
DES PLAINS RIVER WATERSHED WORKGROUP (DRWW) NUTRIENT ASSESSMENT REDUCTION PLAN (NARP) UPDATE

August 17, 2023

AGENDA

Overview

Monitoring and Data Analysis

Model Development

Watershed Management Scenarios

Implementation Plan

DRWW Project Questionnaire

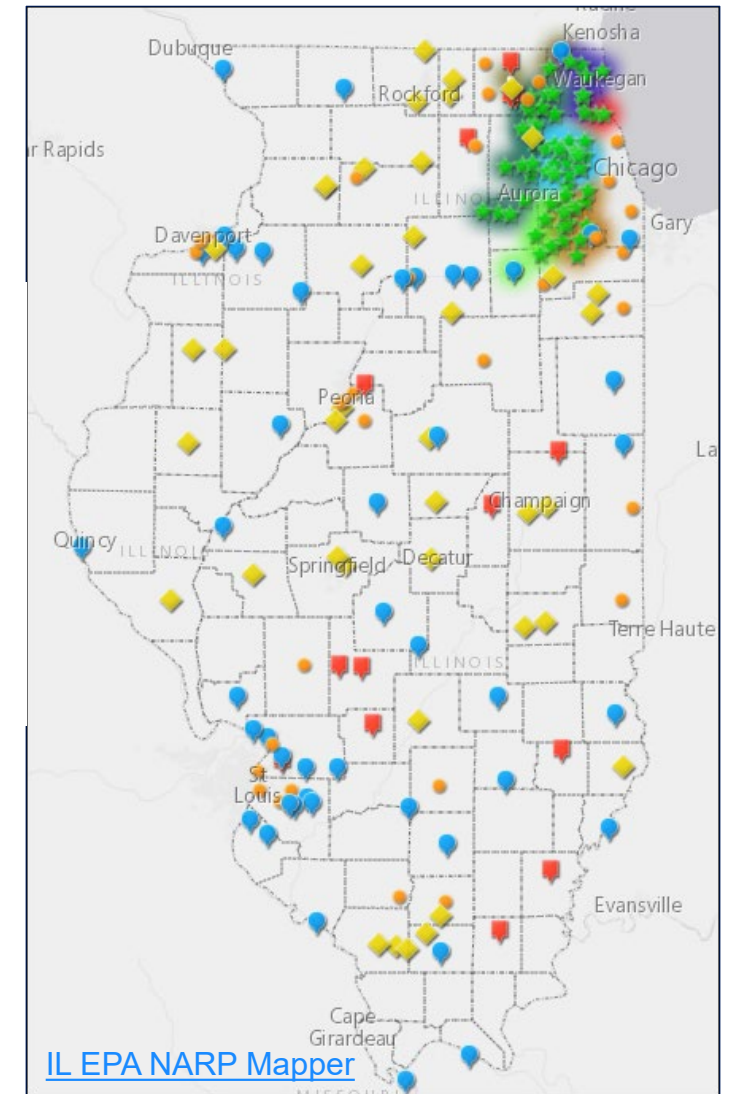
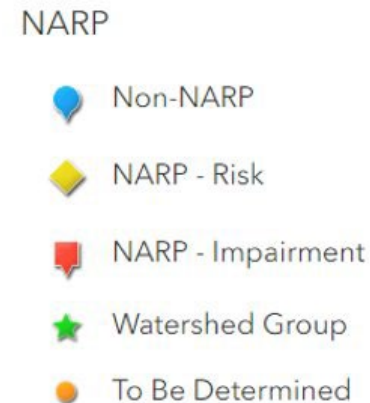


Overview



NARP – Overview

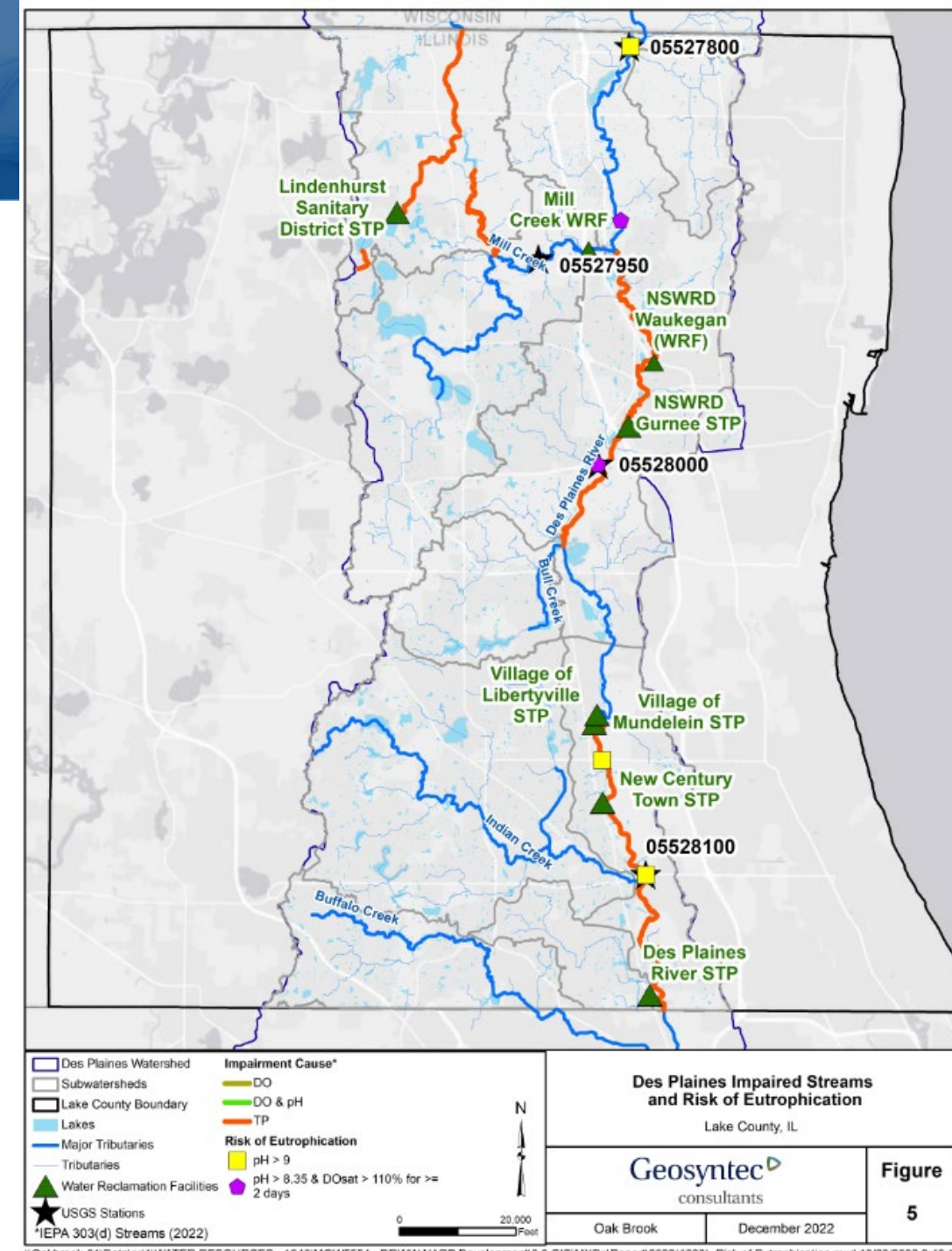
- **What's a NARP?**
 - Nutrient Assessment Reduction Plan
 - Negotiated special conditions in NPDES permits to address phosphorus-related impairments*
 - Dissolved oxygen (DO)
 - Nuisance algae
- **Who gets a NARP?**
 - Dischargers to a 303 (d) listed stream due to a phosphorus-related impairment
 - Dischargers upstream of station at “Risk of Eutrophication”
- **When is NARP Due?**
 - December 31, 2023, or 2024



* Major (>1 MGD) publicly owned treatment works (POTWs)

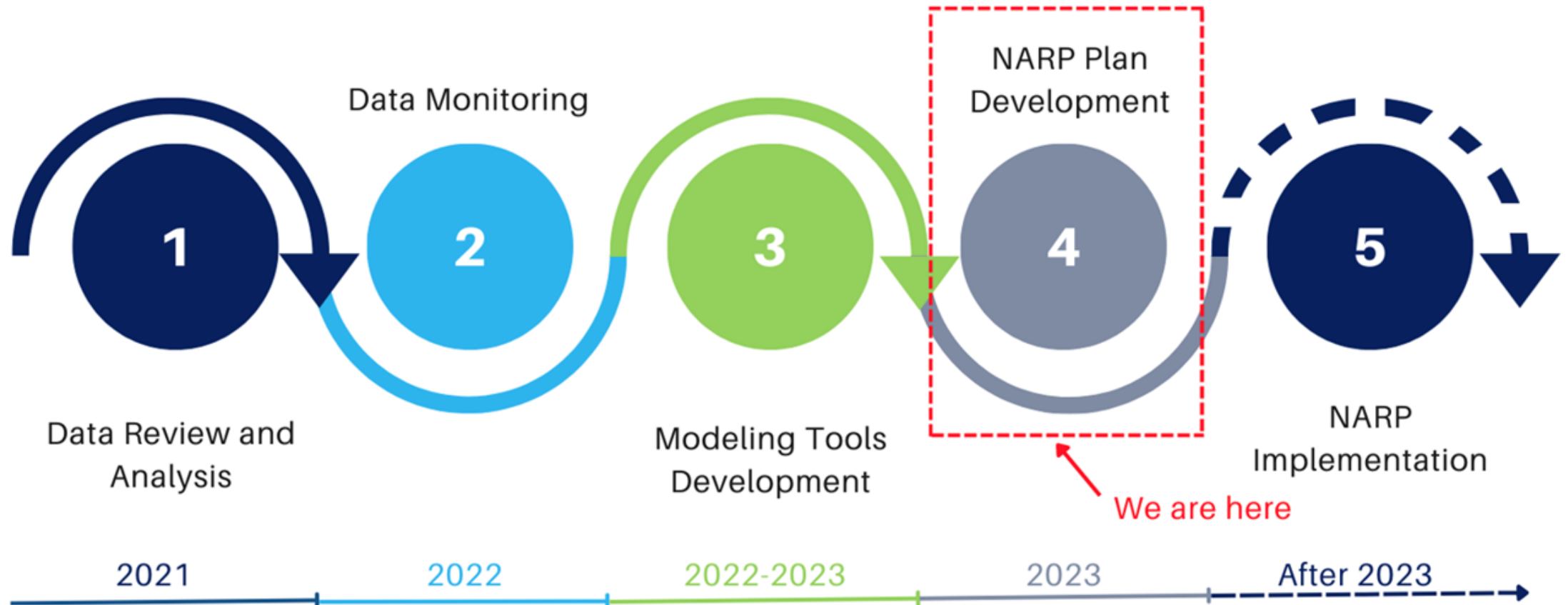
DRWW NARP – Overview

- POTWs discharging to
 - Des Plaines River mainstem (6)
 - Mill Creek (1)
 - Hastings Creek (1)
- The upstream station is at risk of eutrophication



DRWW NARP – Schedule

NARP is due December 31, 2023

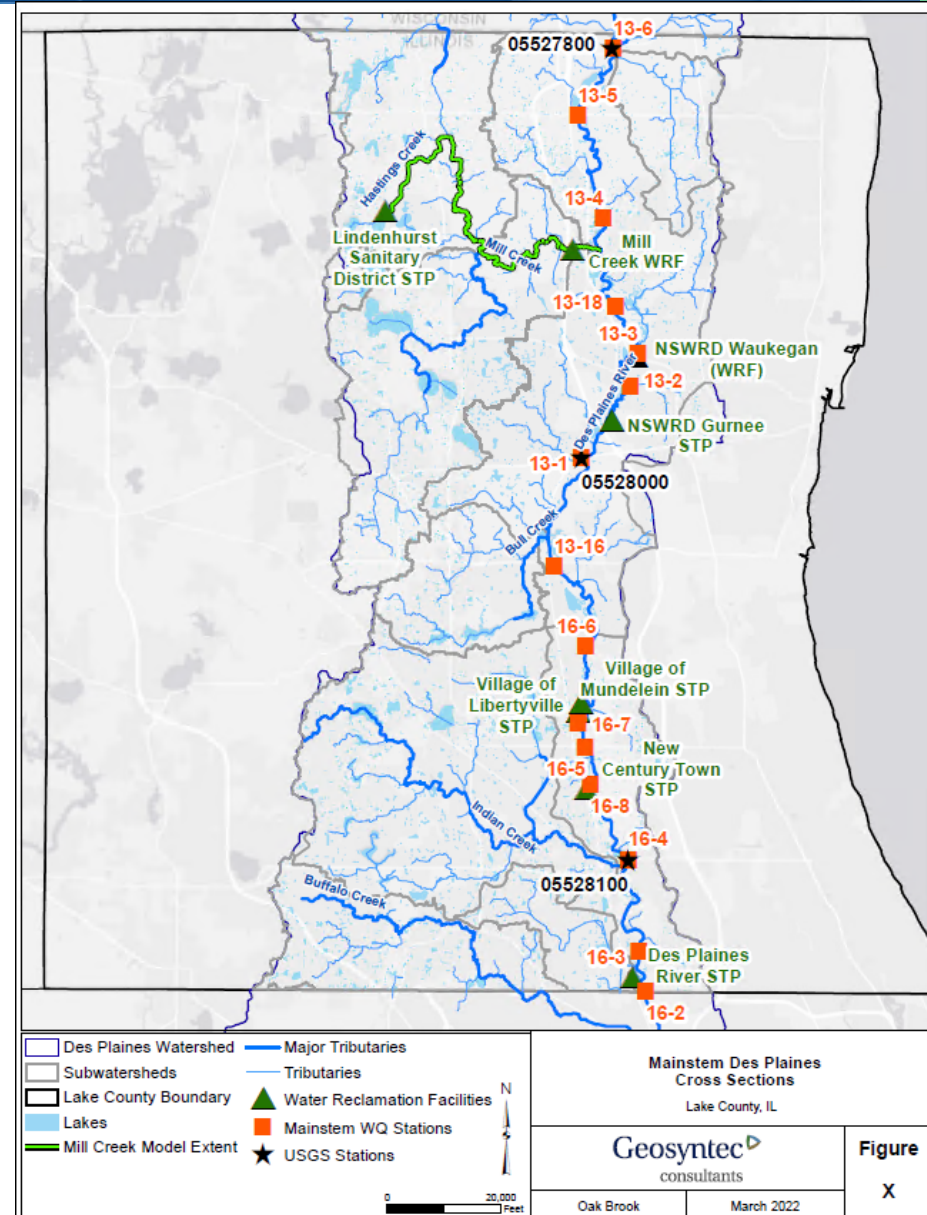


Monitoring and Data Analysis

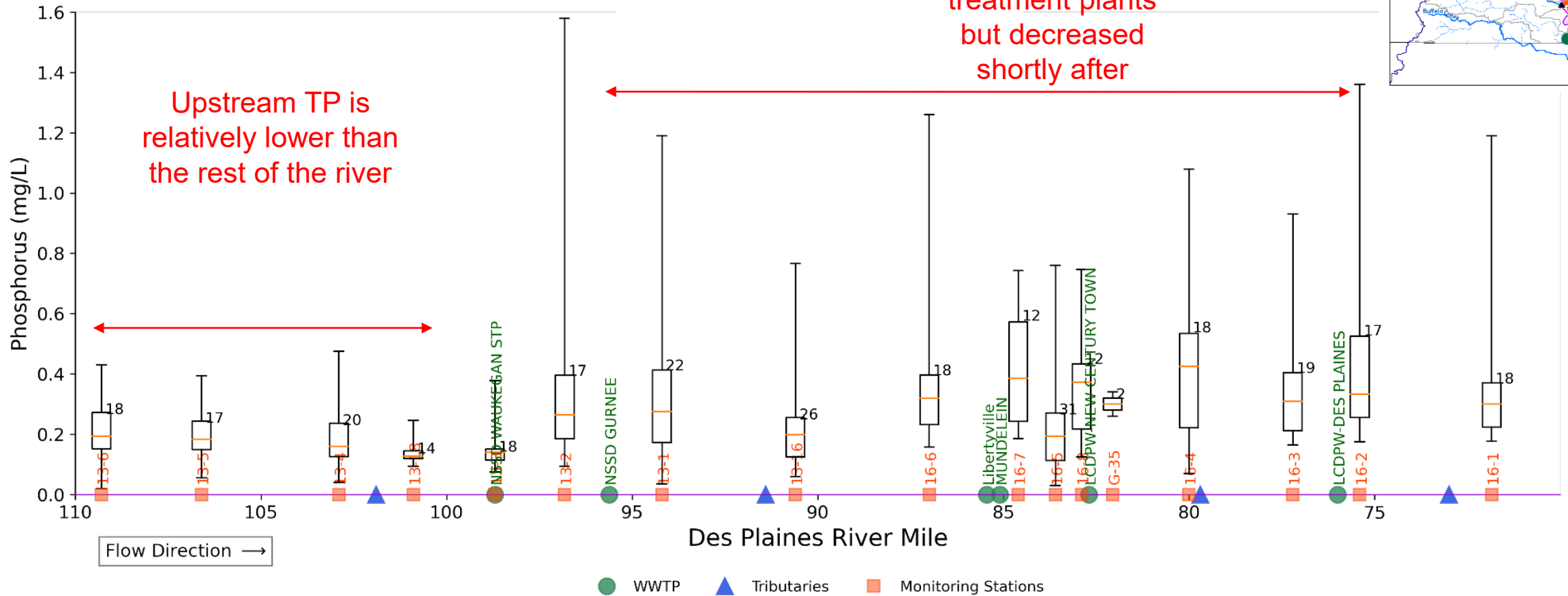
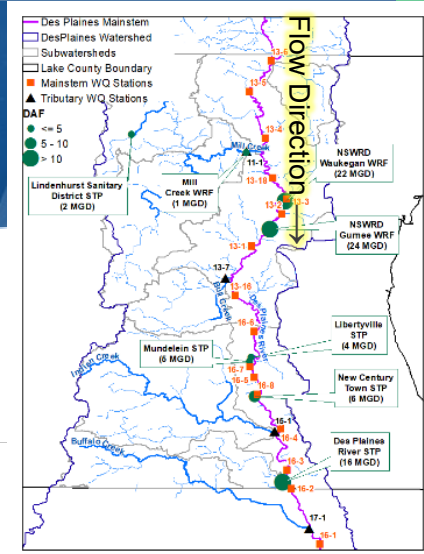


2020 NARP Focused Monitoring

- **Water Column Sampling**
 - 15 sites on mainstem Des Plaines and 3 sites on Mill Creek
 - Increased summer sampling
 - Nutrients, sestonic Chl-a, benthic Chl-a
- **Continuous Monitoring**
 - 3 sites
 - DO, temperature, TSS, pH, Chl-a, and conductivity

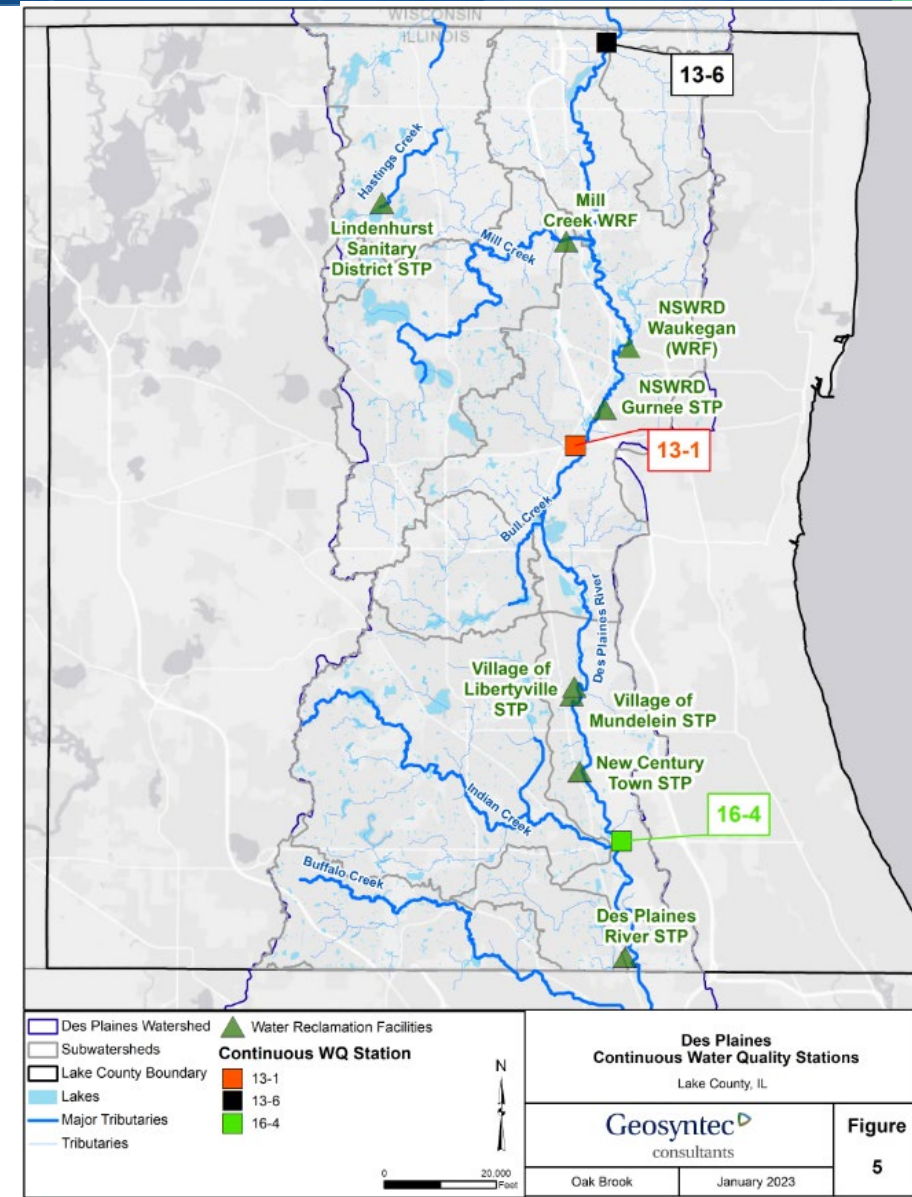
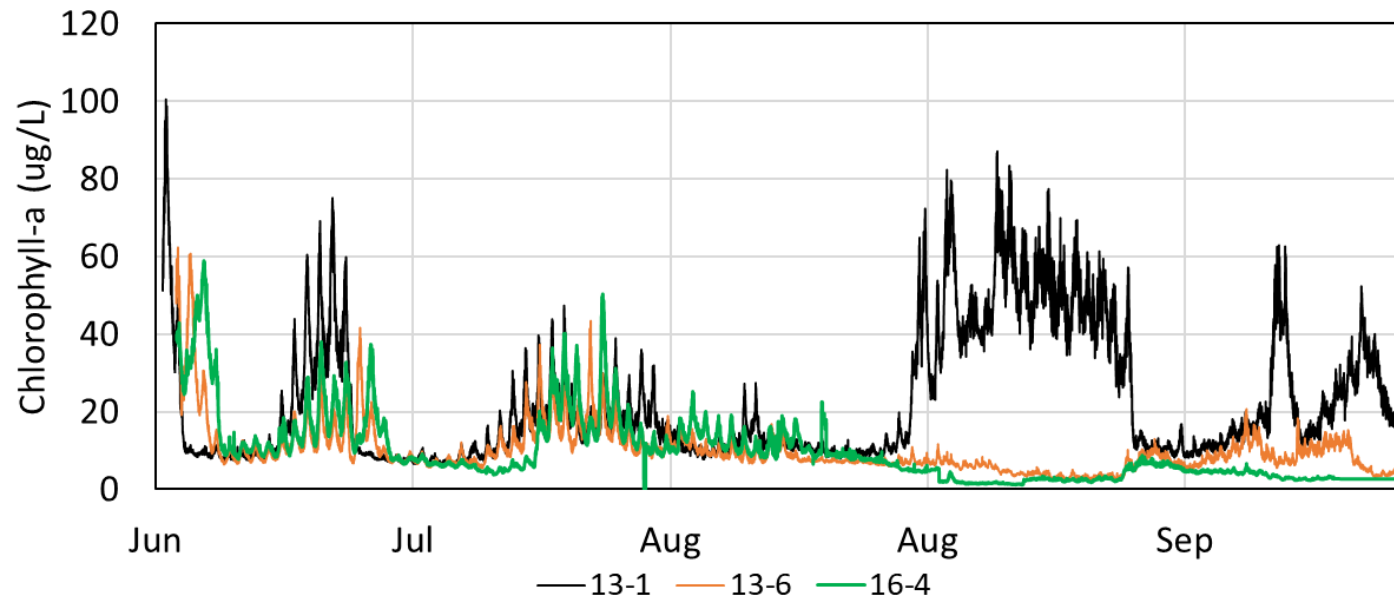


Total Phosphorus 2017-2021 Growing Seasons

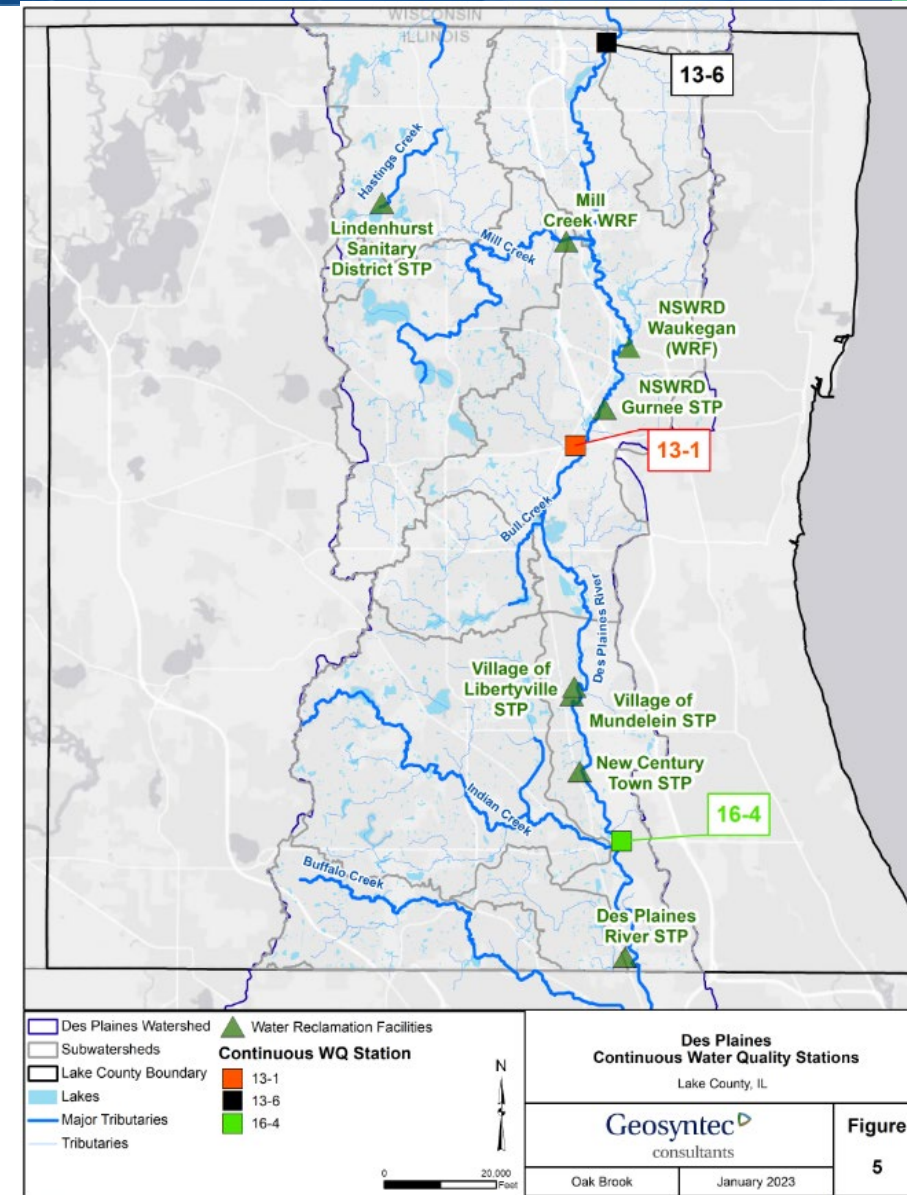
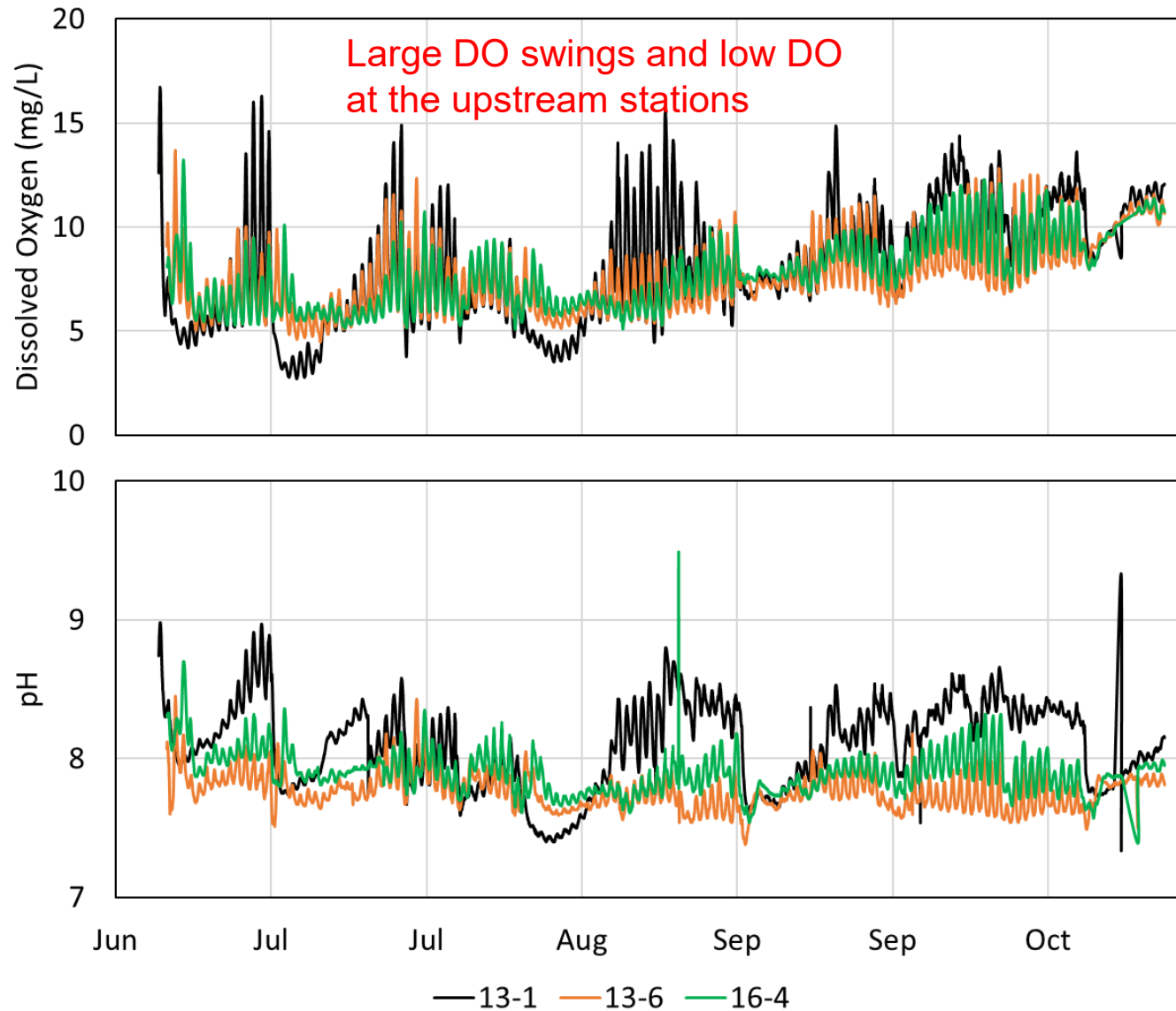


Chlorophyll-a 2020 Growing Seasons

High chlorophyll-a concentration from the upstream boundary



Dissolved Oxygen 2020 Growing Seasons



Data Analysis Inferences

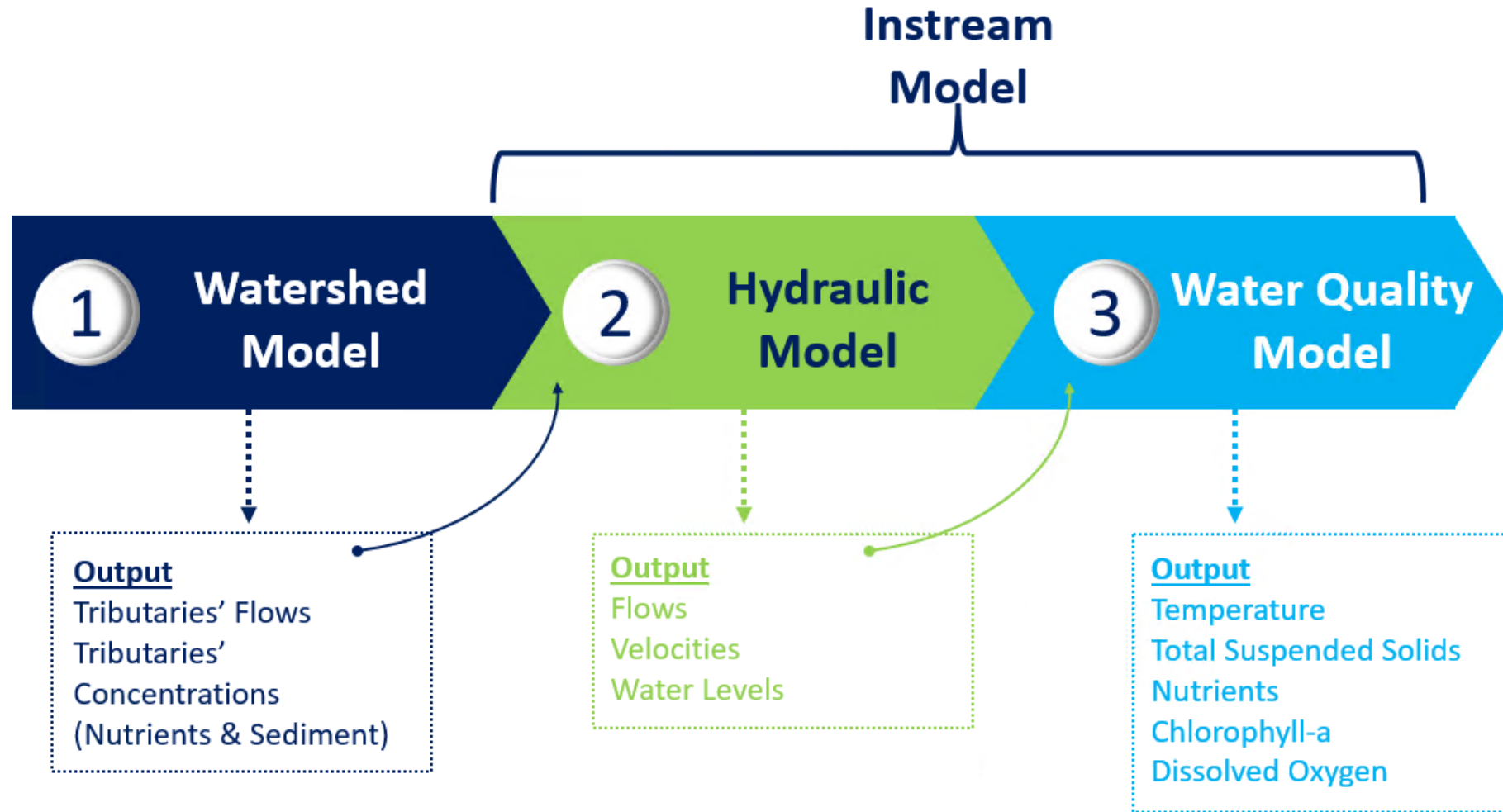
- High Chl-a and DO swings from the upstream boundary
- POTWs contribute to
 - Increased TP concentrations, but concentrations are reduced after a short distance downstream of the plants
 - Decreased Chl-a due to dilution
 - Improved minimum DO



Model Development

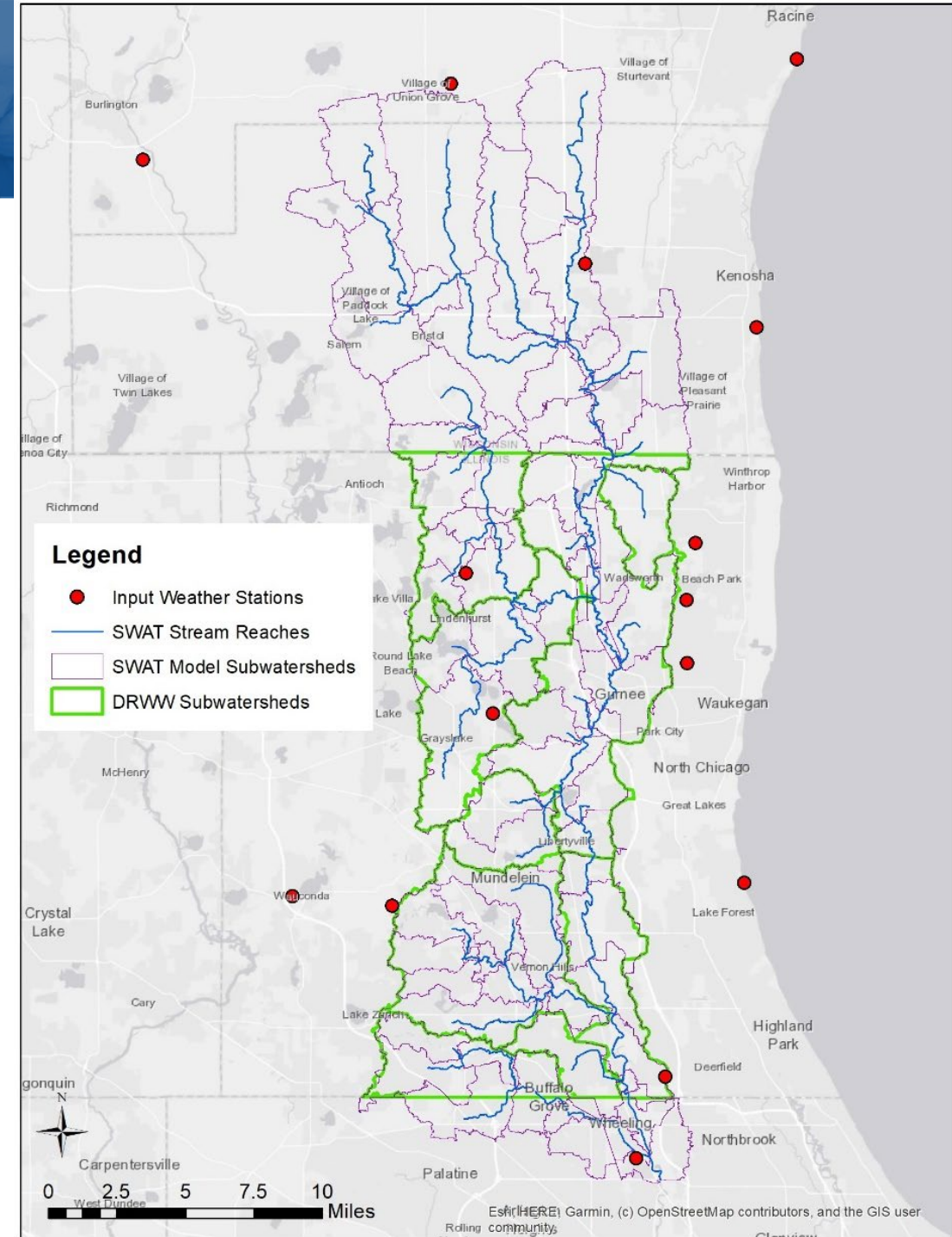


Modeling Background – Framework

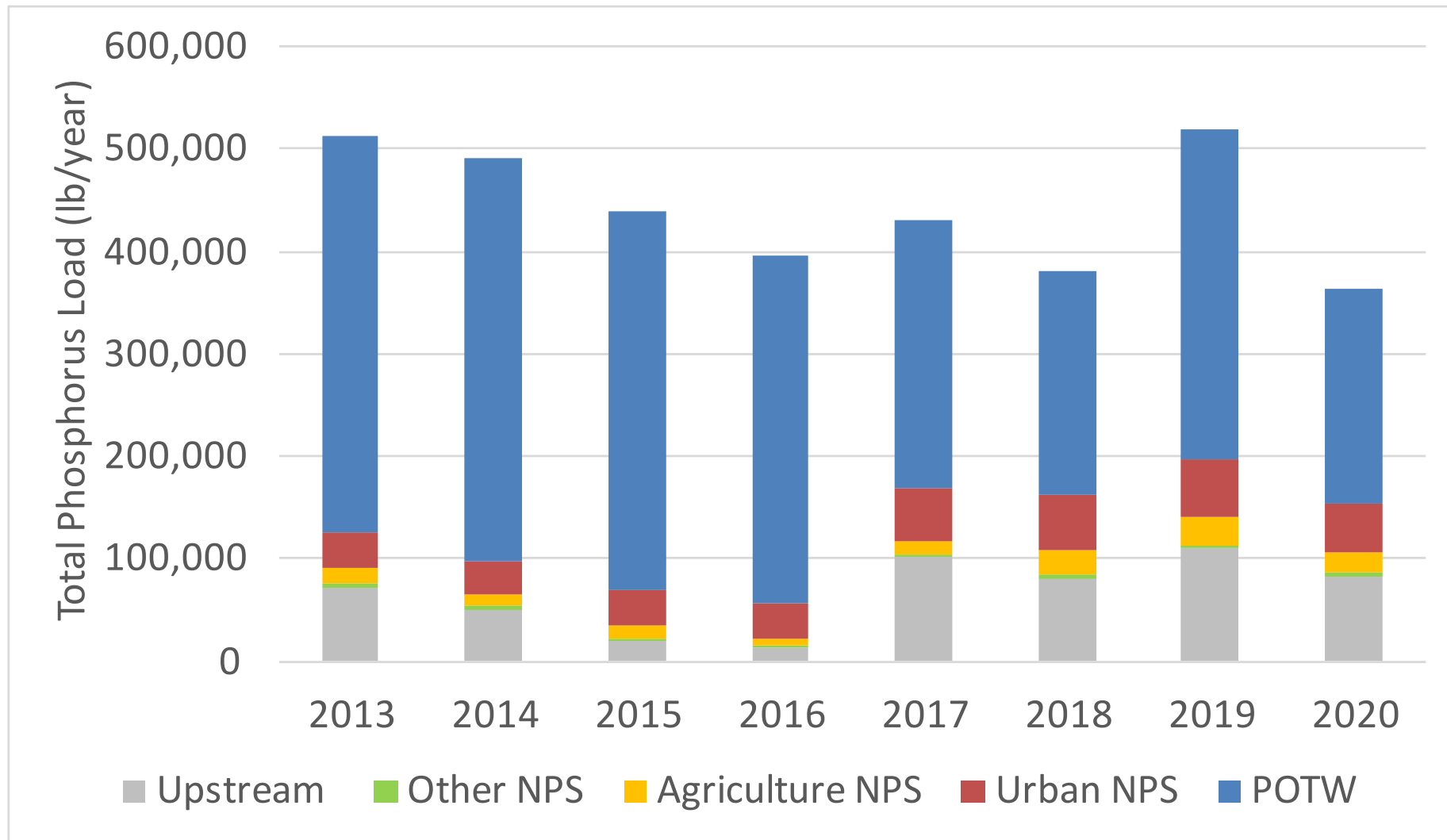


Watershed Model Setup

- Soil & Water Assessment Tool (SWAT)
- 89 sub-basins
- Calibrated to available flow and water quality data



Annual TP Load Distribution

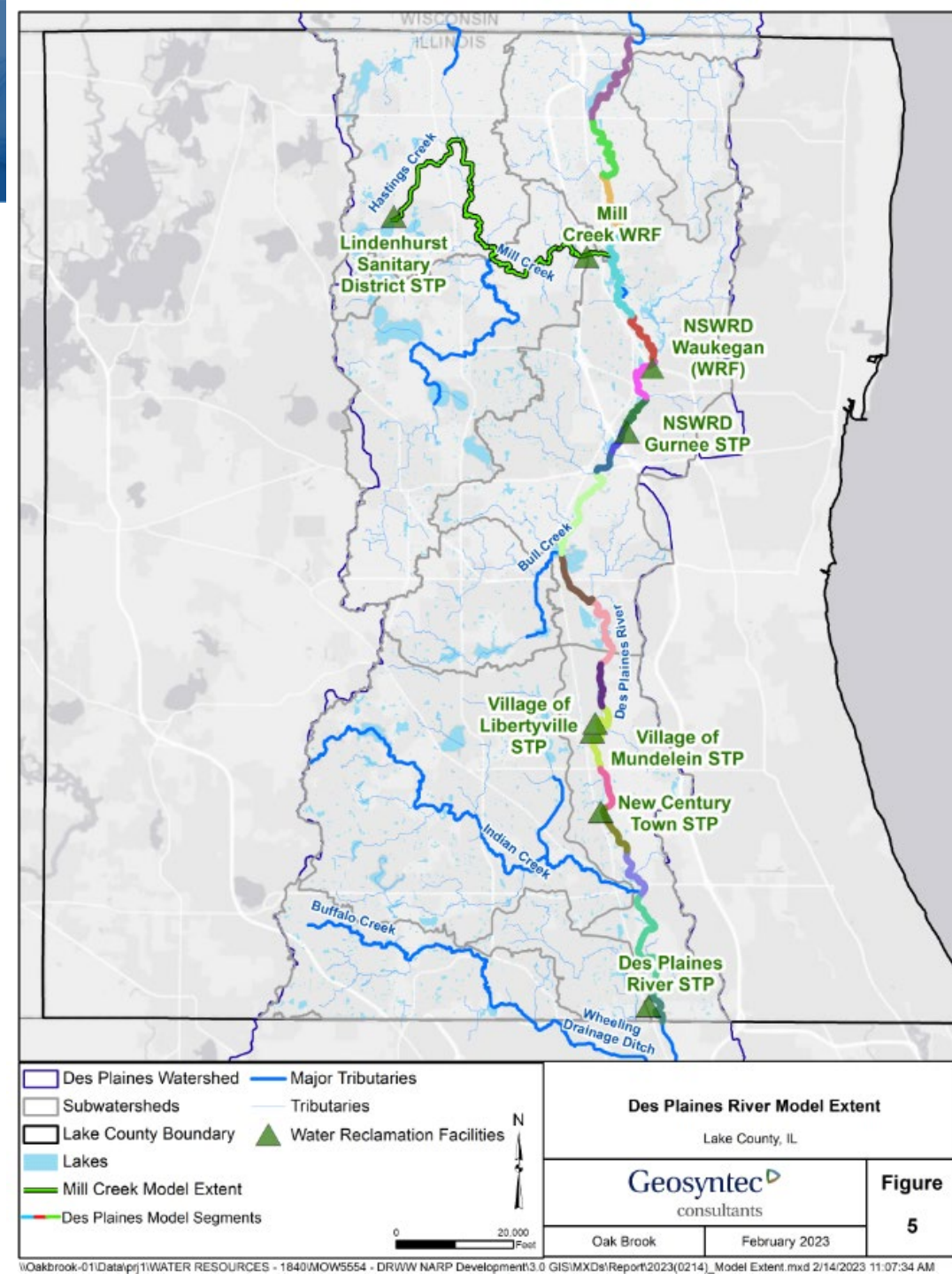


Significant decrease in POTW (WWTP) loads since 2015.
High load in 2019 driven by high precipitation.



Instream Model – Setup

- **Model Domain**
 - Mainstem Model- Russell Road to the confluence of the Des Plaines River and the Wheeling Drainage Ditch
 - Tributary Model- Hastings Lake to the confluence of Mill Creek and the Des Plaines River
- **Simulation Period**
 - 2020 Growing season (May – October)
 - Lowest flow period with the maximum data availability
- **Model Framework**
 - 1D Qual2kw model
 - Dynamic simulation
- **Calibrated to instream data**



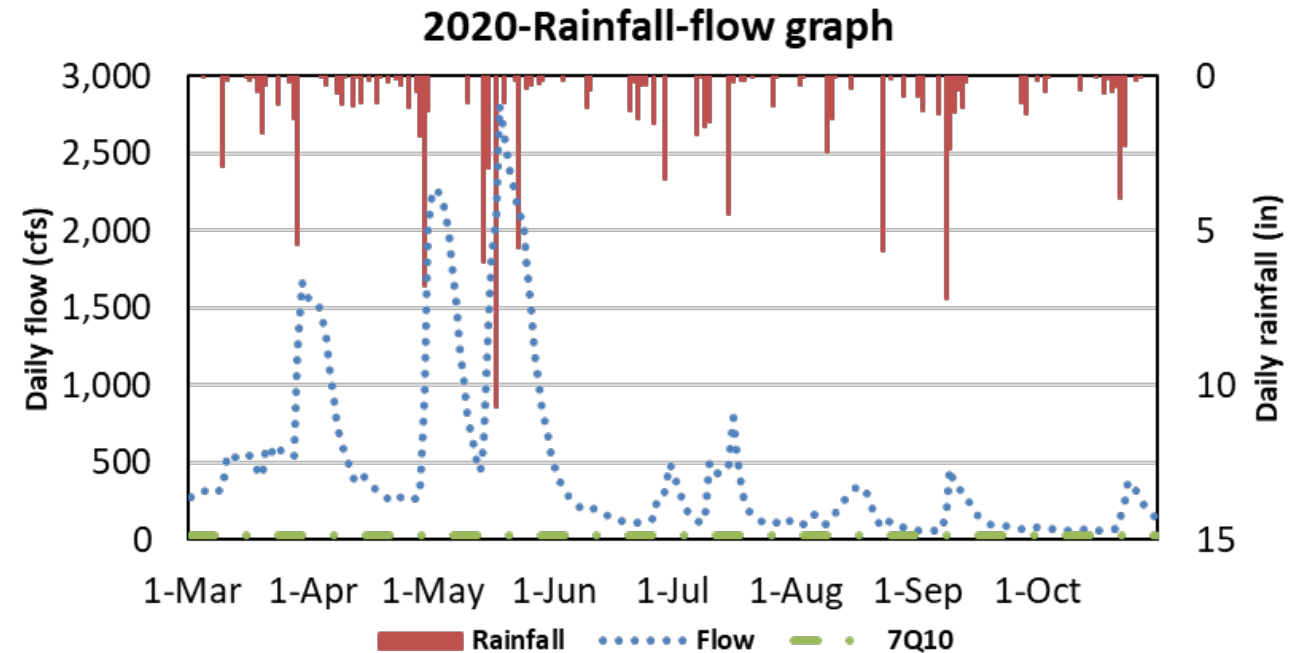
Watershed Management Scenarios

Individual and Combined
Scenarios



Baseline Scenario

- Baseline model scenario represents the existing conditions from May to Oct. 2020
- Low flow period from June to Oct. 2020



Watershed Management Scenarios



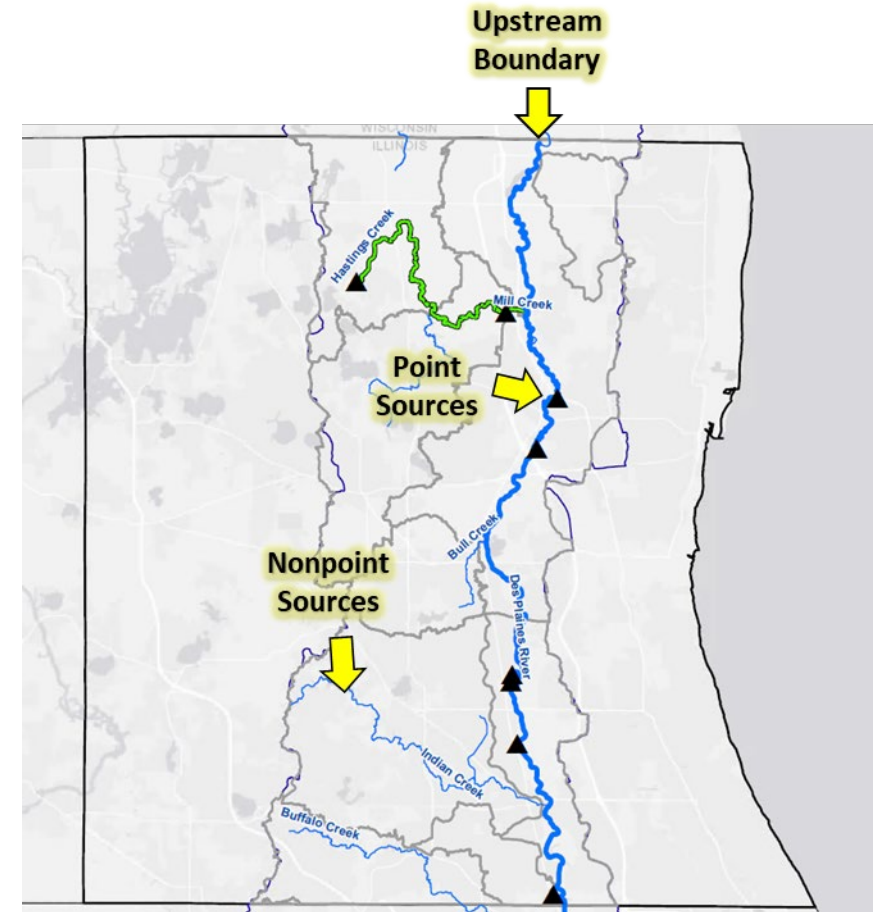
Upstream Load Reductions



Non-Point Sources Load Reduction



POTW Load Reduction



Key Takeaways

Detailed results Presented during DRWW annual General Meeting on Feb. 16, 2023 and Illinois EPA meeting on March 16, 2023

Takeaway #1: Upstream TP reductions reduce sestonic Chl-a and improve DO following large flow events

Takeaway #2: Tributary TP (Non-Point Sources) reductions reduce sestonic Chl-a but has minimal impact on DO

Takeaway #3: POTW TP reductions beyond 0.5 mg/l offer no additional benefit under current conditions

Takeaway #4: Combination of upstream, tributary and POTW load reductions required to address water quality issues



NARP Implementation Plan

DRWW NARP Recommendations



Meet limit of 0.5 mg/L annual geometric mean by January 2030 for CWRP



Collaborate with stakeholders in WI to reduce TP loading, address algae growth and improve DO

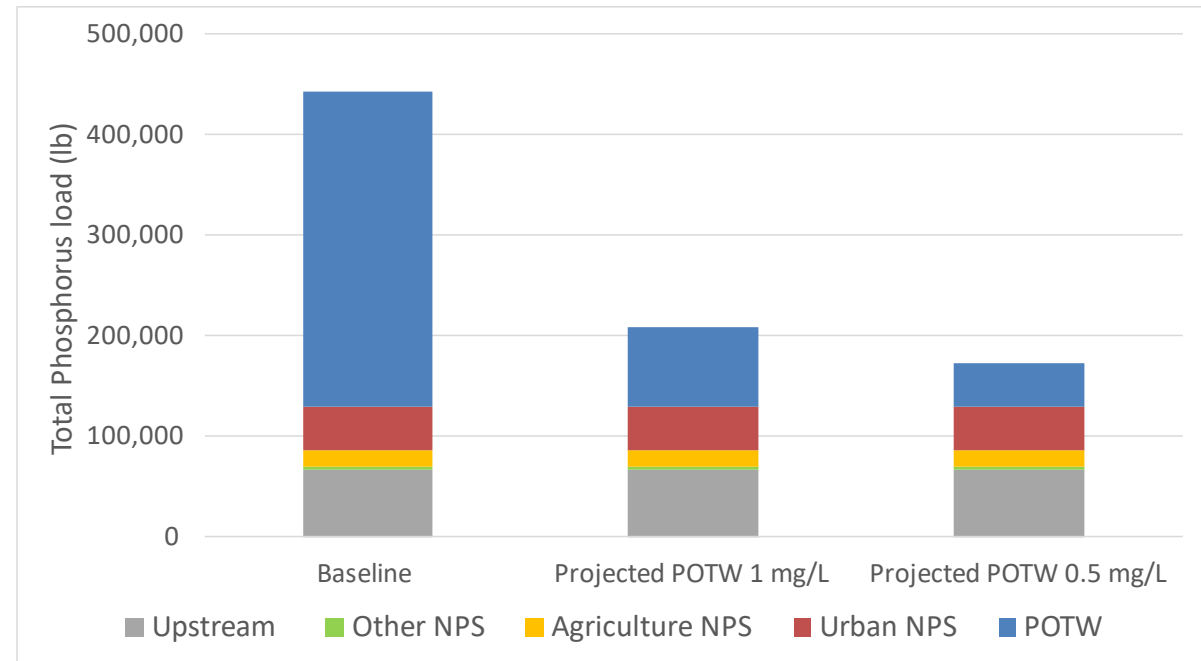


Implement stormwater projects to reduce phosphorus loading



WWTP Load Reduction

- WWTPs required to meet an annual geometric mean of 0.5 mg/L TP effluent
 - Will reduce the annual average existing loading by more than 50%
- Document progress by WWTPs and schedule for achieving compliance
 - Need input from WWTPs

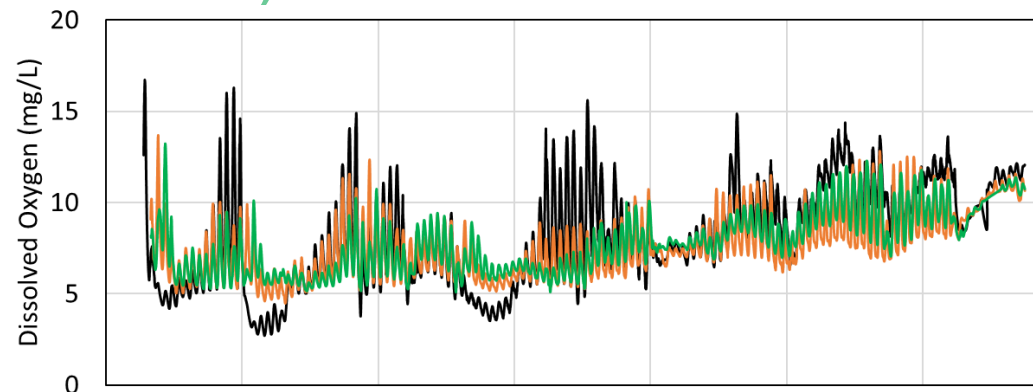


Annual Average Load from 2013 to 2020



Upstream Load Reduction

- Collaboration with Wisconsin required to address issues from upstream
 - Wisconsin DNR is developing a TMDL for Upper Des Plaines River watershed as part of Fox River TMDL
 - <https://dnr.wisconsin.gov/topic/TMDLs/FOXIL>
- Evaluate instream projects to improve instream aeration near WI-IL border near Russell road to address issues (Currently discussing with monitoring committee)



Non-Point Sources Load Reduction

- Identify programmatic controls that could be enhanced for reducing phosphorus loading
- Identify priority areas for project implementation
- Identify project opportunities for load reduction from urban and agriculture sources
- Identify funding mechanism for implementation



Example of Programmatic Controls

- **Enhance programs**
 - Street sweeping and leaf collection practices
 - Improved operation and maintenance for existing facilities
- **Retrofit existing facilities**
 - Convert dry ponds to wet ponds
 - Replace filtration media of existing bioretention (with high-performance P-removal media)



Courtesy Village of Lake Zurich, IL



Priority Area and Project Identification

- **Total Phosphorus Loading from Stormwater Runoff**
 - Based on a watershed model developed and calibrated using monitoring data
 - Areas with high TP loading prioritized
- **Density of Existing Stormwater Facilities**
 - Existing facility information from Lake County
 - Areas without a lot of existing facilities prioritized
- **Other Factors**
 - Flood-prone areas
 - Age of facilities
 - Opportunities to create multi-benefit facilities (parks, trails, & education)
 - Drive equitable investments in green infrastructure
- **Input from DRWW members – DRWW Project Questionnaire**



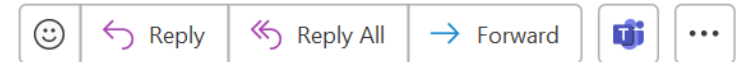
DRWW Project Questionnaire

Request for Projects

DRWW Request for Projects: Questionnaire Submission Request



Strelcheck, Ashley <AStrelcheck@lakecountyil.gov>
To



Thu 8/3/2023 2:00 PM

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This message is being sent on behalf of Geosyntec Consultants, Inc. to the Des Plaines River Watershed Workgroup (DRWW) members:

Geosyntec is currently developing the implementation plan for the DRWW's Nutrient Assessment Reduction Plan (NARP). As part of this process, it is important to evaluate opportunities that may exist to improve our watershed and the Des Plaines River, including ongoing initiatives.

Geosyntec is requesting DRWW member communities and stakeholders submit any waterway, stormwater, or other watershed projects for inclusion in the implementation plan. It does not matter if the project is conceptual, preliminary or shovel ready. Geosyntec will review the projects and assess their ability to capture, and potentially reduce, or be enhanced to reduce phosphorus loading to the Des Plaines River. Please complete the simple questionnaire and submit any supporting information by **Monday, September 18, 2023**. Any questions about this process or the survey should be directed to Brian Valleskey, Geosyntec Consultants, BValleskey@Geosyntec.com.

- Survey Link: [Questionnaire for Plan Submission for DRWW](#)



Questionnaire Elements

Questionnaire for Plan Submission for DRWW

1. What is the approximate location of project
2. Purpose of project (stormwater, flood control, WQ improvement)
3. Public or private property
4. Status (concept, prelim, final w/o permits, shovel ready)
5. Funding source
6. Previously identified
7. WQ assessment – DRWW focused on NARP benefits
8. Contact
9. Email
10. Phone



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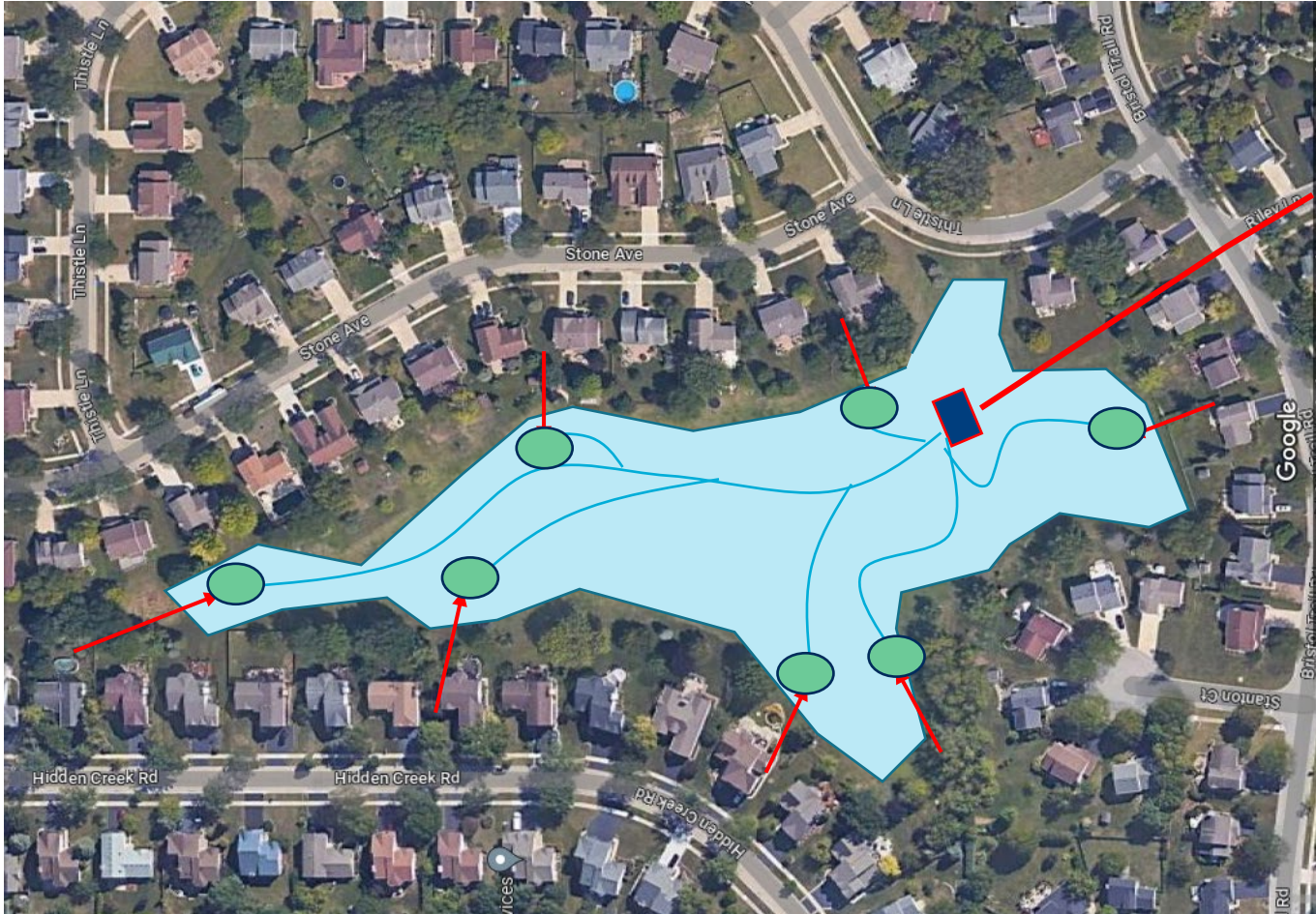
Rishab Mahajan > Client Projects > DRWW NARP > Projects Plans

Name	Modified	Modified By	File size	Sharing	Activity
Trisnki Island Contractv1.pdf	A few seconds ago	Brian Valleskey	4.00 MB	Shared	

Insert Plans – Drag and Drop



DRWW project submission questionnaire



Deepen Facility

- Native Vegetation
- Meandering Swales
- Pocket forebays

DRWW project submission questionnaire



Stabilize Streambanks

- Native Vegetation
- Stream flow modification
- Stormwater disconnection
- Selective Shading

QUESTIONS

**Rishab
Mahajan, PE,
CFM, CPSWQ**

rmahajan@geosyntec.com

- PM for DRWW NARP Project and several other NARP projects
- Surface Water Modeling

**Brian
Valleskey,
CFM, CLP**

Bvalleskey@geosyntec.com

- PM on multiple NARP projects
- Stream and Lakes
- Assisting with NARP implementation for DRWW
- 15 years worth of experience consulting in Lake County, IL
- Several years on TAC