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

Lead PI: Dr. Martin Page, ERDC, Martin.A.Page@usace.army.mil

USACE Harmful Algal Bloom Research & Development Initiative

Delivering scalable freshwater HAB prevention, detection and management technologies through collaboration, partnership and cutting-edge science

Problem Removing harmful algae from waterbodies is not scalable due to logistical challenges associated with managing the large volumes of potentially toxic algal biomass.

Objective Develop a scalable, rapidly-deployable system that removes harmful algae from waterbodies and efficiently manages the resulting biomass.

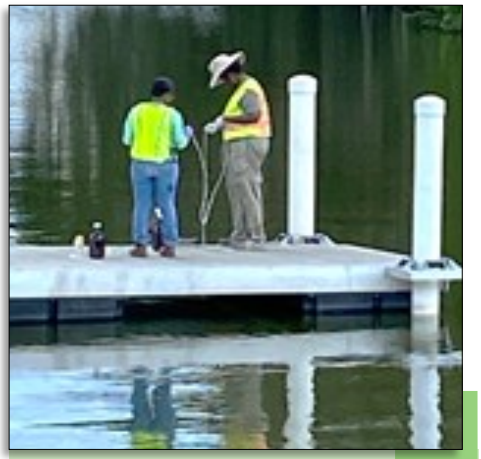

Figure 1: Researchers in the field

Approach HABITATS integrates high-throughput, energy-efficient technologies for interception, treatment, and transformation of HABs. It employs resource recovery to increase physical and economic scalability of HAB removal from large waterbodies. The removed biomass is converted into fuel and fertilizer feedstocks, resulting in a more sustainable solution that can generate more energy than it uses. The system destroys cyanotoxins, both in the treated water and in the removed biomass, while removing intracellular nutrients from the water, decreasing total phosphorus and nitrogen levels in the processed water by up to 93% and 55%, respectively. A rapidly deployable system has been developed that is now undergoing optimization and validation in field settings.

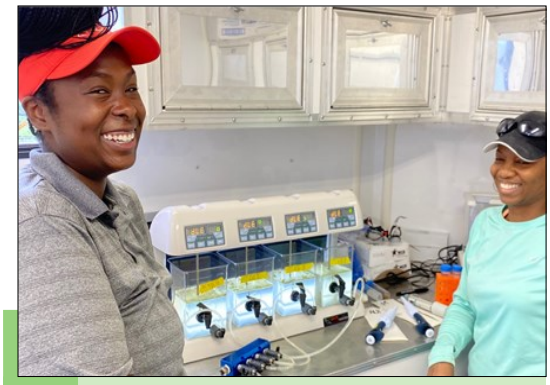

Figure 2: Researchers in the lab

Major Milestones

Date	Milestone
FY21, Q4	Development of technology transfer documentation, updating scalability and economic impact models and technical publication.
FY 21, Q4	Field assessments of in-situ micro-flotation to increase economic scalability of HABITATS (Initial assessment completed; Redesign and optimization ongoing).
FY21, Q4	Field demonstration of onshore treatment system in Florida, including on-site fuel generation (Completed; System optimization ongoing).
FY22, Q3	Assembly and installation of a deployable on-shore system that can treat 2MGD (10-fold higher treatment capacity than previously-tested systems, validation ongoing)
FY22, Q3	Awarded contract for the world's largest deployable hydrothermal liquefaction system for transforming algal biomass into fuel. (Completed)
FY23, Q4	Complete training videos and manuals to support technology transfer.
FY23, Q4	Complete prototype optimization testing.
FY23, Q3	Assemble final deployable prototype and establish HAB mitigation test bed at Lewisville Aquatic Research Facility.
Costs	**FY21:$1.7M FY22:$1.5M FY23:$0.7M TOTAL:$3.9M**

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Partnership/Leveraging Opportunities This work will leverage ongoing field studies within USACE's Aquatic Nuisance Species Research Program, such as HABITATS, which include collaborations with New York State Department of Environmental Conservation and Florida Department of Environmental Protection. In addition to government collaborations, commercial products are being evaluated, modified, and optimized in the RAFT study.

Value to USACE Mission HABITATS can be deployed by stakeholders at key locations, such as spillways and canals, to reduce transport of algae, intracellular nutrients, and potential toxins through critical waterways thereby reducing environmental impacts on downstream waterbodies and communities.

USACE District Liaison: Jim Riley—Jacksonville District

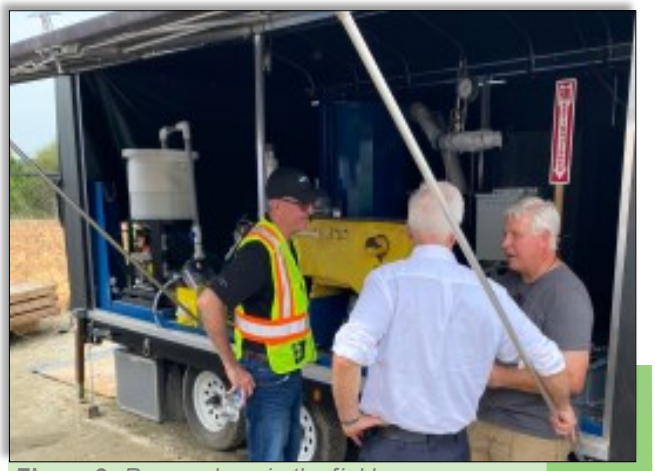

Figure 3: *Researchers in the field*

Figure 4: *HABITATS unit being deployed during project*

Learn about other EL Research Areas including:
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Aquatic Plant Control
Ecosystem Management and Restoration

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