



Remote Sensing Harmful Algal Blooms (HAB) in the Indian River Lagoon

PROJECT DESCRIPTION

In 2021, Applied Ecology, Inc. (AEI) and Brevard County Natural Resources Management Department were awarded a Florida Department of Environmental Protection Innovative Technologies Grant to develop a remote sensing methodology to conduct real-time monitoring of Harmful Algal Blooms (HAB) in the Indian River Lagoon (IRL). The pilot project tested a novel approach to analyze Sentinel-2 and Sentinel-3 satellite imagery to accurately estimate Chlorophyll-a (ChlA) in the water column as a proxy for HAB presence. The real-time monitoring was needed to better understand key HAB triggers, life cycles, hotspots of activity, and movement to inform adaptive management. AEI improved the accuracy of ChlA estimates by reducing atmospheric and water column interferences, a challenge in the turbid waters of the IRL. Once developed, AEI refined and calibrated the method by collecting hyper-spectral imagery from a drone-mounted camera alongside regular surface water sampling to compare spectral ChlA estimates with laboratory results. Three HAB indices were developed to quantify the impacts of bloom intensity and duration into a severity index and a low-ChlA concentration algorithm was developed. AEI is applying this real-time HAB monitoring method to investigate specific HAB drivers like wind, weather, and benthic substrate and to understand the impact on fish populations. These and the AEI generated weekly HAB activity maps raise awareness, educate the public on HAB impacts, and guide and evaluate adaptive management strategies.

OUTCOMES

This project demonstrates AEI's keen ability to address a client need with an innovative solution. In this case, the AEI team of geospatial analysts developed an innovative method to detect real-time HAB activity and procured the funding to implement it and test it. The cost-efficient monitoring allows IRL stakeholders to focus resources where they are most needed to mitigate HAB formation and persistence. AEI continues to push the envelope of this innovative solution, working to refine the methods to speciate alga using satellite imagery.

PROJECT DETAILS

PROJECT CLIENT:

Brevard County Natural Resources Management Department

PROJECT LOCATION:

Brevard County, FL

SERVICE LINE AREAS:



Geospatial Services

EXPERTISE:

- HAB Evaluation and Detection
- UAS Operations
- Remote Sensing Data Collection, Processing, and Analysis
- ESA Sentinel 2 and 3 Satellites
- Estuarine Water Column and Benthic Assessment