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

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 curtained-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

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Agenda

1 Who is AECOM?

2 The HAB Problem

3 Algae Harvesting Technology

4 Laboratory Results

5 Proposed Pilot Test

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Who is AECOM?

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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

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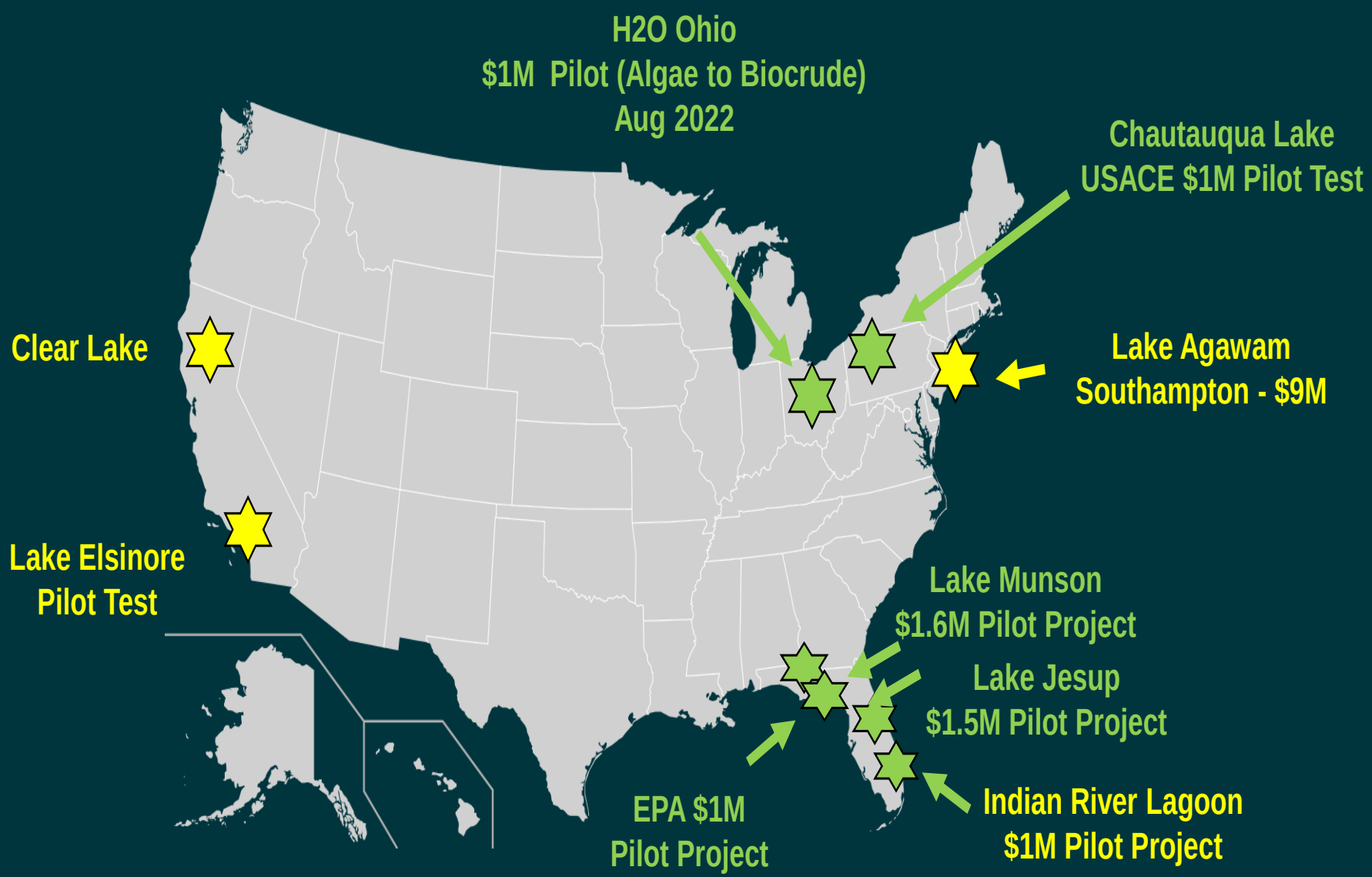
Algae Harvesting Projects



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The HAB Problem

"You are not Alone"

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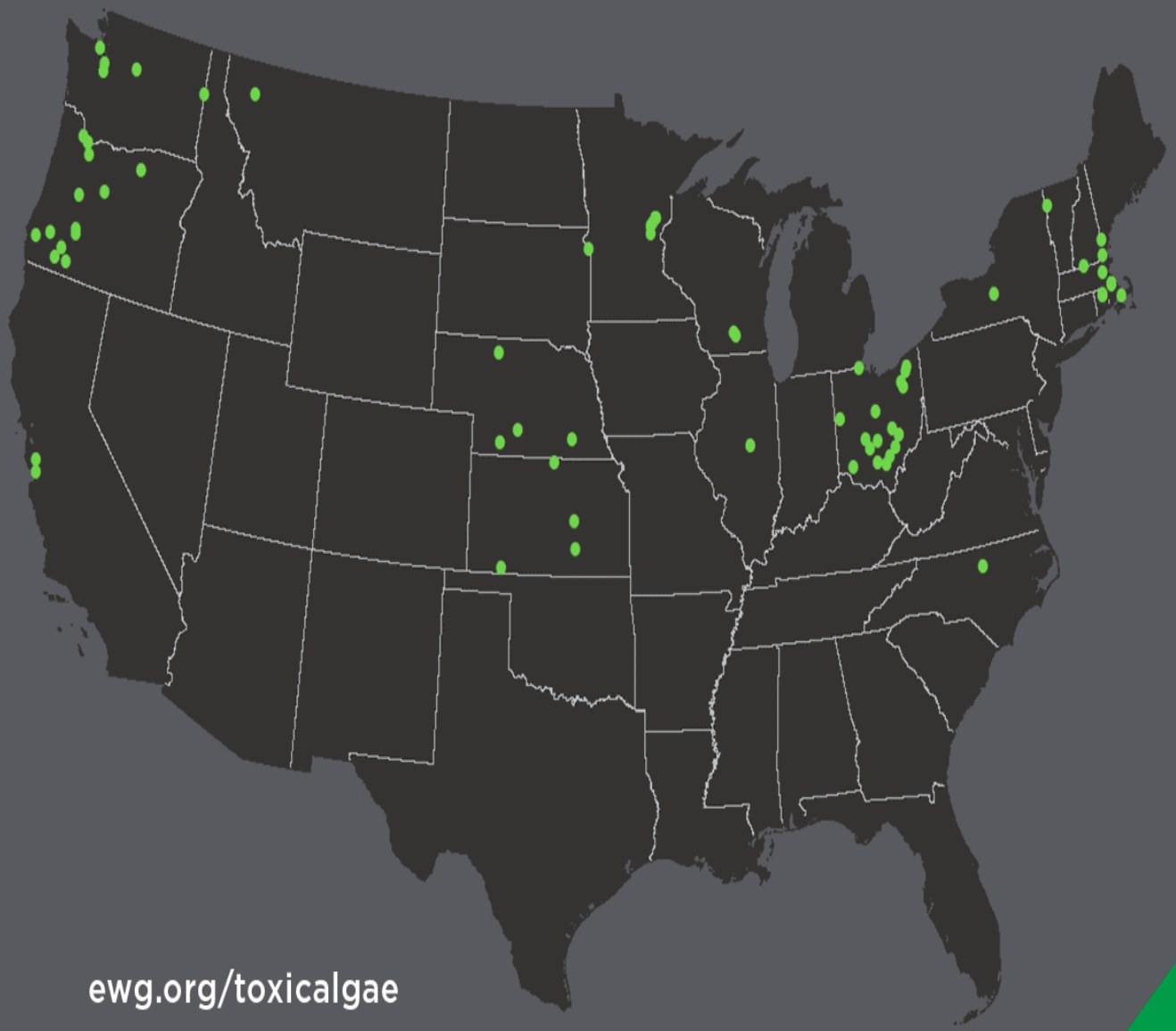
2010

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



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

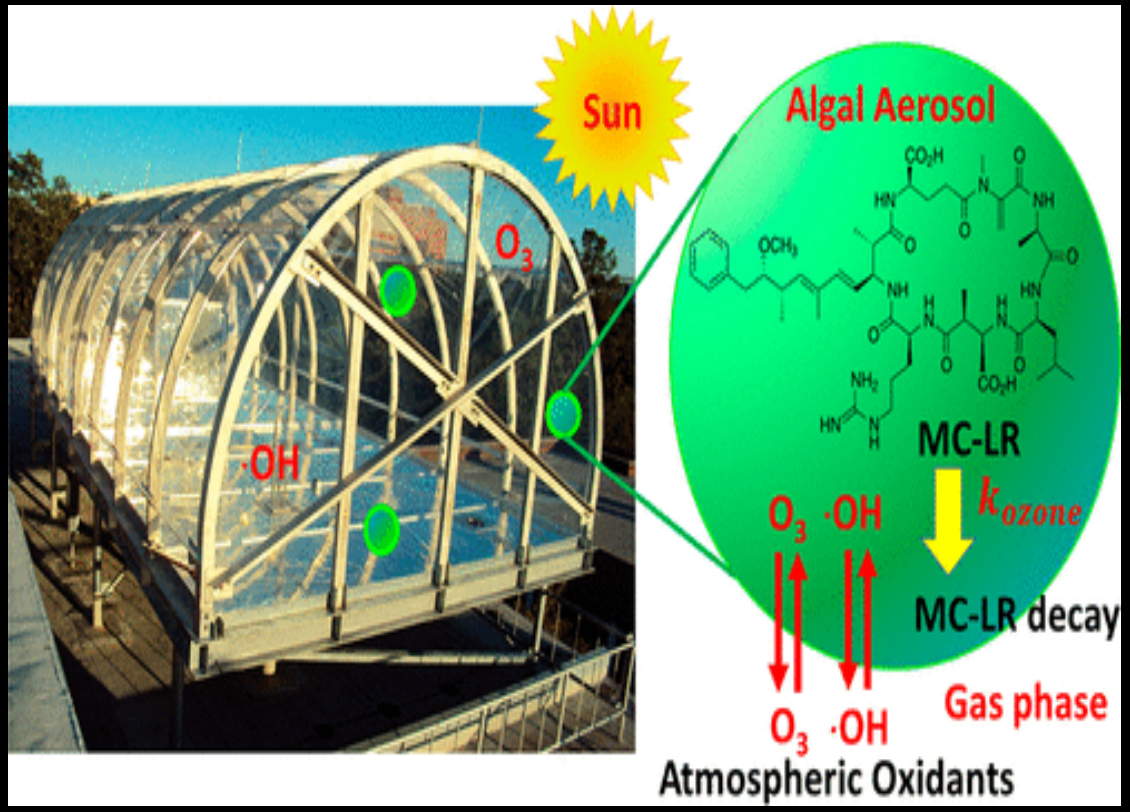
1) Increasing in Intensity

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."

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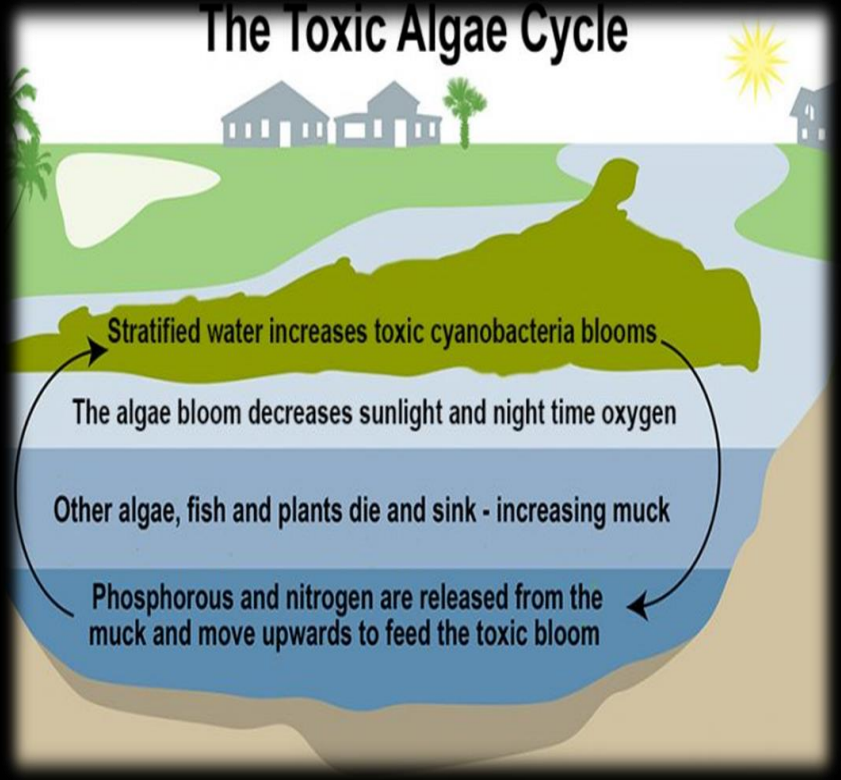
Existing Technologies Not Working

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

New Technology Needed



"Reduce the food…

Reduce the algae"

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Algae Harvesting Technology

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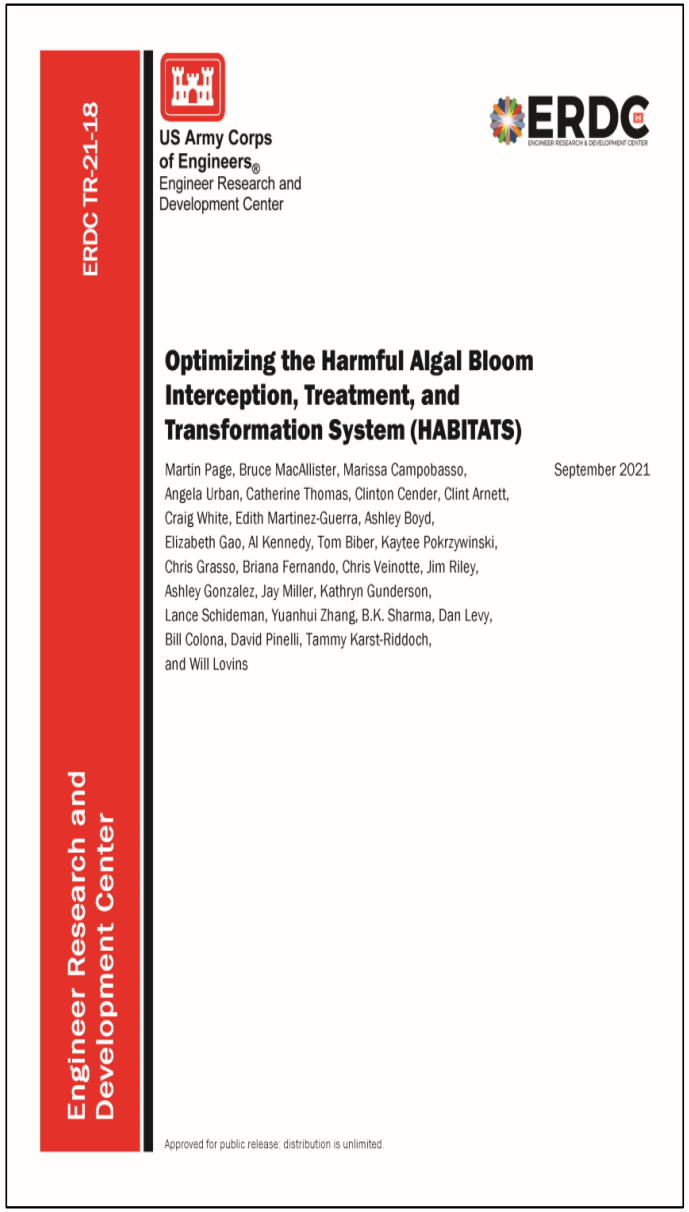
Harmful Algal Bloom Interceptor Treatment and Transformation System
HABITATS (2019 – 2021)


ERDC TR-21-18

US Army Corps of Engineers®
Engineer Research and Development Center

ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Optimizing the Harmful Algal Bloom Interception, Treatment, and Transformation System (HABITATS)

September 2021

Martin Page, Bruce MacAllister, Marissa Campobasso, Angela Urban, Catherine Thomas, Clinton Cender, Clint Arnett, Craig White, Edith Martinez-Guerra, Ashley Boyd, Elizabeth Gao, Al Kennedy, Tom Biber, Kaytee Pokrzywinski, Chris Grasso, Briana Fernando, Chris Veinotte, Jim Riley, Ashley Gonzalez, Jay Miller, Kathryn Gunderson, Lance Schideman, Yuanhui Zhang, B.K. Sharma, Dan Levy, Bill Colona, David Pinelli, Tammy Karst-Riddoch, and Will Lovins

Approved for public release; distribution is unlimited.

Engineer Research and Development Center

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

Public Private Partnership (P3)

ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Aquatic Nuisance Species ANSRP Research Program

Pacific Northwest
NATIONAL LABORATORY

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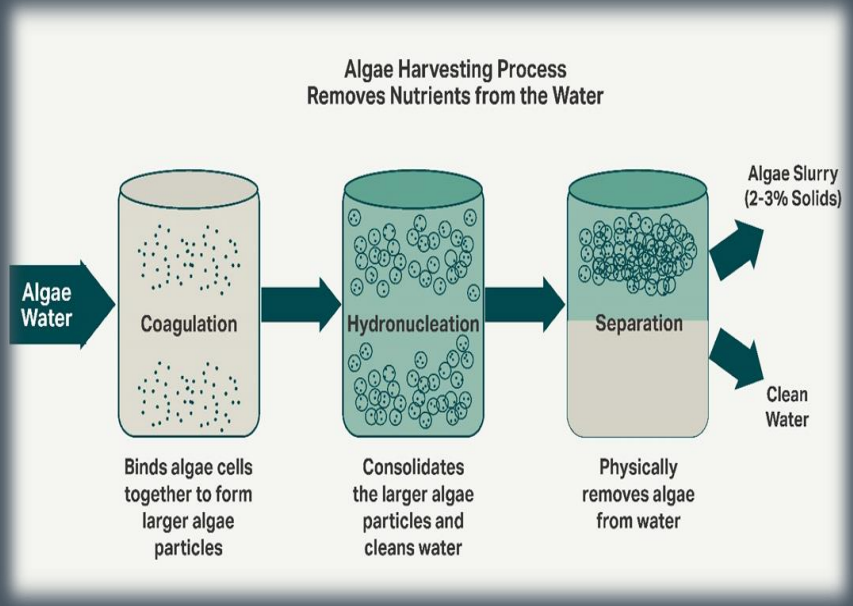
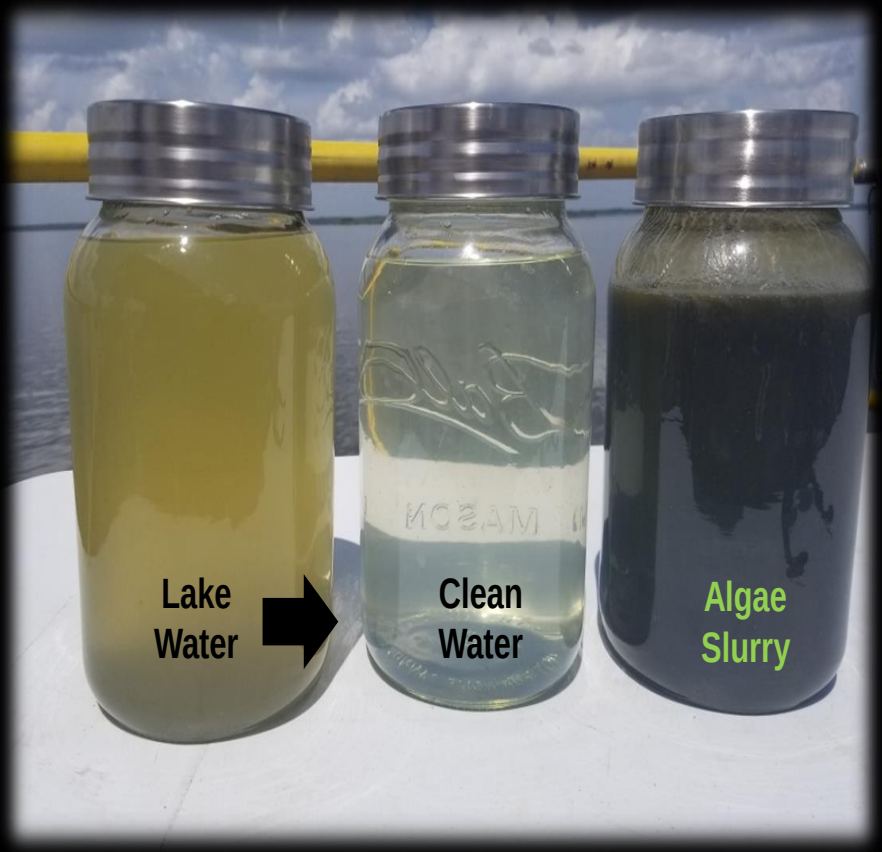
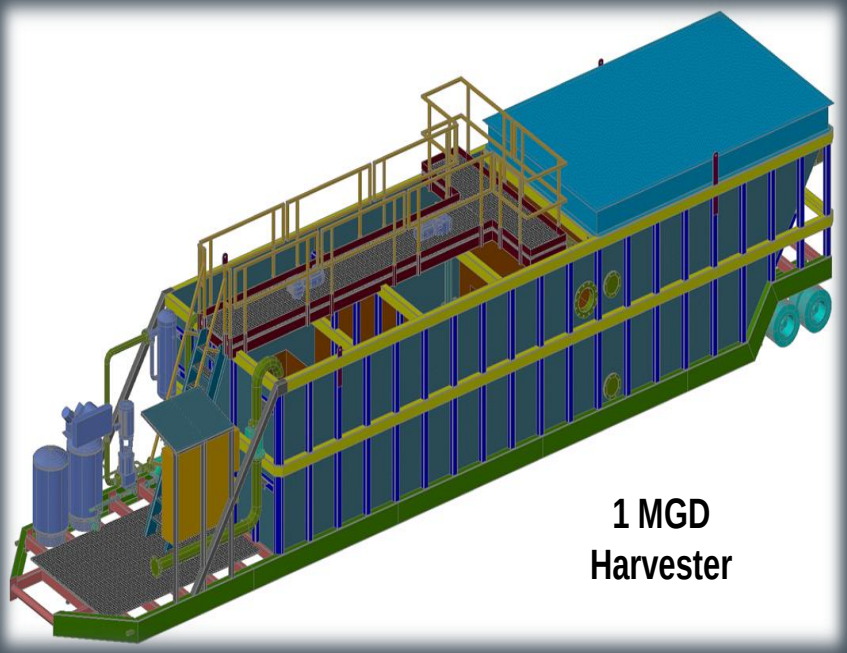
Step 1
Algae Harvesting





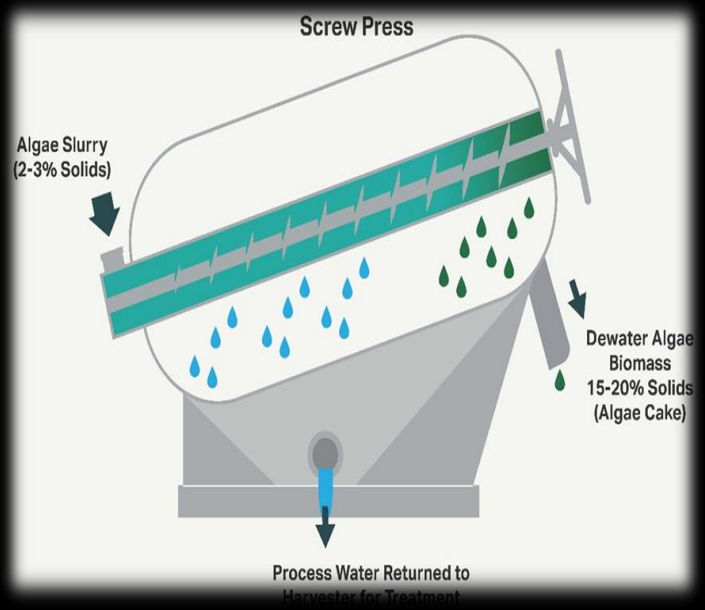


1 MGD
Harvester

Separates algae from water

Algae Slurry (3-5% Solids)

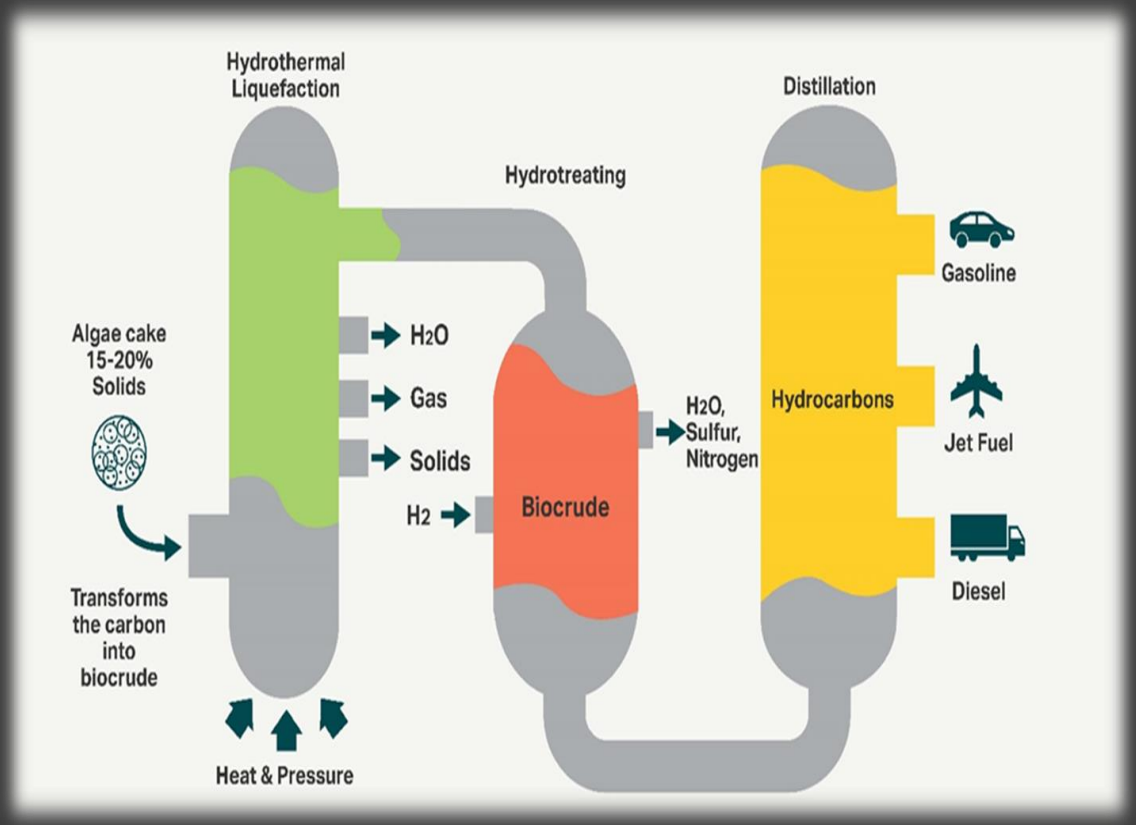
Step 2 Dewatering



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

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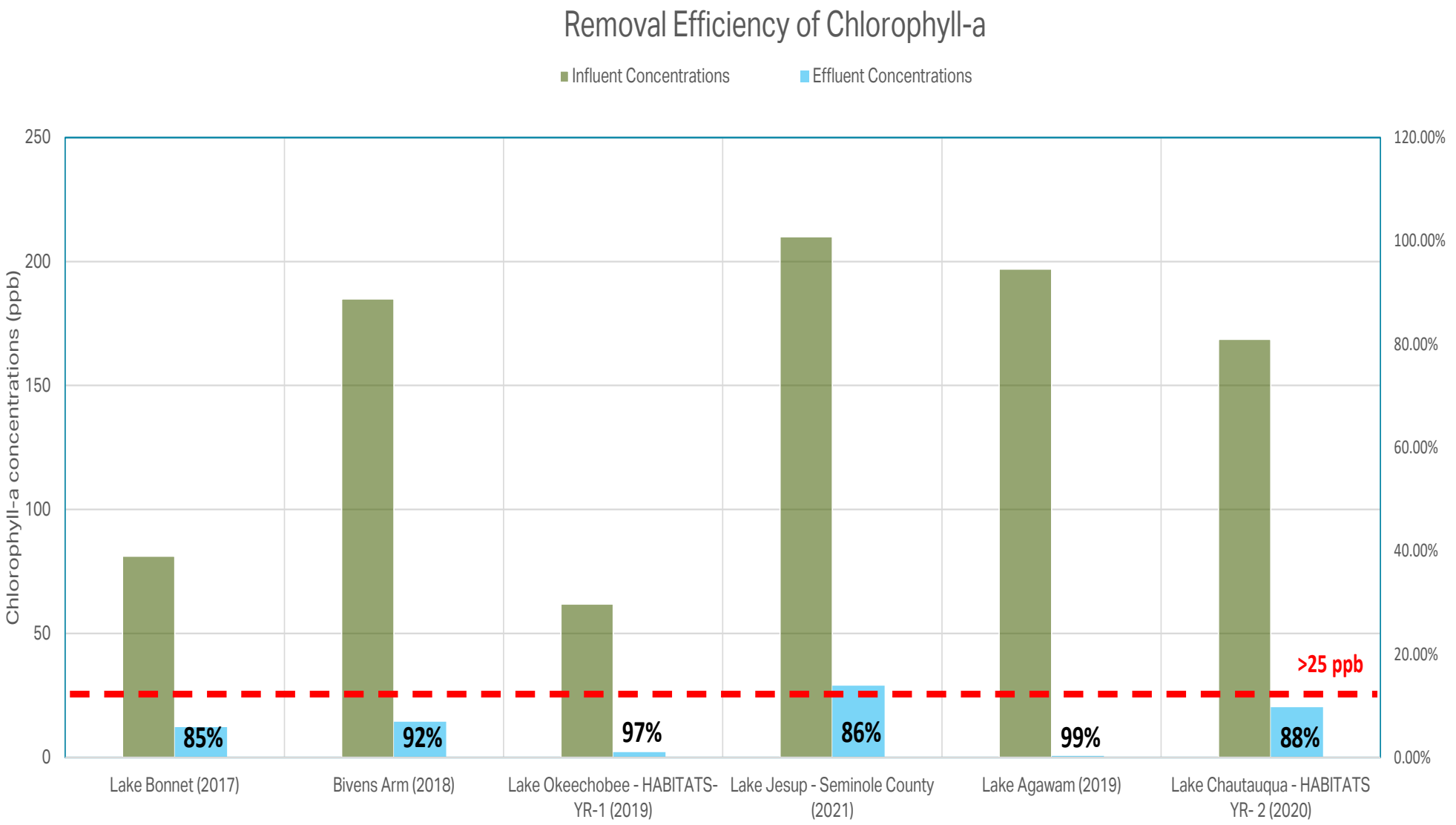
Removal of Chlorophyll-A



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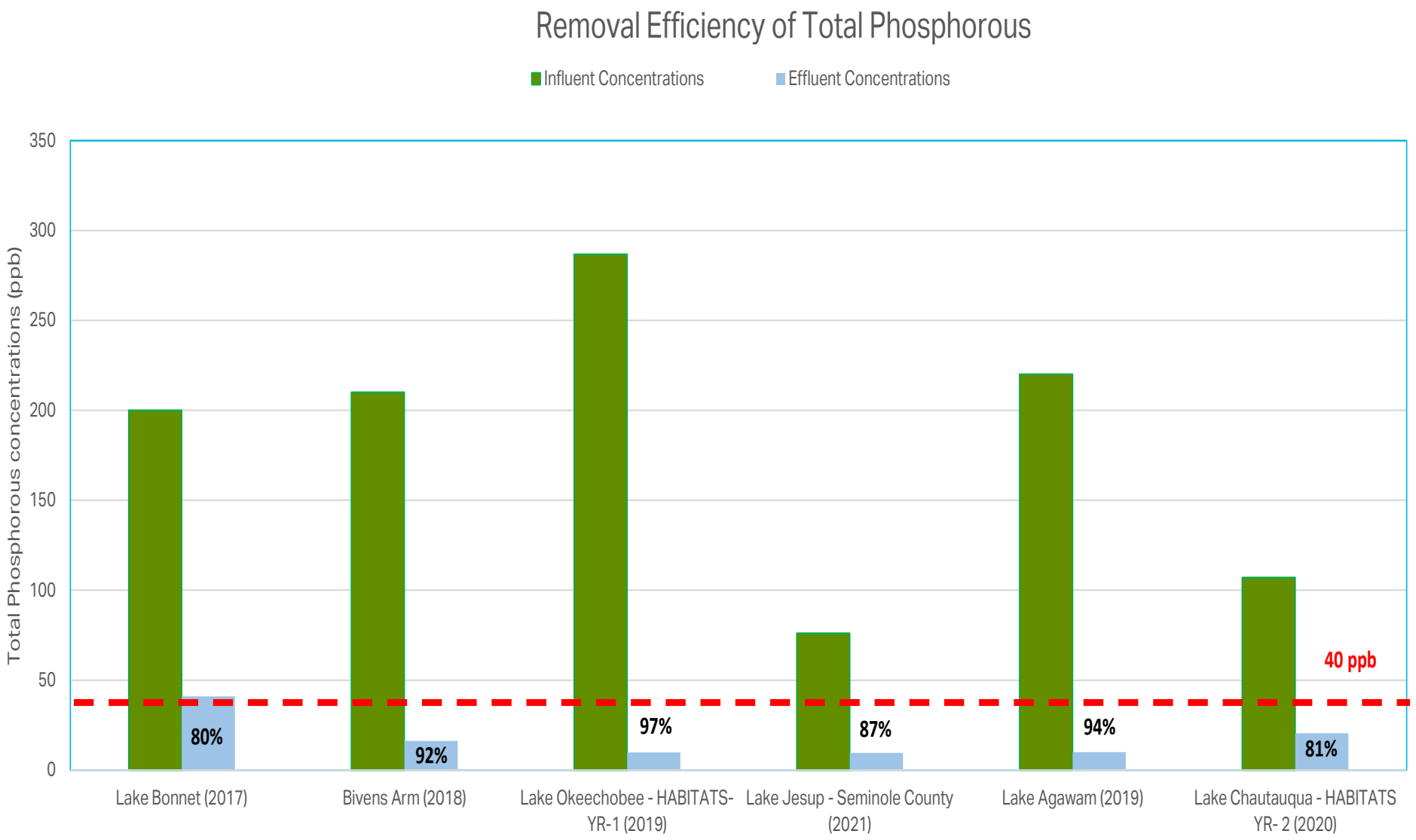
Removal of Total Phosphorous



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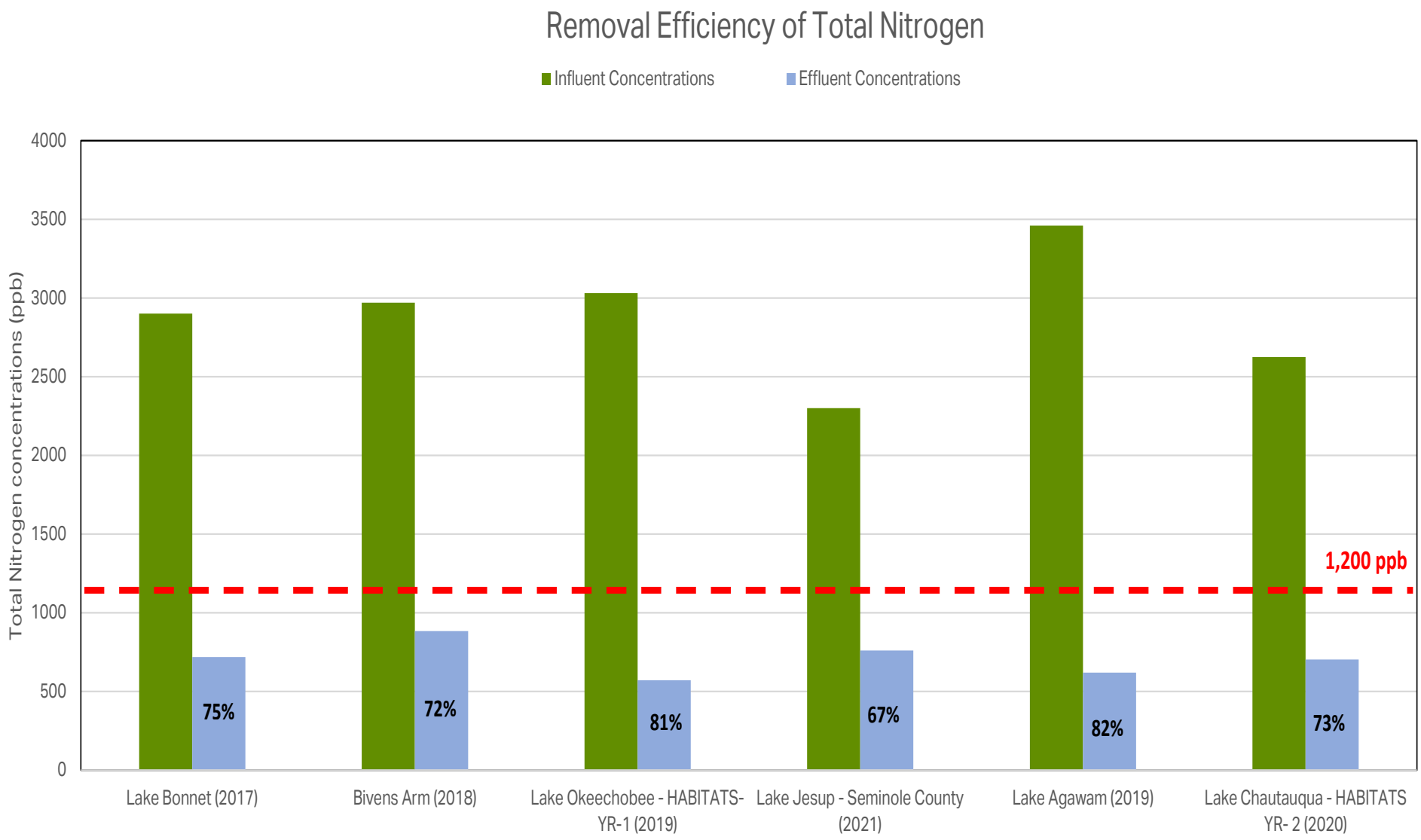
Removal of Total Nitrogen



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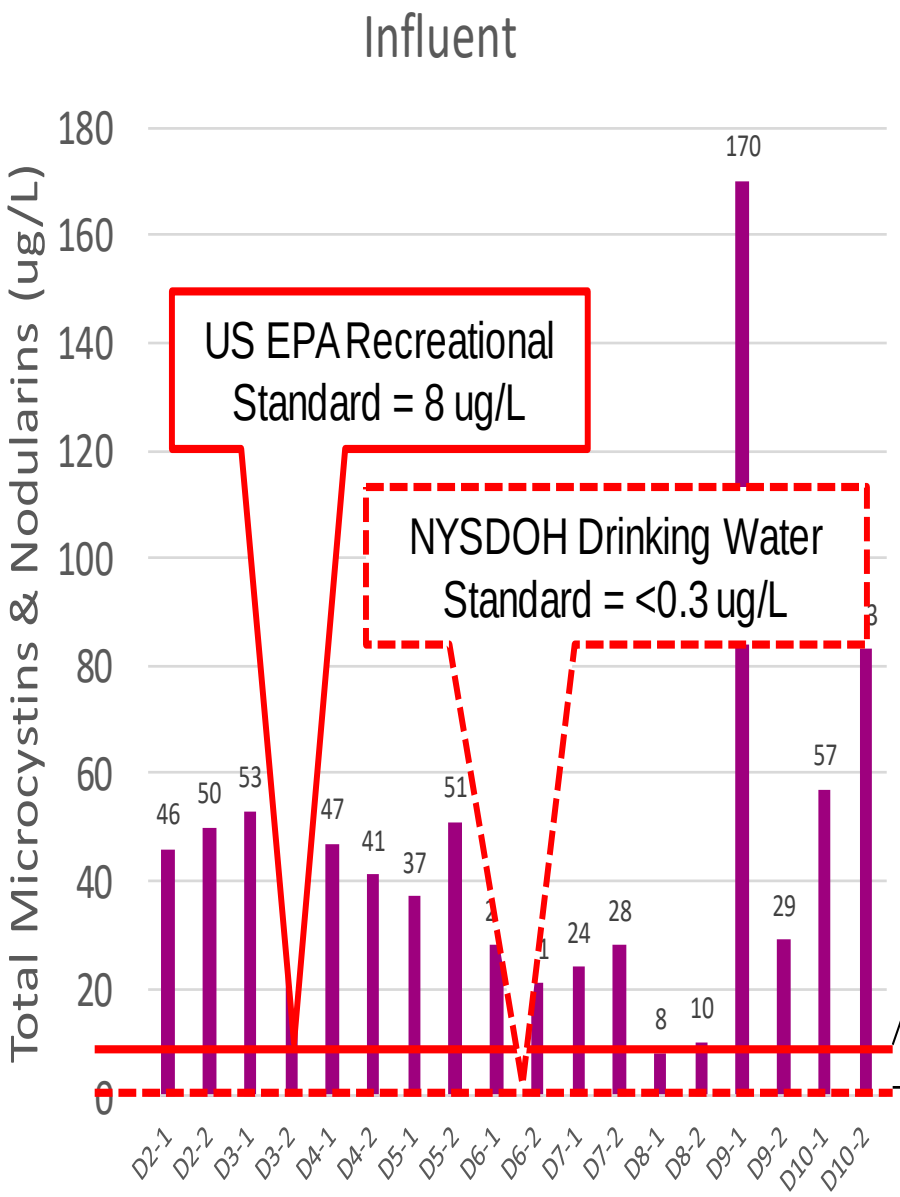
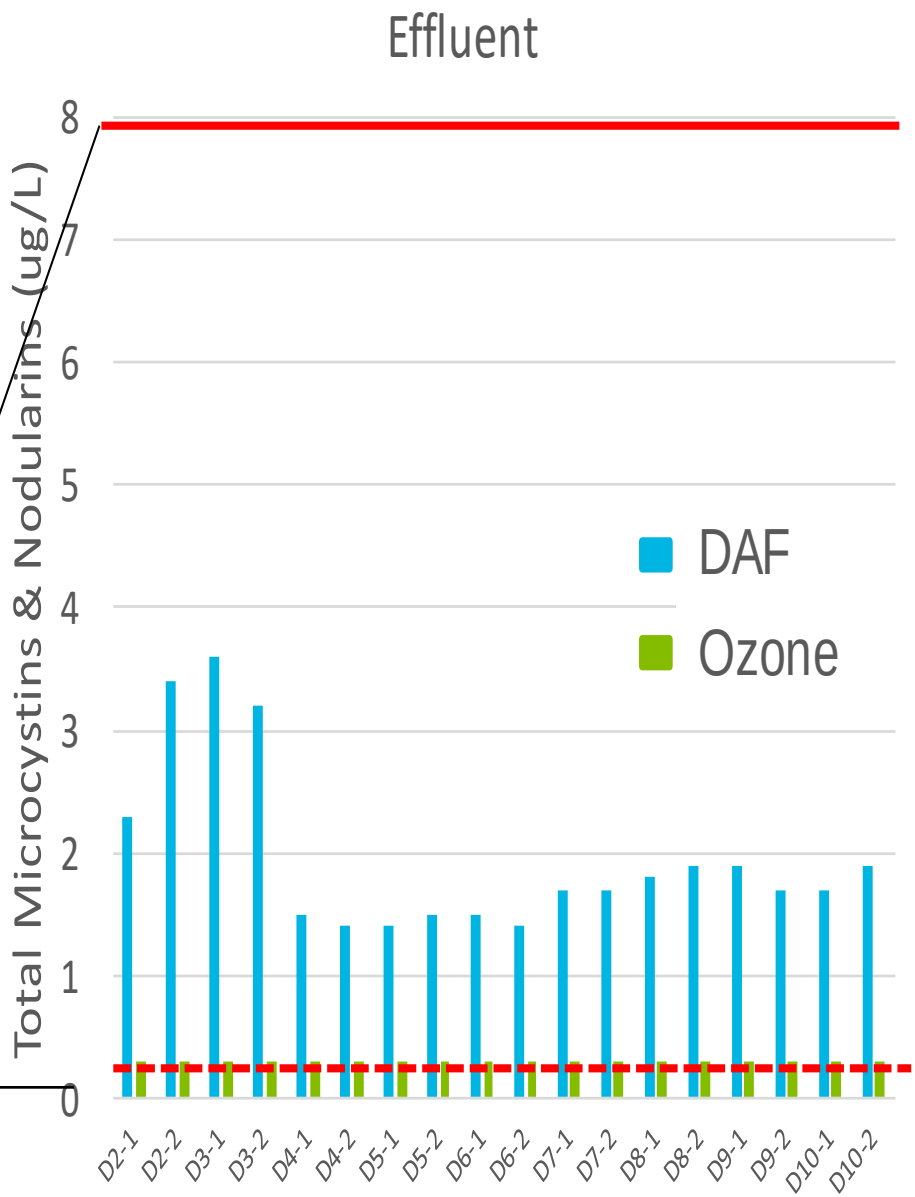
Removal of Cyanotoxins (2019 Lake Agawam Pilot Test)





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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)
Lake Elsinore State Recreation Area
Year 2-5


Questions

Task		Fee	Pilot Test Operations 0-6 months Year 1	6-18 months Year 1-2	19-30 months Year 2-3	31-35 months Year 3	Total 35 months
Pilot Test Equipment and Set-up	(1 MGD) Harvester monthly rental	$ 35,000		$ 420,000	$ 385,000		
	Docking Station	$ 550,000	$ 550,000				
	On-line sensors	$ 75,000	$ 75,000				
	Clean water containment Zone (5.5 acres)	$ 100,000	$ 100,000				
	Slurry Storage - 2 (10,000 gallon) tanks	$ 55,000	$ 55,000				
	Start-up /Shakedown	$ 75,000	$ 75,000				
	Permitting	$ 100,000	$ 100,000				
	Subtotal	**$ 955,000**	**$ 955,000**	**$ 420,000**	**$ 385,000**		**$ 1,760,000**
Test Operations	AECOM Staff to operate ($130/hr)	$ 270,400		$ 270,400	$ 247,867		
	Vehicle / Travel	$ 50,000		$ 50,000	$ 45,833		
	Electrical Costs	$ 50,000		$ 50,000	$ 45,833		
	Supplies (Chemicals, etc.)	$ 40,000		$ 40,000	$ 36,667		
	Biomass Disposal - CR&R	$ 45,760		$ 45,760	$ 41,947		
	Biomass tipping fee (year 2)	$ 73,000		$ -	$ 73,000		
	10 % markup on CR&R Services	$ 16,071		$ 4,576	$ 11,495		
	Subtotal		**$ -**	**$ 460,736**	**$ 502,641**		**$ 963,377**
Test Breakdown	Equipment Demobilization	$ 50,000				$ 50,000	
	Site Restoration	$ 25,000				$ 25,000	
	Subtotal					**$ 75,000**	**$ 75,000**
Laboratory Analysis & Report	Laboratory Testing	$ 95,833	$ -	$ 50,000	$ 45,833		
	Public Involvement /Media Event	$ 50,000		$ 50,000			
	Draft Report	$ 40,000				$ 40,000	
	Final Report	$ 15,000				$ 15,000	
	Subtotal			**$ 100,000**	**$ 45,833**	**$ 55,000**	**$ 200,833**
	Total for 35 month Pilot Test		**$ 955,000**	**$ 980,736**	**$ 933,475**	**$ 130,000**	**$ 2,999,211**

Payment Schedule

Task	Permitting and Installation 1	2	3	4	5	6	Pilot Test Operations (Months 7-19) 7	8	9	11	12	13	14	15	16	17	18	19
(1 MGD) Harvester monthly rental						$ -	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000
Docking Station	$ 91,667	$ 91,667	$ 91,667	$ 91,667	$ 91,667	$ 91,667												
On-line sensors	$ 12,500	$ 12,500	$ 12,500	$ 12,500	$ 12,500	$ 12,500												
Clean water containment Zone (5.5 acres)	$ 16,667	$ 16,667	$ 16,667	$ 16,667	$ 16,667	$ 16,667												
Slurry Storage - 2 (10,000 gallon) tanks	$ 9,167	$ 9,167	$ 9,167	$ 9,167	$ 9,167	$ 9,167												
Start-up /Shakedown					$ 25,000	$ 50,000												
Permitting	$ 25,000	$ 25,000	$ 25,000	$ 25,000														
Subtotal																		
AECOM Staff to operate ($130/hr)						$ -	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533
Vehicle / Travel						$ -	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167
Electrical Costs						$ -	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167
Supplies (Chemicals, etc.)						$ -	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333
Biomass Disposal - CR&R						$ -	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813
Biomass tipping fee (year 2)						$ -												
10 % markup on CR&R Services							$ 381	$ 381	$ 381	$ 381	$ 381	$ 381	$ 381	$ 381	$ 381	$ 381	$ 381	$ 381
Subtotal																		
Equipment Demobilization																		
Site Restoration																		
Subtotal																		
Laboratory Testing						$ -	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167
Public Involvement /Media Event								$ 25,000					$ 25,000					
Draft Report																		
Final Report																		
Subtotal																		
Total for 35 month Pilot Test	$ 155,000	$ 155,000	$ 155,000	$ 155,000	$ 155,000	$ 180,000	$ 77,561	$ 102,561	$ 77,561	$ 77,561	$ 77,561	$ 77,561	$ 102,561	$ 77,561	$ 77,561	$ 77,561	$ 77,561	$ 77,561

Task	Pilot Test Operations (Months 20-30) 20	21	22	23	24	25	26	27	28	29	30	Demobilization and Reporting 31	32	33	34	35	Total
(1 MGD) Harvester monthly rental	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000						$ 805,000
Docking Station																	$ 550,000
On-line sensors																	$ 75,000
Clean water containment Zone (5.5 acres)																	$ 100,000
Slurry Storage - 2 (10,000 gallon) tanks																	$ 55,000
Start-up /Shakedown																	$ 75,000
Permitting																	$ 100,000
Subtotal																	$ -
																	$ -
AECOM Staff to operate ($130/hr)	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533	$ 22,533						$ 518,267
Vehicle / Travel	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167						$ 95,833
Electrical Costs	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167						$ 95,833
Supplies (Chemicals, etc.)	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333	$ 3,333						$ 76,667
Biomass Disposal - CR&R	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813	$ 3,813						$ 87,707
Biomass tipping fee (year 2)	$ 6,636	$ 6,636	$ 6,636	$ 6,636	$ 6,636	$ 6,636	$ 6,636	$ 6,636	$ 6,636	$ 6,636	$ 6,636						$ 73,000
10 % markup on CR&R Services	$ 1,045	$ 1,045	$ 1,045	$ 1,045	$ 1,045	$ 1,045	$ 1,045	$ 1,045	$ 1,045	$ 1,045	$ 1,045						$ 16,071
Subtotal																	$ -
																	$ -
Equipment Demobilization												$ 25,000	$ 25,000				$ 50,000
Site Restoration														$ 25,000			$ 25,000
Subtotal																	$ -
																	$ -
Laboratory Testing	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167	$ 4,167						$ 95,833
Public Involvement /Media Event																	$ 50,000
Draft Report														$ 20,000	$ 20,000		$ 40,000
Final Report																$ 15,000	$ 15,000
Subtotal																	
Total for 35 month Pilot Test	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 84,861	$ 25,000	$ 25,000	$ 45,000	$ 20,000	$ 15,000	$ 2,999,211

$ -