarik	MWRDGC
KIM KNOWLES	PRAIRIE RIVERS NETWORK

Projects Committee

Name	Organization
#1 Sanjay Sofat	CEPA
Jeff Kindiermann	Itasca.
MaryBeth Falgy	DuPage SWM
Jen Boyes	DuPage SWM
Candace Bauer	US EPA
Stephen McCarthy	DRSCW / TCF