



Developing Phosphorous Assessment and Reduction Plan to Address Unnatural Growth in an Urbanized Unnatural Waterway – Interim Findings and Next Steps

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Outline

1 Background

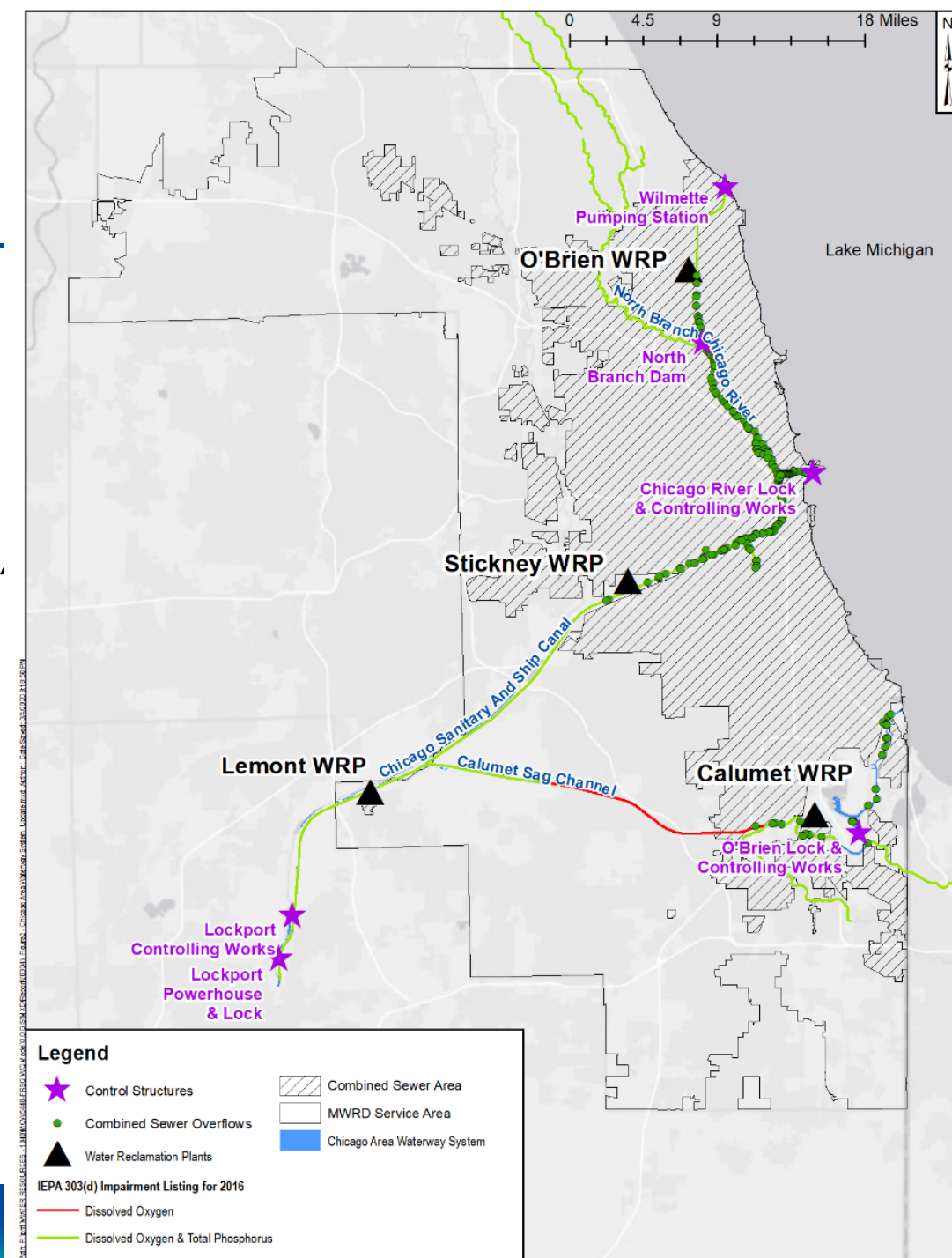
2 PARP Methodology

3 Lessons Learned

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Chicago Area Waterway System

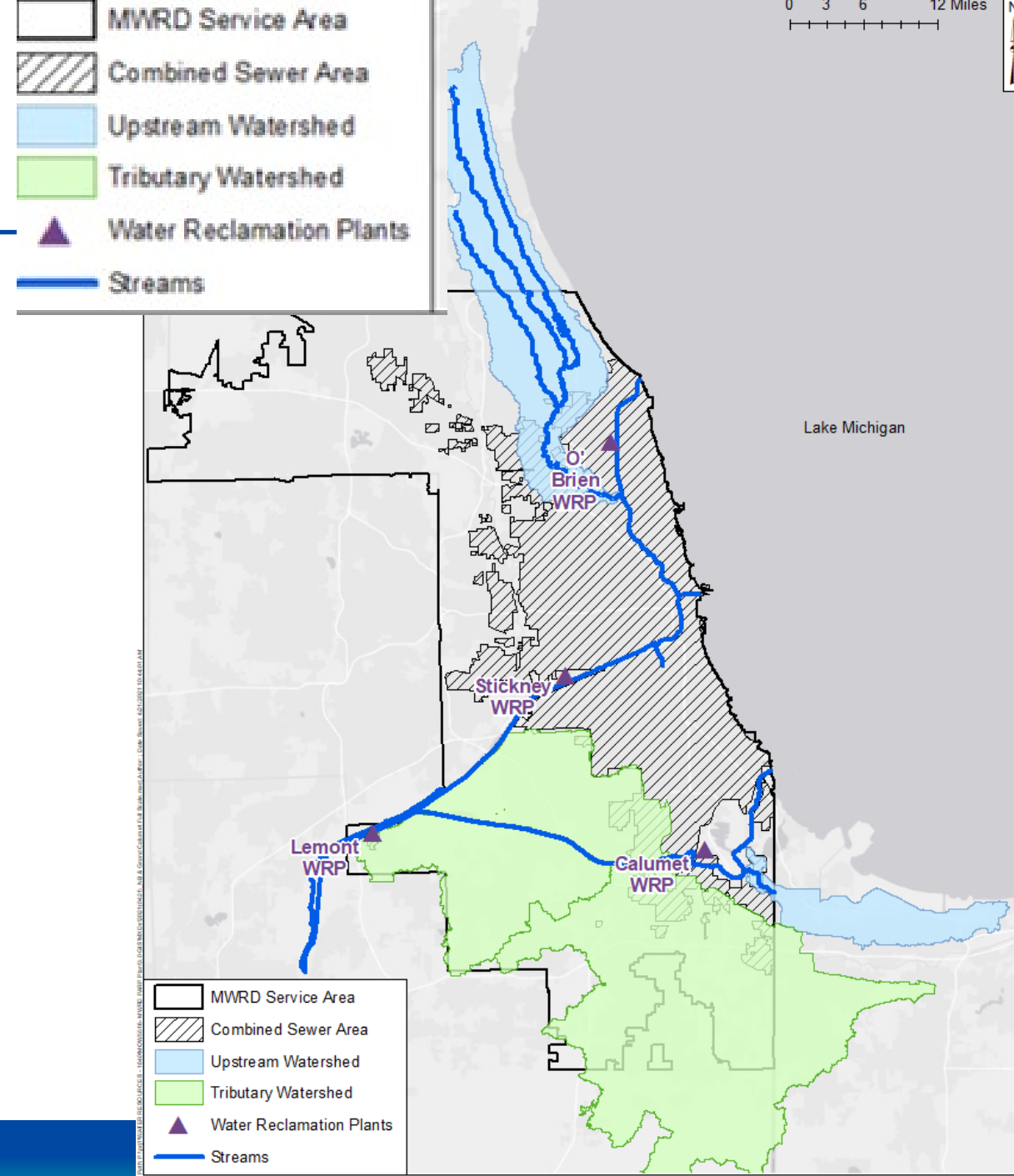
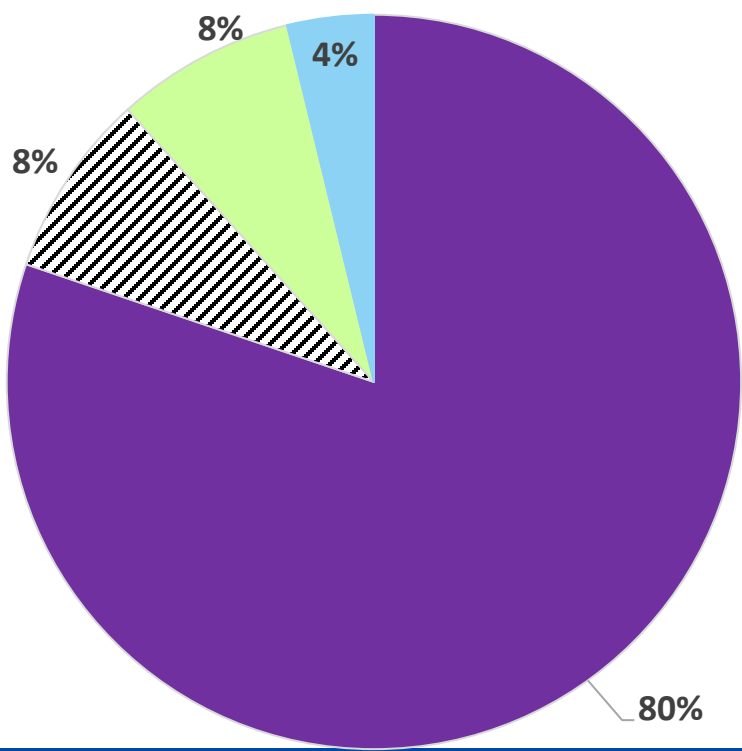
- Constructed by the Metropolitan Water Reclamation District (MWRD) in 1900s
 - 80 miles of engineered waterways to reverse flow from Lake Michigan to Mississippi River
 - Dredged and realigned for navigation, flood control, and wastewater conveyance
- Receives discharge from
 - Four water reclamation plants (WRPs)
 - Combined sewer overflows (CSOs)
 - Pumping stations
 - Industrial discharges
 - Runoff from 740 square miles upstream



Phosphorus Sources

March-September (Growing Season), 2020

WRPs CSOs Tribs Upstream



Background

- Negotiated settlement between MWRD, environmental groups, and Illinois EPA
- Develop a Phosphorus Assessment Reduction Plan to eliminate unnatural growth in the CAWS
- Project Oversight by Nutrient Oversight Committee
 - MWRD
 - Illinois EPA
 - Environmental Groups

PARP Methodology

PARP Objective and Approach

Objectives

- *Determine CAWS reaches with offensive conditions associated with unnatural plant or algal growth*
- *Develop a PARP to eliminate offensive conditions*

Project Approach

Phased approach to meet the above objectives

Task 1

Identify CAWS reaches with unnatural plant or algal growth



Task 2

Identify the measures to eliminate the unnatural algal growth



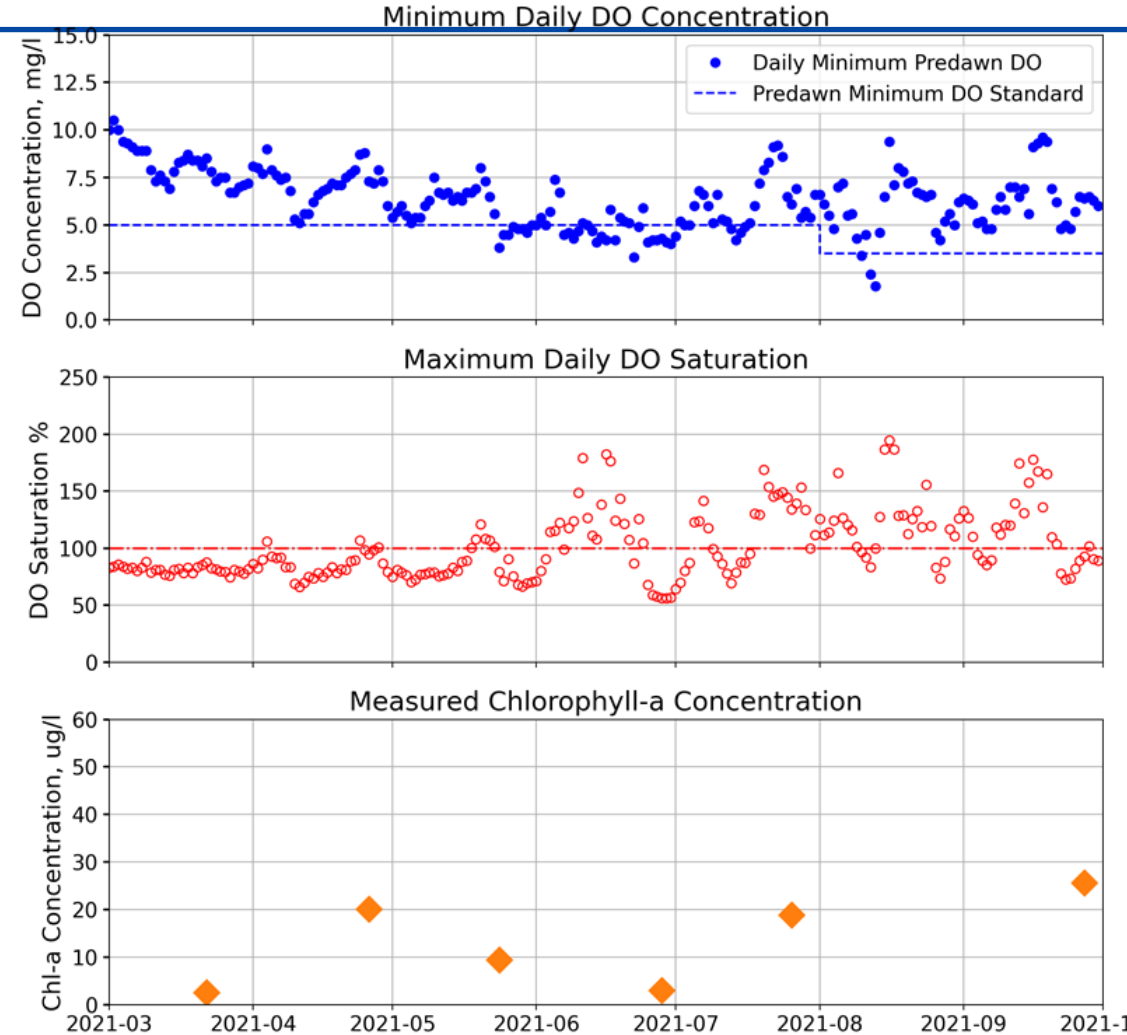
Task 3

Develop implementation plan and schedule for measures identified

Unnatural Growth Determination

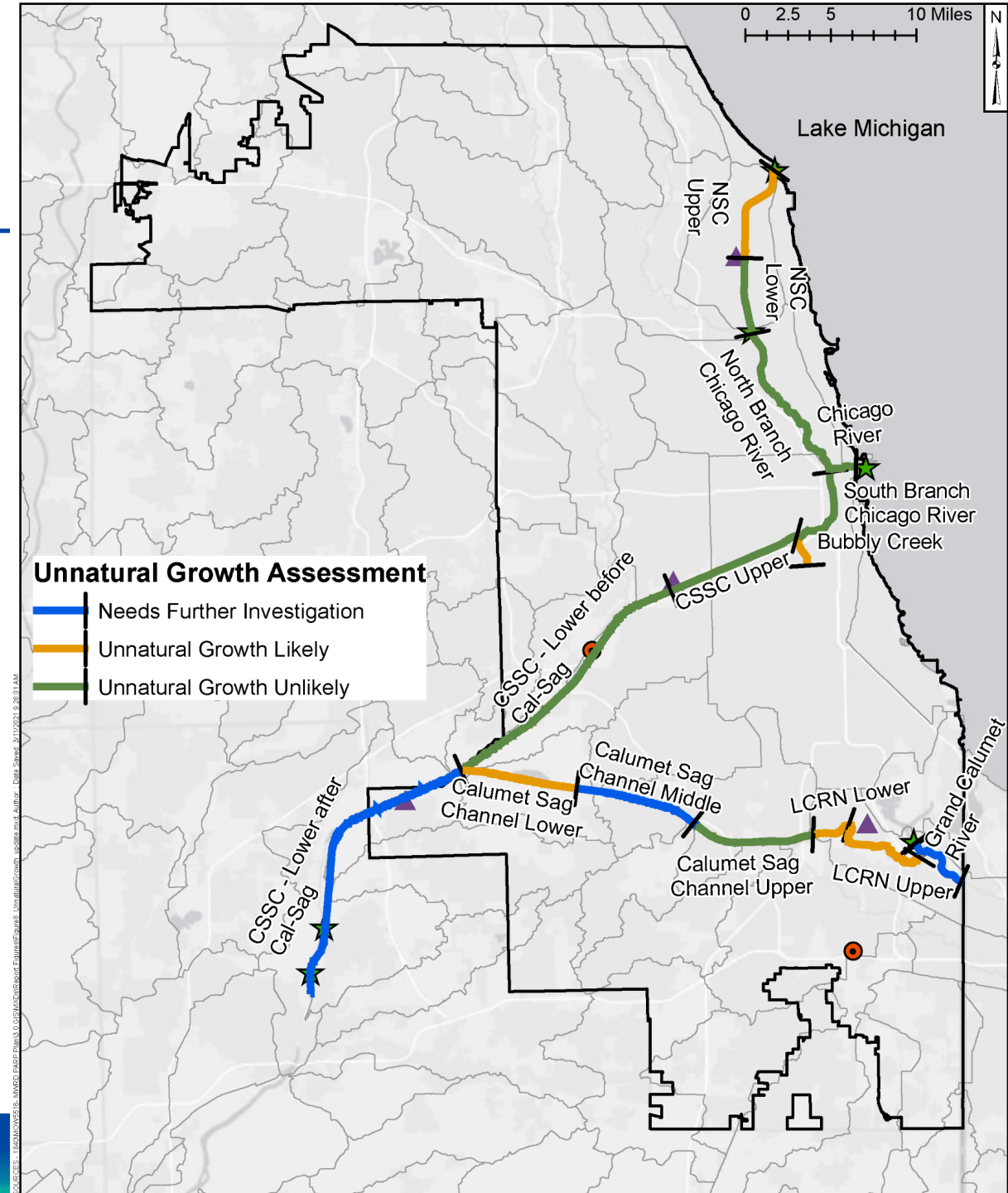
- Unnatural growth defined as recurring
 - Pre-dawn excursions of DO standards
 - DO oversaturation
 - Relatively high chlorophyll-a
- Analyzed MWRD data from 19 monitoring stations over multiple years

Station: Cicero Ave. Year:2021
Reach: Calumet Sag Channel

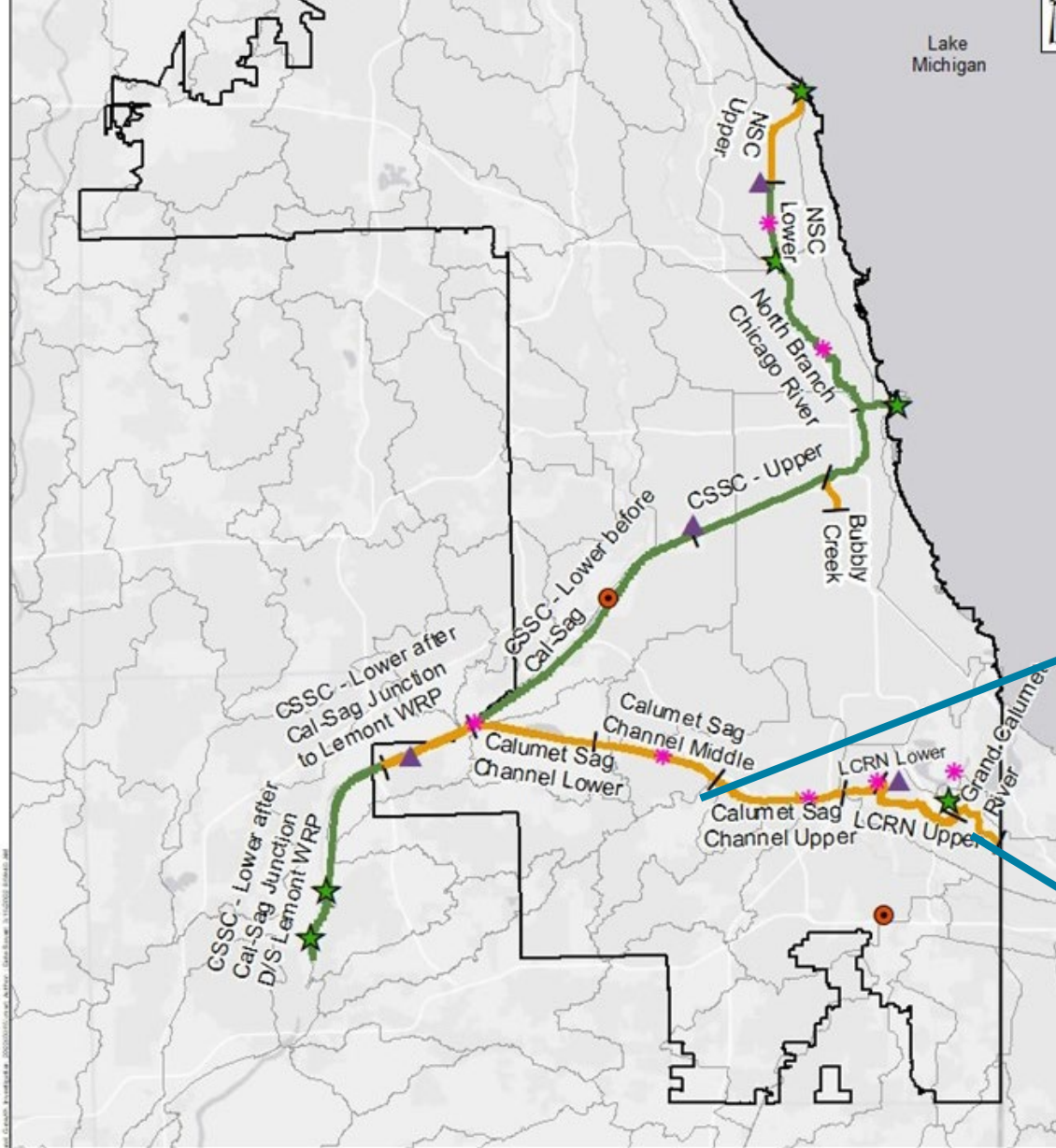


Unnatural Growth Determination

- Based on data analysis using multiple lines of evidence
- Reaches determined to be unnatural are in the Calumet River System except for Bubbly Creek and North Shore Channel Upper
- PARP measures to focus on Calumet System reaches to eliminate unnatural growth*



* The NSC Upper and Bubbly Creek has unique characteristics that are outside of the scope of the current study.



- | | | |
|-------------------|--------------------------|---------------------------|
| MWRD Service Area | Aeration Stations | Unnatural Growth Likely |
| HUC12 Watersheds | Control Structures | Unnatural Growth Unlikely |
| MWRD Reservoirs | Water Reclamation Plants | |



Task 2 – Identify Measures to Eliminate Unnatural Growth

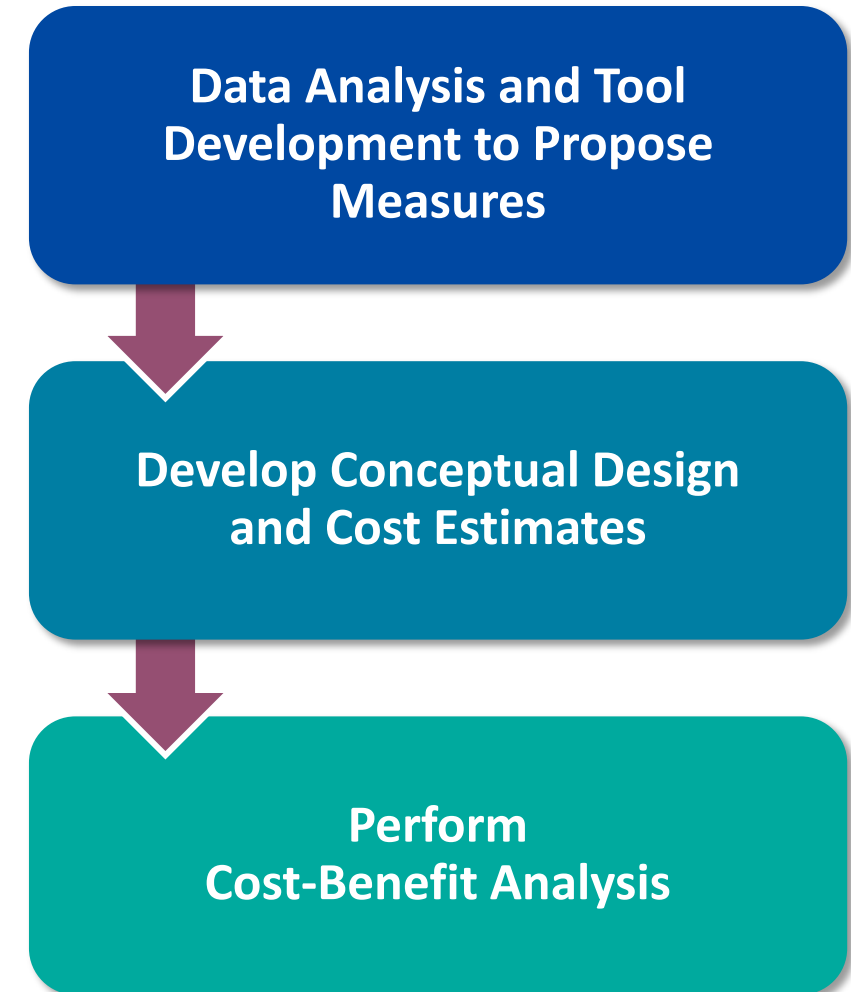
Objective

Identify P-input reduction and other measures to reduce or eliminate the conditions causing unnatural plant or algal growth.

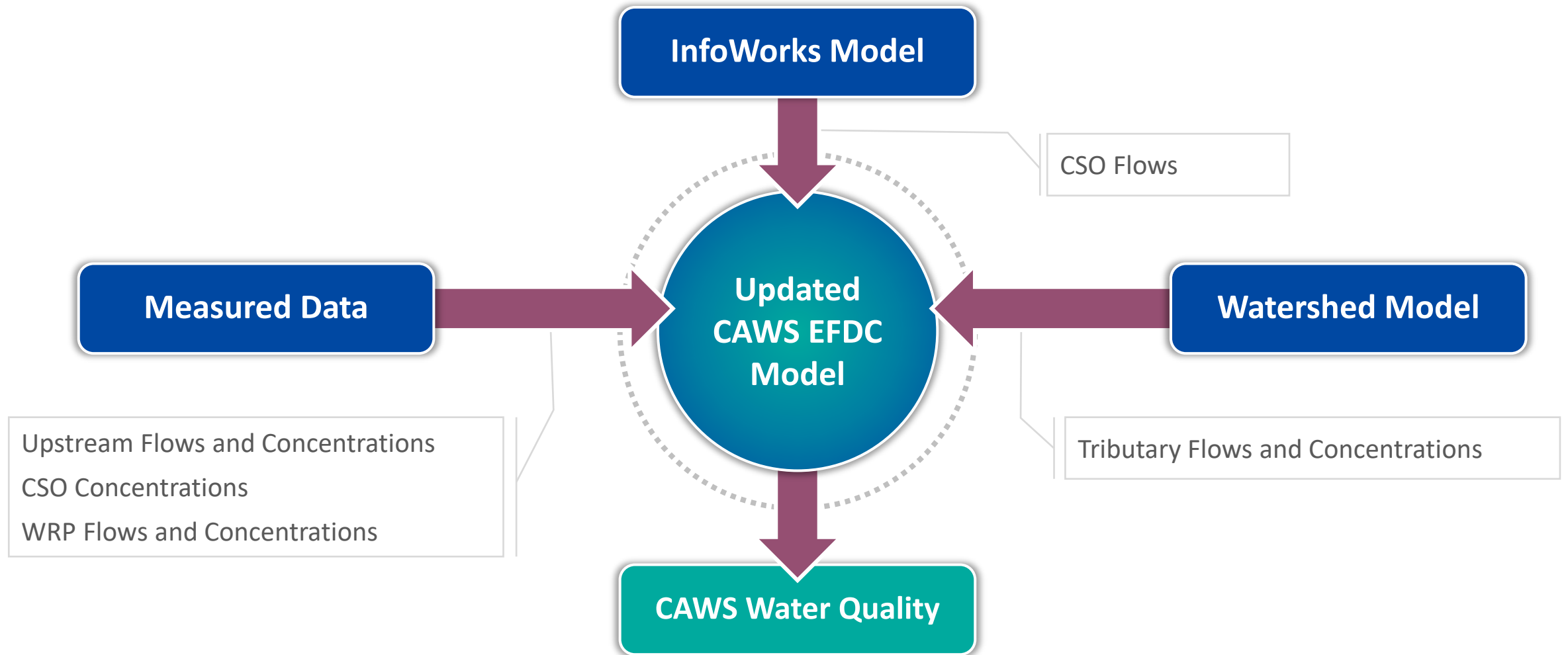
Approach

Data analysis and model development for assessing P-input reductions

May require an alternative package of measures

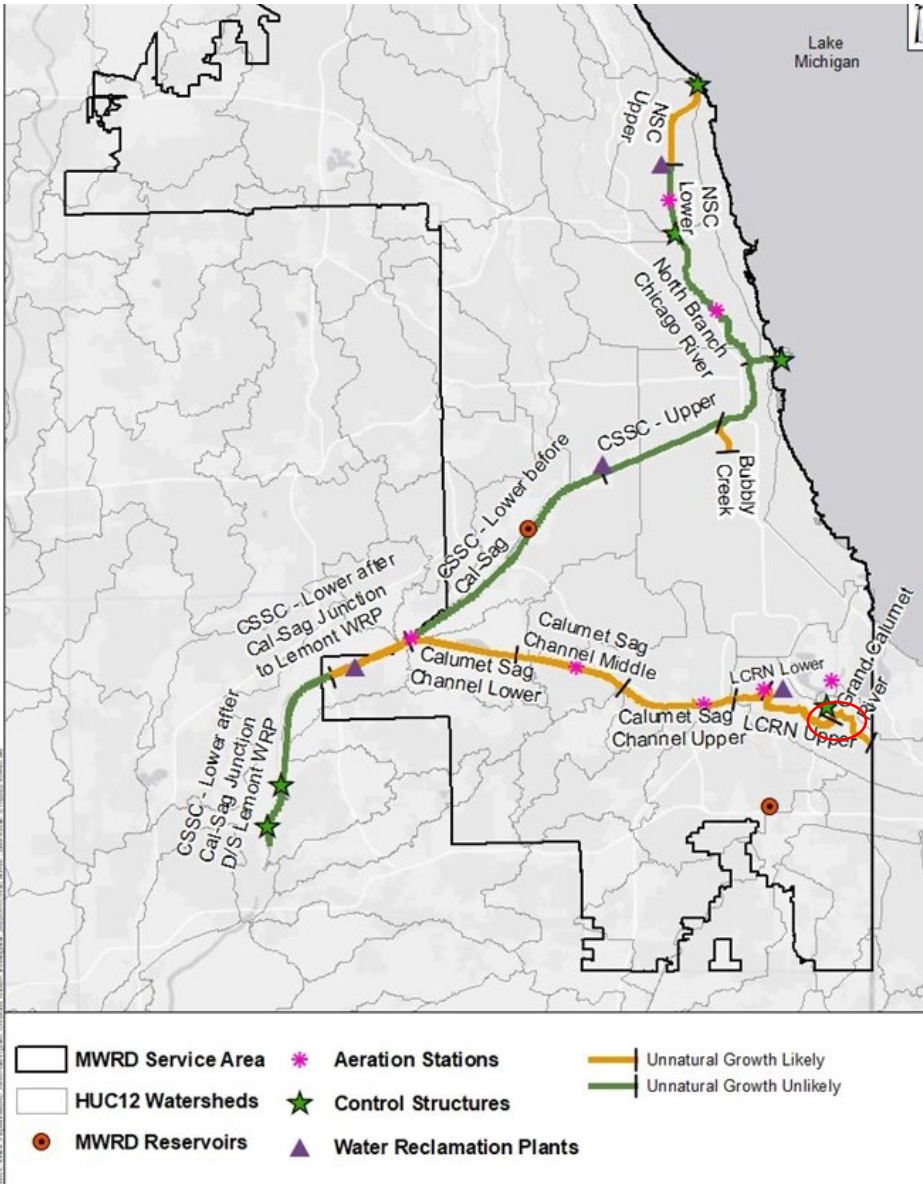
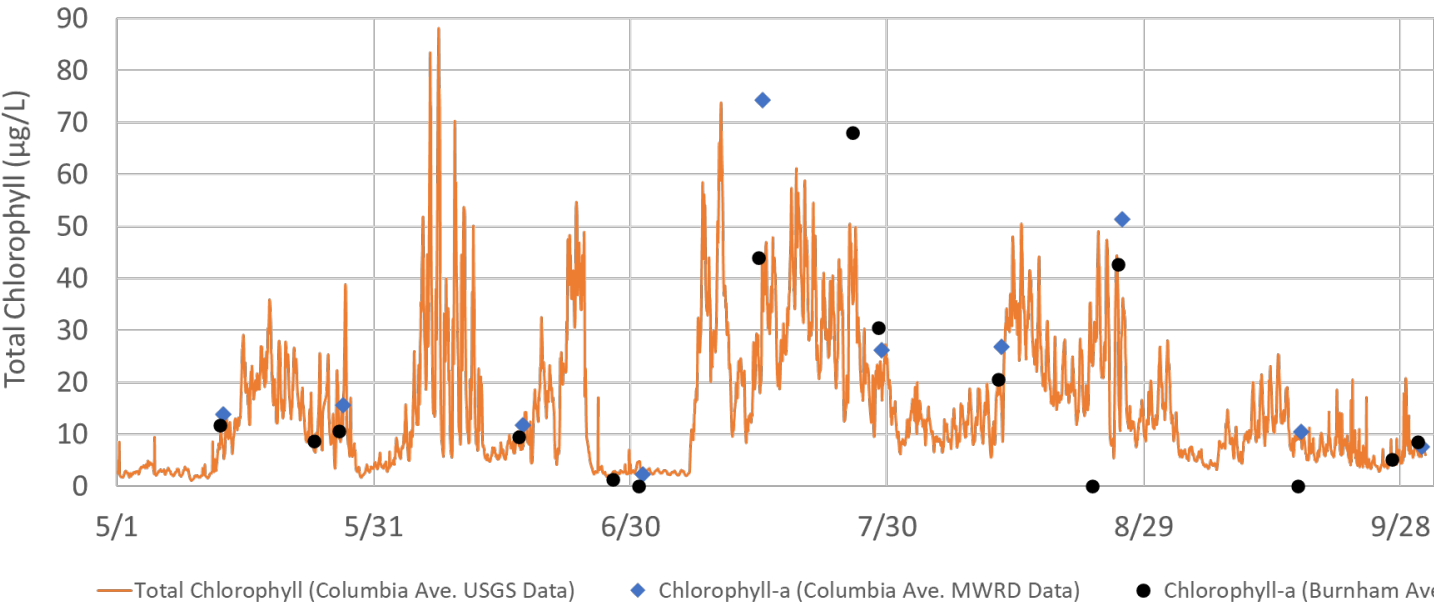


Modeling Framework



Impact of Upstream Grand Calumet River

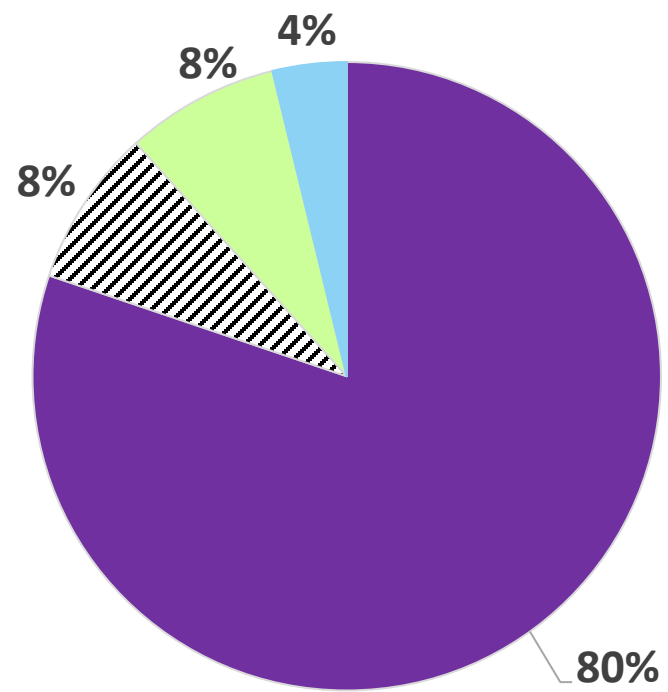
High chlorophyll-a input



Impact of WWTP upgrades

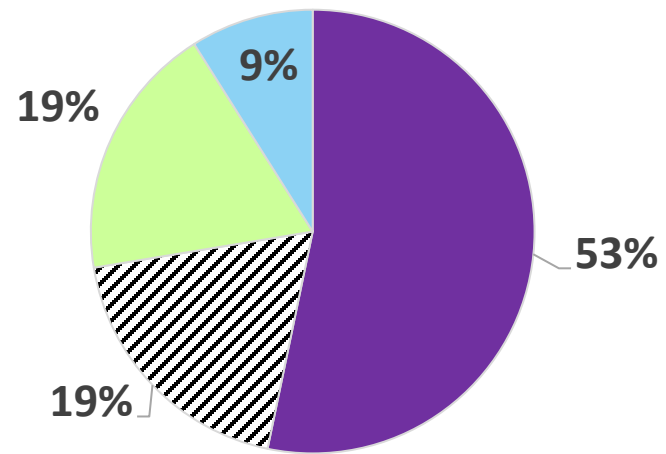
■ WRP ▨ CSO ■ Trib ■ Upstream

Existing Load from May to October 2020



Total P Load: 1.8 million Kg

WRPs @ 0.5 mg/L



Total P Load: 0.75 million Kg

Task 3 Objectives and Approach

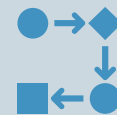
Objective: Develop a feasible implementation plan and schedule (IPS) for P-reductions or other measures identified in Task 2

Approach:

- Identify and engage with internal (MWRD) and external stakeholders
- Prepare draft IPS
- Finalize IPS



Additional Stakeholder Input



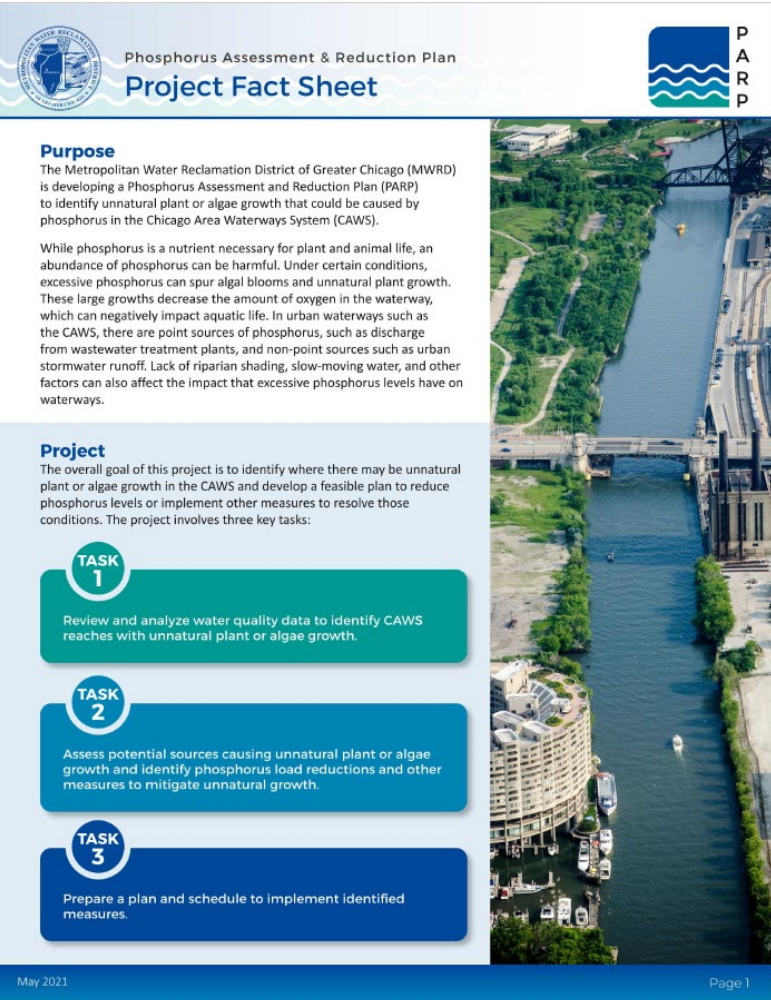
Prepare Draft Implementation Plan and Schedule





**Finalize
Implementation Plan and
Schedule**

Stakeholder Engagement Plan

- Identified Stakeholder Engagement Plan Goals
- Key Stakeholders
 - Municipalities – Stakeholder surveys
 - Watershed groups
 - Regional/state agencies
 - Non-profit organizations
 - Community groups/General public
 - Indiana stakeholders
- Developed Project Fact Sheet
- Engagement with stakeholder at multiples stages of project



 Phosphorus Assessment & Reduction Plan
Project Fact Sheet 

Purpose
The Metropolitan Water Reclamation District of Greater Chicago (MWRD) is developing a Phosphorus Assessment and Reduction Plan (PARP) to identify unnatural plant or algae growth that could be caused by phosphorus in the Chicago Area Waterways System (CAWS).

While phosphorus is a nutrient necessary for plant and animal life, an abundance of phosphorus can be harmful. Under certain conditions, excessive phosphorus can spur algal blooms and unnatural plant growth. These large growths decrease the amount of oxygen in the waterway, which can negatively impact aquatic life. In urban waterways such as the CAWS, there are point sources of phosphorus, such as discharge from wastewater treatment plants, and non-point sources such as urban stormwater runoff. Lack of riparian shading, slow-moving water, and other factors can also affect the impact that excessive phosphorus levels have on waterways.

Project
The overall goal of this project is to identify where there may be unnatural plant or algae growth in the CAWS and develop a feasible plan to reduce phosphorus levels or implement other measures to resolve those conditions. The project involves three key tasks:

- TASK 1**
Review and analyze water quality data to identify CAWS reaches with unnatural plant or algae growth.
- TASK 2**
Assess potential sources causing unnatural plant or algae growth and identify phosphorus load reductions and other measures to mitigate unnatural growth.
- TASK 3**
Prepare a plan and schedule to implement identified measures.

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Lessons Learned

Lessons Learned

- Availability of good quality data important for developing management plans to address nutrient issues
- Need to assess the contribution of upstream sources of phosphorus and algae
- Involving stakeholders early in the process is useful

Q&A

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