



**Department of  
Environmental  
Conservation**

# **2018 HABs Volunteer Training**

**Division of Water, Bureau of Water Assessment  
and Management**

**Wednesday June 13, 2018 – Wells College, Cayuga Lake**

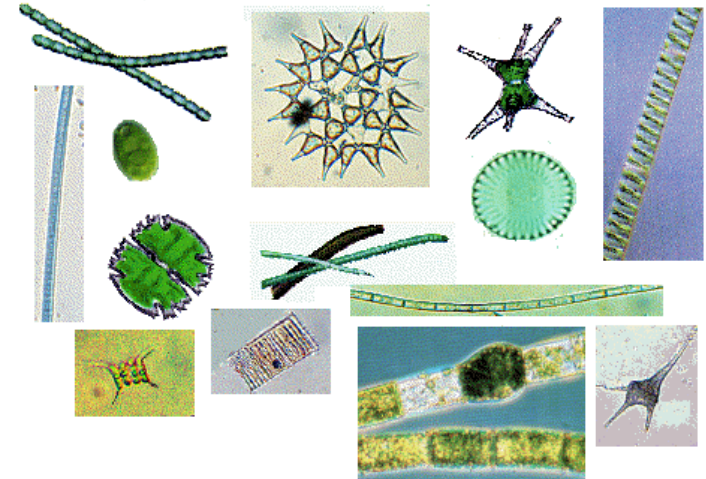
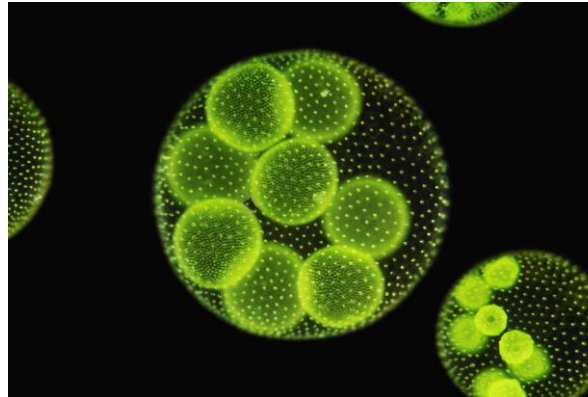
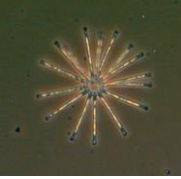
# What are Harmful Algal Blooms?

## Introduction



# What are Algae?

- Single-celled plants
- Possess chlorophyll
- Conduct photosynthesis.



# Normally, NOT HARMFUL



- Algae are present in all lakes and oceans
- Most kinds do not cause any harm
- Diverse communities of many types of algae

# Acronym time: HABs

**H: Harmful** (toxins, economic aesthetics, ecological)

**A: Algal** (freshwater HABs refer to cyanobacteria, not truly algae)

**B: Blooms** (proliferation of cells, dense concentrations)



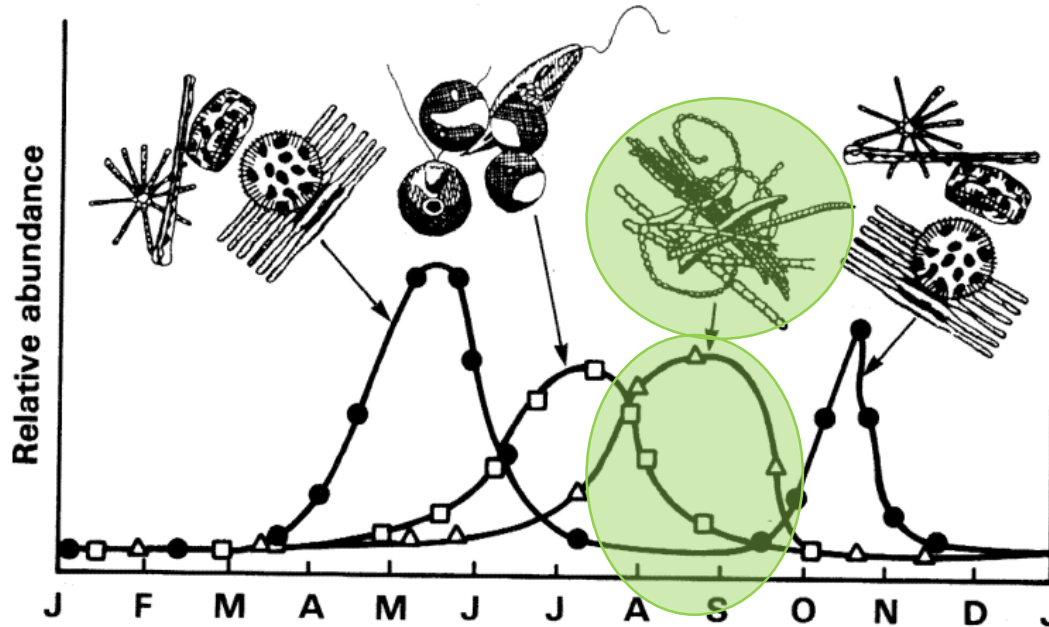
# Cyanobacteria – Blue-green Algae – HABs

- Highly specialized and competitive
  - Some regulate buoyancy
  - Some fix nitrogen
- Best in high temps, high light, high nutrients
- Causes not fully understood, hard to predict





# Seasonal Changes in Algae



**Figure 5. Seasonal Succession of Phytoplankton (Olem and Flock, 1990)**

Diatoms tend to dominate in spring and fall, with greens and blue-greens dominant during summer, but many variations are possible.

# Algae, Cyanos need Nutrients and Light to Thrive

- Lakes that have higher nutrients are more likely to have HABs
- HABs are present in low nutrient waterbodies too (Finger Lakes, Lake Placid)
- Causes not fully understood
  - Some low P systems bloom, some high P systems don't bloom
  - Interannual variability within lakes





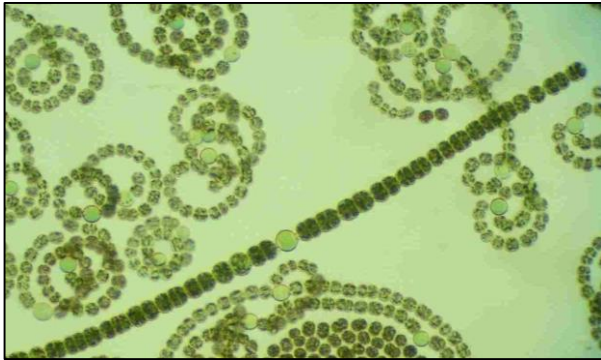
# Wild Cards Affecting HABs

1. Climate change
2. Trophic interactions
  - increased nutrient recycling
  - selective feeding by **dreissenid mussels**
3. Emerging contaminants



# Common types of Cyanobacteria

*Dolichospermum*

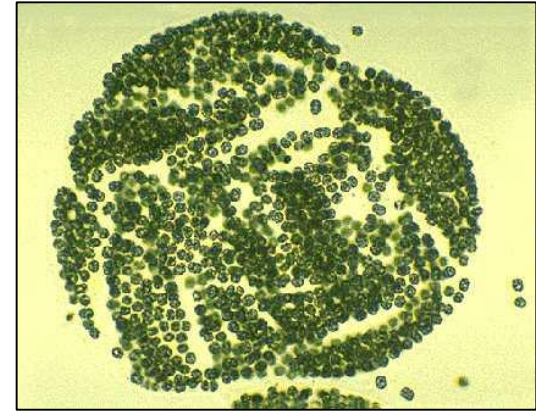


- Fixes Nitrogen
- Produces anatoxin (nerve toxin) and others

*Aphanizomenon*



*Microcystis*



- Adjusts buoyancy
- Produces microcystin (liver toxin)

# Cyanotoxins

## Microcystins (liver toxins)

- Most common toxin in New York

## Anatoxins (nerve toxins)

- Potentially fatal to dogs

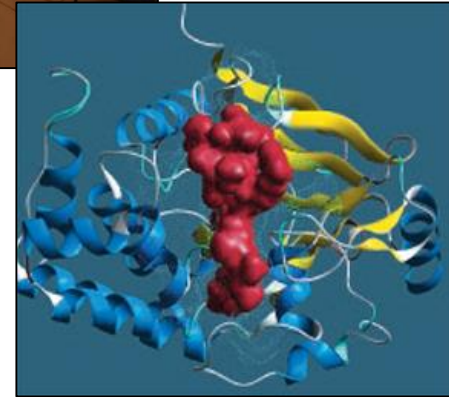
## Lipopolysaccharides (endotoxins)

- Skin irritants and allergens
- Produced by most cyanobacteria

## Other Toxins (Cylindrospermopsin, Saxitoxin, BMAA, etc.)

No visual cues that toxins are present

Sample collection is warranted



# Routes of exposure to toxins



1. Consumption: incidental swallowing, drinking water
2. Inhalation: aerosols created during household use or recreation
3. Dermal: skin contact during swimming

**Any health effects should be reported to your local health department!**



# Recognizing HABs

## NOT HABs

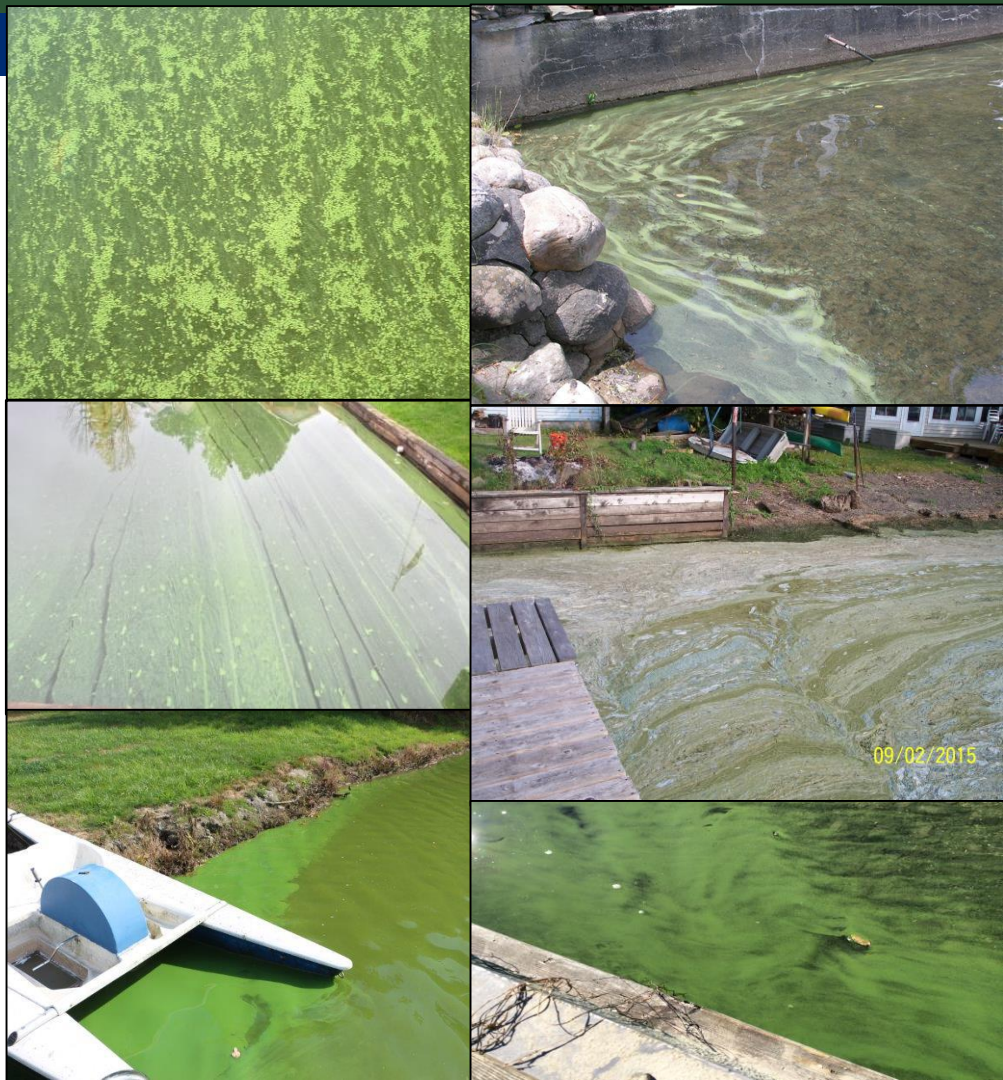
- Filamentous algae
- Floating plants (watermeal and duckweed)
- Discolored water
- Blooms of other types of algae



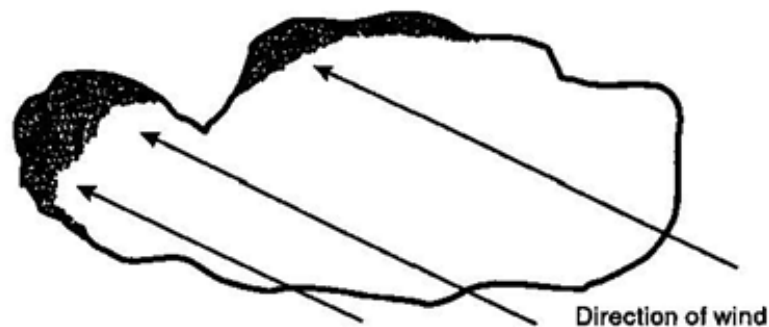
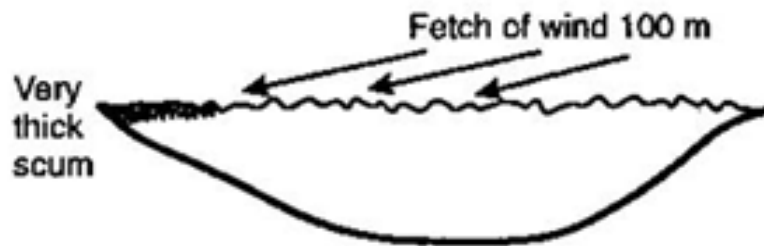
# Recognizing HABs

## PROBABLY HABs

- Floating on surface of the water
- Streaks, clumps, pea soup or spilled paint appearance
- Often bright green (or bluegreen, white-ish, or purple)







**Be careful of wind concentrated scums!**





# Cladophora



# Differences between Cladophora & HABs

## Cladophora

- Dense mats in water; often on bottom or on shore
- Not known to produce toxins
- Peaks in early summer
- Filamentous (end to end) growth

## HABs

- Floating blooms tend to stay in water, on surface
- Can produce toxins
- Peaks in late summer
- Colonial



# Cladophora



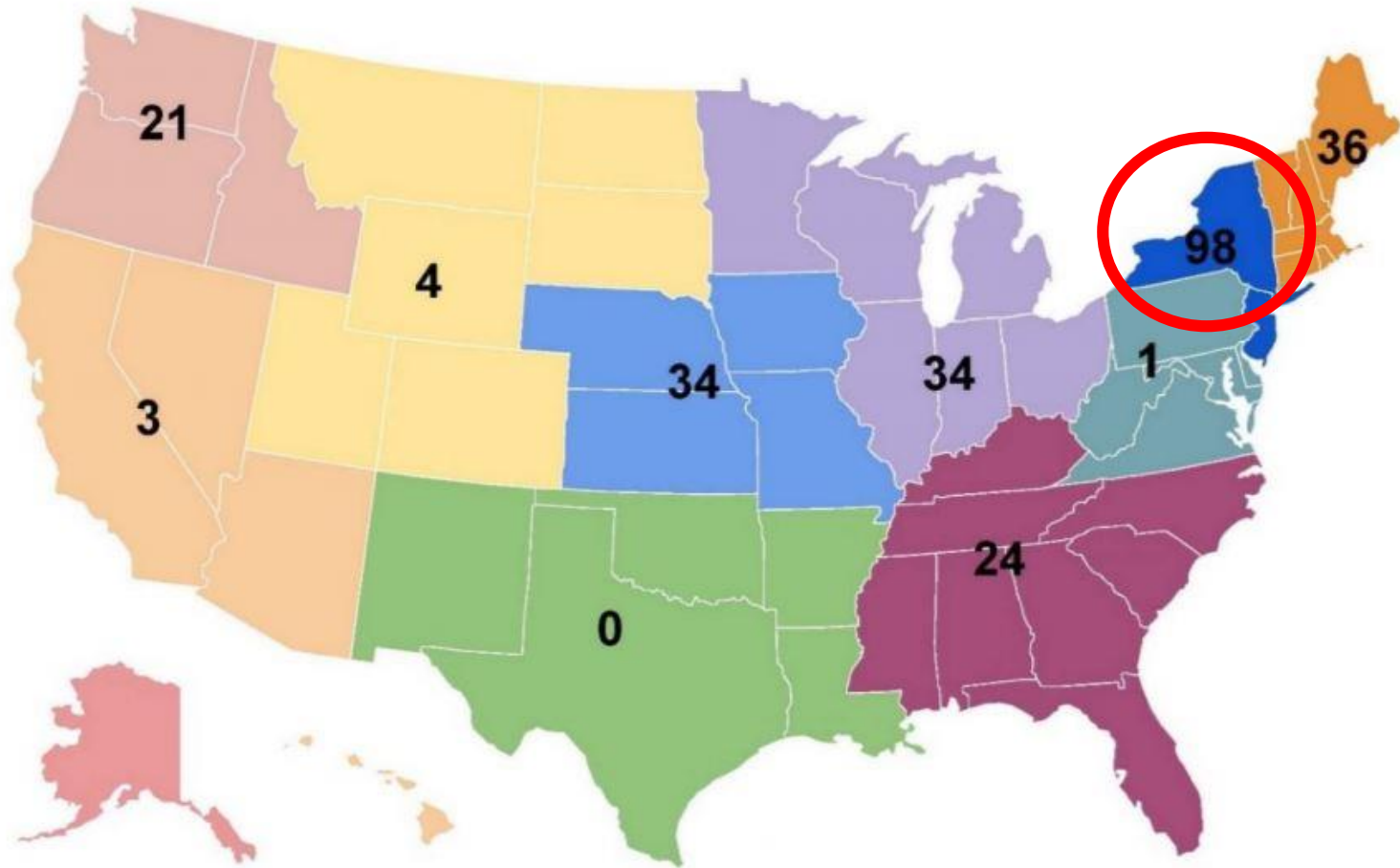


# Not just NY!





**Figure 2-2. State-reported HAB Advisories by EPA Region, January 1 to August 12, 2016**



# The Finger Lakes in 2017

- All Finger Lakes had algal blooms in 2017
- Cayuga Lake, mid-late July and September
  - over 50 reports in 72 hours
  - 3 confirmed





Even Skaneateles isn't immune to HABs



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# DEC HABs Program

What do we do?



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# The DEC HABs Program



## Surveillance/sampling

- DEC coordinates several HABs and lake monitoring programs (DEC lake monitoring, CSLAP, NYC Parks, Suffolk County, individual lakes)
- Sampling conducted mostly by trained volunteers, DEC staff
- Drinking water and regulated swimming areas (beaches) are the jurisdiction of DOH & State Parks

# The DEC HABs Program

## Bloom Status

- Determine bloom status (**Suspicious**, **Confirmed**, or **Confirmed with High Toxins**) based on surveillance (visual evidence) and sampling data

## Education

- Maintain website with HABs primer, FAQs, photo gallery and more ([on.ny.gov/hab](https://on.ny.gov/hab))
- Publish articles in DEC publications, respond to press inquiries, lake association newsletters, etc.
- Public presentations and training workshops

## Outreach

- Daily notifications sent via email to agency and county staff
- Weekly updates to website (map), social media, etc.

### Diet for a Small Lake



Prepared by the New York State Federation of Lake Associations, Inc.  
in cooperation with the New York State Department of Environmental Conservation



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### HARMFUL ALGAL BLOOMS (HABS) PROGRAM GUIDE



[www.dec.ny.gov](https://www.dec.ny.gov)



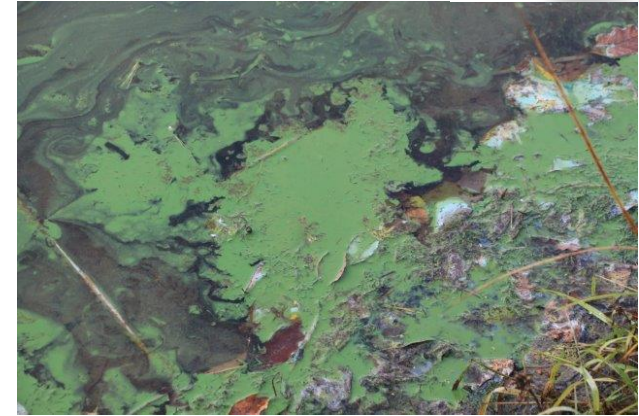
# DEC HABs Program Role



# What is measured by the labs?

- **Fluorometry** – Total chlorophyll-a
  - Blue-green algae Chl-a
  - Green algae Chl-a
  - Yellow algae Chl-a
  - Diatom Chl-a
- **Microscopy** – Visual scan, check for cyanobacteria for consistency with Fluoroprobe
- **Toxins** – Microcystin, anatoxin-a, cylindrospermopsin, BMAA

Bbe moldaenke  
FluoroProbe



# Initial Bloom Report

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Is the observer a professional or trained citizen?

No (lay person)

Yes

Has a regulated beach been closed?

Yes

Does DEC HABs Program staff determine descriptions/photos appear to be a likely cyanobacteria bloom?

No

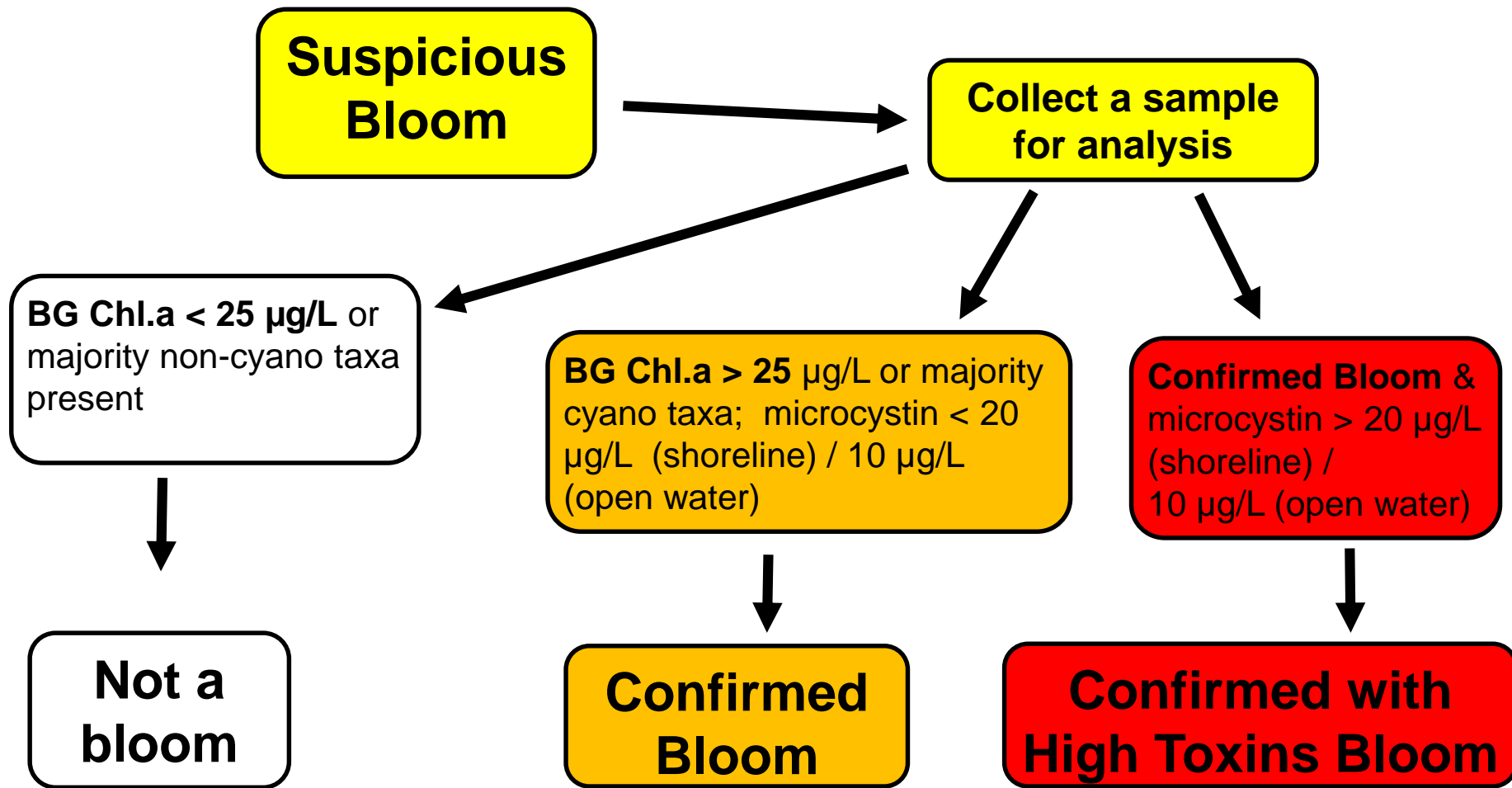
Yes

**Not a bloom**

**Suspicious Bloom**



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# The Difficulty of Sample Collection



## ***For all blooms....***

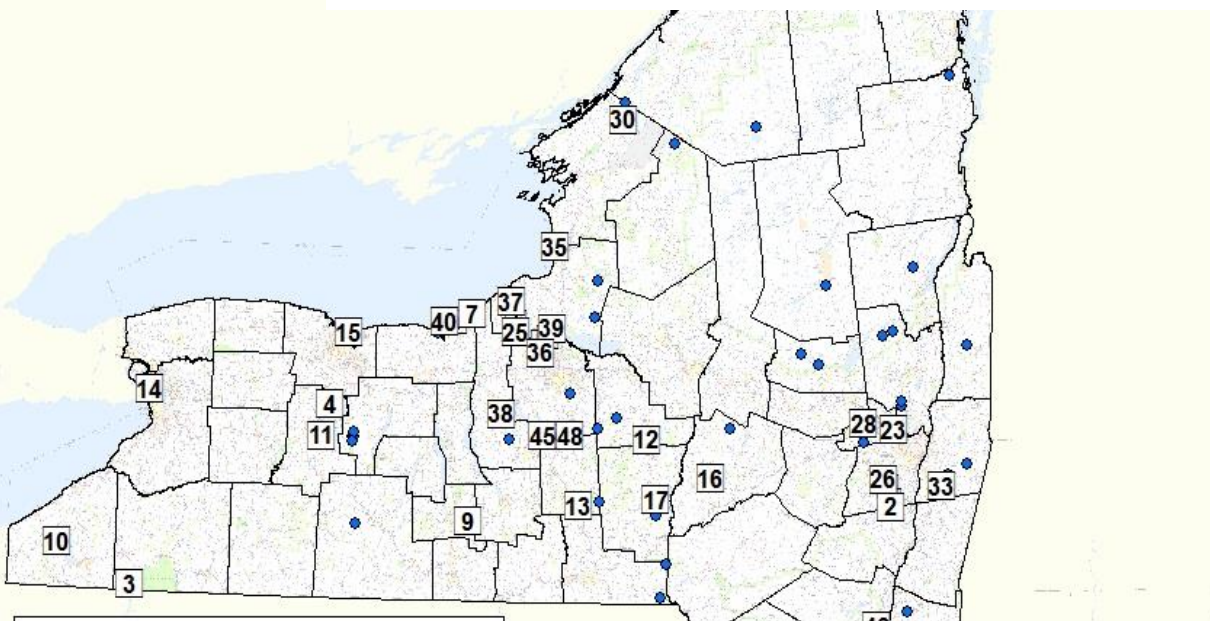
- **Avoid exposure.** Keep children and pets away from scums or discolored water
- Seek immediate medical assistance for symptoms consistent with exposure
- Report any symptoms to local/state Health Department
- Report additional and on-going blooms to DEC through digital photos, suspicious bloom form, or email drop box ([HABsInfo@dec.ny.gov](mailto:HABsInfo@dec.ny.gov))



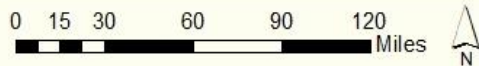


# Web notification (Fridays)

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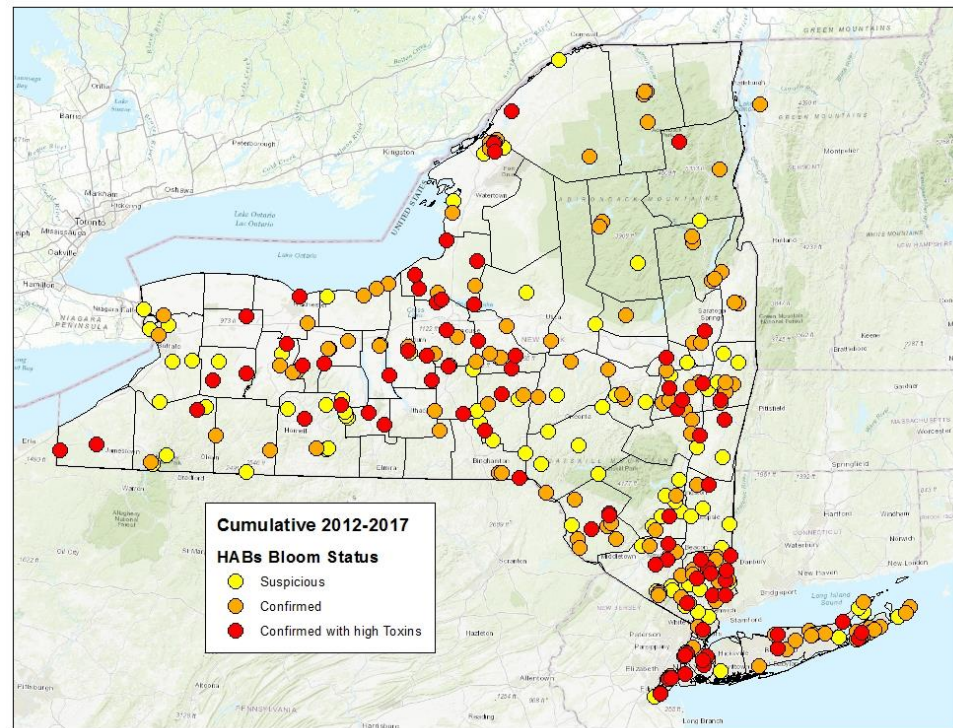
- Current HABs Locations
- 2016 DEC Lakes Monitoring Program



Map #	Waterbody Name	County	Status	Extent of bloom	Date	Type of Sample	Change in Status
1	Allegheny Reservoir	Chautauqua	Confirmed	Large localized	10/7	Lab sample	Updated listing
2	Beaver Dam Lake	Orange	Confirmed	Small localized	10/7	Lab sample	Updated listing
3	Browns Pond	Orange	Suspicious	Widespread / lakewide	10/3	Visual report	No change
4	Burden Lake	Rensselaer	Confirmed	Small localized	9/29	Lab sample	No change

# HABS in New York 2012-2017

Year	Suspicious	Confirmed	High Toxins	Total
2012	20	29	9	58
2013	17	37	22	76
2014	19	51	23	93
2015	40	62	35	137
2016	41	95	38	174
2017	45	84	36	165
<b>12-17</b>	<b>75</b>	<b>133</b>	<b>77</b>	<b>340</b>



# The role of volunteers



# What do volunteers need to do?

- Agree to survey specific zones on your lake weekly at about the same time
- Submit a report whether bloom is present or not
- If a HAB is present, take pictures and collect a sample
- Deliver forms, photos, and/or mail samples on a regular basis





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# Owasco Lake - Zone 1 - Brundage Harmful Algal Bloom Shoreline Survey Form

1. Fill out sample information above
2. Survey lakeshore:  
If no bloom is present, send form to WIP;  
If a bloom is present, collect sample  
at densest location, send sample & form to WIP
3. Show location and size of bloom on map
4. Mark an X where sample was collected

HABs



Collect a Sample

Not HABs



Do Not Collect a Sample

Sample ID#s:  Date:  Time:  Name:

Percent of Zone Surveyed (circle one): <25% 25-50% 50-75% >75%

Description of Bloom:

Extent of Bloom (check one) ☐ No Bloom Present ☐ Small Localized (few properties)  
☐ Large Localized (many properties) ☐ Widespread/lakewide

Additional Comments:





# Extent

- **No Bloom Present:** No sampling necessary, please go online and submit a No Bloom Report
- **Small Localized:** Bloom affects a small area of the waterbody, limited from one to several neighboring properties
- **Large Localized:** Bloom affects many properties within an entire cove, along a large segment of the shoreline, or in a specific region of the waterbody
- **Widespread/Lakewide:** Bloom affects the entire waterbody, a large portion of the lake, or most to all of the shoreline




# CSLAP HABs Training Video

[https://www.youtube.com/watch?v=X5os1xFd\\_3w&feature=youtu.be&list=PLnBbYubhbH1VcuHdAWmJ1WTabit2Bm417](https://www.youtube.com/watch?v=X5os1xFd_3w&feature=youtu.be&list=PLnBbYubhbH1VcuHdAWmJ1WTabit2Bm417)



# No Bloom Report

See your specific Cayuga Lake materials



**Surveillance No Bloom Report**

Use this form when to report on HABs surveillance when no sample is collected.

*\* Required*

**Your name**

Your answer

**Waterbody name \***

Your answer

**Zone Number (for Seneca and Owasco Lake HABs programs)**

Your answer

**Date \***

# Photos: What are we looking for?

- 2-3 photos when a bloom is present that capture both close up and extent of the bloom
- High quality photography
- Labeled file names
- Geolocation if your camera is capable and you know how to use it (optional)



# Wide Angle

- Show extent of the bloom
- Photograph out into the water or along the shore
- Try to show all bloom types that are present





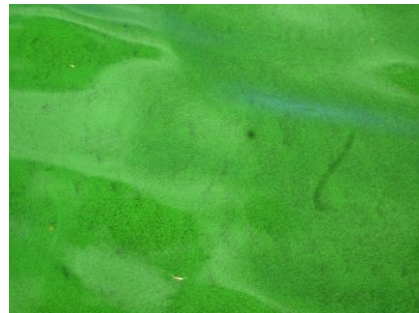
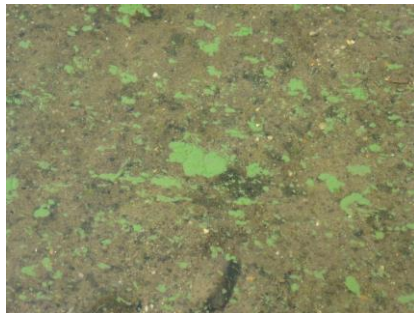
# Medium Angle

- Show location of the bloom relative to the shore or man made structures
- Take photo along shore or near docks
- Try to show proximity to areas of potential exposure

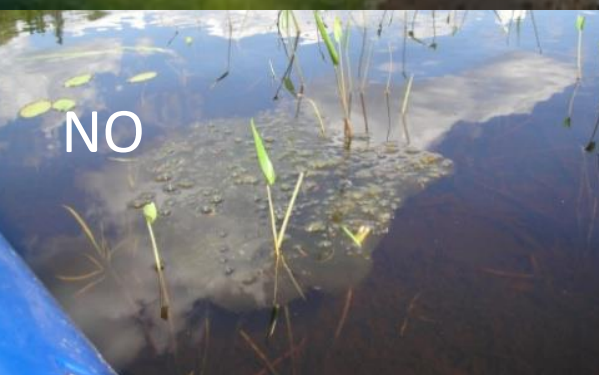


# Close Up/Top Down

- Show detail of the bloom







# Collecting a sample





# So you have a cyanobacteria bloom...

You step out to survey your zone (Zone #3405) on August 6th; you come across this.....



What should you do?

# Sampling Supplies

- Shoreline Survey Form
- Pencil or Pen
- Digital Camera
- Large (500 ml) sample bottle
- Sample Label
- Gloves



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**Owasco Lake - Zone 1 - Brundage  
Harmful Algal Bloom Shoreline Survey Form**

**Collect a Sample**

**Do Not Collect a Sample**

**HABs**

**Not HABs**

1. Fill out sample information above  
2. Survey lakeshore:  
If no bloom is present, send form to WIP;  
If a bloom is present, collect sample  
at densest location, send sample & form to WIP  
3. Show location and size of bloom on map  
4. Mark an X where sample was collected

Sample ID# \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Name \_\_\_\_\_  
Percent of Zone Surveyed (circle one): <25% 25-50% 50-75% >75%  
Description of Bloom: \_\_\_\_\_  
Extent of Bloom (check one): ☐ No Bloom Present ☐ Small Localized (few properties)  
☐ Large Localized (many properties) ☐ Widespread/Statewide  
Additional Comments: \_\_\_\_\_

0 80 160 320 480 640 Meters



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# Protect yourself

- Think: Do I suspect this is a HAB?
- If yes – **Safety First!**
- Minimize exposure, do not touch it, wear gloves
- Get out get your sample supplies and camera



# Don't Panic

- Fill out your survey form like usual
- Take several bloom photos
- Identify the densest part of the bloom in your Zone
- Collect a sample in one of your sample bottles
- **Label sample correctly**





# Label your sample

- Each Lake has a 4 digit code:

Seneca 3000

Owasco 3100

Honeoye 3200

Otisco 3300

**Cayuga 3400**

Skaneateles 3500

Canandaigua 3600

- Zones are numbered 3401, 3402, 3403, etc.
- Know Your Zone #! It is also printed on your field form

RAW WATER HABS SAMPLE

Lake Name: \_\_\_\_\_

Sample No. 18-\_\_\_\_-B1

Date \_\_/\_\_/18 Time: \_\_\_\_\_

Sampler Name: \_\_\_\_\_



RAW WATER HABS SAMPLE

Lake Name: Seneca

Sample No. 18-3005-B1

Date 8/5/18 Time: 10:00

Sampler Name: R. Honeoye



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# Label your photos too!

See your specific Cayuga  
Lake materials



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## And finally...

- Deliver ship your sample rapidly
- Email photos and field form to your point of contact
- Get a new sample bottle if you need one

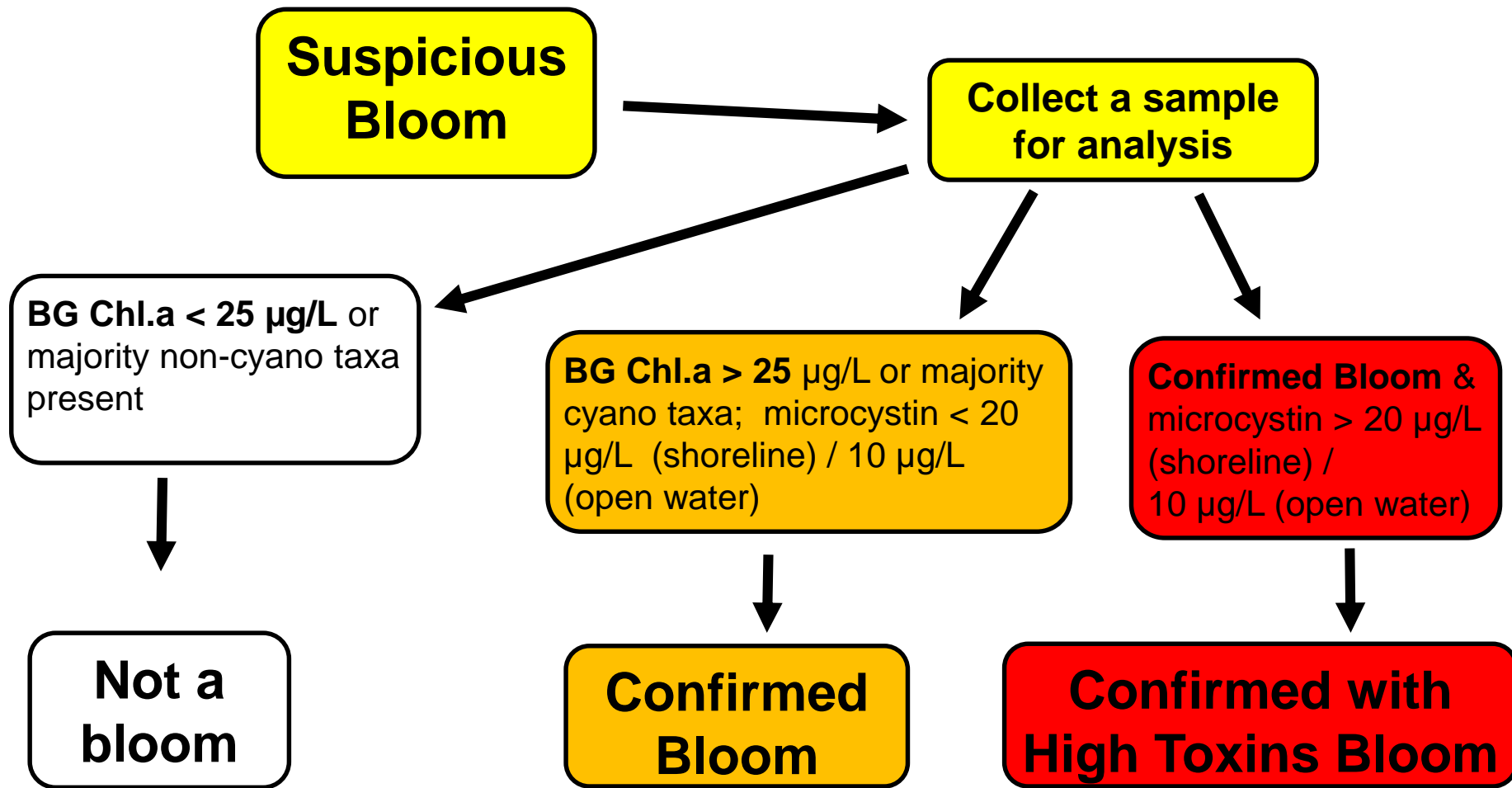


# What Happens Then?

1. Processor ships the samples to the lab
2. Within 1-2 days the lab will report to the DEC HABs Program
3. DEC HABs Program will determine bloom status







# What Happens Then?

1. Processor ships the samples to the lab
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3. DEC HABs Program will determine bloom status
4. Disseminate results to local stakeholders
5. Updates to DEC HABs Notification page



# Cayuga Lake

- 2018 Cayuga Lake HABs Volunteer Monitoring Information Packet
- [habshotline@gmail.com](mailto:habshotline@gmail.com)
- Drop samples off at the Community Science Institute  
283 Langmuir Lab, 95 Brown Rd., Ithaca, NY



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## Harmful Blue-green Algae Blooms

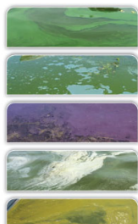
- [Blue-green Algae and Health bookmark](#) (PDF, 276KB, 2 pp.); [Blue-green Algae and Health brochure](#) is available in Portable Document Format (PDF, 533KB, 2 pp.)

Blue-green algae are microscopic organisms that can form dense blooms in surface waters. People and animals should avoid blooms because blue-green algae can cause health effects.

### Know It

It might be a blue-green algae bloom in surface water if you see:

- Strongly colored water (blue-green, green, yellow, white, brown, purple, or red).
- Paint-like appearance.
- Floating mats or scums.



### Avoid It

Always stay away from blooms in surface waters:

- Don't swim, fish, boat, or wade in areas with blooms.
- Don't eat fish caught from areas with blooms.

If you are not on a public water supply and are using surface water:

- Bloom or no bloom, never drink, prepare food, cook, or make ice with untreated surface water.
- During a bloom, don't drink, prepare food, cook, or make ice with surface water, even if you treat the water yourself. Also, consider not using it for showering, bathing, or washing.

If you are on public water:

### Report It

- Report blooms to: the [NYS Department of Environmental Conservation](#), [your local health department](#), or [harmfulalgae@health.ny.gov](mailto:harmfulalgae@health.ny.gov)
- Report blue-green algae related symptoms to: [your local health department](#) or [harmfulalgae@health.ny.gov](mailto:harmfulalgae@health.ny.gov)
- Consider visiting a healthcare provider if you, your family, or your animals are experiencing symptoms related to blue-green algae exposure. Symptoms include diarrhea, nausea, or vomiting; skin, eye, or throat irritation; and allergic reactions or breathing difficulties.

# HABs and Health



Health department email:  
[harmfulalgae@health.ny.gov](mailto:harmfulalgae@health.ny.gov)

County health departments  
[https://www.health.ny.gov/prevention/prevention\\_agenda/contact\\_list.htm](https://www.health.ny.gov/prevention/prevention_agenda/contact_list.htm)



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# Thank You/Questions

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