AGENDA ITEM 3
OPEN DISCUSSION & ANNOUNCEMENTS

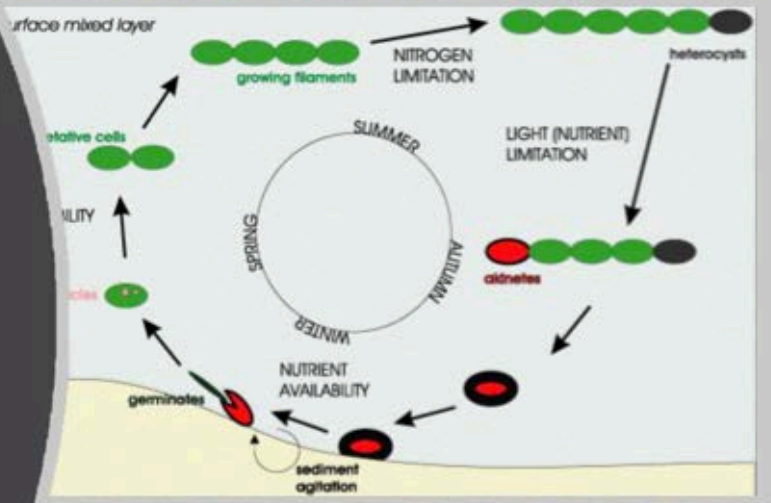
OUTLINE OF TOPICS

- CyanoSED: A Workshop on Benthic Cyanobacteria and Cyanotoxins – Overview and Objectives
- Special Issue in the Open Access Journal *TOXINS*
- 1st Cyanobacteria Twitter Conference
- Journal Publications
- Upcoming HAB Meetings
- EPA FHAB Newsletter
- 2019 Benthic HABs Presentations – Call for Presenters

File Name

CyanoSED: A Workshop on Benthic Cyanobacteria and Cyanotoxins

Overview and Objectives



Kaytee Pokrzywinski, Tim Davis, Susie Wood, Jim Lazorchak, Brooke Stevens, Jonathan Puddick, Andrew McQueen, Karen Keil, Mike Habberfield

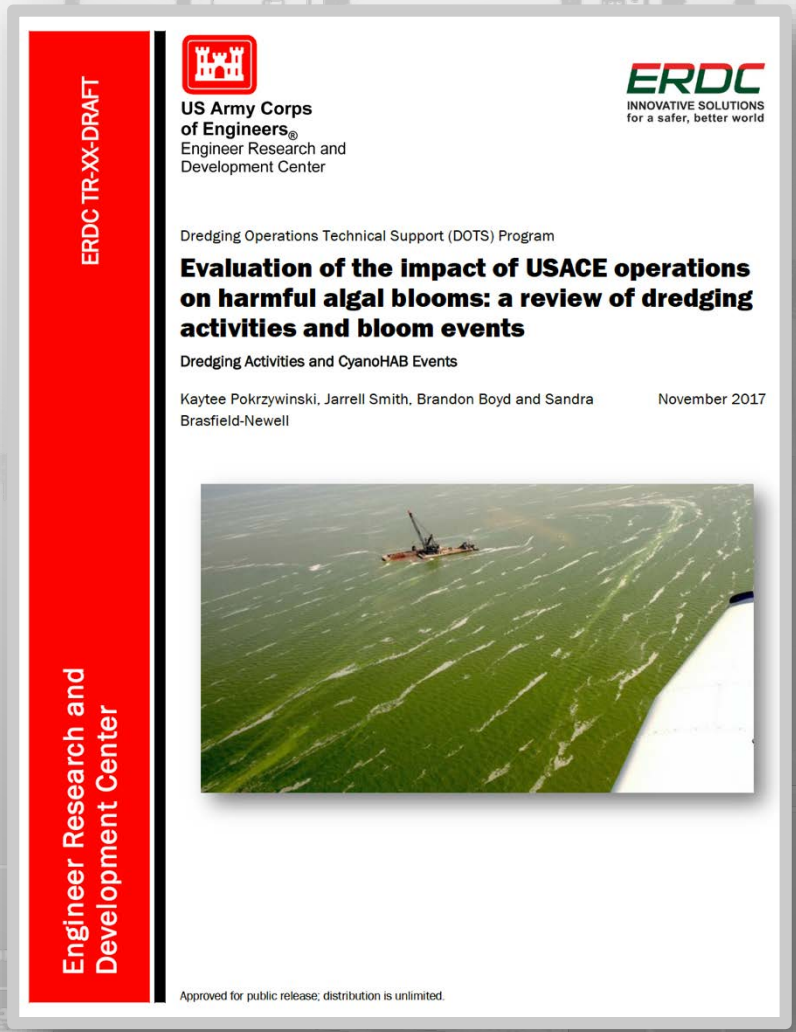
USACE-ERDC, BGSU, Cawthron Institute, US EPA
and USACE-LRB

US Army Corps of Engineers

ERDC ENGINEER RESEARCH & DEVELOPMENT CENTER

Purpose and Inspiration

- The primary purpose of the workshop is to identify knowledge gaps and prioritize research needs on issues surrounding '**benthic cyanobacteria**'.
- Two ERDC reports funded by our Dredging Operational Technical Support Program (DOTS)



ERDC TR-XX-DRAFT

Engineer Research and Development Center

US Army Corps of Engineers®
Engineer Research and Development Center

ERDC
INNOVATIVE SOLUTIONS for a safer, better world

Dredging Operations Technical Support (DOTS) Program

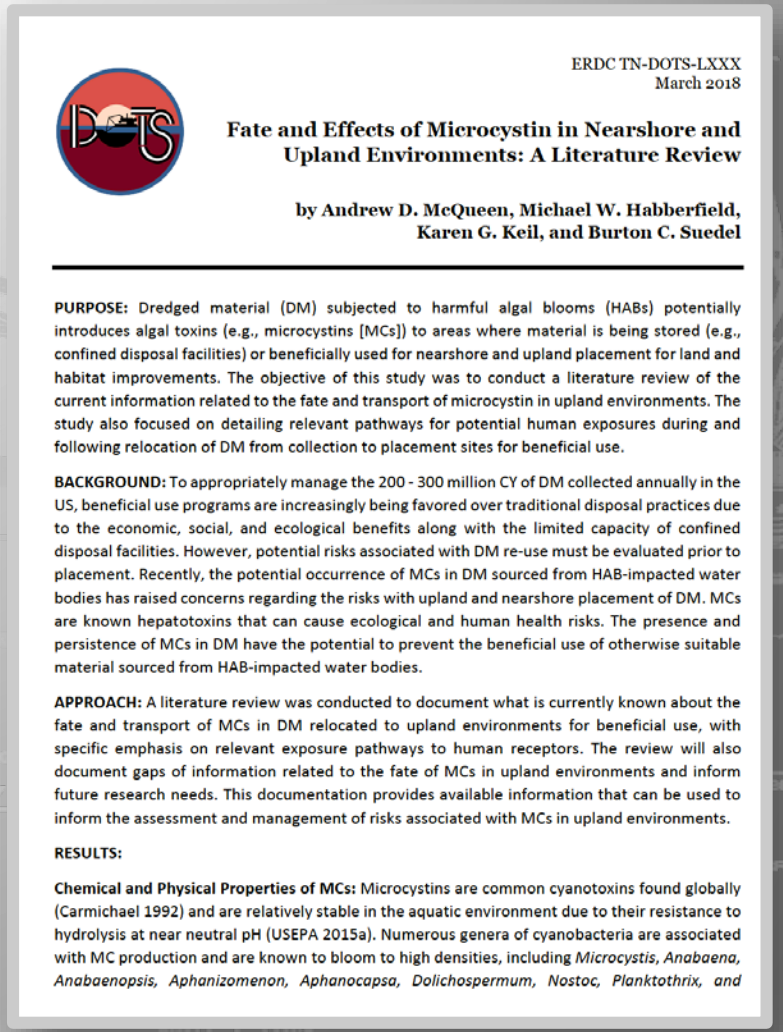
Evaluation of the impact of USACE operations on harmful algal blooms: a review of dredging activities and bloom events

Dredging Activities and CyanoHAB Events

Kaytee Pokrzywinski, Jarrell Smith, Brandon Boyd and Sandra Brasfield-Newell

November 2017

Approved for public release; distribution is unlimited.



ERDC TN-DOTS-LXXX
March 2018

Fate and Effects of Microcystin in Nearshore and Upland Environments: A Literature Review

by Andrew D. McQueen, Michael W. Habberfield, Karen G. Keil, and Burton C. Suedel

PURPOSE: Dredged material (DM) subjected to harmful algal blooms (HABs) potentially introduces algal toxins (e.g., microcystins [MCs]) to areas where material is being stored (e.g., confined disposal facilities) or beneficially used for nearshore and upland placement for land and habitat improvements. The objective of this study was to conduct a literature review of the current information related to the fate and transport of microcystin in upland environments. The study also focused on detailing relevant pathways for potential human exposures during and following relocation of DM from collection to placement sites for beneficial use.

BACKGROUND: To appropriately manage the 200 - 300 million CY of DM collected annually in the US, beneficial use programs are increasingly being favored over traditional disposal practices due to the economic, social, and ecological benefits along with the limited capacity of confined disposal facilities. However, potential risks associated with DM re-use must be evaluated prior to placement. Recently, the potential occurrence of MCs in DM sourced from HAB-impacted water bodies has raised concerns regarding the risks with upland and nearshore placement of DM. MCs are known hepatotoxins that can cause ecological and human health risks. The presence and persistence of MCs in DM have the potential to prevent the beneficial use of otherwise suitable material sourced from HAB-impacted water bodies.

APPROACH: A literature review was conducted to document what is currently known about the fate and transport of MCs in DM relocated to upland environments for beneficial use, with specific emphasis on relevant exposure pathways to human receptors. The review will also document gaps of information related to the fate of MCs in upland environments and inform future research needs. This documentation provides available information that can be used to inform the assessment and management of risks associated with MCs in upland environments.

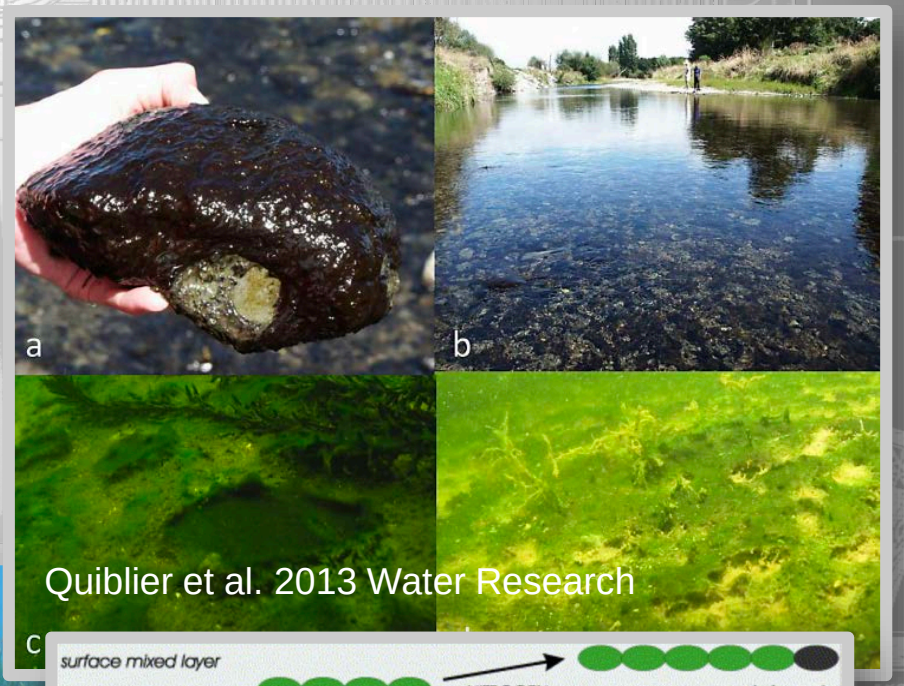
RESULTS:

Chemical and Physical Properties of MCs: Microcystins are common cyanotoxins found globally (Carmichael 1992) and are relatively stable in the aquatic environment due to their resistance to hydrolysis at near neutral pH (USEPA 2015a). Numerous genera of cyanobacteria are associated with MC production and are known to bloom to high densities, including *Microcystis, Anabaena, Anabaenopsis, Aphanizomenon, Aphanocapsa, Dolichospermum, Nostoc, Planktothrix, and*

Context

- What do we mean by benthic cyanobacteria?
  - In, on or near sediment or other ‘substrate’
  - Planktonic vs periphytic (mats, films)
  - Filamentous vs single celled
  - Toxic vs nuisance
  - Lakes vs rivers
  - Benthic-pelagic coupling

CyanoSED
Cyanobacteria + Sediment…
in any conformation or condition



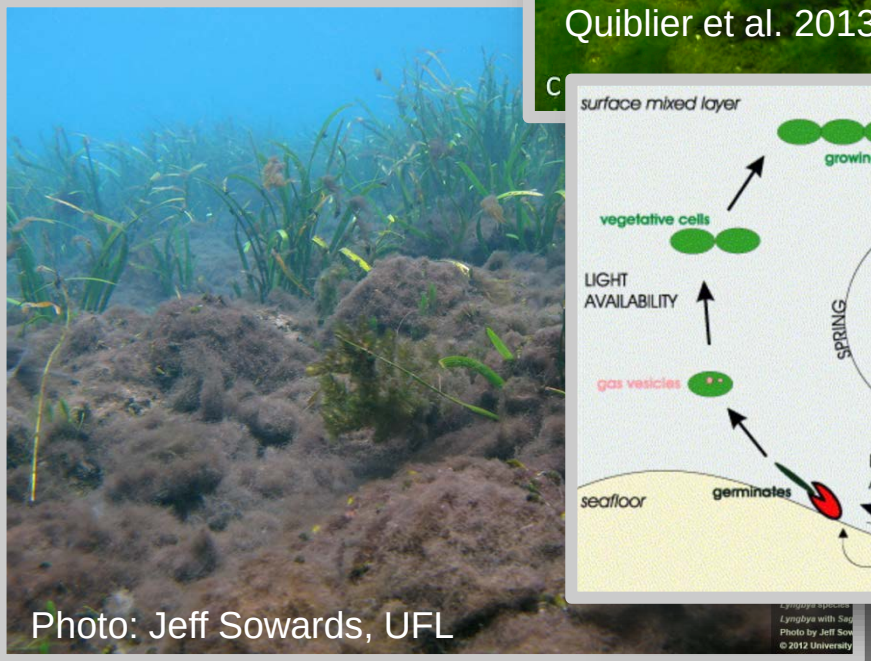
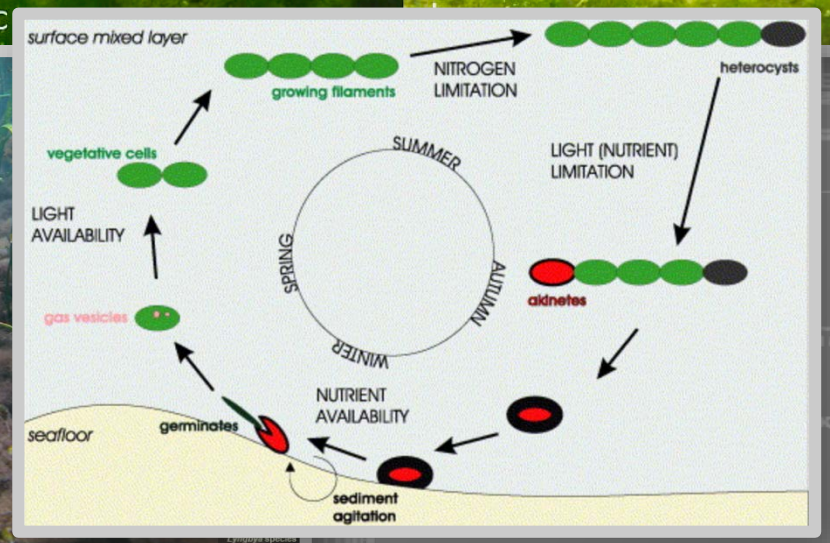


Photo: Jeff Sowards, UFL



Hense & Beckman 2006
Ecological modeling

Workshop Objectives

- **Understand current research** in benthic/sediment-associated HABs.
- **Identify knowledge gaps** and topic areas worth pursing in more detail.
- **Facilitate engagement** among federal, local and state government agencies; non-profit organizations; academic institutions; and industry partners
- Effectively **disseminate workshop results** by facilitating publication of research priorities and detailed key discussions developed through this workshop.

Workshop Structure

- Invited presentations from, followed by roundtable discussions.
- 4 sessions
  - *Monday Morning: Ecology in lakes and rivers*
  - *Monday Afternoon: Tracking and monitoring cells and toxins*
  - *Tuesday Morning: Methods for benthic cyanotoxin detection and research gaps*
  - *Tuesday Afternoon: Fate and transport of benthic cyanobacteria/toxins and their environmental and human health risks*
- 3-4, 20 min presentations – Auditorium
- Small group discussions – Rooms 120, 126, 130 and 138
- Special presentations on topics related to benthic cyanobacteria including working groups and hot topics/technological advances

There will be breaks! Sponsored by Lonza and AERF

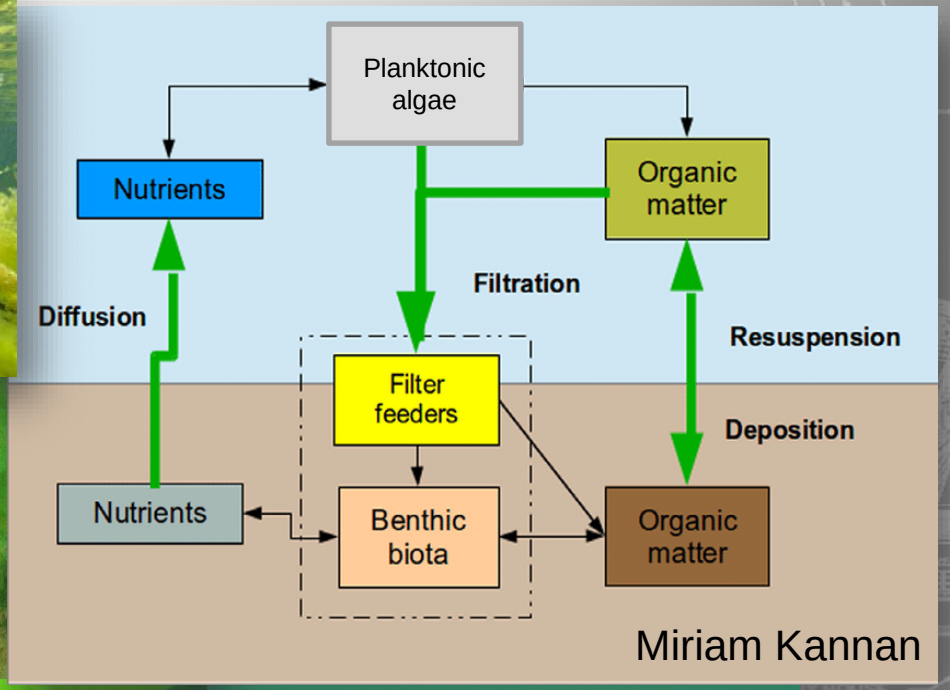
Ecology of periphytic and planktonic cyanobacteria in Lakes and Rivers

- ***Benthic cyanobacteria and toxin production in New Zealand***

  Susie Wood, Cawthron Institute
- ***Tipping towards toxicity: cyanobacteria in California rivers***

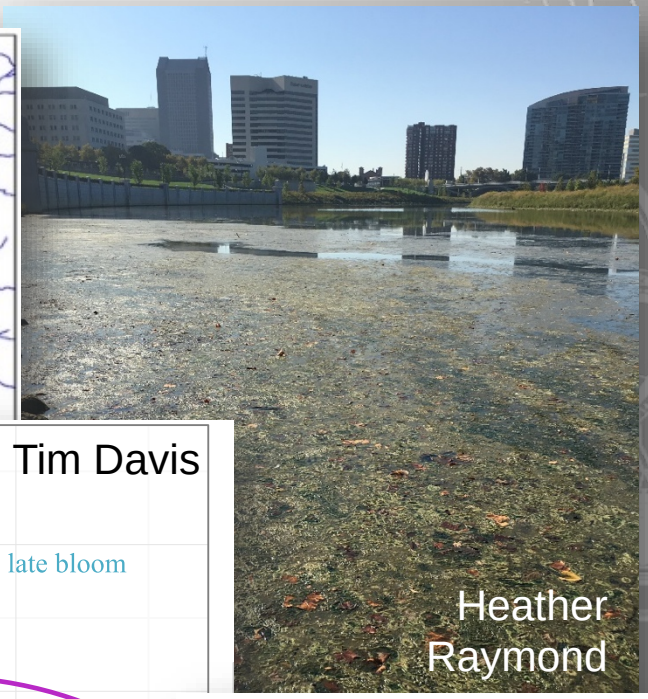
  Keith Bouma-Gregson, UC Berkeley
- ***Ecology of planktonic river/lake cyanobacteria***

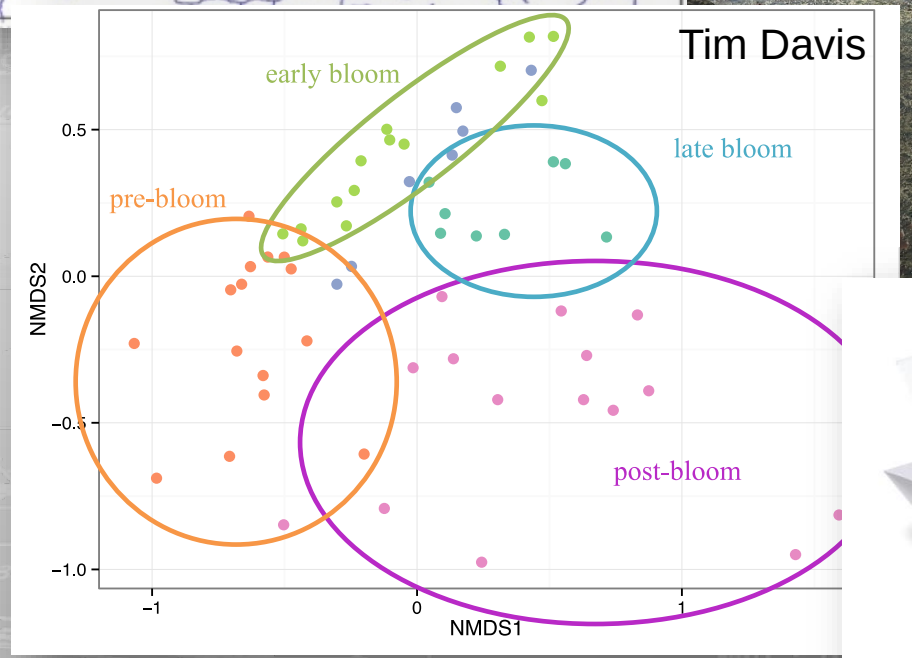
  Miriam Kannan, NKU

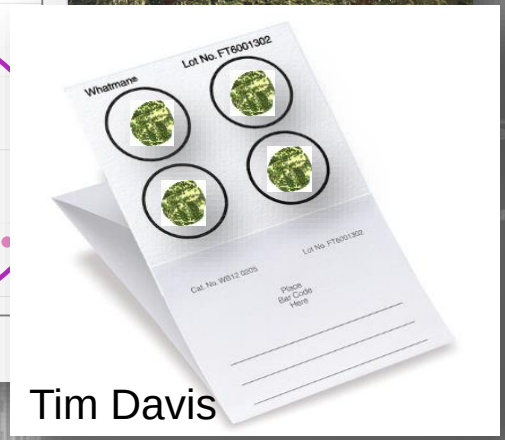


Tracking and monitoring cyanobacteria and cyanotoxins

- ***Ohio HAB monitoring and emerging benthic HAB issues***
  Heather Raymond, OH EPA
- ***Cyanobacteria in sediments of Harsha lake***
  Alan Lindquist & Jingrang Ju, US EPA
- ***Monitoring cyanoHABs and their toxins***
  Tim Davis, BGSU

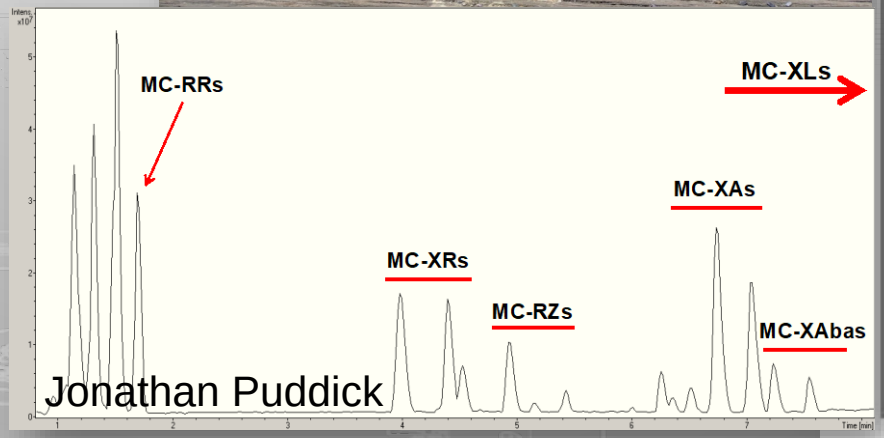


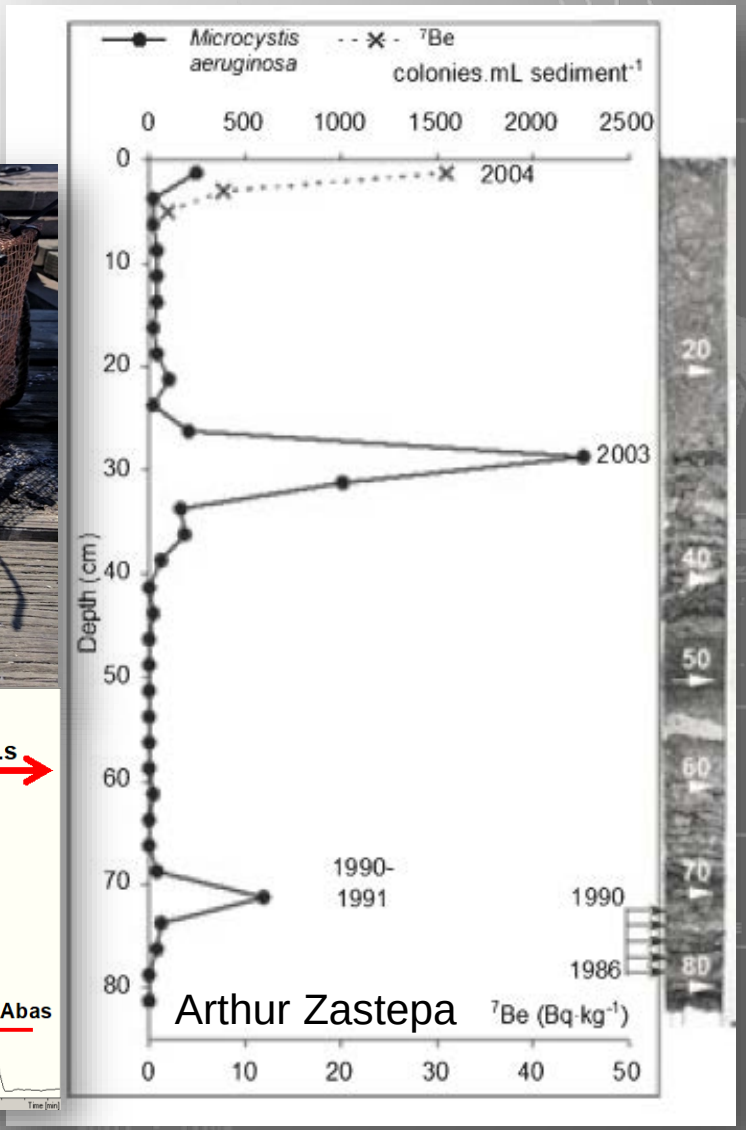




Identification and toxicity of cyanotoxins in complex matrices

- ***Analysis of cyanotoxins in NZ and the minimization of sample handling artifacts***
  Jonathan Puddick, Cawthron Institute
- ***Monitoring multiple HAB toxins across the freshwater-marine continuum using SPATT samplers***
  Meredith Howard, SCCWRP
- ***Fate and quantitation of cyanotoxins in lake sediments***
  Arthur Zastepa, Environment and Climate Change Canada





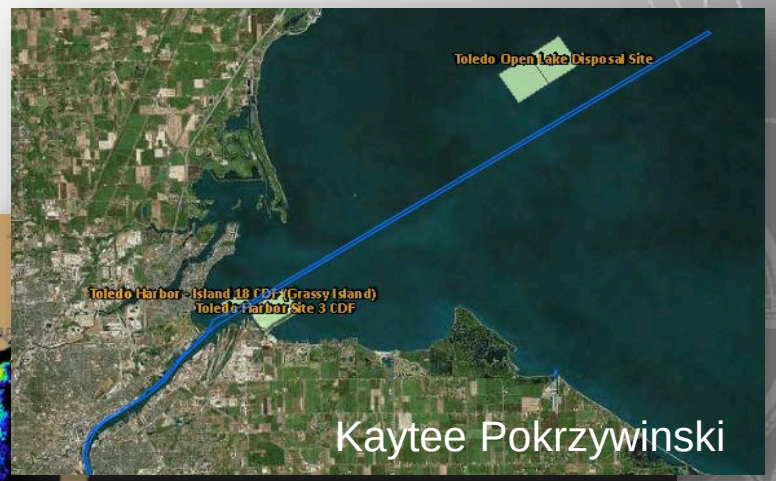
Fate and transport of benthic cyanobacteria and cyanotoxins

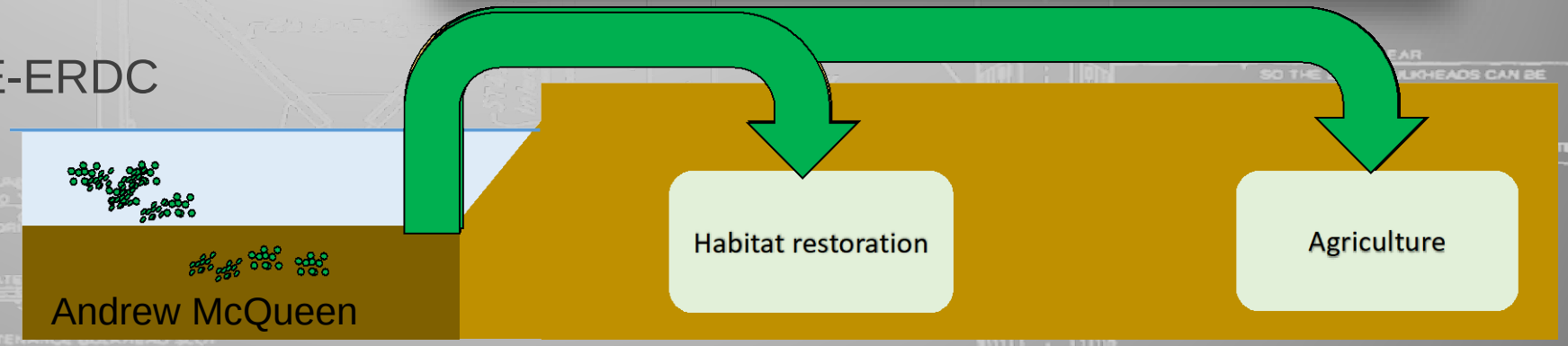
- ***A review of USACE dredging activities and HAB events***

  Kaytee Pokrzywinski, USACE-ERDC
- ***Experimental Lake Erie HAB forecast***

  Mark Rowe, GLERL
- ***Fate and transport of cyanotoxins: microcystin case study***

  Andrew Mcqueen, USACE-ERDC





Products

- Ranked research priorities targeted to bridge gaps between R&D and resource management.
- Workshop summary report and/or publication detailing key discussions and ranked research priorities.

Special issue in open access journal toxins

"Potentially Toxic Benthic Microorganisms in Freshwater and Marine Ecosystems"

Guest Editor Dr. Philipp Hess (Ifremer, France)
Guest Editor Dr. Jean-Francois Humbert (Sorbonne University, France)

Reason: To increase the knowledge needed by scientists, ecosystem managers and other stakeholders to better comprehend the ecology and toxicity of benthic cyanobacteria and microalgae and to limit the health risks associated with their proliferations.

Goal: To gather the most recent research on benthic cyanobacteria and microalgae proliferating in marine and freshwater ecosystems and on their toxins.

Inclusion: All papers on taxonomy, genetic diversity, ecology and toxicity of biofilms dominated by potentially-toxic cyanobacteria and microalgae and on risk assessment and management associated with such assemblages will be considered.

DEADLINE ON SUBMISSIONS: 31 AUGUST 2019 Papers published as soon as they are accepted following peer-review

For information on manuscript submission, go to:
HTTPS://WWW.MDPI.COM/JOURNAL/TOXINS/SPECIAL_ISSUES/BENTHIC_ECOSYSTEMS#EDITORS

Cyanobacteria Twitter Conference 2018
24 October 2018
3:00 PM PDT, 6:00 PM EST

On the International Day of Climate Action, the Australian Rivers Institute, Griffith University, Australia is hosting the 1st online Cyanobacteria Twitter Conference with a focus on climate change effects on cyanobacteria blooms and its management.

Objectives include:

- Keep abreast of research developments and impacts
- Strengthen our group network using online social media platforms
- Identify new opportunities for collaboration
- Provide outreach and engagement on cyanobacteria to a broad audience

TAGS

algae analysis Antarctic Aquatic Ecology Australia Belgium biodiversity biomonitoring biotoxins Bloom BMAA book China climate change conference COST Action cultures cyanobacteria CYANOCOST CYANONEWS cyanotoxins cylindrospermopsin Czech Republic decision support tool drinking water Ecology Europe France freshwater genetic engineering Germany Great Lakes HABs health Horizon 2020 ICHA2018 Ireland Italy lakes Management marine metagenomics microalgae Microcystins Molecular tools monitoring Nantes natural toxins neurotoxins Newsletter Norway Omics PhD PhD position photosynthesis Poland postdoc research papers Serbia Spain special issue sponges statistcal model Summer School Sweden Taxonomy toxic Toxins UK USA US EPA water quality webinar Wiley workshop

To participate, go to:

https://www.griffith.edu.au/__data/assets/pdf_file/0020/515405/cyanoTC2018_Twitter.pdf

#cyanoTC2018

JOURNAL PUBLICATIONS

Widespread anatoxin-a detection in benthic cyanobacterial mats throughout a river network
Keith Bouma-Gregson, Raphe Kudela and Mary Power; PLoS ONE 13(5) May 2018
https://doi.org/10.1371/journal.pone.0197669

ADDED:

Extracts from benthic anatoxin-producing Phormidium are toxic to three macroinvertebrate taxa at environmentally relevant concentrations: Cyanobacteria toxicity to three invertebrates

Brian Anderson, Jennifer Voorhees, Bryn Phillips, Rich Fadness, Rosalina Stancheva, Jeanette Nichols, Daniel Orr, Susanna A. Wood; Environ Toxicol Chem 2018.

READ ONLY version available at: https://rdcu.be/70rB

Others?

UPCOMING CYANOHAB MEETINGS

- **18th International Conference on Harmful Algae (ICHA) 2018** Nantes, France October 21-26, 2018 https://www.icha2018.com/
- **20th International Conference on Cyanobacteriology and Cyanobacteria Research** Barcelona, Spain October 29-30, 2018 https://waset.org/conference/2018/10/barcelona/ICCCR
- **38th International Symposium of the North American Lake Management Society (NALMS) 2018** Cincinnati, OH October 30 – November 2, 2018 https://www.nalms.org/nalms2018/
- **39th Annual Meeting Society of Environmental Toxicology and Chemistry [ADDED]** Sacramento, CA November 4-8, 2018 https://sacramento.setac.org/
- **National Water Quality Monitoring Council (NWQMC) Webinar HABs Detection** November 28, 2018 at 3:00 PM EST https://acwi.gov/monitoring/webinars/index.html
- **Health and Climate Change: 1st Scientific Symposium (ISS)** Rome December 3-5, 2018 https://healthclimate2018.iss.it/
- **11th International Conference on Toxic Cyanobacteria (ICTC11**) Krakow, Poland May 5-10, 2019 Theme "Learning from the past to predict the future" http://ictc11.org/

EPA FHAB NEWSLETTER

Dr. Lesley D'Anglada (U.S. EPA)

- Monthly newsletter on freshwater HABs
- News & upcoming events
- Health Advisories
- Recently Published articles

To sign up, send email to: EPACyanoHABs@epa.gov

EPA United States Environmental Protection Agency

September 2018

Freshwater HABs Newsletter

Lake Discovery, RTP, NC, September 13, 2018
Algae (green), Anabaena (red), Microcystis (gray-red). From Dr. Zucker, NHEERL, EPA

City of Salem Water Advisory After-Action Assessment Final Report

On September 14, the City of Salem published an After-Action Assessment report conducted by an independent company regarding the City of Salem's 2018 Drinking Water Advisory for cyanotoxins from May to July. The report lays out a timeline of what happened during the event as well as an assessment of what worked well, what did not, and lessons learned. The reports highlight the great work done by the City staff to protect public health and identified the areas that need improving such as deficiencies in communication, and the lack of action plans in responding to an emergency. The City is taking this report as an opportunity to learn from its response and to take steps to ensure that it is better prepared to handle future events.

UPCOMING EVENTS

18th ICHA
October 21-26, 2018
Nantes, France

Cyanobacteria Twitter Conference - #cyanoTC2018
October 24, 2018, 6:00pm EST

NALMS 2018
October 30 – Nov. 2, 2018
Cincinnati, Ohio

NWTOMC Webinar HABs Detection
November 28, 2018
3:00 pm EST

Cyanobacteria Assessment Network (CyAN) Annual Science Meeting

From September 26-28, CyAN, a multi-agency project among NASA, NOAA, USGS, and EPA to develop an early warning indicator system using historical and current satellite data to detect algal blooms in U.S. freshwater systems, hosted an annual reporting and planning meeting in RTP, NC. The meeting focused on the transition from the NASA Ocean Biology Program to the NASA Applied Sciences Program, and to review and discuss FY18 work, and plans for work to be done during FY19. Representatives from EPA Regional Offices and Office of Water participated and provided summary reports on use of CyAN data and future plans of use. For more information on CyAN please visit the CyAN website here.

In situ data (e.g. cyanobacteria counts) is used for the evaluation, validation, and refinement of the remote-sensing algorithm on multiple spatial and temporal scales. If you are interested in collaborating or want to learn more, please send an email to ClydWilliam.gov

Important Links

- Congressional Research Service Report: Freshwater Harmful Algal Blooms: Causes, Challenges and Policy Considerations
- OCEAN.US Article: *The Recipe for a Harmful Algal Bloom*
- ENVIRONMENTAL MONITOR Article: Water-Filter Pitchers Not Equally Effective at Removing Microcystins
- OAPP: Prevalence and Persistence of Cyanotoxins in Lakes of the Puget Sound Basin
- Scientists Uncover Genetic Basis for Toxic Algal Blooms

Call for Presenters on HABs

The PA Lake Management Society (PALMS) is seeking abstracts for oral presentations at the 29th Annual PALMS Conference to be held March 6-7, 2019 at the Ramada Hotel and Conference Center, State College, PA. Abstract deadline is November 1, 2018.

Call for Presenters in 2019

Interest Categories:

- Networking
- Monitoring
- Water Quality Drivers
- Toxin Species Relationships
- Taxonomy & Identification
- Toxin Fate & Transport
- Technology
- Human Health

Areas of Interest:

- Monitoring and Data Collection Programs
- Research
- Species Identification and Species Toxicity
- Regulatory Thresholds
- Lab Methods and Analysis
- Using Technology to Identify Blooms
- Fish & Wildlife Impacts
- Public Health Impacts

WHAT CAN YOU SHARE?