What’s new at the DEC HABs Program?

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Acronym time: HABs

**H**: Harmful toxins

**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
- Best in high temps, high light, high nutrients
- Gas vacuoles (moderate buoyancy)
- Fix nitrogen
Algae need Nutrients and Light to Thrive

• Lakes that have higher nutrients (are eutrophic) are more likely to have HABs
• However, present in low nutrient waterbodies too (Finger Lakes, Lake Placid)
• Causes not fully understood
Three Main Toxins

Microcystins (liver toxin)
- Impacts liver
- Most common toxin in New York

Anatoxins (nerve toxin)
- Impacts nerves
- Potentially fatal to dogs

Lipopolysacharides (endotoxins)
- Skin irritants and allergens
- Produced by most cyanobacteria

Others (Cylindropermopsin, Saxitoxins, BMAA, etc.)
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
Not just NY!

- Hamilton Reservoir, Platte River Power Authority, Fort Collins, CO
- Batesville, MI
- Lake Chao Hu, China
- Lake Mead, AZ
- Hoover Dam
DEC HABs Program
What do we do?
The DEC HABs Program

Surveillance/sampling

- Funded through EPA recurrent grant to DEC (2011-present)
- MOUs with SUNY ESF and Stony Brook for lab analyses: fluorometry (chlorophyll), microscopics & toxins
- Coordinate with sampling programs: CSLAP, LCI, NYC, Suffolk Co., Owasco, Seneca and more
- Additional sampling and reporting by DEC, DOH & OPRHP

Bloom Status

- Determine bloom status (Suspicious, Confirmed, or Confirmed with High Toxins Blooms) based on surveillance and sampling data
The DEC HABs Program

Education & Outreach

- Website with HABs primer, FAQs, photos, notifications, map, and past archive data
- Conduct presentations & trainings
- Weekly MakingWaves, Twitter, FaceBook updates
- Summary results in DEC & CSLAP reports
- **NEW!** Brochure and Program Guide
- County email lists of agency and regional staff, lake association contacts. Notifications sent with date, bloom status, photos, raw data for most blooms
Credible Report

Suspicious Bloom

Collect a sample for analysis

BG Chl.a < 25 µg/L or non-cyanobacteria majority

Not a bloom

BG Chl.a > 25 µg/L and/or cyanobacteria majority; Microcystin <10 µg/L (open water) / 20 µg/L (shoreline)

Confirmed Bloom

Confirmed Bloom + Microcystin > 10 µg/L (open water) / 20 µg/L (shoreline)

Confirmed with High Toxins Bloom
DEC HABs Bloom Status

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)
HABS in New York 2012-2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Year Suspicious</th>
<th>Year Confirmed</th>
<th>Year High Toxins</th>
<th>Year Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>20</td>
<td>29</td>
<td>9</td>
<td>58</td>
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<td>17</td>
<td>37</td>
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<td>2015</td>
<td>40</td>
<td>62</td>
<td>35</td>
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<td>2016</td>
<td>41</td>
<td>95</td>
<td>38</td>
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<tr>
<td>12-16</td>
<td>75</td>
<td>133</td>
<td>77</td>
<td>285</td>
</tr>
</tbody>
</table>
Is the problem getting worse?

- **% of Sampled Lakes with HABs**
- **Cumulative # of Waterbodies with HABs**
- **# of Waterbodies with HABs**
- **# of High Toxin Waterbodies**
New(s) for 2017

• CSLAP in all Finger Lakes, Hub in place
• Continued monitoring in NYC, Suffolk County, Owasco & Seneca Lakes
• Inaugural year for Otisco Lake
• Expanded river and stream HABs sampling
• DEC Lakes Database up and running
New(s) for 2017

- HABs continue to be a high profile issue
- Press release soon for new documents
- Expanded collaboration with Parks and DOH
So what now?

More……

- Research
- Surveillance programs
- Collaborations
- Community planning
- Education
Thank You!

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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 produce toxins
• Diverse communities of many types of algae
Algae & Fish

• Algae are a crucial part of lake food webs:
• Algae->Zooplankton->Fish
Trophic Impacts

HABs can disrupt lake food webs
Remember Cell Bio?

**Eukaryotes**
- Possess nucleus, organelles
- Most algae
- Generally bigger cells
- Highly variable

**Prokaryotes**
- No nucleus
- Cyanobacteria
- Ancient life form
- Small cells, form colonies
The bar chart shows the number of lakes with suspicious, confirmed, and high toxins over the years 2012 to 2015 and all years combined.

- **Suspicious**
  - 2012: ~20 lakes
  - 2013: ~25 lakes
  - 2014: ~30 lakes
  - 2015: ~35 lakes
  - All Years: ~50 lakes

- **Confirmed**
  - 2012: ~30 lakes
  - 2013: ~40 lakes
  - 2014: ~50 lakes
  - 2015: ~60 lakes
  - All Years: ~80 lakes

- **High Toxins**
  - 2012: ~5 lakes
  - 2013: ~15 lakes
  - 2014: ~25 lakes
  - 2015: ~35 lakes
  - All Years: ~60 lakes