

## 2021 IEPA Annual Report



### Background

For two decades, a diverse coalition of stakeholders (see Directors sidebar and Supporters list) has been leading a watershed-wide effort to understand and improve the water quality of the Fox River and its tributaries for the Fox River Study Group (FRSG). This undertaking has received wide-spread financial and in-kind support from watershed communities, water reclamation districts, environmental organizations and foundations. Our efforts have been backed by the USEPA, IEPA, Chicago Metropolitan Agency for Planning and engaged the scientific expertise of the Illinois State Water Survey (ISWS), United States Geological Survey (USGS) and private consultants. In 2015 the Fox River Study Group submitted a Fox River Implementation Plan (FRIP) to the Illinois EPA that the group has been implementing since that time, with a FRIP update due to the IEPA at the end of 2022. Throughout 2021, the FRSG continued to meet on a monthly basis and the group's activities were supplemented by committee actions. All meetings were conducted virtually in 2021.

### Modeling

To make informed decisions about how best to maintain and improve the quality of the Fox River in our urbanizing watershed, the FRSG has developed two computer models of the Fox River watershed – an HSPF model and a QUAL2K model. Updates of these models have been completed by Geosyntec Consultants with the HSPF model update completed in 2018. The QUAL2k model relies on the HSPF model inputs. Geosyntec completed updating the QUAL2k model to QUAL2kw, a dynamic version of QUAL2k, in 2019. The models were used to assess management scenarios to address the low dissolved oxygen and nuisance algae problems in the Fox River throughout 2020 and into the 2021 calendar year. First the models were used to separately model the implementation of scenarios reducing phosphorus loads from 1) tributary streams, 2) from the Fox River upstream of the study boundary at the Stratton Dam in McHenry, 3) from major wastewater treatment facilities in the study area and 4) the removal of dams on the mainstem of the Fox River. These results ([presentation slide deck](#)) were presented at the January 28, 2021 FRSG board meeting. Next Geosyntec staff modeled scenarios that combined actions reducing phosphorus inputs to the river along with the removal of dams from the Fox River mainstem. The scenarios were selected in consultation with the FRSG's Monitoring Committee. These results were presented by Geosyntec engineer Rishab Mahajan at a [public webinar](#) on August 5, 2021. The results showed a reduction of phosphorus concentrations by major wastewater facilities in the study area beyond the 0.5 mg/L annual average geometric mean would not substantially improve water quality. (Per current NPDES permits, Fox River major wastewater facilities, those treating one million gallons per day or more) are required to meet this requirement by the year 2030.) However, this planned action combined with the removal of dams from the Fox River mainstem reduce algae levels and oxygen levels improve. Mr. Mahajan again presented the results of the completed modeling of various management scenarios at the FRSG's virtual annual meeting on November 2, 2021.

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The FRSG and Geosyntec also met virtually with Illinois EPA staff on November 30, 2021 to go over the modeling results and to discuss the FRSG's plans for updating the results into the next FRIP. Model results are currently being used to develop an 2022 update to the FRIP that will recommend the most cost-effective measures to improve the overall health of the river with respect to these impairments based on these latest findings.

## Monitoring

2021 concluded the 19th year of all-volunteer water quality monitoring efforts of the FRSG. The data collection includes monthly monitoring of 7 mainstem locations and 7 tributary locations along an 80-mile stretch of the Fox River from McHenry to Yorkville. Laboratory analysis and data management are donated as in-kind services by the City of Elgin, the Fox River Water Reclamation District, and the Fox Metro Water Reclamation District. These data have been utilized to support the ongoing modeling efforts. The Illinois State Water Survey (ISWS) updates the FoxDB for the FRSG, which is the publicly available, online water quality monitoring database.

In summer 2021, the FRSG initiated a new contract with the ISWS to update the FoxDB and complete a water quality trends analysis. The project is scheduled for a duration of 21 months from September 1, 2021 through May 31, 2023. The project timeline includes the following: 1) Receive all water quality and related data with a cutoff data date of Sept, 30, 2021 and complete updating FoxDB by Jan. 31, 2022 for water quality trend analysis; (2) Process and submit all new water quality data collected by FRSG during the project duration to the Illinois Environmental Protection Agency and also continue to update the FoxDB to the project end date, (3) Complete exploratory data analysis and water quality trends by Feb. 28, 2023, and (3) Submit final water quality trend analysis report to FRSG by April 30, 2023 and final report by May 31, 2023.

Additional monitoring is conducted in support of the modeling efforts. After discussions with Geosyntec on data needed for their modeling updates, a new water quality monitoring station was installed by USGS in August 2018 at the Stratton Dam ([USGS Station #05549500](#)). During the growing season, continuous measurements of temperature, pH, conductivity, dissolved oxygen, chlorophyll a, blue-green algae and turbidity are collected at this station. The USGS is also collecting in-situ measurements at the Stratton Dam to characterize the upstream boundary condition. The discrete samples are collected on a monthly basis during station equipment calibration and are analyzed for chlorophyll a, Nitrogen-Ammonia, Nitrogen Nitrate + Nitrite, Total Nitrogen (includes filtered organics), Phosphate-Orthophosphate, and Total Phosphorus. In August 2019, the FRSG asked the USGS to begin utilizing the blue green algae sensing capabilities of the chlorophyll sensor and to report the data at the station's website. The FRSG initiated a three-year contract extension through September 30, 2024 with the USGS to collect more real-time data at the Stratton Dam.

FRSG also continued an effort to coordinate a data collection undertaking in conjunction with the Carpenter dam removal that the Forest Preserve District of Kane County is commencing with funding from the IDNR's Dam Safety Fund. The dam is scheduled to be removed during summer 2022. Working with a number of other agencies and consultants, we have conducted four pre-removal studies to document the impacts of the dam removal on water quality and fauna in the river. Three of the studies were completed in 2020. In 2021, FRSG executed a contract with the Illinois Natural History Survey (INHS) to conduct a mussel survey before the dam is removed. Mussel field surveys were conducted in summer 2021 at 3 sites – one impact site at the Carpenter dam location, one reference site upstream of the dam near Algonquin, and one reference site downstream of the dam near West Dundee. The INHS' field sampling results were presented at the FRSG annual meeting on November 2, 2021. The INHS scope of work also includes mussel tagging during dam removal and subsequent tracking and other post-removal studies in the future.

## Reports

The FRSG was involved with three reports during 2021. First, the modeling work being conducted by Geosyntec will be utilized to amend the Fox River Implementation Plan (2015 FRIP). The FRSG entered into a contract with Geosyntec to develop the 2022 FRIP Update in October 2021. Geosyntec staff and members of the FRSG board reviewed the outline for the FRIP Update with IEPA staff in November 2021. Work on the Update began in late 2021 and is proceeding. The group is on target to meet the December 31, 2022 deadline for an updated FRIP submittal to the IEPA.

Second, the FRSG continued to work with the U.S. Army Corps of Engineers (Corps) to resume the Fox River Connective & Habitat Study (Study) that was placed on hold in August 2015 due to the lack of a State of Illinois budget. The FRSG has continued to communicate with the Corps and Illinois Department of Natural Resources (IDNR) to discuss the best path forward and remind the agencies of the FRSG's prioritization of the project. In May 2020, IDNR let the Corps know officially that they are ready to resume the Illinois River Basin Restoration (519) Program which the Study falls under. The FRSG executed a Joint Funding Agreement in November 2021 with the IDNR to cover the local cost share needed to complete the study. The FRSG and many of its member organizations worked throughout 2020 and 2021 to reach out to the leadership at the Corps and to members of Congress from the Fox River Valley to advocate for the restart of the Study. However, in January 2021 the project was not approved for inclusion in the Corps workplan. Corps Headquarters supports the study restart so our hope is that it will be included in the Chicago and Rock Island districts' 2022 workplan. [As of March 11, 2022 Illinois Senators Durbin and Duckworth report that \\$250,000 in funding for completion of the Study has been included in the Corps' 2022 budget.](#) Once the project is restarted, the timeline is one year to complete the original study, one year to complete the public outreach associated with the study, and one year to finalize the study and issue the final report. The Corps has also indicated they would like to complete the study in two years, if possible.

In 2020 FRSG and the Chicago Metropolitan Agency for Planning began collaborating with other watershed stakeholders on the development for a watershed-based plan for the Indian Creek watershed in Kane and DuPage counties. The HSPF model for the Indian Creek watershed is being updated as part of this effort, with funding provided by the FRSG.

## Public Outreach

The FRSG has continued public outreach and participation as work has been completed to update the Fox River Implementation Plan (FRIP) as appropriate during the pandemic. 2021 outreach efforts included:

Two Presentations - Fox River Study Group Board Meeting, January 27

*First Look- 2020 Fox River Study Group Data Carpentersville Dam Pre-removal Water Quality Study- Art Malm*

*Watershed Management Scenarios Results Summary- Rishab Mahajan*

Slide decks available online at [www.foxriverstudygroup.org/meetings](http://www.foxriverstudygroup.org/meetings)

Presentation- Fox River Summit March 11

*Development of Water Quality Model to support Fox River Implementation Plan- Rishab Mahajan, Geosyntec Consultants and Cindy Skrukud, Fox River Study Group*

Presentation- Fox River Study Group Board Meeting, July 29

*Combined Watershed Scenarios- Rishab Mahajan*

Slide deck available online at <https://www.foxriverstudygroup.org/post/frsg-reports-scenario-results-from-river-modeling-tools>

Presentation- Special Webinar, August 5

*Evaluation of Watershed Scenarios for Improving Water Quality in Fox River-Executive Summary-* Rishab Mahajan

Slide deck and recording available online at <https://www.foxriverstudygroup.org/post/frsg-reports-scenario-results-from-river-modeling-tools>

Three Presentations - Fox River Study Group Annual Meeting, November 2

*Development for watershed-based strategies to eliminate phosphorus related impairments in the Fox River-* Rishab Mahajan, Senior Engineer, Geosyntec and consultant to the Fox River Study Group

*Elgin's Source Water Protection Initiative-* Eric Weiss, Water Director, City of Elgin, Tim Holdeman, Sr. Project Manager, Engineering Enterprises, Inc., Danielle Gallet, Founding Principal, Waterwell, LLC

*Mussels be dammed: how interrupting natural flow can impact the freshwater mussel community-* Alison Stodola, Assistant Aquatic Biologist, Illinois Natural History Survey and consultant to the Fox River Study Group

Meeting recording available online at [www.foxriverstudygroup.org/meetings](http://www.foxriverstudygroup.org/meetings)

The FRSG continued work through our contract with Aileron Communications to perform public outreach messaging and branding in 2021. Aileron helped the FRSG create a dam removal benefits fact sheet, which is attached to this report.

The FRSG board and membership has continued to work with entities throughout the Fox River watershed to build community support and to find the resources needed to implement the identified projects.

### **Point Source Nutrient Reductions**

The major (discharge > 1 mgd) wastewater treatment facilities were issued permits with phosphorus reduction requirements during the previous permit cycle. In late 2018 and extending into 2019, the Fox River permits were issued with updated phosphorus compliance schedules. Most wastewater treatment facilities are on schedule to meet their phosphorus limit of 1.0 mg/l annual average by various dates through 2023.

Phosphorus discharge optimization plan (PDOP) requirements were added to most major permits during this permit cycle, requiring a comprehensive study of potential phosphorus input reductions and operational improvements at the wastewater treatment plants. These PDOPs are mostly complete for major permittees watershed-wide.

### **Financial Solvency**

The FRSG is a 501c3 not for profit organization. Independent audits are performed annually to ensure proper financial management and a copy of the most recent audit is available upon request. FRSG continues to be funded by member agencies in the watershed at the rate of 25¢ per capita. At the beginning of each year, a contribution request is sent to communities. Due to the pandemic, the group

has credited the 2020 contributions for two years, foregoing the 2021 contribution request as a rate relief gesture.

FRSG maintains a sufficient balance to fund activities and these funds are allocated to completing the action items described above: modeling, monitoring, public outreach, and the U.S. Army Corps of Engineers Fox River Habitat & Connectivity Study. In 2021, the group also updated our budget and long-term financial plan.

## Financial and In-Kind Supporters

The Fox River Study Group greatly appreciates the continued support from:

### Financial Support

Village of Algonquin

City of Aurora

Village of Barrington

City of Batavia

Village of Cary

Village of East Dundee

Village of Elburn

City of Elgin

Fox River Water Reclamation District

City of Geneva

Village of Gilberts

Kane County

Lake in the Hills Sanitary District

City of Plano

Village of Sandwich

City of St. Charles

Yorkville-Bristol Sanitary District

USEPA

Village of Wauconda

City of Yorkville

### In-Kind Support

Village of Algonquin

City of Crystal Lake

Deuchler Engineering Corporation

Environmental Defenders of McHenry County

Fox Metro Water Reclamation District

Friends of the Fox River

Gardner Carton & Douglas

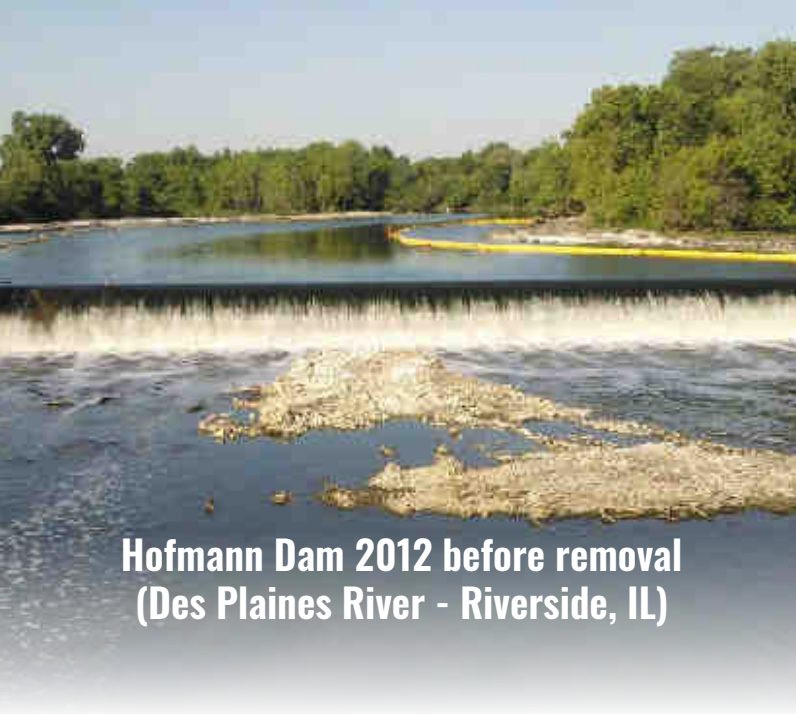
Northern Moraine Water Reclamation District

Illinois EPA

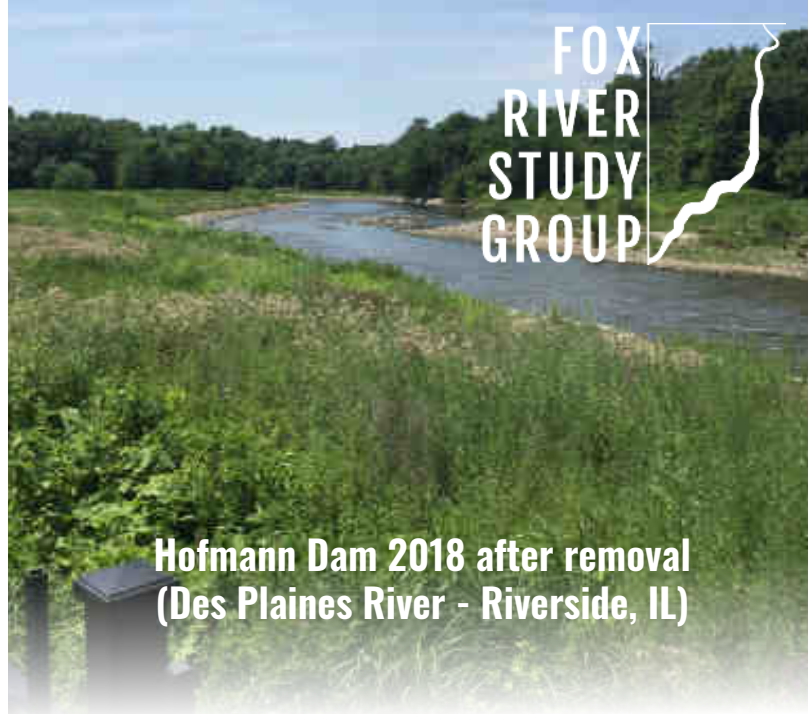
Illinois Department of Natural Resources

Illinois State Water Survey

Sierra Club



**Hofmann Dam 2012 before removal  
(Des Plaines River - Riverside, IL)**



**FOX  
RIVER  
STUDY  
GROUP**

**Hofmann Dam 2018 after removal  
(Des Plaines River - Riverside, IL)**

# Removing Dams Restores the Fox River

*The Fox River is a source of drinking water, a hub for recreation and a key landmark in communities that nearly one million people call home. The biggest threats to water quality, safety and recreation on the Fox River today are obsolete dams. Removing dams that no longer serve a purpose will protect our health, save us money and benefit the environment.*

**Dam removals improve water quality in the Fox River, which supplies drinking water to over 300,000 people.**

Removing dams resolves a major cause of algae blooms and sedimentation, which cause oxygen depletion and the buildup of organic pollution that strains local water treatment plants. Removing dams helps rivers keep themselves clean and helps ensure we will always have a dependable source of clean drinking water for communities in the Fox River watershed.

**Dam removal can save lives and improve public safety.**

Dams on the Fox River have caused dozens of drownings and many more near-fatal accidents. Our local leaders can improve public safety and protect first responders by removing dams.

**Dam removals will create a free-flowing river that better supports fish, wildlife and recreation.**

Returning the river to a more natural state will immediately benefit the fish, wildlife and natural beauty of the Fox that residents cherish. We have an opportunity to reconnect the Fox River and reestablish its natural flow by removing dams that no longer serve a useful purpose.

**Dam removals are necessary to keep utility bills affordable.**

Federal laws require that the Fox River meet strict water quality standards. Attempting to meet those standards without dam removals would cost the Fox Valley community an estimated \$150 million in new wastewater treatment infrastructure.\*

\*Fox River Implementation Plan, 2015