

# ADVANCING ALGAL BLOOM MONITORING THROUGH DRONES & ARTIFICIAL INTELLIGENCE



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## HABs: A WORLDWIDE PROBLEM

Harmful Algal Blooms (HABs) are extreme proliferations of cyanobacteria or algae which upset the natural states of water bodies. HABs can also produce toxins that act as cancer promoter, liver toxins, neuro toxins and irritants. Water treatment of these toxins is incredibly difficult and expensive, and their appearance regularly shuts down use of recreational waters.



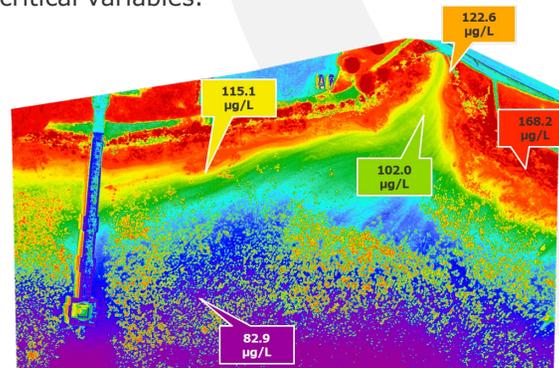
HABs occur around the world, but are especially problematic in CNY, resulting in millions in lost revenue, 1000s of lost beach days and use of expensive water treatment systems. Creative innovative solutions are critical to reducing unnecessary beach closures and to increase efficiencies in water treatment with early HAB warnings and timely monitoring.

## IMPROVING ON THE STANDARD

Current methods for HAB monitoring rely largely on satellites, which tend to be expensive to develop and update, provide low-resolution data, and are difficult to coordinate with, making timely HAB detection difficult. BloomOptix, therefore, focuses on using remotely operated vehicles to produce complex datasets making more precise and in-depth monitoring and study of HABs possible.

## UAS-BASED HAB MONITORING

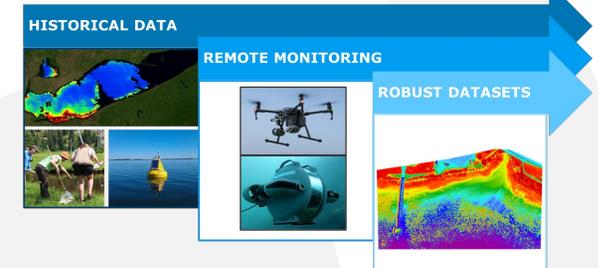
Unmanned aerial systems (UAS) equipped with spectral sensors are an excellent tool for HAB monitoring and tracking. They provide higher spatial, temporal, and spectral resolution than satellites, as well as customized deployment schedules and flexibility in use. BloomOptix UAS can image over 100 acres in a few hours, with approximately 2 in. spatial resolution. Our UAS also collect geolocated water samples up to thousands of feet off-shore, which can be combined with imaging data to produce HAB heat maps which are critical for tracking (below), as well as robust datasets which incorporate HAB imaging and over a dozen critical variables.



Lake Neatahwanta NDVI and independent, lab-determined cyanobacterial pigment (phycocyanin) concentrations

## REAL-TIME WATER QUALITY ANALYSIS

Using a sensor-equipped remotely operated vehicle (ROV), BloomOptix collects critical water quality parameters in real-time. These data are combined with spectral data to produce high density datasets, which can be used to pinpoint HAB trigger conditions and HAB-driving variables, eventually providing users with an early-warning system.



## HABAlert: AI ENABLED CYANOBACTERIAL ID & ENUMERATION

BloomOptix also provides solutions for users with less intensive monitoring needs. HABAlert analyzes images of cyanobacterial cells via artificial intelligence (AI). Using HABAlert and the provided microscope, BloomOptix can provide users with cyanobacterial counts and identification within minutes of upload, compared to days using standard lab methods. HABAlert allows for real-time response to changing HAB conditions in any setting.

## HABAlert



Less than 30 minutes

## LEARN MORE



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