

Revised Recreational Ambient Water Quality Criteria and/or Swimming Advisories (AWQC/SA) for Cyanotoxins

MD/VA HAB Task Force Meeting
February 19, 2019

John Ravenscroft



Office of Water, Office of Science and Technology,
Health and Ecological Criteria Division

Presentation Outline

- Background information on AWQC/SA
- Revising the Recreational AWQC/SA in response to public comment
- Implementation Tools for AWQC/SA

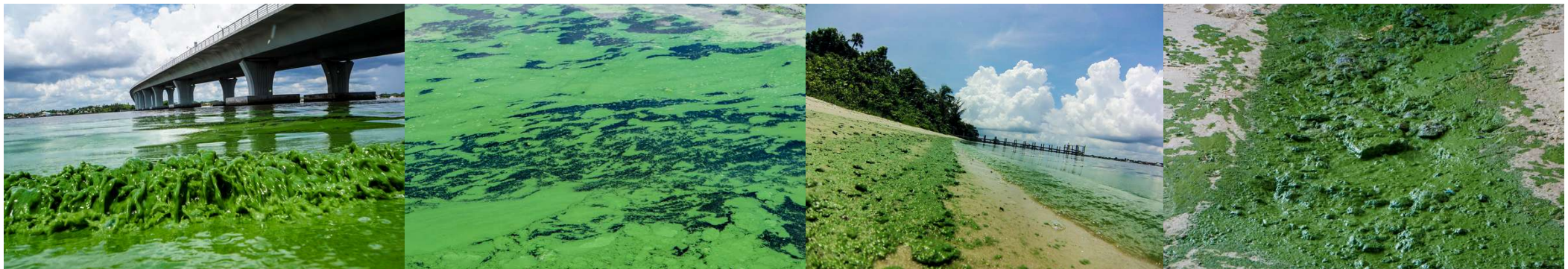


An aerial photograph of a lush green landscape. On the left, there is a large, irregularly shaped green field, possibly a golf course or a natural wetland, with varying shades of green and some darker patches. To the right of the field, a dense line of trees and shrubs separates it from a paved road. The road has a yellow curb and a single dark-colored car is visible driving away from the viewer. The overall scene is bright and clear, suggesting a sunny day.

Background Information on AWQC/SA

Development Approach

- Used peer-reviewed information to develop recommended values for microcystins and cylindrospermopsin.
- Used Agency-recommended recreational exposure values in a scenario which includes immersion and incidental ingestion of ambient water.
- Evaluated science describing health effects from exposure to cyanobacteria cells.




Development of AWQC/SA and Stakeholder Engagement

- Worked with ACWA and other stakeholders over the last several years.
- Arrived at a flexible approach for using or adopting recommended values.
- Used as either §304(a) recreational criteria or as swimming advisories, or both.
 - Adopted as WQS and approved by EPA under §303(c) and used for CWA purposes.
 - Use as basis for swimming advisories for notification purposes.



EPA's DRAFT Recreational AWQC/SA Recommendations

 **EPA** United States
Environmental
Protection Agency Office of Water
Mail Code 4304T EPA 822-P-16-002
December 2016

Human Health Recreational Ambient Water
Quality Criteria or Swimming Advisories for
Microcystins and Cylindrospermopsin

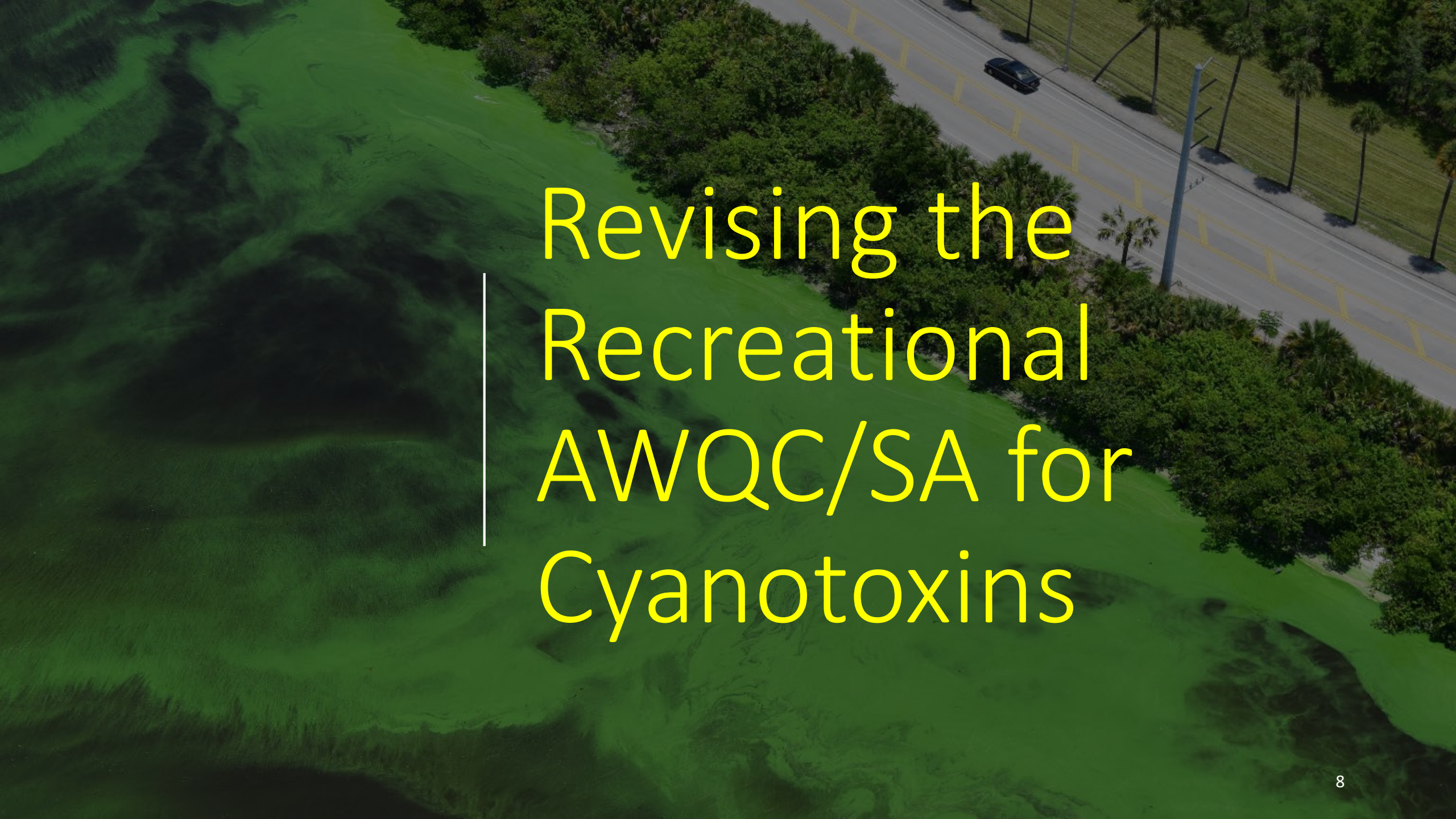
Draft

Application	Draft Recommended AWQC/SA	
	Microcystins	Cylindrospermopsin
	4 µg/L	8 µg/L
Swimming Advisory	Not to be exceeded on any day.	
Recreational Water Criteria	Not to be exceeded more than 10 percent of days per recreational season up to one calendar year.	

Draft AWQC/SA Public Comments

- Draft AWQC/SA posted for public comment in December 2016.
- Public comment period closed March 2017.
- Received comments from 52 entities: states and one tribe, industry representatives and consultants, and environmental organizations.
- AWQC/SA revised based on comments received.
- Goal: publish a final document in 2019.





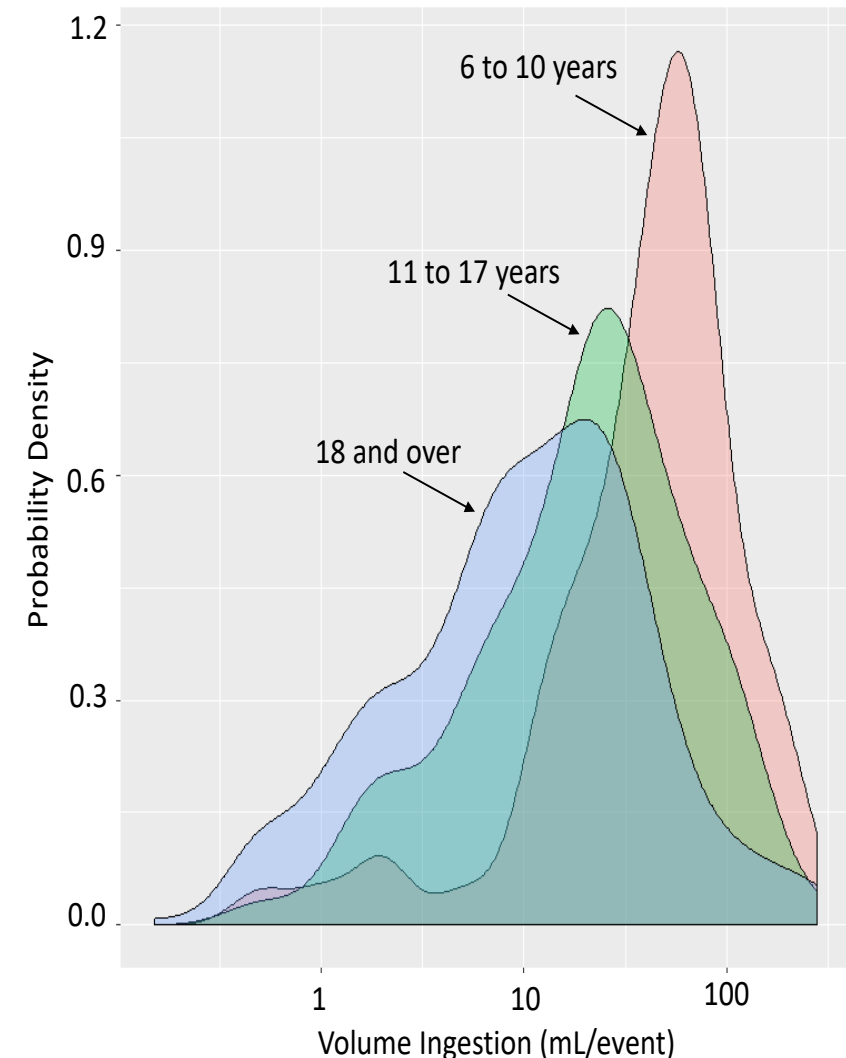
Revising the Recreational AWQC/SA for Cyanotoxins

Revision Highlights

- Major comments addressed the calculation of children's ingestion rate, and duration and frequency components.
- The document was revised to:
 - Incorporate new, more scientifically robust, children's ingestion data published in 2017. Provide additional detail on the science underpinning daily ingestion rate (L/d)
 - Revisited application of relative source contribution parameter, consistent with Guidance.
 - Revised duration and frequency recommendations.
 - Revised estimated toxigenic cell density based on updated values for microcystins.
- We added additional information and detail on toxicological studies in response to comments.

Incidental Ingestion for Age Groups

- For the draft, EPA based estimates of ingestion volume on Dufour et al, 2006, which included 53 participants. The daily ingestion rate (0.33 L/day) was the product of the 97th percentile children's incidental ingestion rate and mean exposure duration for children ages 5 to 11 years.
- Comments criticized the conservatism of the incidental ingestion rate and the limited number of people that participated in the Dufour et al., 2006 study.
- Dufour et al., 2017 was published after the release of the draft and is a more scientifically robust study, including 548 participants, breaking them into additional age groups, and recording the duration of exposure.
- In the revised, EPA combined two distributions: incidental ingestion volumes based on Dufour et al. (2017) and exposure durations from EPA's (1997) *Exposure Factors Handbook*. The 90th percentile of the *combined* distribution is the basis for the exposure parameter, consistent with EPA's Human Health Methodology (EPA, 2000). The revised ingestion rate for children 6 to 10 is reduced to 0.21 L/d.



Relative Source Contribution (RSC)

- For the draft, EPA used an RSC of 0.8. In deriving this value, EPA estimated that incidentally ingested water was the dominant source of exposure to cyanotoxins resulting from primary contact recreation.
- While many agreed with EPA's selection of this parameter, others pointed out that recreational criteria developed by EPA previously have not considered other sources of toxins, such as drinking water or fish consumption.
- EPA decided to not include an RSC in the derivation of the recommended magnitude in this revision, consistent with derivation of other recreational criteria. However, other sources are acknowledged.
- Not including an RSC is also consistent with the health effects based on short-term exposure.

Duration and Frequency of the AWQC

- For the draft, EPA recommended that criteria not be exceeded more than 10 percent of days per recreational season up to one calendar year. This recommendation was consistent with the 2012 recreational criteria developed for enterococci and *E. coli*.
- Commenters requested EPA provide additional scientific rationale and health relevancy for the recommendation
- EPA reconsidered the frequency and duration components of the criteria and agreed to align the duration component with the 10-day Health Advisory, and to take into consideration seasonal HAB occurrence characteristics such as length of event and severity of occurrence.
 - EPA recommends that the number of years that a pattern of HAB formation occurs that results in impairment of the recreational use is a risk management decision that EPA expects states to define in their water quality standards.

Cyanobacterial Cells Characterization

- The draft provided a summary of available information on health effects associated with cyanobacterial cells, but did not derive criteria associated with cell density due to data uncertainties. It includes:
 - tables of cell density guidelines used by states, countries and international organizations,
 - information available demonstrating a link between total cyanobacterial cell exposure and inflammatory illness,
 - toxigenic cell density of 20,000 cells/mL based on the Draft recommended AWQC/SA for microcystins
- In comments many states indicated they use cell density to manage water quality. Commenters, emphasized the importance of characterizing the inflammatory effects resulting from exposure to cells. They also indicated the importance of having information about adverse effects related to cell density in this document.
- In the revised document the estimate of toxigenic cell density was revised to reflect the updated recommended AWQC/SA for microcystins. As a result, the concentration of toxigenic microcystin-producing cells increased to 40,000 cells/mL.



Implementation Tools for Cyanotoxins in Recreational Waters



Monitoring and Responding to Cyanobacteria and Cyanotoxins in Recreational Waters

A compilation of web materials, useful documents and links posted in July 2017.

- *Main Page:*
 - *Basic info on cyanotoxins and cyanobacteria*
 - *Many links to state/local government documents, NOAA, CDC, WHO sites*
- *Monitoring Document*
 - *Information on setting up a monitoring program and prioritizing waters, recommendations for notifying the public, considerations for methods*
- *Communication Toolbox*
 - *FAQs, social media template and press release templates, Cyanobacteria Bloom Response Contact List and notification signage examples*



Additional Implementation Tools in Development

- *In conjunction with finalization of the cyanotoxin criteria/advisory document, provide additional implementation support materials*
 - *FAQs for assessment/listing/TMDLs/NPDES permits in recreational waters*
 - *Adoption and implementation flexibilities for criteria*
- *Expected summer 2019*

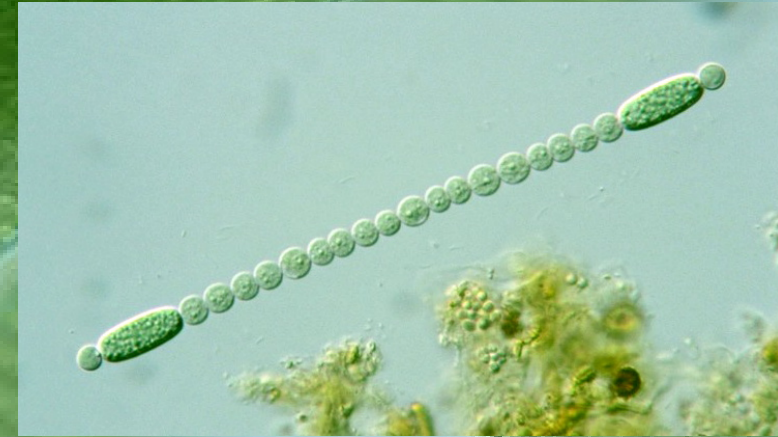
Contact Information:

John Ravenscroft
202-566-1101

ravenscroft.john@epa.gov

John Healey
(202) 566-0447

healey.john@epa.gov

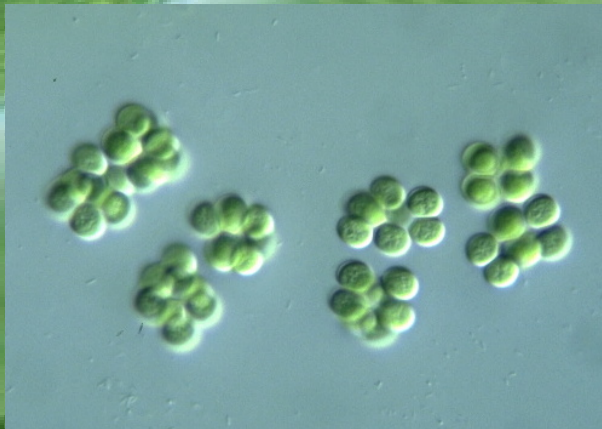


Lesley D'Anglada
202-566-1125

Danglada.lesley@epa.gov

EPA's CyanoHABs Website

www.epa.gov/cyanohabs





Conceptual Model of Cyanotoxin and Cyanobacteria Exposure Pathways While Recreating

