

24) **SAWPA Round 1 Prop 2 Algae Harvester Update**

Authorize the City Manager to approve the continued submittal of the grant application with revised project scope and up to \$1.5M in City cost share for the \$3M project over the 3-year project period.



REPORT TO CITY COUNCIL

To: Honorable Mayor or Members of the City Council

From: Jason Simpson, City Manager

Prepared by: Johnathan Skinner, Director of Community Services
Benjamin Foster, Management Analyst

Date: December 13, 2022

Subject: **SAWPA Round 1 Prop 2 Algae Harvester Update**

Recommendation

Authorize the City Manager to approve the continued submittal of the grant application with revised project scope and up to \$1.5M in City cost share for the \$3M project over the 3-year project period.

Background

In Spring 2022, the City of Lake Elsinore applied for Prop 1, Round 2 IRWM grant funding from the State of California Department of Water Resources (DWR) through the Santa Ana Watershed Project Authority (SAWPA) for an algae harvesting project. The project, entitled "Lake Elsinore Algae Harvesting Demonstration Project for Harmful Algae Bloom and Nutrient Reduction," would entail the rental and deployment of one algae harvester unit designed and developed by AECOM which would be in operation for up to 23 months. The grant would be for a total not to exceed \$3M, which includes up to a 50% cost share requirement not to exceed \$1.5M from the City.

Discussion

After multiple rounds of participatory budgeting and detailed scoring of projects, the City's project ranks 5th in the General Implementation project category, and the top 7 ranked projects have been recommended for funding. The next phase of the application process is for recommended project applicants to work with SAWPA's consulting firm Dudek to provide detailed projects plans and budgets to DWR over the next few months before final awards are made in Spring 2023. A decision to proceed and commitment to the cost share is needed at this time.

Staff performed additional due diligence and researched current similar pilot projects in and Florida (St. Johns River Water Management District in Florida) and Ohio (Ohio Department of Natural Resources) to estimate economy of scale with the 3,000-surface acre water body of Lake Elsinore. After much consideration and research, City staff has worked with SAWPA and AECOM

SAWPA Algae Harvester Update

to revise the originally proposed 15-year project with an outright purchase of the harvester unit to a 3-year pilot project that would entail rental of the harvester unit from AECOM. The pilot study would take place at a curtailed-off 5–6-acre area at Launch Pointe Public Beach, which would demonstrate the effectiveness of the treatment, potentially provide a clean-water swim area, and could be scaled accordingly during the project period. All power needs, infrastructure for lake water intake and outflow, and disposal of algal biomass slurry is included in the grant budget. The findings of the study would provide valuable insight into the effectiveness, scalability, and long-term cost of algae harvesting as a treatment option for water quality improvement in Lake Elsinore.

Fiscal Impact

Not to exceed \$1.5 million cost share for the 3-year project period, funded through Measure Z Funds.

Attachments

Attachment 1- AECOM PowerPoint Presentation - Algae Harvester Lake Elsinore

Attachment 2 - Lake Elsinore Algae Harvester Budget - 3 Year

Algae Harvesting

Hydronucleation Flotation Technology

Innovative technology that removes nutrients, cleans our water, and decarbonizes our planet

Lake Elsinore
December 6, 2022

Agenda





- 1 Who is AECOM?
- 2 The HAB Problem
- 3 Algae Harvesting Technology
- 4 Laboratory Results
- 5 Proposed Pilot Test

1

Who is AECOM?

About us

US\$ 
13.3B
FY 2021 revenue


260
Fortune 500

#1 ENR-ranked for General
Buildings, Transportation
and International Markets

50K+
people
worldwide 

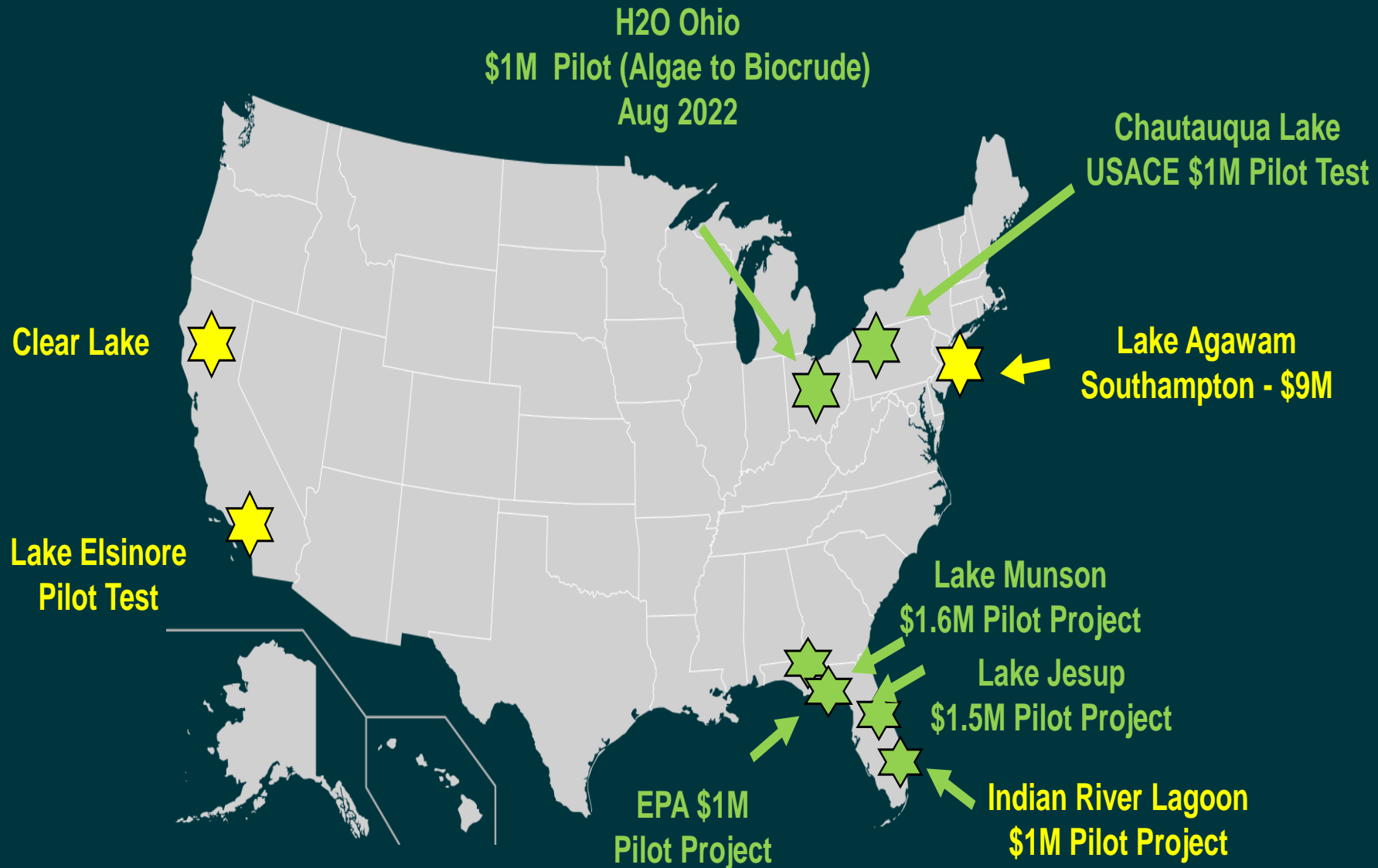
300+
offices
worldwide 

 **ENR2022**

Top 500

- | | | |
|-------------------------|-------------------|-------------------|
| 1 General Building | 2 Top Design Firm | 3 Sewer and Waste |
| 1 International Markets | 2 Hazardous Waste | 3 Water |
| 1 Transportation | | |

Algae Harvesting Projects



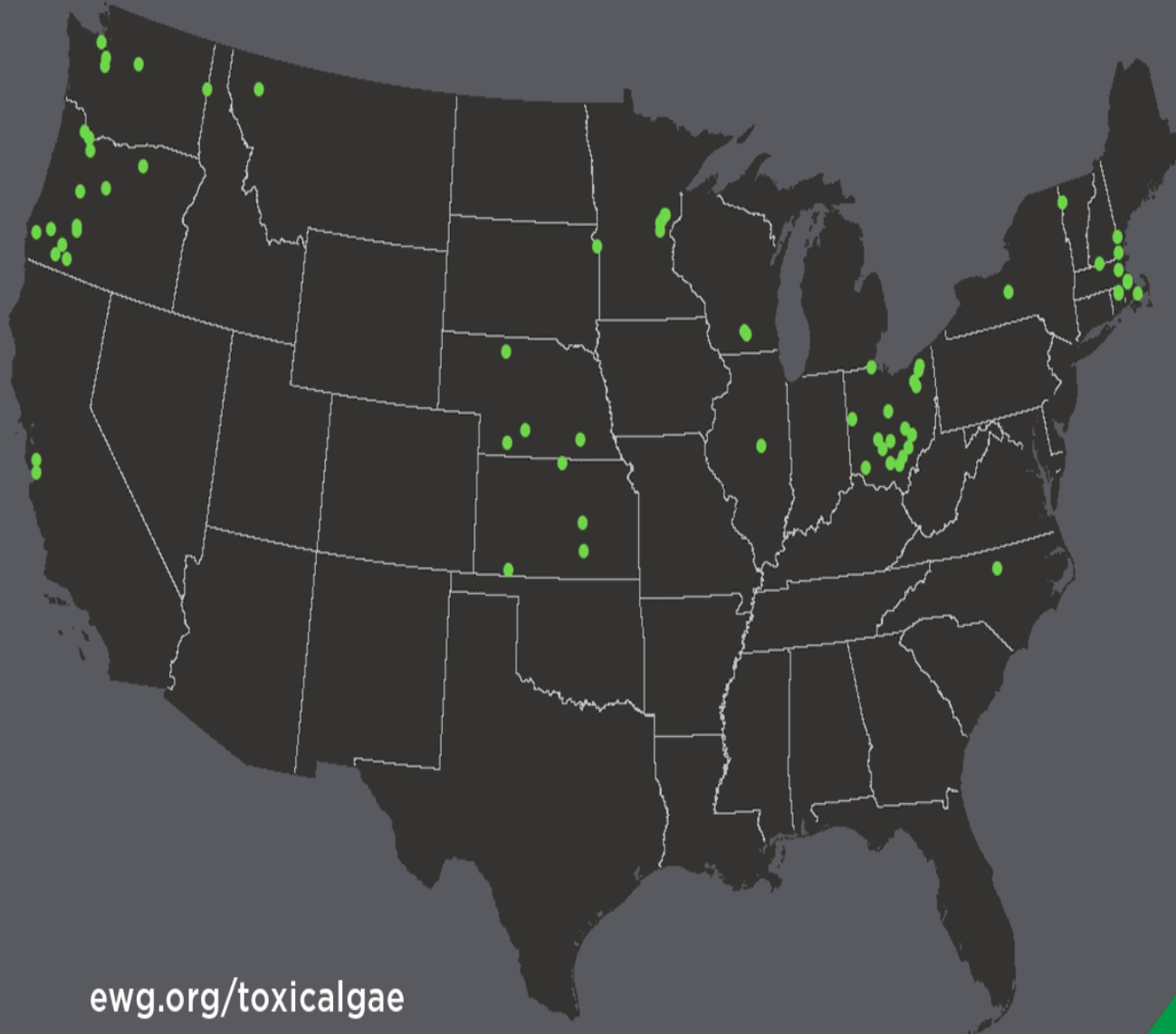
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The HAB Problem

“You are not Alone”

2010

ALGAE BLOOMS IN THE U.S. HAVE SURGED BETWEEN 2010 AND 2020



ewg.org/toxicalgae

■ Locations of Algae Blooms 2010-2019

■ Locations of 2020 Algae Blooms (through October 9th)

Source: Environmental Working Group. Updated through October 9th, 2020.

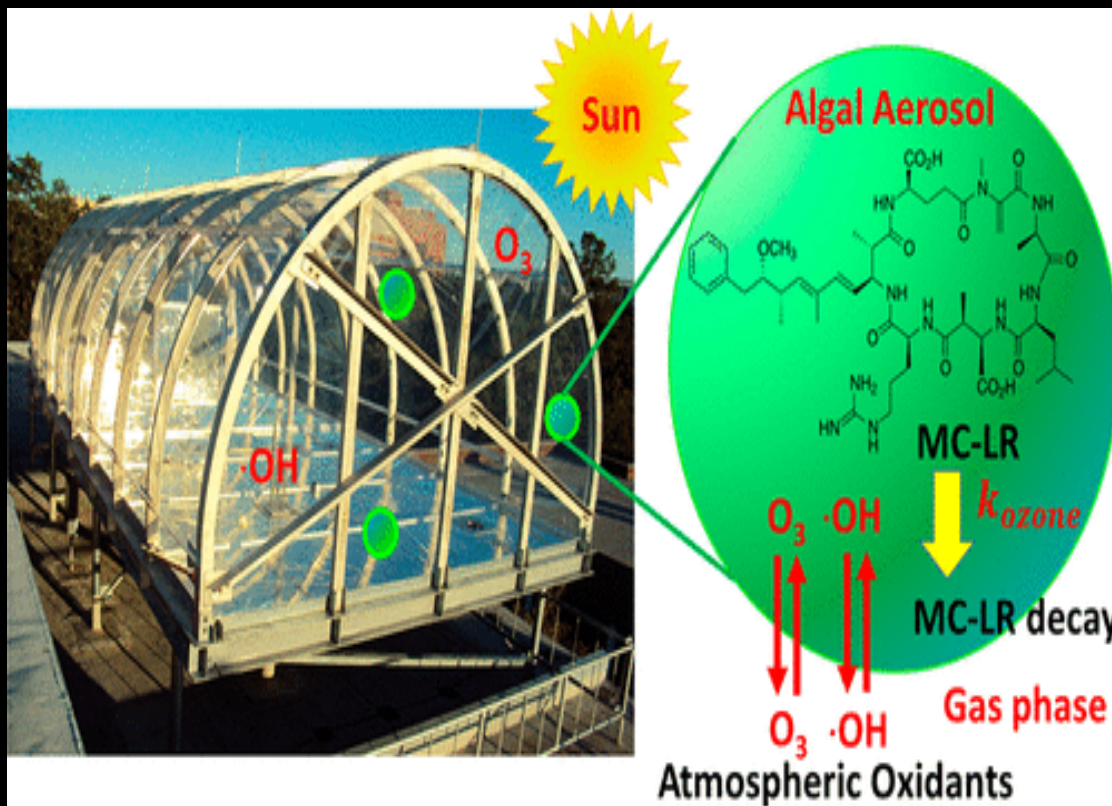
Harmful Algal Blooms

- 1) Increasing in Intensity
- 2) Lasting Longer
- 3) Becoming More Toxic



More Challenges Ahead

UF scientists show how long toxins produced by HABs of blue-green algae remain in the air- October 2020

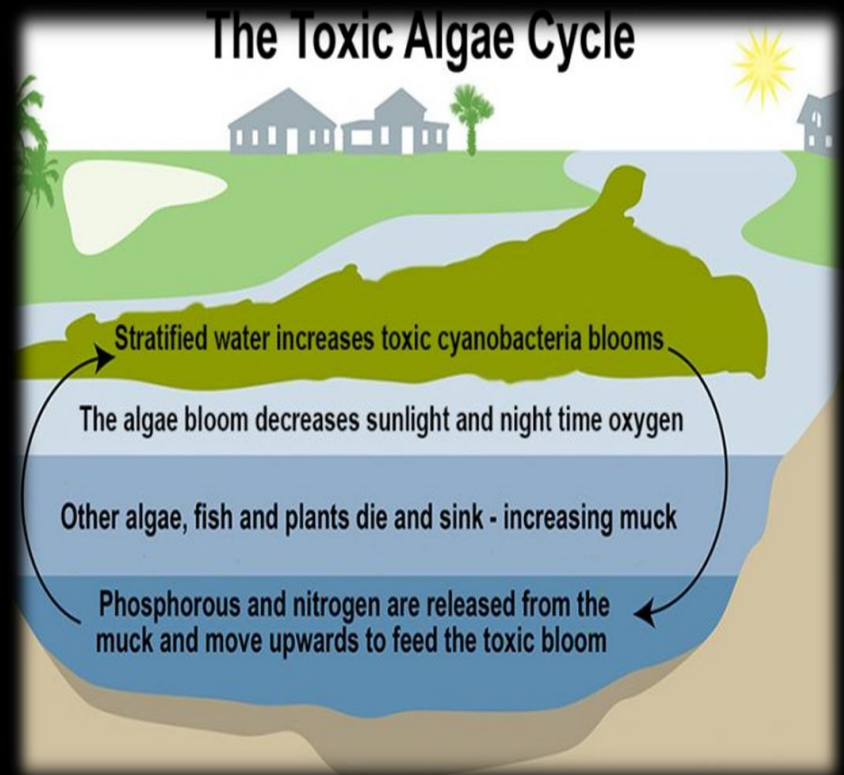


“....Residential areas within about 10 miles from a cyanobacterial bloom source could be impacted by the harmful algal aerosols even under a gentle breeze traveling four to seven miles per hour.”

Existing Technologies Not Working

1. Sonic
2. Aeration Bubbles
3. Peroxide
4. Algaecides
5. Dredging

New Technology Needed



*“Reduce the food...
Reduce the algae”*

2

Algae Harvesting Technology

Harmful Algal Bloom Interceptor Treatment and Transformation System HABITATS (2019 – 2021)

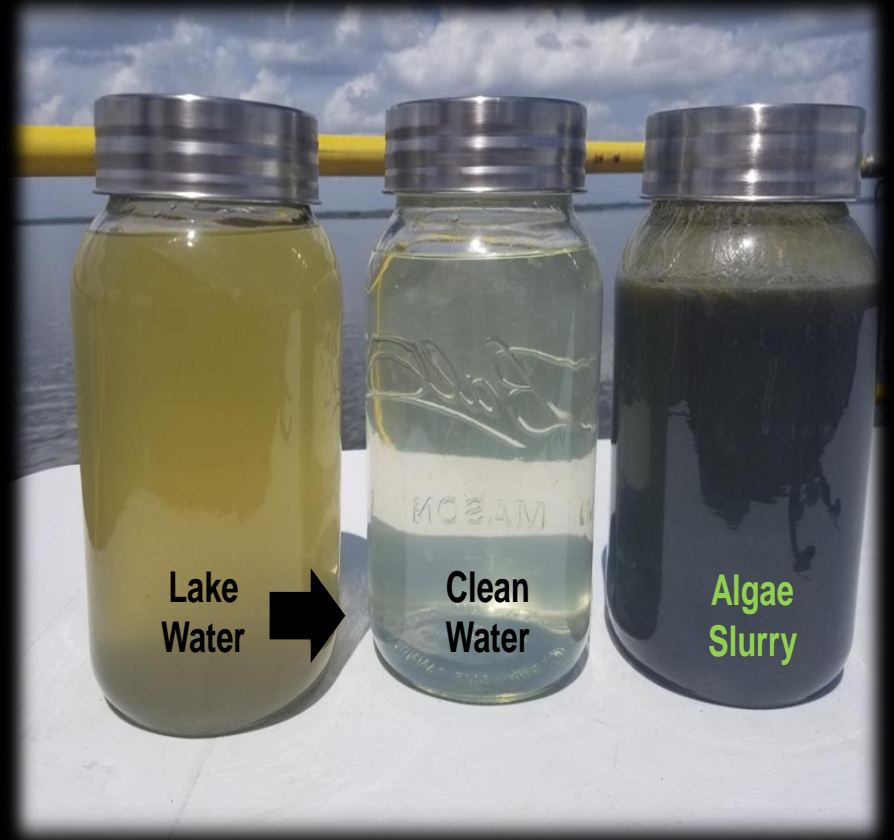
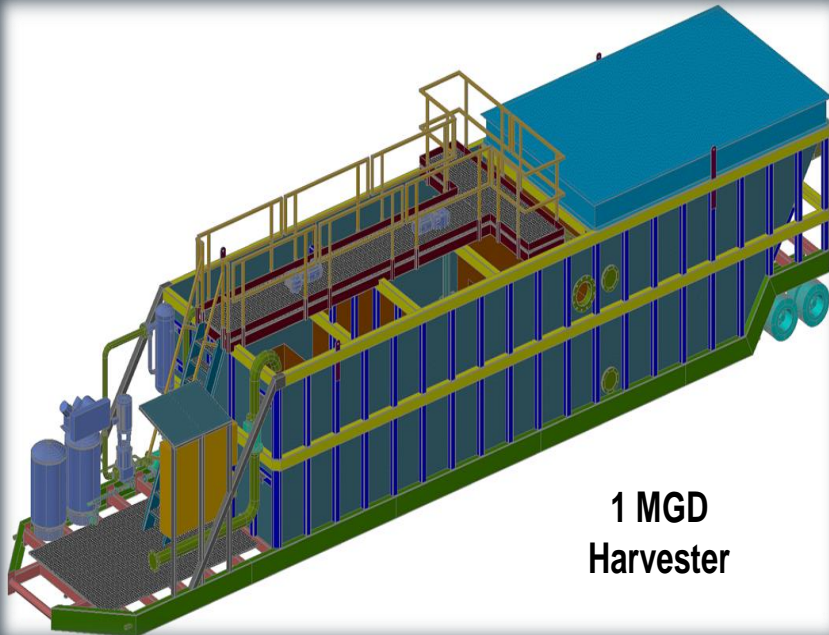
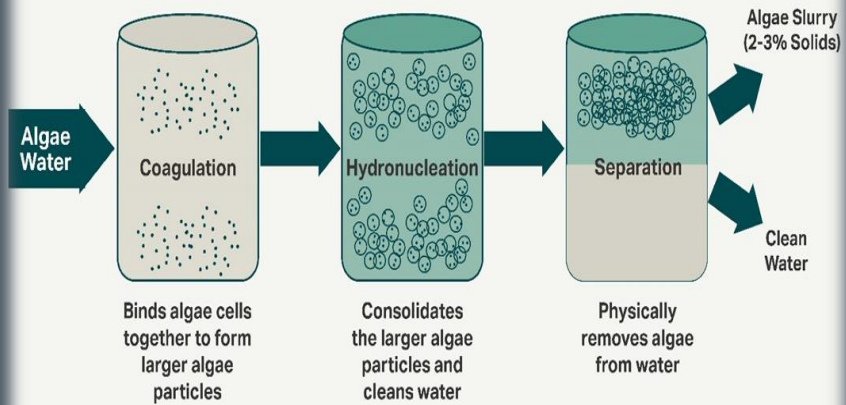


2018 Water Resources Development Act (WRDA) requires ERDC to demonstrate scalable technologies for the mitigation of Harmful Algal Blooms (HABs) SEC. 140. Harmful Algal Bloom Technology Demonstration



Step 1 Algae Harvesting

Algae Harvesting Process
Removes Nutrients from the Water

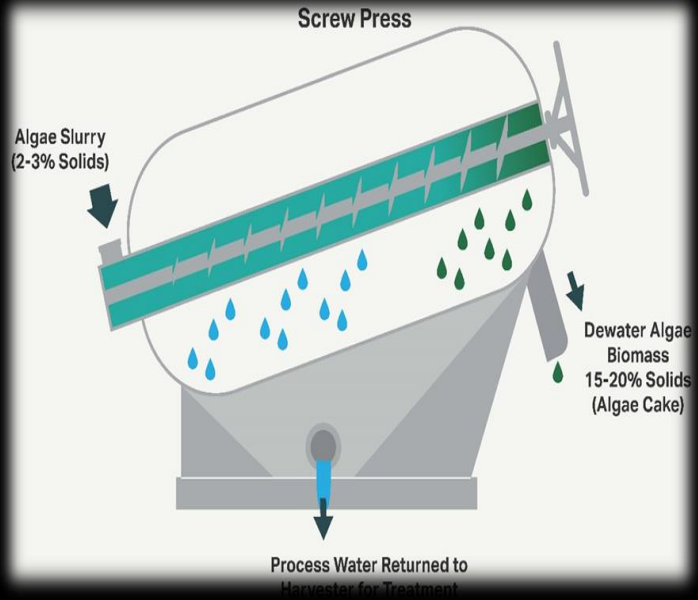


Separates algae from water

Algae Slurry (3-5% Solids)



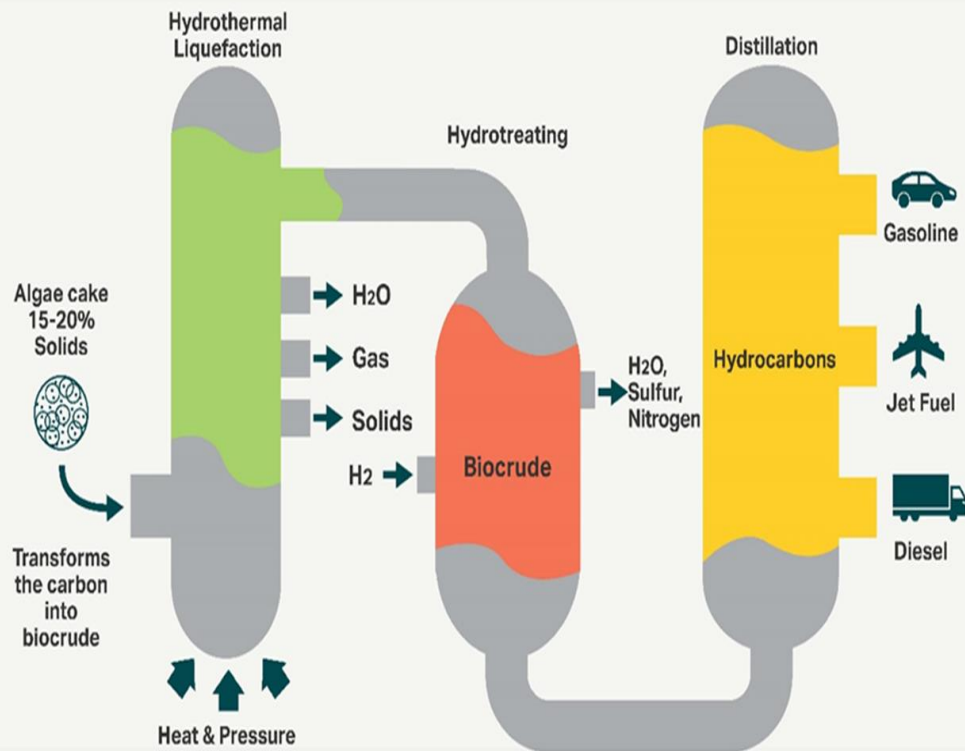
Step 2 Dewatering



Step 3 Hydrothermal Processing

*Heat and pressure
to convert wet
waste into
biocrude*

**30 minutes
vs
Millions of
years**





**Algae
Biofoam**



**Algae
Biofertilizer**



**Algae
Biocrude**

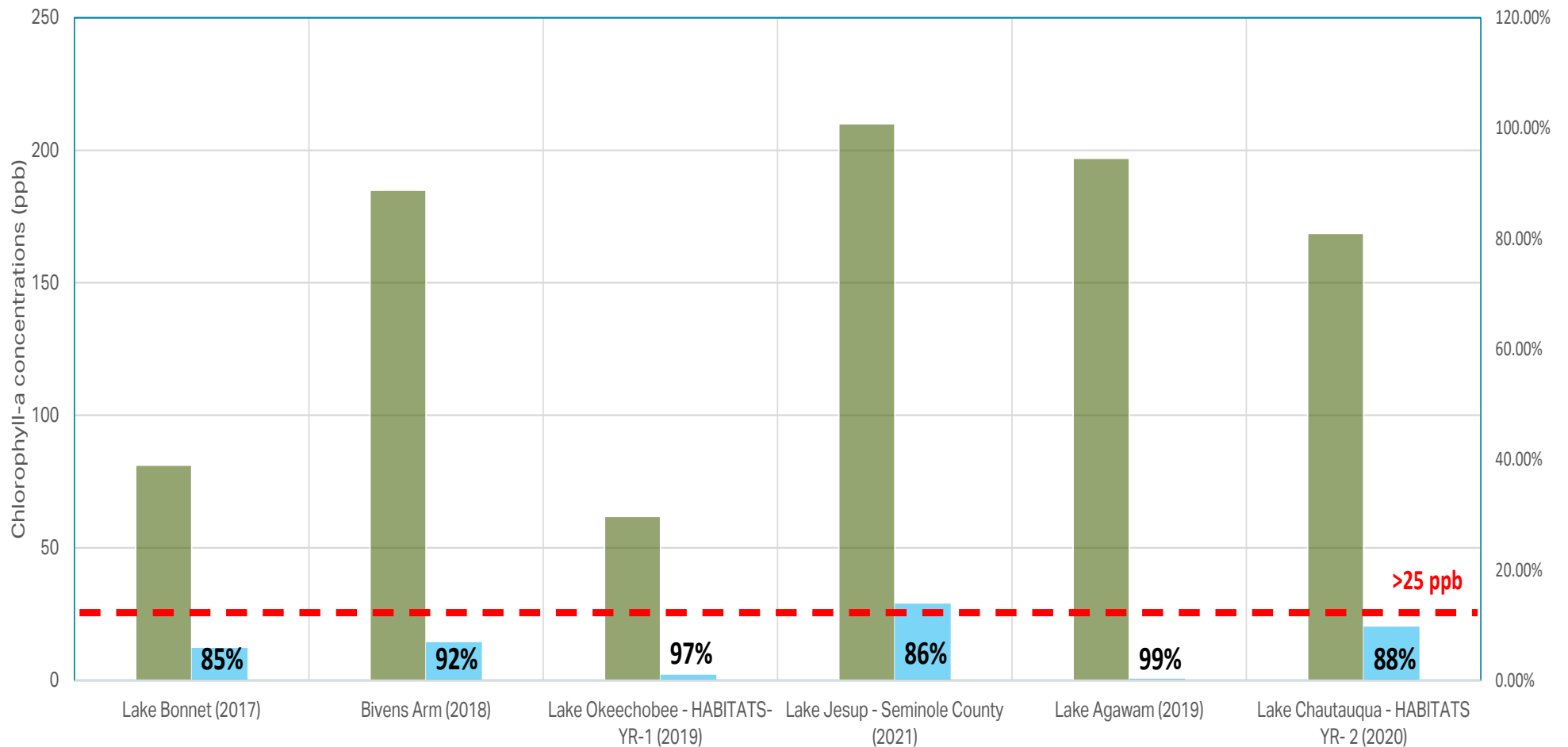
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Laboratory Results

Removal of Chlorophyll-A

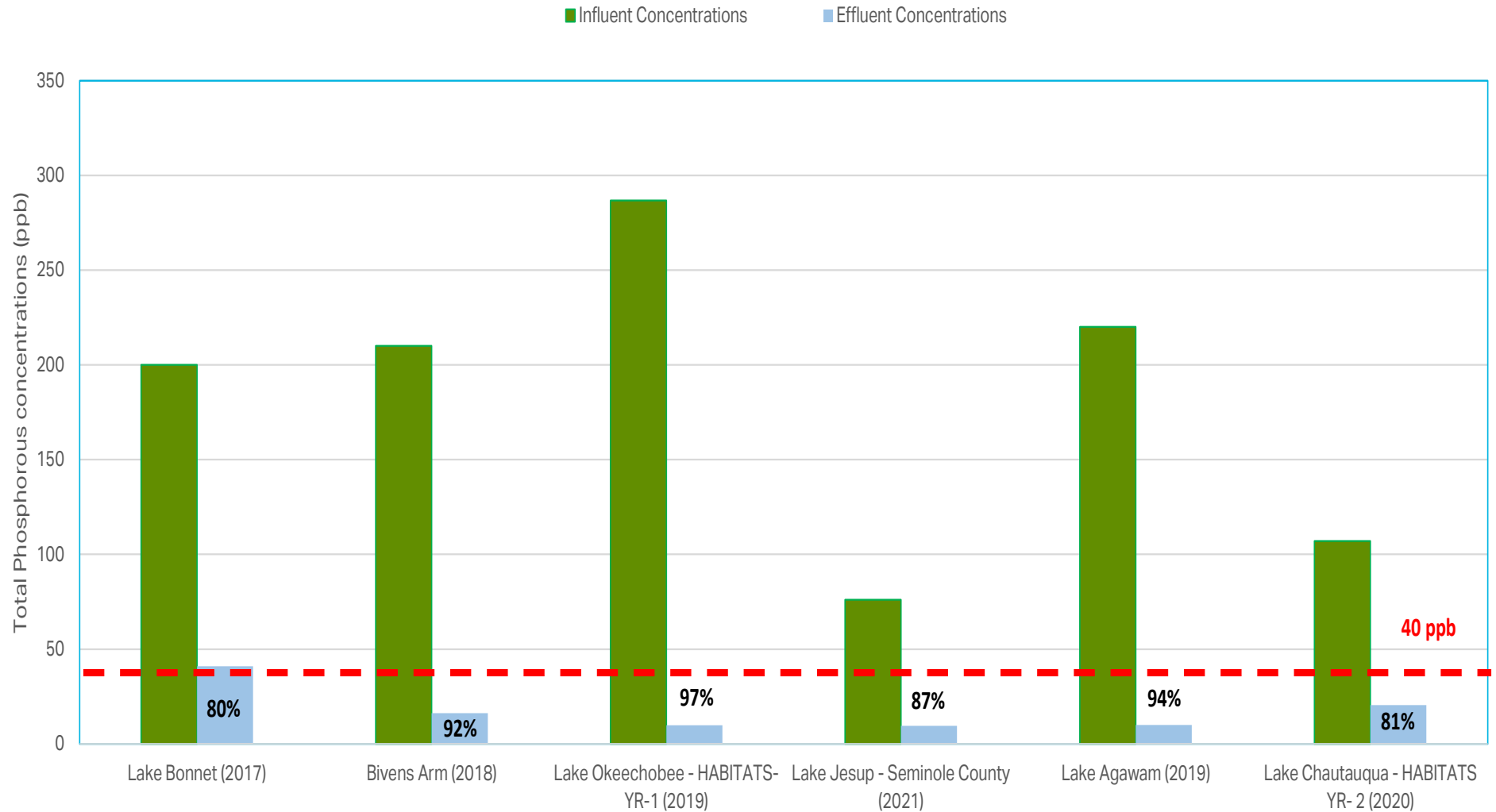
Removal Efficiency of Chlorophyll-a

■ Influent Concentrations ■ Effluent Concentrations



Removal of Total Phosphorous

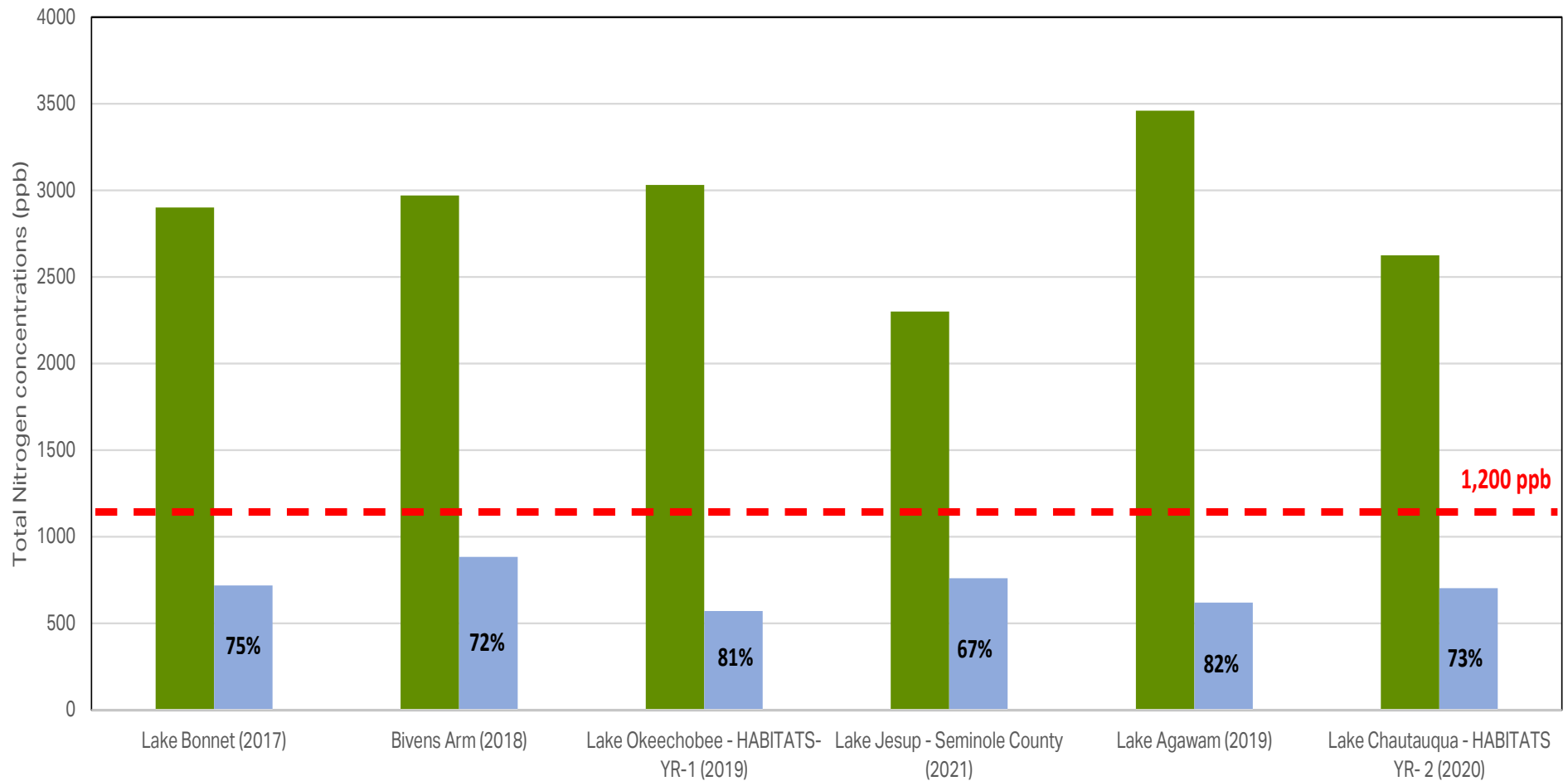
Removal Efficiency of Total Phosphorous



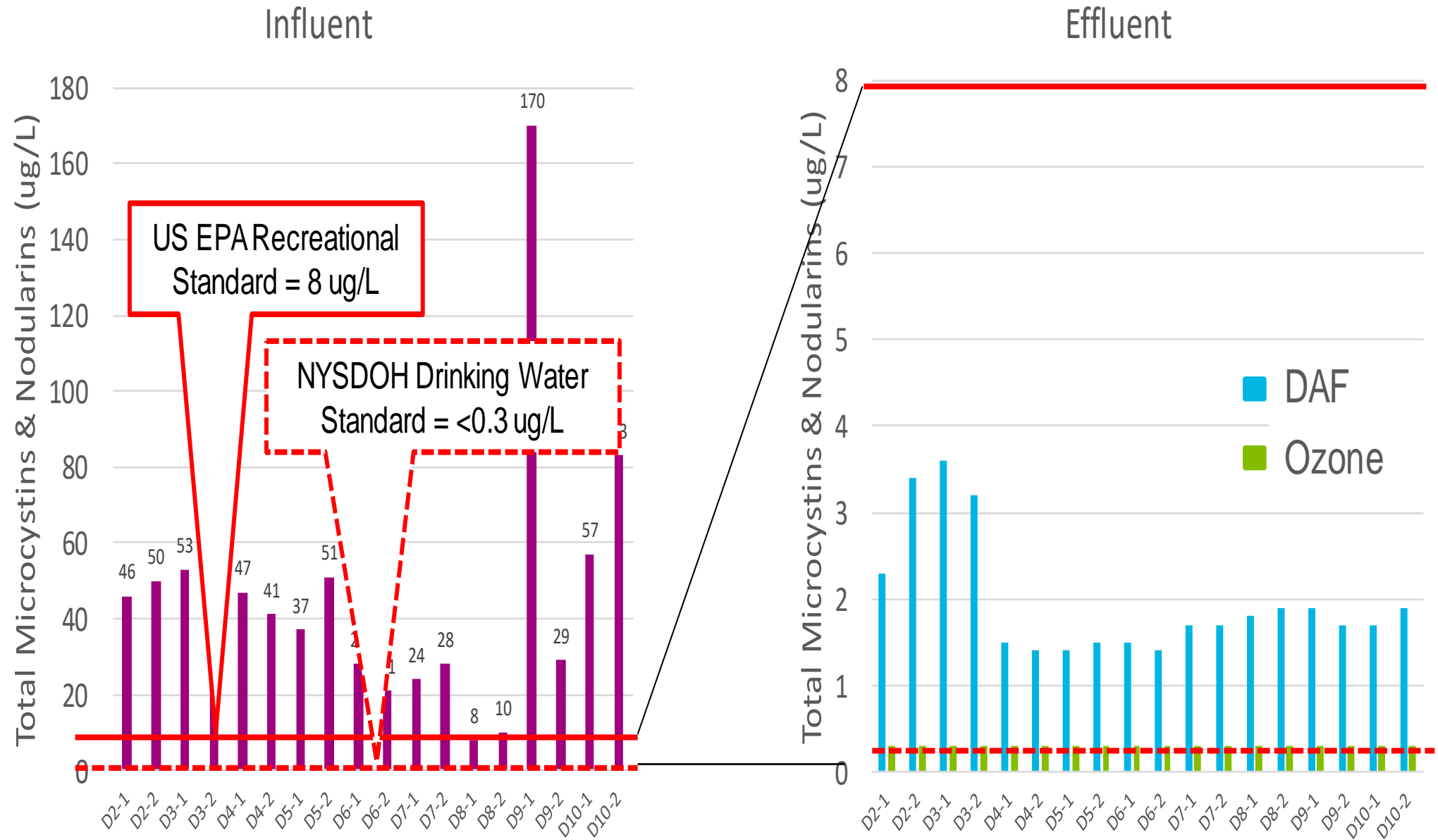
Removal of Total Nitrogen

Removal Efficiency of Total Nitrogen

■ Influent Concentrations ■ Effluent Concentrations



Removal of Cyanotoxins (2019 Lake Agawam Pilot Test)



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Lake Elsinore



**Proposed Pilot Test
Location**



**5 MGD Discharge of
Wastewater Effluent**





Solar Panels on Elevated Structure (Provides Shade for Harvester and Public)

50 ft by 250-ft (12,500 ft2)

Influent (Lake Water)

Full Length Curtain

Buried Pipeline

5.5 Acres
9 Million Gallons

Effluent (Clean Processed Water)



Questions



