



Department of
Environmental
Conservation

NY HABs, NYHABS, and Other Updates from NYS DEC

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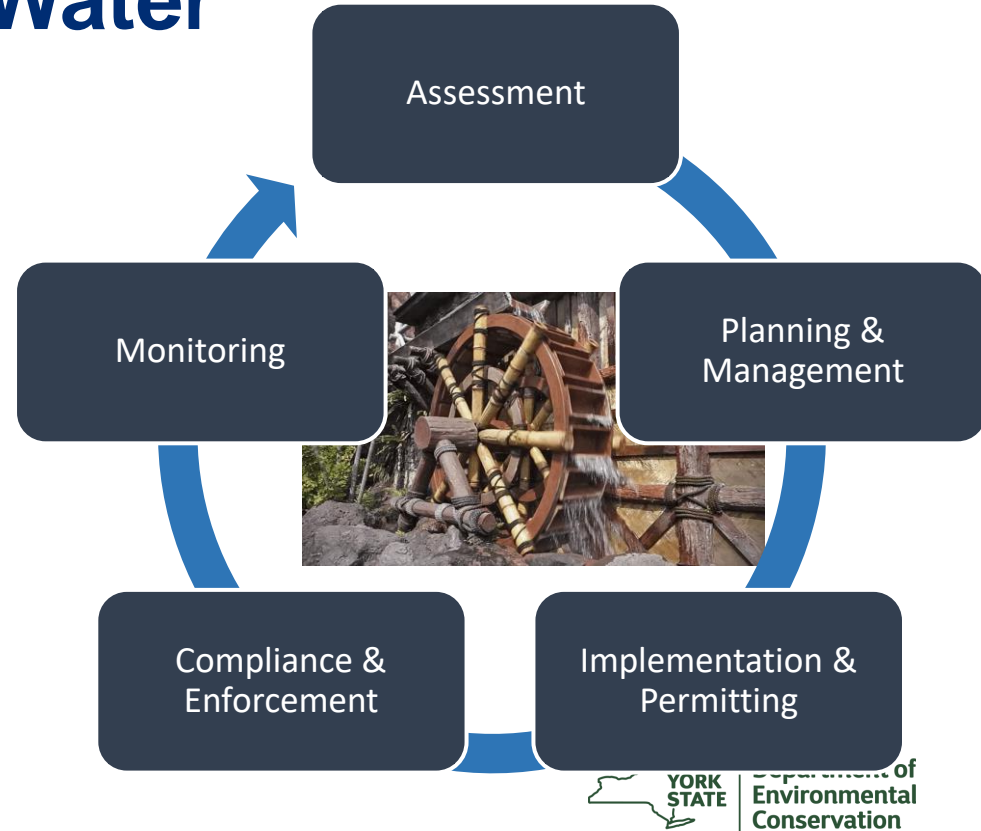
NY State HABs Efforts



- Interagency collaboration: DEC, OPRHP, DOH
- Reports of HABs go to DEC or DOH
- DEC coordinates extensive reporting; >400 lakes/year & hosts notifications on DEC map
- Health concerns & drinking water treatment overseen by local operators and DOH
- Regulated swimming areas (beaches) have a protective response protocol based on visual observations

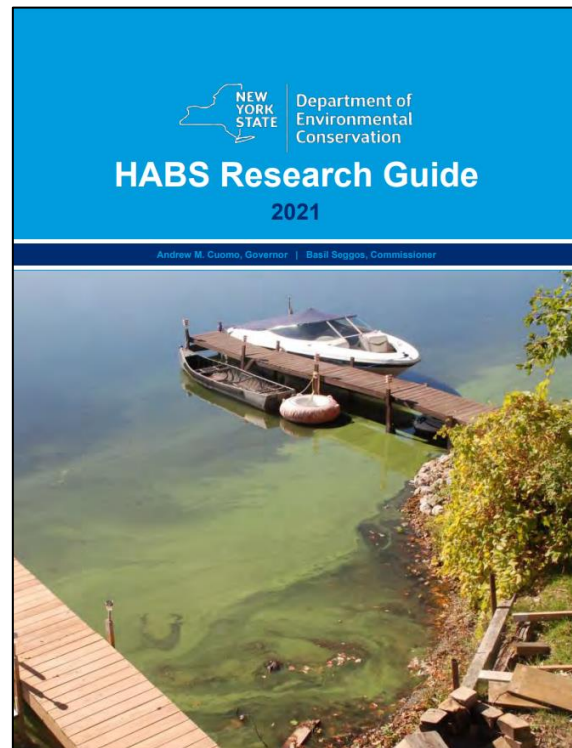
NYS DEC Division of Water

- Goals and objectives regarding HABs
 - Identify contributing factors
 - Lessen frequency and/or impact
 - Provide public notification of HABs locations
 - Share research findings/publish



DEC HABs Programs

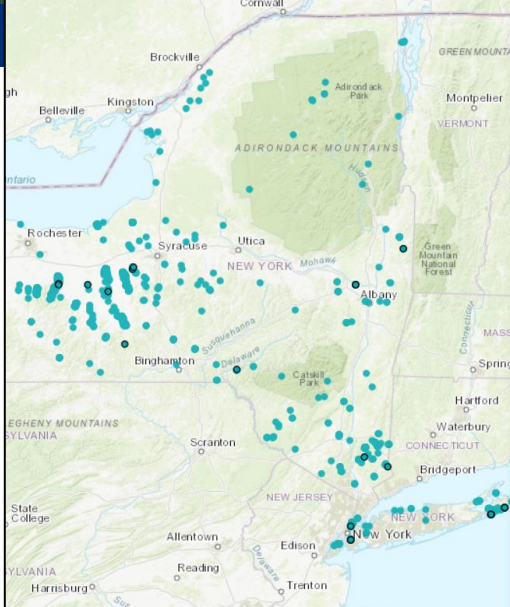
- Active research program
- Mitigation (in-lake) special projects with academic & federal partners
- >500 waterbodies with documented HABs since 2012
- Watershed management
 - Reduce nutrient sources
 - Clean Water Plans: TMDL, 9E, HAB Action Plans
- 2018 Governor's Initiative; >\$400 m NYS Environmental Protection Fund annually
- Well-established interagency notification system (NYHABS)



The NY HABs System (NYHABS)

- Esri ArcGIS Online interactive map of HAB reports, updated daily*
- Reports include status, extent, reported by, exact location, photos
- Reports remain Current on map for 2 weeks
- After 2 weeks, all HABs remain visible as Archived
- User can filter by lake or county and export reports as pdf

on.ny.gov/nyhabs




About NYHABS

Press the ... icon above to minimize this info tab.

[Return to DEC HABs homepage.](#)

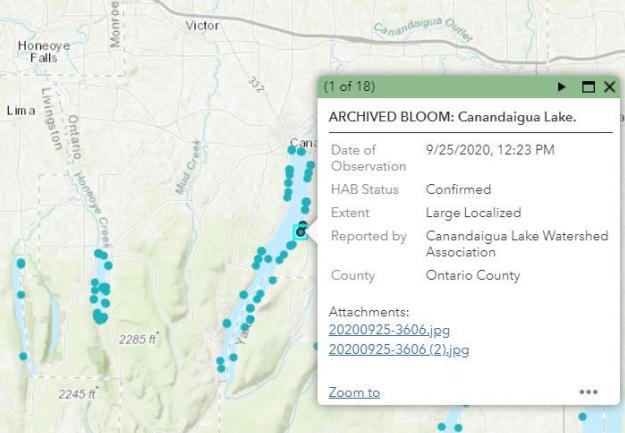
NEW YORK STATE OF OPPORTUNITY Department of Environmental Conservation

Click on any point to view report data.

Use the arrow icon at the bottom of your screen  to view a table of reports.

In this map:

- Current HAB reports within the last two weeks, and may not reflect current conditions.
- Archived HAB reports more than two weeks ago, but were reported this year (2020).



(1 of 18)

ARCHIVED BLOOM: Canandaigua Lake.

Date of Observation	9/25/2020, 12:23 PM
HAB Status	Confirmed
Extent	Large Localized
Reported by	Canandaigua Lake Watershed Association
County	Ontario County

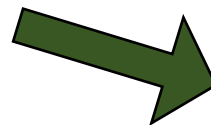
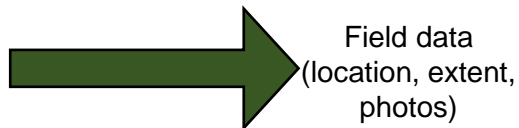
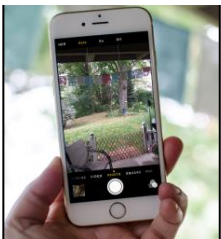
Attachments:
[20200925-3606.jpg](#)
[20200925-3606 \(2\).jpg](#)

[Zoom to](#) ...

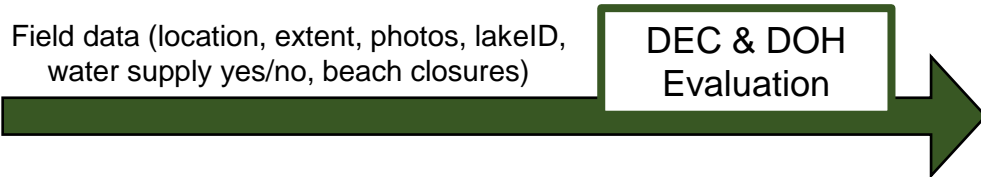
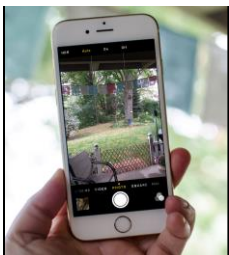
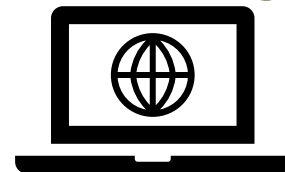
Streamlined Reporting Tools



- Survey123: ESRI ArcGIS Online fillable forms
- Works on any platform (desktop, mobile, tablets)
- Fill out anywhere, but ideally in the field for exact location
- Attach photos to report a bloom (required)
- Trained User HABs Form: **on.ny.gov/habproform**
- Public HABs Form: **on.ny.gov/habform**



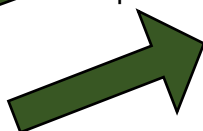
NYHABS



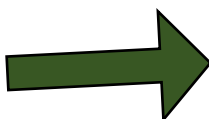
Samples



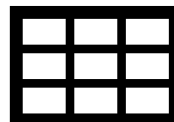
Sample ID



Lab Analysis



Results

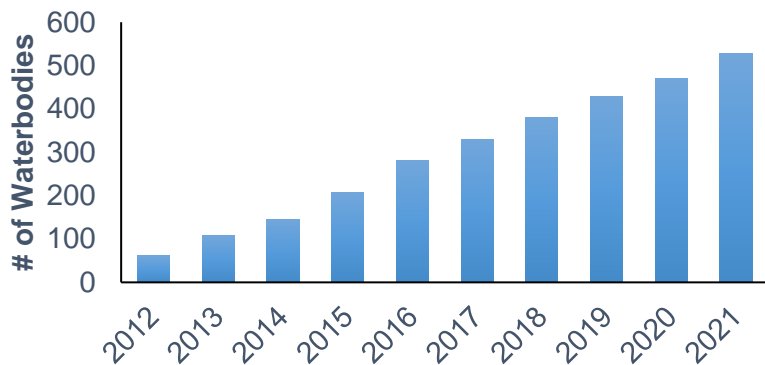


Learn how to ID HABs

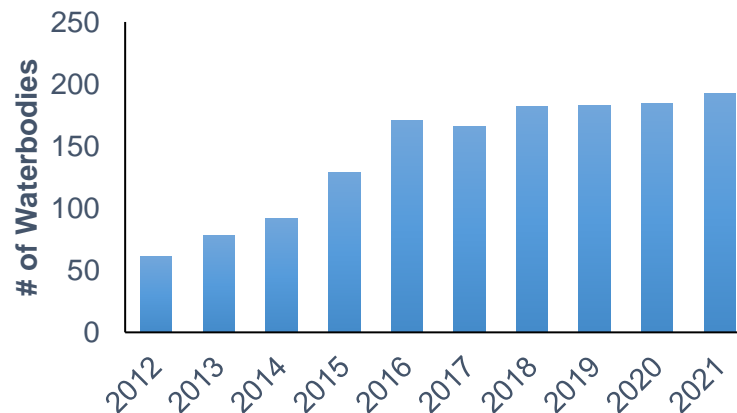
Several resources available:

- DEC Reporting Guide:
www.dec.ny.gov/docs/water_pdf/habsreportingguide.pdf
- DEC: “Harmful Algal Bloom (HAB) Identification Tips and Tricks”:
www.youtube.com/watch?v=8nL_s77FV-o
- HealthVermont: “How to identify cyanobacteria”:
www.youtube.com/watch?v=ea0EHw5suDs
- Interstate Technology and Regulatory Council (ITRC): “Learn to Identify Cyanobacteria Blooms”:
www.youtube.com/watch?v=1Aknc7dZHMg

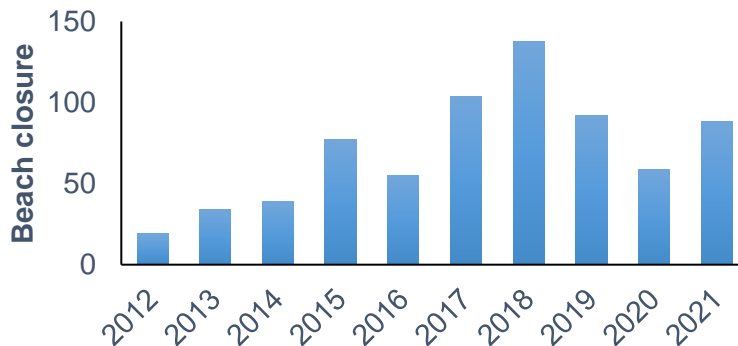
Cumulative # of Waterbodies with HABs



Annual # of Waterbodies with HABs



of HABs Beach Closures



Mitigation Projects

Lake Agawam:

Ultrasonic with peroxide



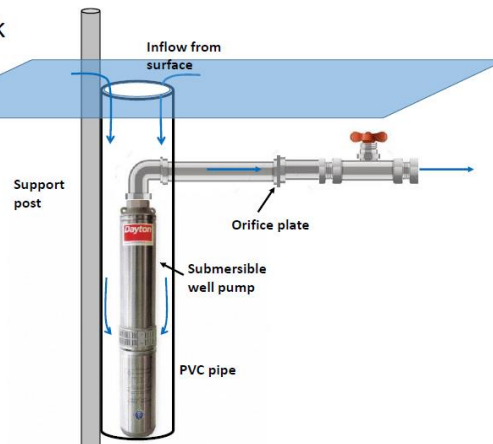
MPC-Buoy
Monitor, Predict and Control Algal Blooms

Lake Neatahwanta:
Hydrodynamic cavitation &
Electrochemical oxidation

Chautauqua Lake:

HABITATS

Next Steps: Dock
mounted
cavitation
unit



Lake Agawam

- 64-acre; hypereutrophic; avg. depth 2 m / 6 ft
- Recurring high toxin *Microcystis* blooms
- HABITATS pilot 2019
- HAB Action Plan 2020
- High local engagement
- Long term monitoring dataset



Stony Brook University



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Two Methods

Ultrasonic Devices

- Unknown efficacy, some use in NY
- Emits high frequency sound waves that affect gas vacuoles
- Algae prevented from moving throughout water column, sinks, dies-off
- Upfront investment, low operational cost

Hydrogen Peroxide

- Known efficacy, infrequent use in NY
- Breaks down to water and oxygen
- Shift in algal community
- Oxidation of toxins

Both Together

Unknown how they interact, no previous well-documented whole lake studies



 **GreenClean Liquid 5.0**



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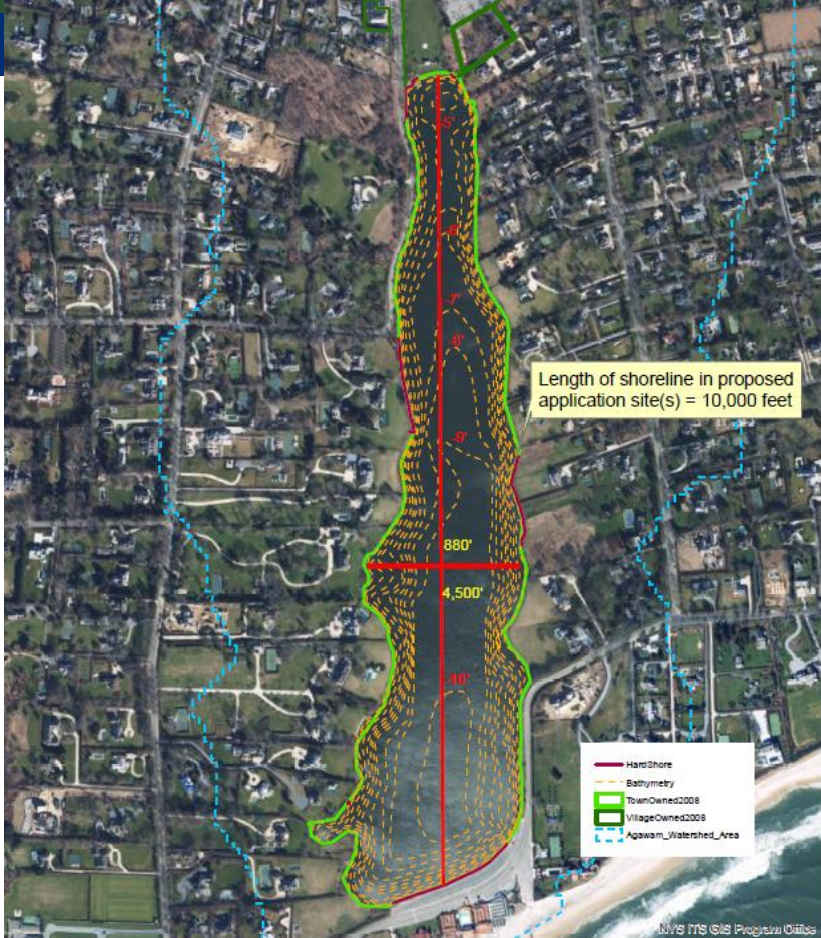
LG Sonic Devices

- Shipped unassembled to Albany, transported to LI, assembled on site.
- Launched with 2 motorboats on April 14.
- Removed from site on October 29
- Real time sonde data on LG's data platform.



Hydrogen Peroxide Treatments

- Initiated by the Village
- They contracted with licensed applicator
- Freshwater wetlands & Pesticide permits were issued
- Treated May 20 & July 1



Site Plan

(Area of Treatment equals entirety of Lake Agawam)

Source: ESRI Web Mapping Service, USGS 2016 data, SIM 3398
Scale: 1 inch = 600 feet

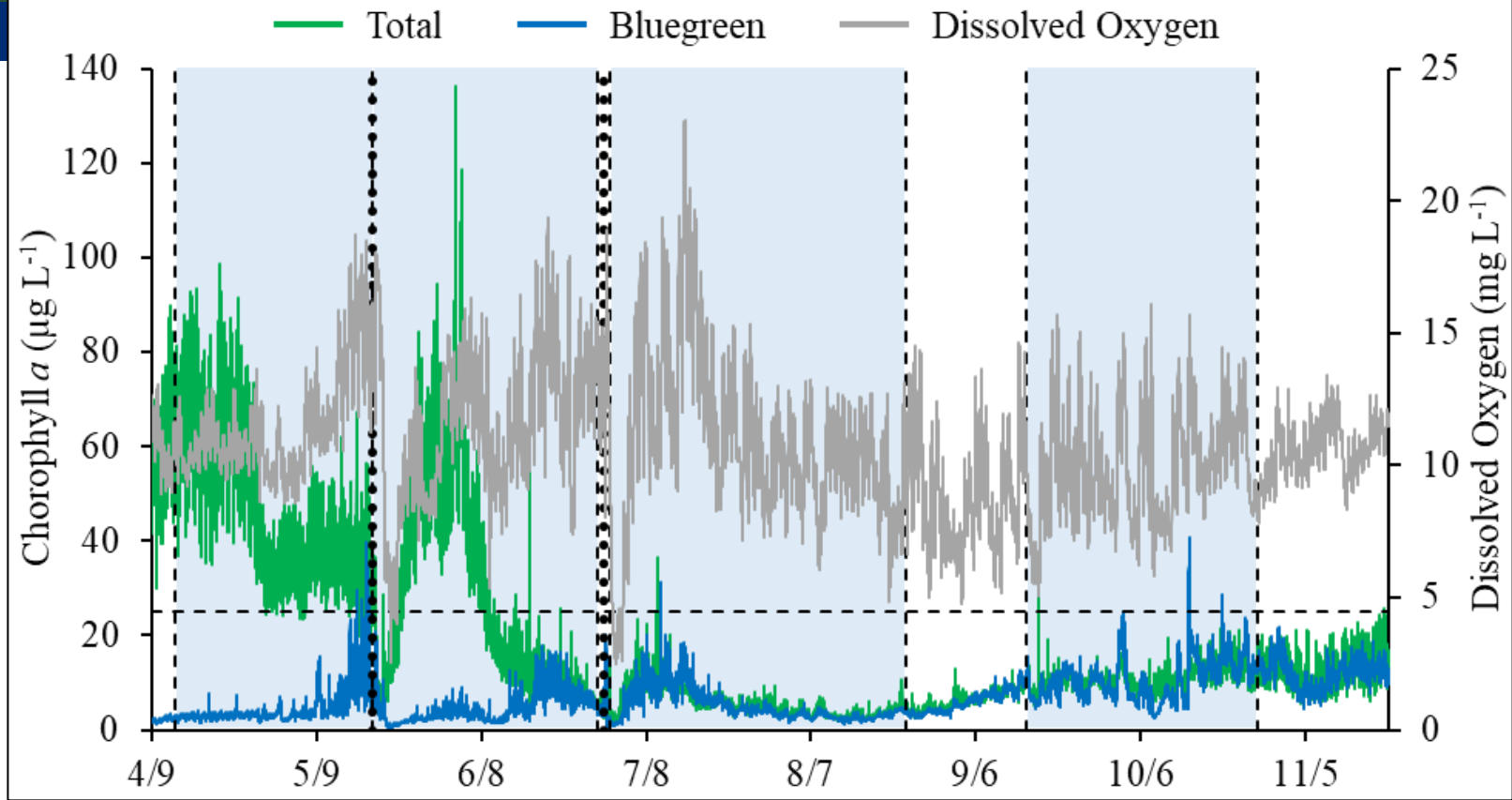


Lake Agawam
Southampton, NY

Prepared on: 7/26/2020



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Buoy data showing total biomass (green), bluegreen algae (blue), and dissolved oxygen levels (grey). Horizontal dashed line shows bluegreen level of concern of $25 \mu\text{g L}^{-1}$. Vertical dashed lines with shaded regions show when ultrasound buoys were active. Vertical dotted line shows when GreenClean applications were performed. (Figure from Gobler)

Findings

- No detectable difference from ultrasonic alone
- Peroxide effective at knocking down initial biomass, but no long-lasting impact
- Observed drop in dissolved oxygen after peroxide treatments

Takeaway/Next steps

- Unclear if lack of efficacy was site specific
- Test potential efficacy of ultrasonic in varied physical lake conditions (size, depth, trophic status)
- Partnership with local entities/researchers is key for successful pilot



Hydrodynamic Cavitation

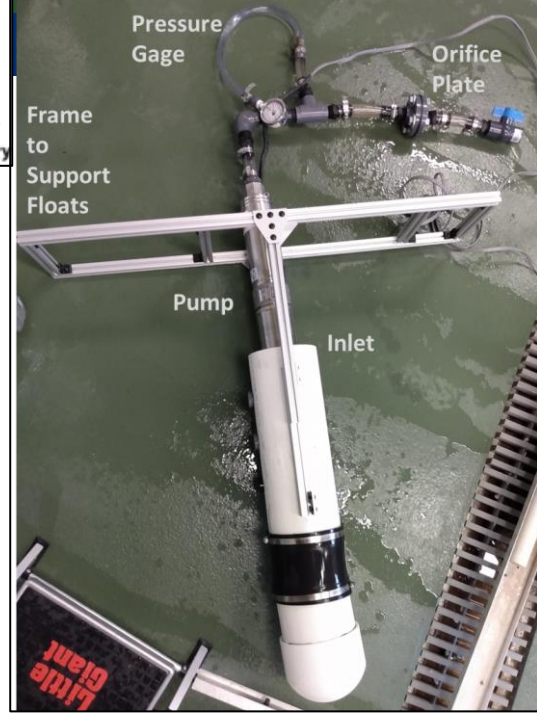
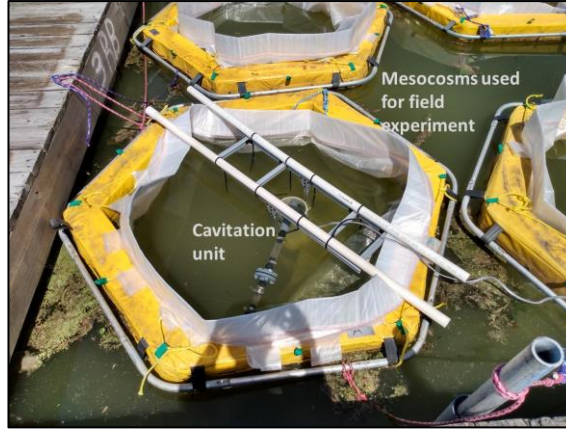
Phase 4 Study: Understand how cavitation changes the vertical motility of cyanobacteria.

Treatment

Small scale, near-shore unit on Lake Neatahwanta

Findings

Field experiments revealed minimal effect on vertical motility for low cyano concentrations (difficulty with mesocosms)



Takeaway

Currently using lab studies to understand why effects of cavitation are most pronounced on high concentration/surface blooms

Site specific limitations

Electrochemical Oxidation



Phase 4 Study: measure effectiveness, understand effects on non-target organisms: zooplankton, fish larvae

Treatment

Production scale (100gpm), open-water on Lake Neatahwanta

Findings

In effluent: reductions in Chl-a (50%), microcystin (25%), no fish toxicity but disinfection byproducts above MCL, and some reproductive effects on *Daphnia* (although lake water had the same effect!)



Photo Credit: L. McCaffrey, NYS-DEC

Takeaway

Proven reduction in Chl-a & cyanotoxin, but remains to be seen if levels are practical. *May* require a permit due to DBP.

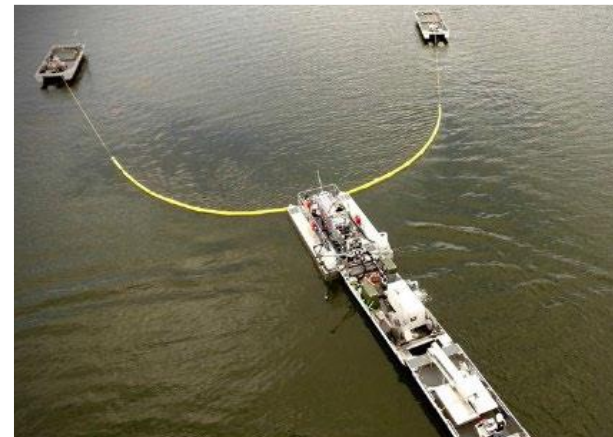
HABITATS

Interception, Treatment, and Transformation System



Treatment

- Dissolved air flotation, dewatering, ozone, hydrothermal liquefaction
- Removes algal biomass, oxidize cyanotoxins
- Mobility to treat open water
- Alternative coagulant chemical usage
- Potential to be energy neutral
- Shoreline and in-lake shipboard demonstrations



Findings

- Reductions in HAB biomass and toxins; nutrients
 - Validated shipboard system design performance
 - Demonstrated equivalency between onshore and shipboard treatment
- ### Takeaway
- Critical cost-effectiveness analysis for scalability needed
 - Modify to increase barge stability
 - Investigate alternative chemical options

What can be done?

There is no silver bullet

- DEC monitors for HABs parameters in our surface water programs
- DEC & DOH conduct outreach, provide guidance, close beaches, and post notifications on NYHABS
- Once a bloom is going, difficult to resolve, likely to return
- We can't control climate change or precipitation
- We can control water quality (nutrient inputs) & in lake processes



In Lake Mitigation Options

- Algaecides
- Aeration/Oxygenation
- Dredging
- Ultrasonic devices
- Nutrient Inactivants





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Thank you

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