

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

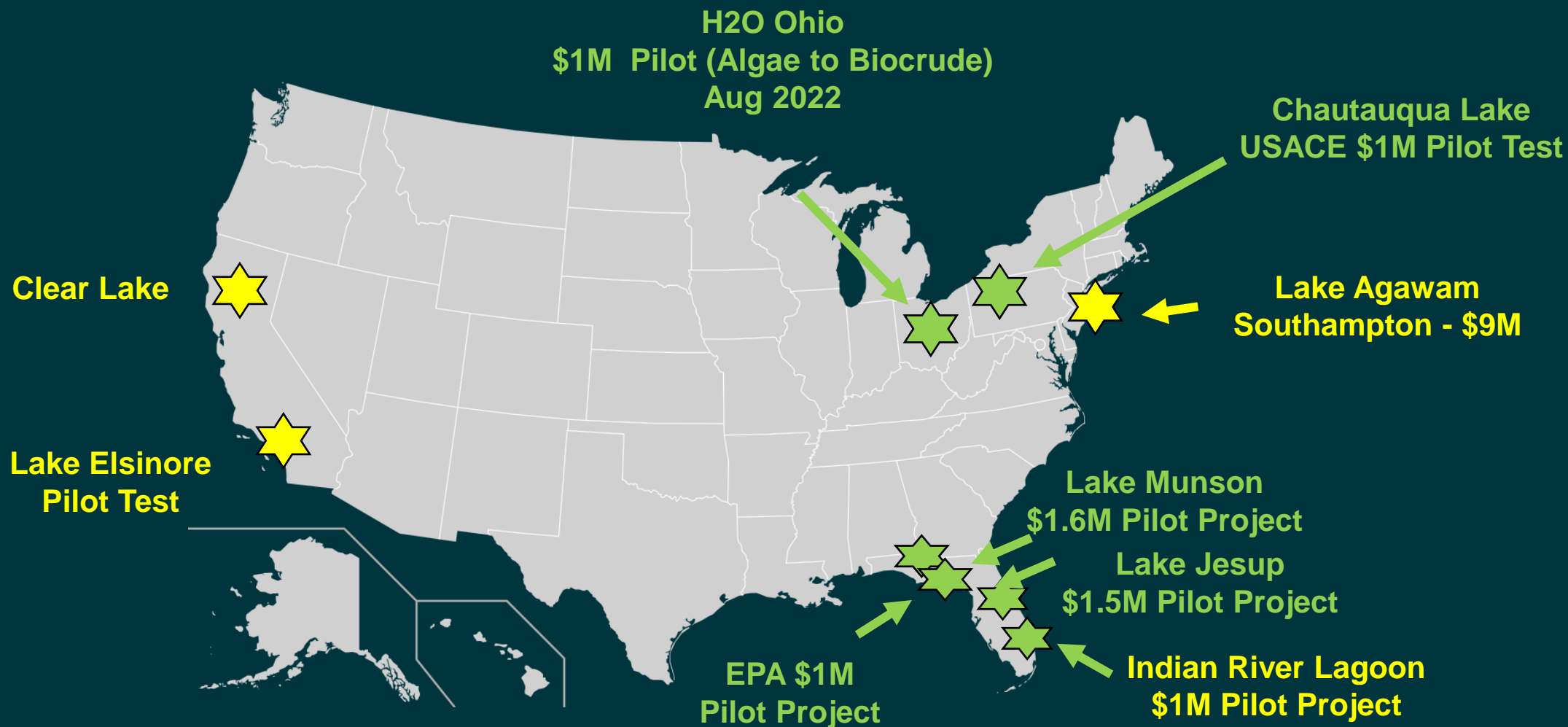
Top 500

- 1 General Building
- 1 International Markets
- 1 Transportation

- 2 Top Design Firm
- 2 Hazardous Waste

- 3 Sewer and Waste
- 3 Water

Algae Harvesting Projects



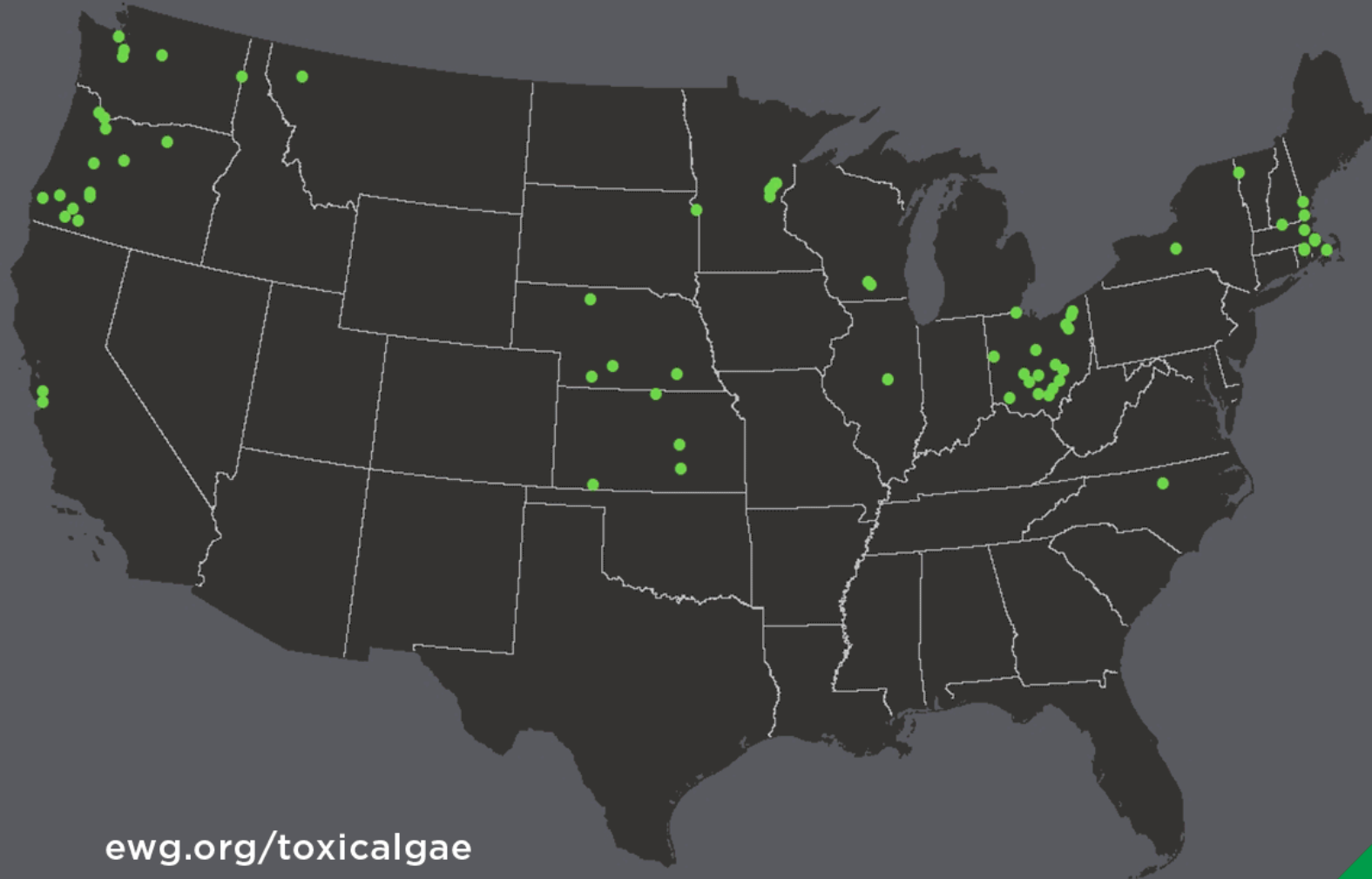
2

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.

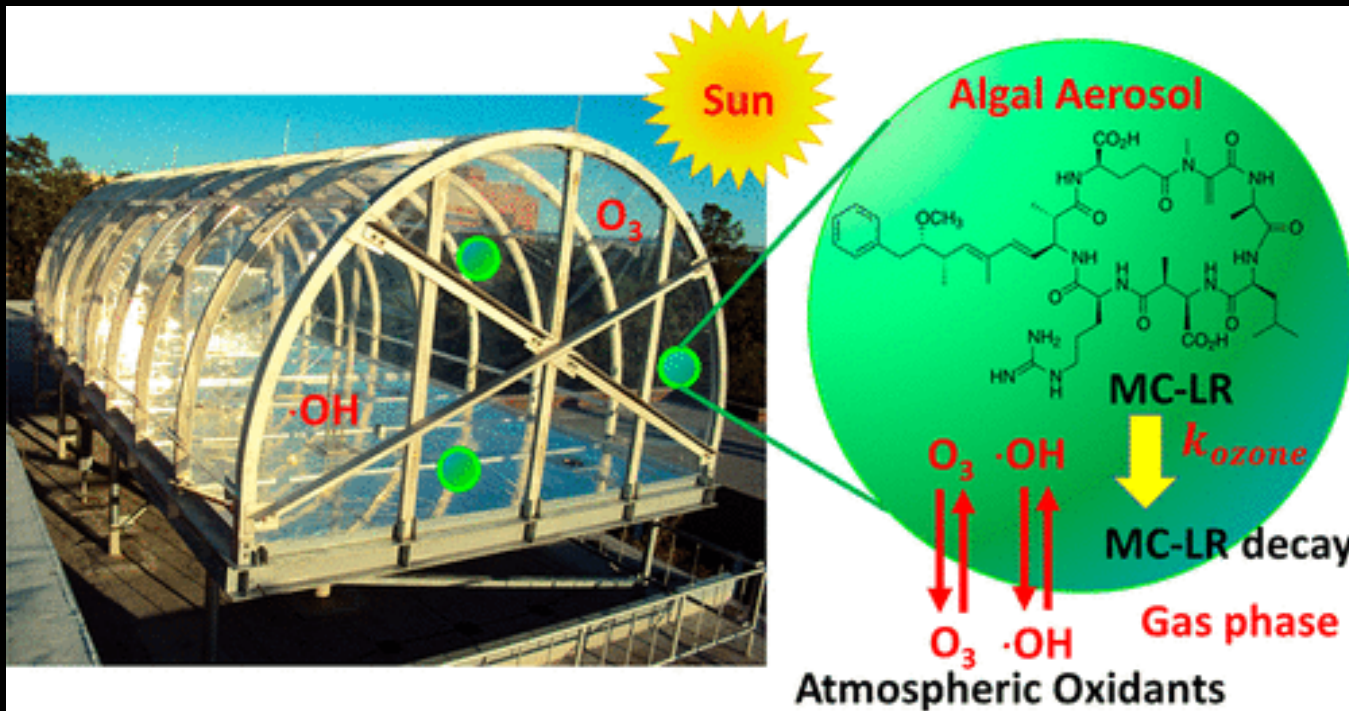
Harmful Algal Blooms

- 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

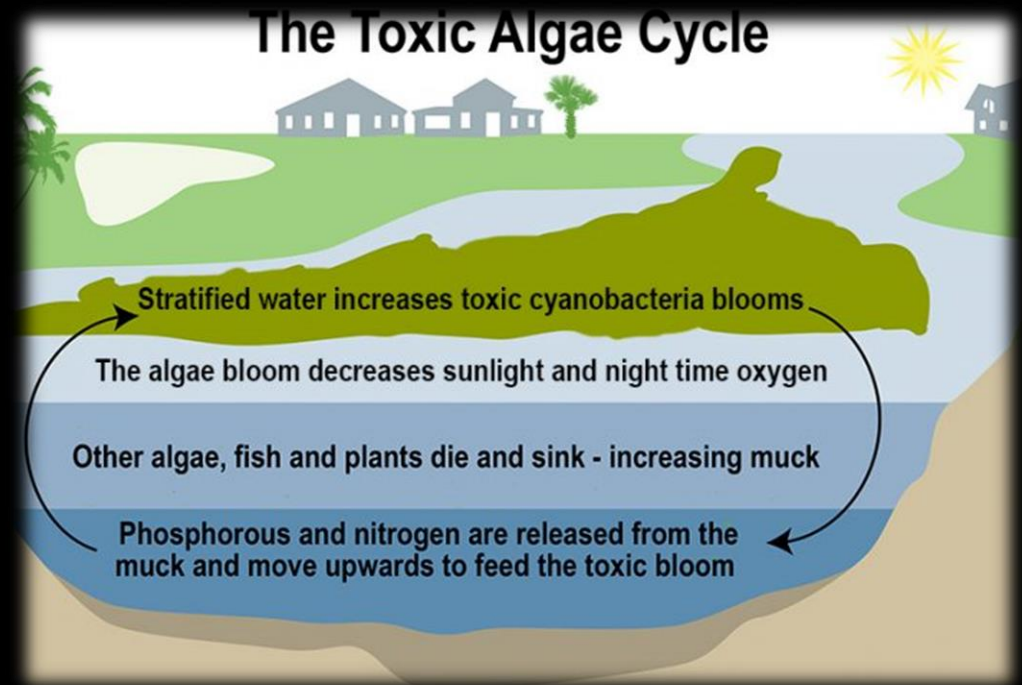


“....Residential areas within about 10 miles from a cyanobacterial bloom source could be impacted by the harmful algal aerosols even under a gentle breeze traveling four to seven miles per hour.”

Existing Technologies Not Working

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

New Technology Needed

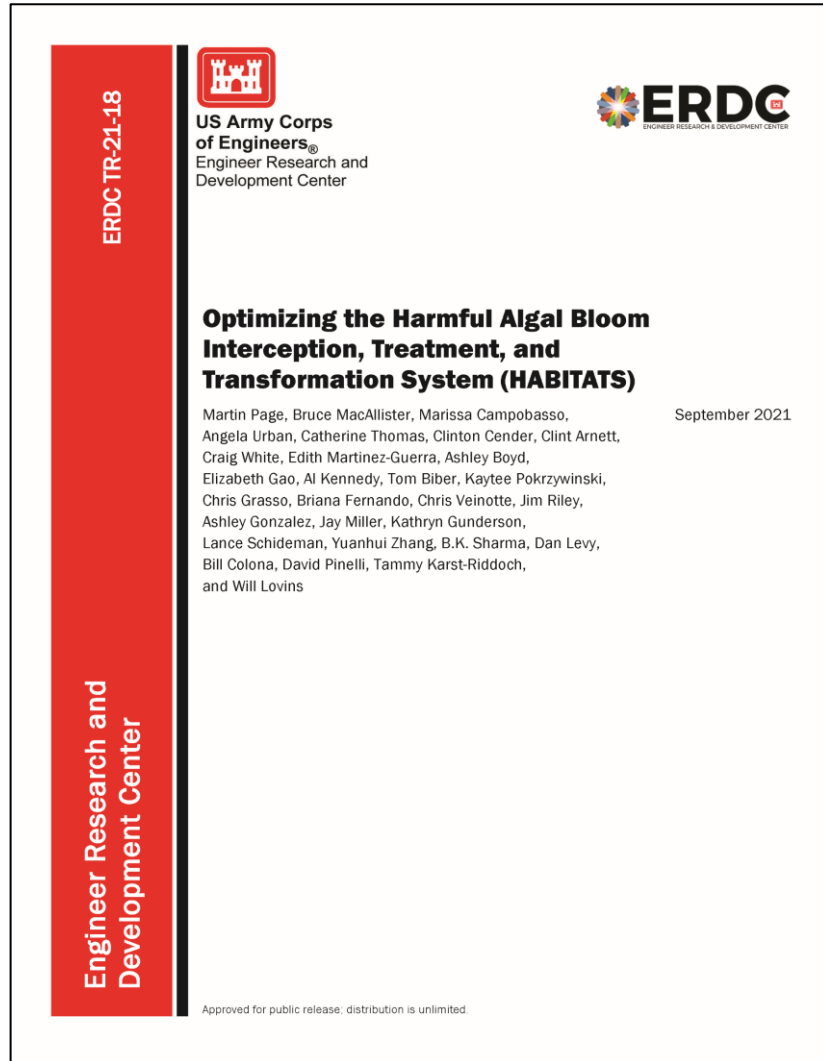


*“Reduce the food...
Reduce the algae”*

2

Algae Harvesting Technology

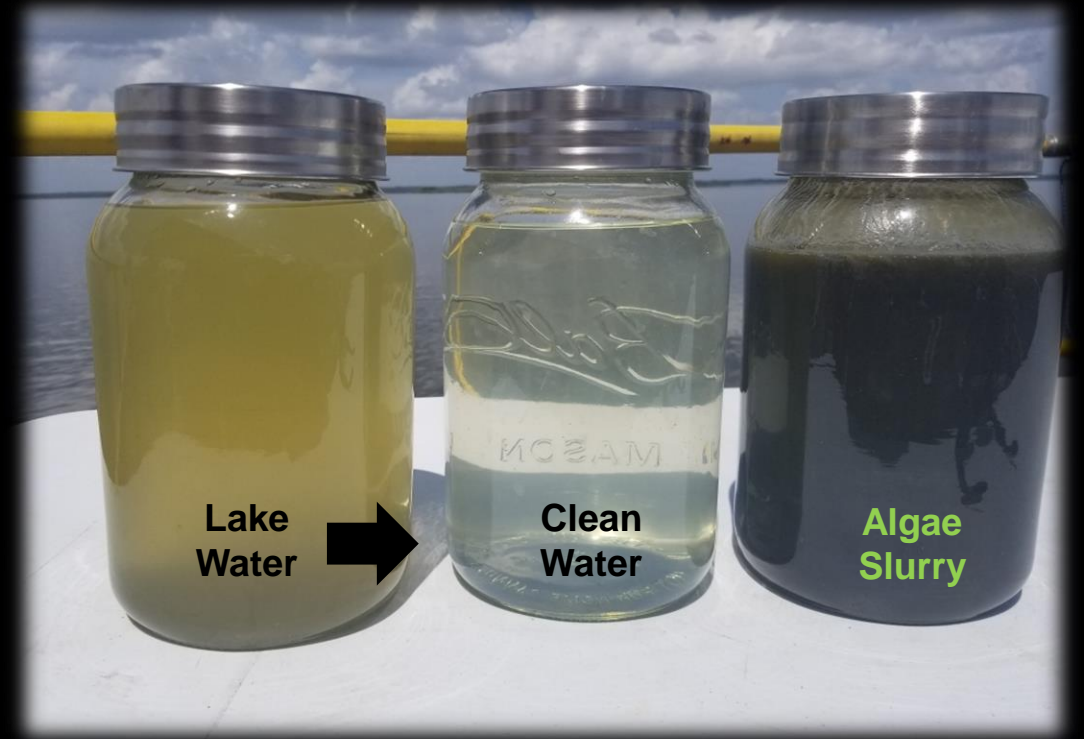
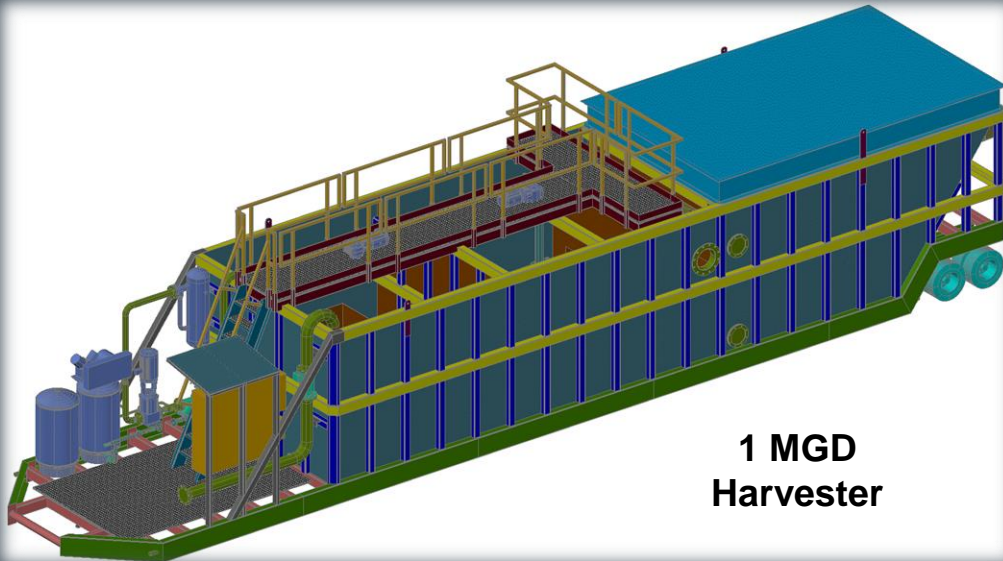
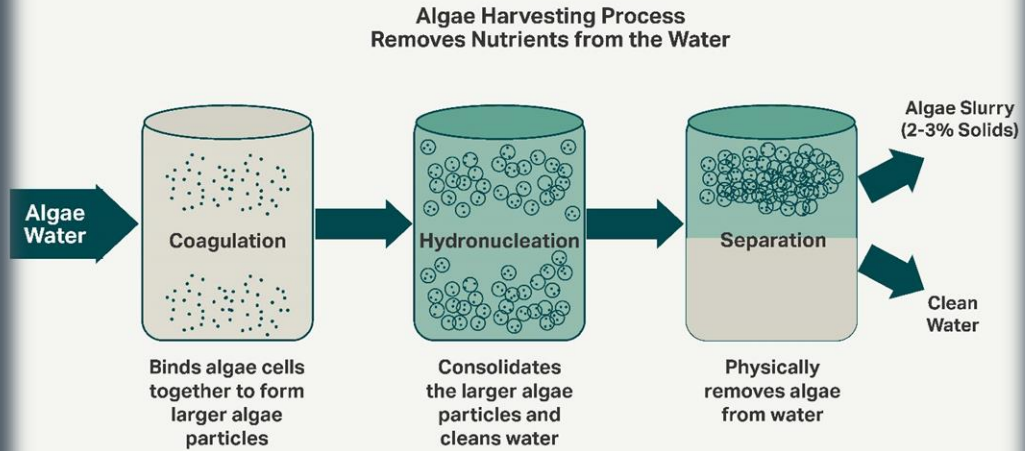
Harmful Algal Bloom Interceptor Treatment and Transformation System HABITATS (2019 – 2021)



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

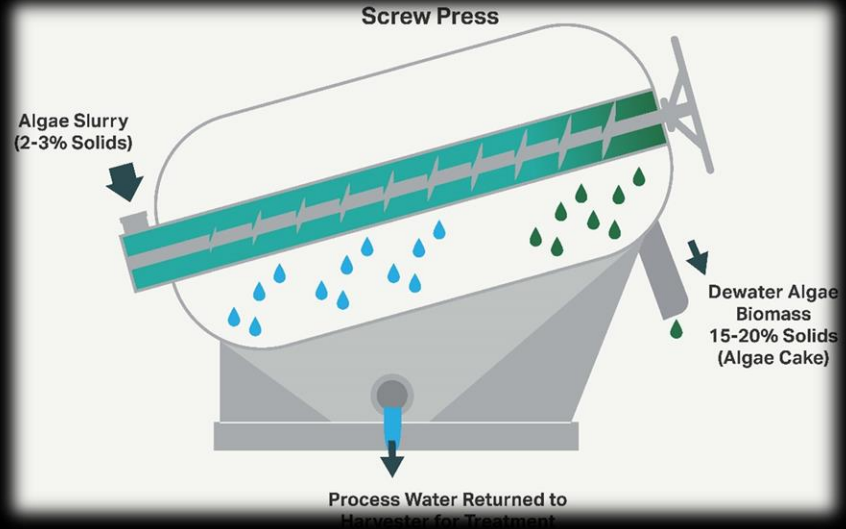


Separates algae from water

Algae Slurry (3-5% Solids)



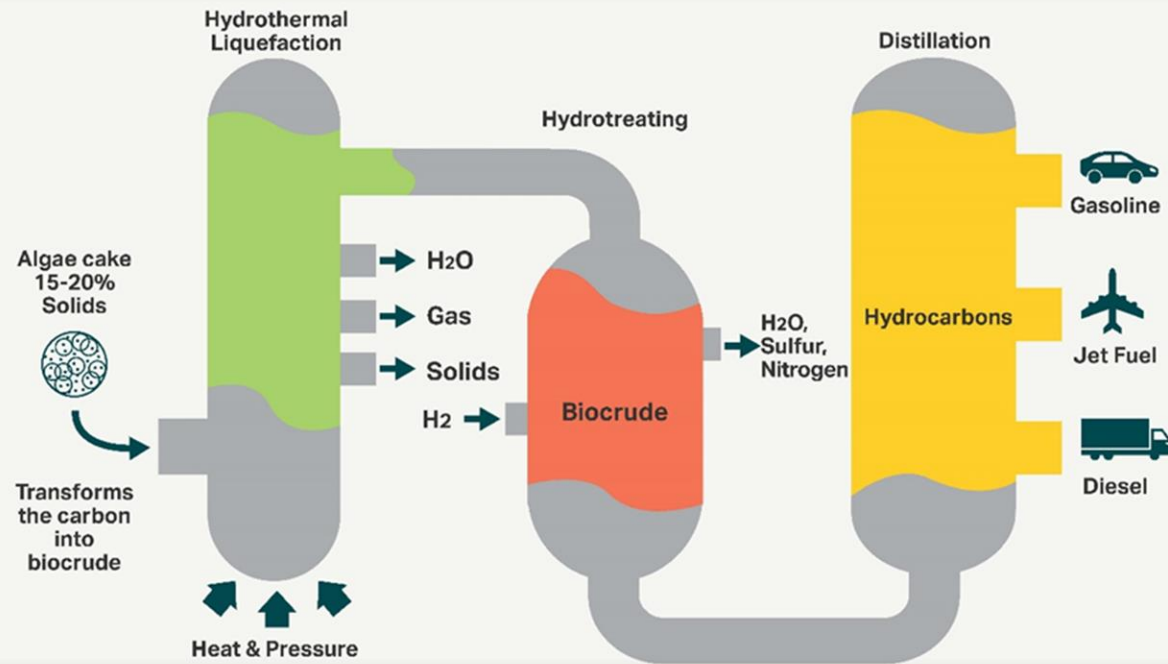
Step 2 Dewatering



Step 3 Hydrothermal Processing

*Heat and pressure
to convert wet
waste into
biocrude*

**30 minutes
vs
Millions of
years**





**Algae
Biofoam**



**Algae
Biofertilizer**



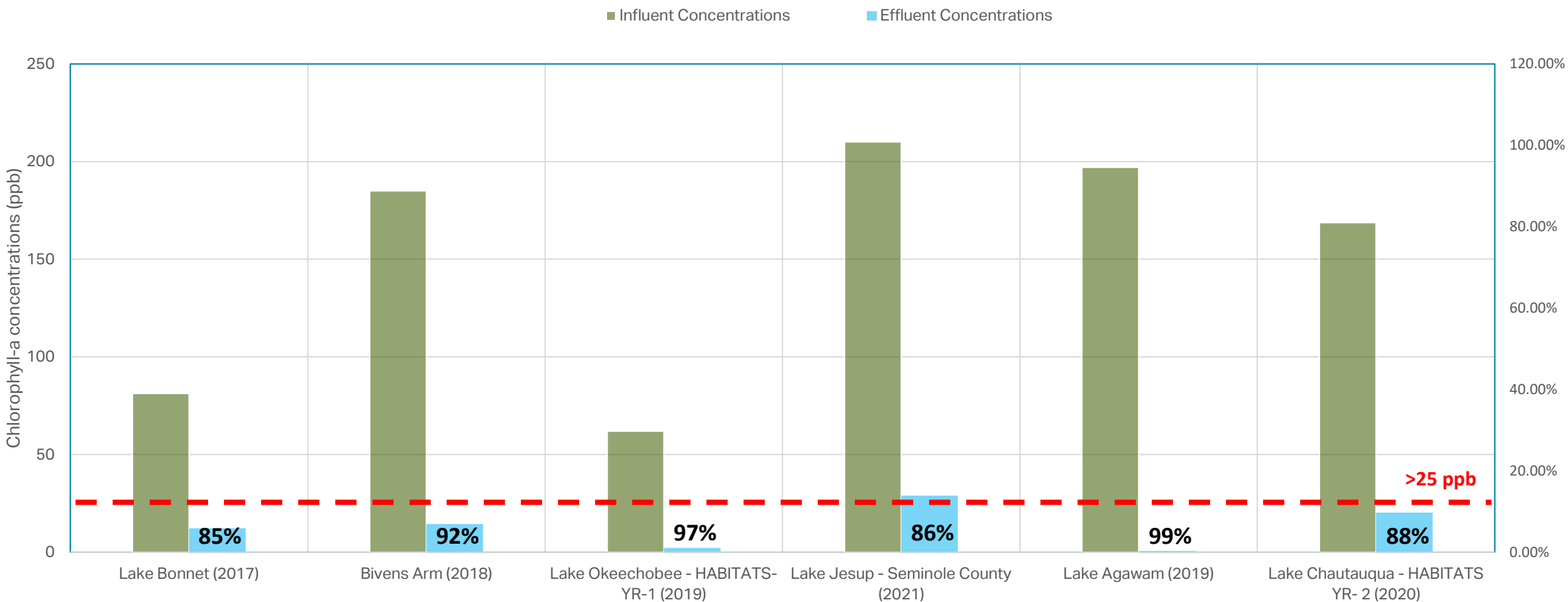
**Algae
Biocrude**

4

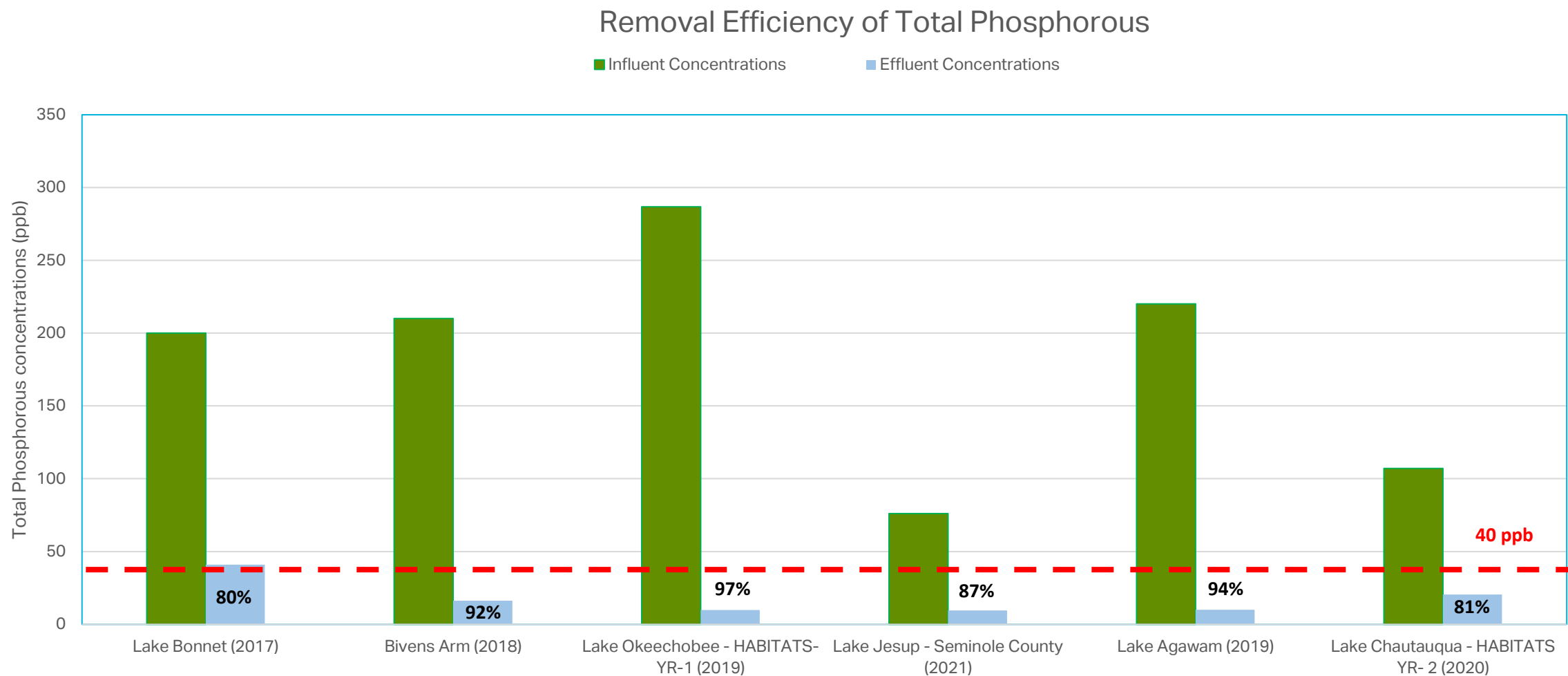
Laboratory Results

Removal of Chlorophyll-A

Removal Efficiency of Chlorophyll-a

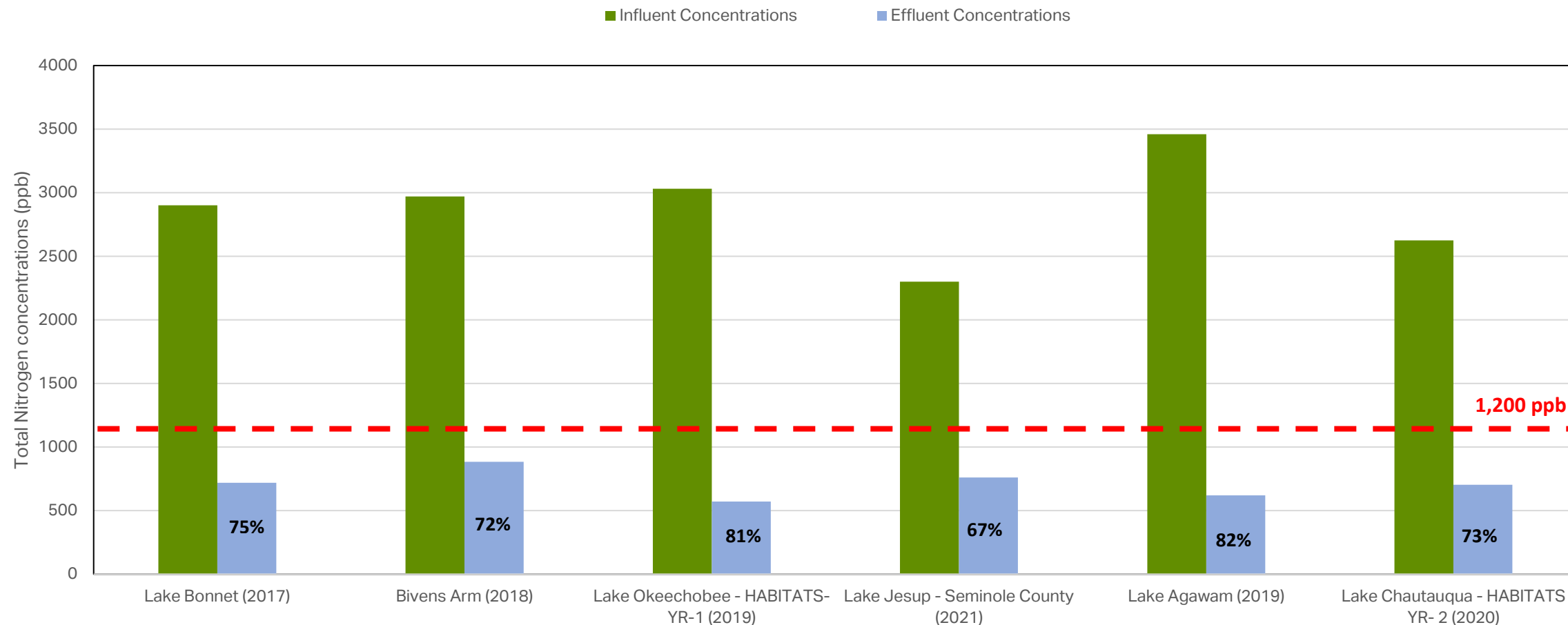


Removal of Total Phosphorous

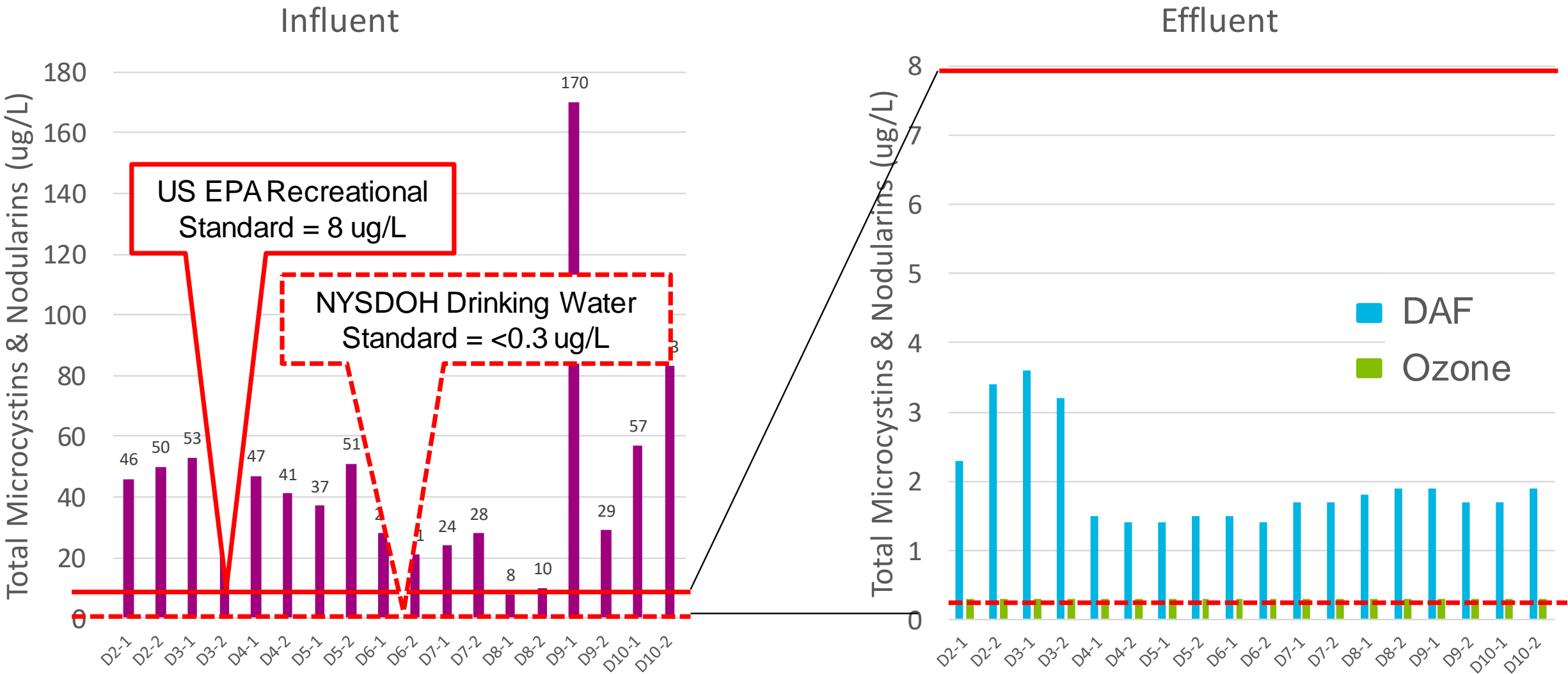


Removal of Total Nitrogen

Removal Efficiency of Total Nitrogen



Removal of Cyanotoxins (2019 Lake Agawam Pilot Test)



5

Lake Elsinore



**5 MGD Discharge of
Wastewater Effluent**

**Proposed Pilot Test
Location**



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

5.5 Acres
9 Million Gallons

Effluent (Clean Processed Water)

Buried Pipeline

Lake Elsinore State Recreation Area

Questions

