

11TH U.S. SYMPOSIUM ON HARMFUL ALGAE

THE HARMFUL ALGAL BLOOM INTERCEPTION, TREATMENT, AND TRANSFORMATION SYSTEM (HABITATS)

Harmful Algal Blooms (HABs) continue to impact lakes and waterways across the nation, often resulting in environmental and economic damage at regional scales. The U.S. Army Engineer Research and Development Center (ERDC) and collaborators have continued research on the Harmful Algal Bloom Interception, Treatment, and Transformation System (HABITATS) project to develop a rapidly deployable and scalable system for mitigating large HABs. The third year of the project focused on: (1) development of a new organic flocculant formulation for charge neutralization and flotation of algal cells while enhancing dewaterability and reducing environmental toxicity; (2) testing and optimization of the shipboard HABITATS prototype on land in a controlled environment; (3) characterizing algal bloom extent within the water column to provide data for improving interception capabilities; and (4) beginning the acquisition process for full-scale individual deployable modules that will comprise the base units of future full-scale systems and treat up to 2 MGD. Ongoing work for the research phase of the project includes (1) acquiring remaining deployable modules; (2) developing in situ flotation to preconcentrate algae at the water surface prior to interception; (3) optimizing waste stream management to enable closed-loop operations and maximize resource recovery; (4) Updating economic scalability analyses for various full-scale deployment scenarios; and (5) initiating technology transition planning in coordination with end users.

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Marissa Campobasso is an Environmental Engineer in the USACE ERDC-CERL's Operational Water Team. She has been focusing her efforts on the Harmful Algal Bloom Interception, Treatment, and Transformation System (HABITATS) project, which aims to develop a rapidly deployable and scalable water treatment system to mitigate harmful algal blooms in the environment while achieving energy neutrality. Her current roles include leading the permit and equipment acquisition for the full-scale FY22 demonstration, as well as providing technical support for the engineering design and water treatment optimization.

Her love of research began during her junior year of college, where she secured a grant to study the effects of engineered nanoparticles on aquatic microbial communities and published an article in the American Society of Civil Engineer's Journal of Environmental Engineering. The following summer she was a SULI Intern at the Argonne National Laboratory to study the effects of biofuel crops as agents of remediation for nutrient pollution. Marissa joined ERDC-CERL in 2019 as a Civil Engineering Research Assistant in the Sustainment Management Systems team to aid in the development of a standardized inspection methodology and condition rating assessment for the management of DoD dams, levees, and dikes. In 2020 she transitioned to the Operational Water Team to support the HABITATS project.

She graduated from Southern Illinois University Carbondale (SIUC) in 2019 with a BS in Civil and Environmental Engineering. Upon graduating from SIUC, she studied Water Resources Engineering and Science at the University of Illinois Urbana-Champaign and earned her MS in 2021.

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