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NCCOS PROJECT

Assessing Societal Impacts of Harmful Macroalgae Blooms in the Caribbean

Research Area(s): [Social Science \(/category/social-science/\)](#) / [Ecosystem Services Valuation \(/category/social-science/ecosystem-services-valuation/\)](#); [Stressor Impacts and Mitigation \(/category/stressor-impacts/\)](#) / [Harmful Algal Bloom Detection and Forecasting \(/category/stressor-impacts/harmful-algal-bloom-detection-and-forecasting/\)](#); [Other Topics \(/category/topics/\)](#) / [Sponsored Research \(/category/topics/sponsored-research/\)](#)

Region(s) of Study: [U.S. States and Territories \(/region/us-states-and-territories/\)](#) / [Puerto Rico \(/region/puerto-rico/\)](#), [U.S. Virgin Islands \(/region/us-virgin-islands/\)](#)

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This project began in September 2020 and is projected to be completed in August 2023.

We will examine how [Sargassum seaweed blooms](#) and their mitigation in the Caribbean affect multiple dimensions of social resilience, including economic impacts, human well-being, local ecological knowledge, and individual attitudes, values, and behaviors.

Why We Care

In recent years, the number, distribution, and magnitude of macroalgal blooms have increased globally, with consequent impacts on coastal system resilience that have led many to consider them a new type of natural disaster. This is particularly true in the Caribbean and Gulf of Mexico regions, where blooms of free-floating [Sargassum](#) spp. are resulting in pelagic, nearshore, and onshore accumulations that have become an increasingly persistent and severe nuisance since first appearing in 2011.

Although recent attention has gone to forecasting trajectories or discovering causative influences of these harmful algal bloom (HAB) events, their impacts are still poorly understood. However, mounting evidence suggests that the size and frequency of these blooms pose unprecedented environmental, social, and economic risks, including threats to tourism, property

values, fisheries, aquaculture, public health, and quality of life. In addition to the direct effects of nearshore and onshore *Sargassum* accumulations, there are also secondary effects associated with control and mitigation.

Management responses to these HAB events vary considerably from place to place and can include deployment of floating interception barriers and development of removal technologies in nearshore waters, varying intensities of manual and mechanical removal of beached macroalgae, and transport and disposal of removed biomass, often to unlined landfills or illegal dump sites. These control and mitigation activities pose unique challenges, and their impacts and efficacy are largely unstudied. Additionally, lack of coordination within and between communities, concerns about public safety, equity considerations, lack of policy development, and lack of authoritative best practice guidelines complicate management efforts. An assessment of the primary and secondary socioeconomic impacts of *Sargassum* accumulations will inform a wise and efficient response by local and regional managers.

What We Are Doing

Few studies have evaluated economic impacts of harmful macroalgal blooms. These include, economic estimates of macro-HABs related to large-scale tourism losses and property devaluation in Hawaii from invasive *Hypnea musciformis*, and costs to aquaculture operations and monitoring and mitigation of green tides in China's Yellow Sea. Though some preliminary efforts have been made to quantify the labor required for *Sargassum* cleanup efforts, no formal economic studies have been published estimating the cost of that labor, or any other economic effects of *Sargassum* events.

The project team will assess how massive blooms of the macroalga *Sargassum* in the Caribbean affect multiple dimensions of social resilience, including economic impacts, human well-being, local ecological knowledge, and individual attitudes, values, and behaviors. In particular, this study has the following objectives:

1. Characterize the nature and severity of *Sargassum* events in the wider Caribbean.
2. Investigate human well-being, local ecological knowledge, and individual attitudes, values and behaviors associated with *Sargassum* events, primarily in U.S. jurisdictions of the Caribbean.
3. Analyze economic impacts of *Sargassum* events, primarily in U.S. jurisdictions of the Caribbean.

4. Actively integrate local community members, resource users, and other relevant stakeholders throughout the project to ensure that results effectively transition to management applications.

Dr. Tracey Dalton of the University of Rhode Island leads this project. Co-investigators are Dr. Carlos Garcia-Quijano (University of Rhode Island), Mr. Peter Freeman (University of Rhode Island), and Dr. Di Jin (Woods Hole Oceanographic Institution). The project is funded through the NCCOS Prevention, Control, and Mitigation of Harmful Algal Blooms Program (<https://coastalscience.noaa.gov/science-areas/habs/pcmhab/>).

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