SUMMER SERIES 2021

COMPREHENSIVE STRATEGIES TO PROTECT DRINKING WATER FROM HARMFUL ALGAL BLOOMS

June 23 | 12:00PM CST | HAB Impacts to Drinking Water and Current Management Outlook | ~ 2 hours

Widespread disturbance of watersheds and a warming climate have enhanced the occurrence of harmful algal blooms (HABs) that present direct threats to human health. Comprehensive, interdisciplinary management strategies are needed from the watershed to the tap to best protect drinking water from HAB threats. This introductory webinar for the seminar series will begin with short perspectives from the collaborating groups hosting the webinar series. Following comments from host organizations, three technical presentations will be provided.

Our first presentation by Dr. Jennifer Graham will describe cyanotoxin occurrence in the United States, with an emphasis on the last 20 years. The unique challenges associated with the study of cyanotoxins will be discussed along with recent technological advances that have enhanced the scientific study of cyanotoxin occurrence and the current understanding of causal factors.

Dr. Graham currently serves as the harmful algal bloom coordinator for the U.S. Geological Survey (USGS) Water Mission Area. She also represents the USGS on the Interagency Working Group on Harmful Algal Blooms and Hypoxia.

Our second presentation by Dr. Lorraine Backer will review concerns that arise when blooms become harmful. Properties that make a bloom harmful and a brief description of the toxins produced by algae and cyanobacteria will be reviewed. The public health perspective, including emerging issues, the public health response, and current research at CDC will also be discussed.

Dr. Backer is a senior environmental epidemiologist for the Health Studies Section at the National Center for Environmental Health, Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia. She has over 20 years of experience in environmental epidemiology.

Our final presentation co-presented by Dr. Beckye Stanton and Mr. Ben Holcomb will describe the efforts of the Interstate Technology Regulatory Council (ITRC)—a state-led coalition working to reduce barriers to the use of innovative environmental technologies and processes—to develop and disseminate a synthesis of the latest strategies for prevention and management of Harmful Cyanobacterial Blooms (HCBs).

Dr. Stanton *(left) i*s a toxicologist with the California Office of Environmental Health Hazard Assessment and is primarily focused on HABs (both freshwater and marine) with particular emphasis on collaboration and outreach.

Mr. Holcomb *(right)* works for the Utah Division of Water Quality where he manages the WQ Standards and Technical Services Section. He has worked at UT DWQ for 12 years and his past work includes salmon restoration, water quality management, and tribal sovereignty in the Pacific NW.

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COMPREHENSIVE STRATEGIES TO PROTECT DRINKING WATER FROM HARMFUL ALGAL BLOOMS

June 30 | 12:00PM CST | Source Water Protection in the Watershed | ~ 1.5 hours

Best Management Practices in the watershed are crucial to limiting external nutrient loading into our drinking water sources.

Our first presentation by Dr. Stephen Souza will discuss how watershed development impacts the water quality, hydrology and biota of surface water reservoirs. It will review how to assess and quantify such impacts, what can be done by reservoir managers to protect and improve the raw water quality of their reservoir, and how tracking and responding to changes in raw water quality can actually reduce in-plant treatment needs.

Our second presentation by Dr. Erich Marzoff will be an assessment of how Florida is approaching load reductions from agricultural areas. This will include a discussion on agricultural Best Management Practices (BMP), advanced BMPs, changes in farming practices, such as crop rotation and buyouts, and specific regional treatment programs.

Dr. Souza is the Owner of Clean Waters Consulting, LLC. He is also the Founding Partner of Princeton Hydro, LLC. Over the past 35 years, he has dedicated his career to the management and restoration of aquatic ecosystems, in particular lakes, ponds and reservoirs. Dr. Souza is a past president of the North American Lake Management Society (NALMS) as well as the Pennsylvania Lake Management Society (PALMS). He serves on the Board of Trustees of the Association of New Jersey Environmental Commissions (ANJEC).

Dr. Marzolf is the Director of the Division of Water and Land Resources with the St. Johns River Water Management District where he oversees data collection, land management and ecosystem restoration planning. In this role, he works on integrating aquatic and terrestrial restoration and management efforts to meet the District's core missions.

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July 7 | **12:00PM CST** | **Mitigation of Internal Nutrient Loads in Drinking Water Sources** | **~ 1.5 hours**

With the increasing occurrence of harmful algal blooms (HABs), and no silver-bullet solution, development of innovative management practices and technology has come to the forefront.

Our first presentation by Dr. Bob Kortmann will review the structure of thermal stratification and mechanisms of internal loading of anaerobic respiration products and soluble reactive phosphorus that stimulates cyanobacteria blooms. A variety of management methods will be reviewed for controlling internal loading in source water reservoir systems, including: Artificial Circulation Technologies, Hypolimnetic Aeration, Depth-Selective Layer Aeration, and Oxygenation Systems. Advantages, disadvantages, and risk of adverse impacts will be identified for each method.

Our second presentation by Dr. Elizabeth Crafton-Nelson provides insight on how to leverage new technology and integrated practices to curb HABs. This presentation highlights key information that will allow water resource managers to tailor a management program that includes both short- and long-term strategies, to actively manage HABs now and work to prevent them in the future.

Dr. Kortmann earned his Ph.D. in Applied Limnology and Ecosystem Ecology in an interdisciplinary program in the Biological Sciences, Natural Resources, and Engineering Schools at the University of Connecticut. He has published dozens of papers on applied limnology of supply source water systems, controlling cyanobacteria blooms, and lake restoration. Additionally, Dr. Kortmann invented a number of naturalistic lake restoration technologies, was awarded four US Patents, and was awarded the Technology Innovator Award by EPA Region 1 for inventing Layer Aeration.

Dr. Crafton-Nelson is a Source Water Quality Engineer with Hazen and Sawyer. Elizabeth assists utilities across the country by working to increase their source water quality and treatability. Her source water management approach encompasses both short and long term practices for a wide variety of issues and risk assessment. Elizabeth received her PhD from the University of Akron where she studied cyanobacteria and cyanobacteria dominated harmful algal blooms.

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July 14 | **12:00PM CST** | **Harmful Algae Management** | **~ 1.5 hours**

As part of comprehensive strategies to protect drinking water, direct control of harmful algae through various integrated strategies can reduce their density at drinking water intakes and decrease pressure on treatment plants to remove these organisms and their toxins.

Our first presentation by Dr. West Bishop will review the use of USEPA-registered algaecides in rapid responses to restore water resource uses when nuisance or harmful algae are discovered. Action threshold response programs will be highlighted that preserve potable water source integrity.

Our second presentation by Dr. Kaytee Pokrzywinski-Boyd and Dr. Mandy Michalsen will review non-traditional HAB management strategies including physical and biological control techniques. Links will be made across freshwater and marine resources and the presentation will highlight potential areas for cross utilization/development, with emphasis on treatments applicable to drinking source waters.

Dr. Bishop is the Algae Scientist and Water Quality Research Manager at SePRO Corporation. He has presented more than 100 professional presentations and published numerous articles in peer-reviewed and other literature and is a certified lake professional through NALMS. Dr. Bishop's current focus includes inventing, developing and implementing numerous proactive and reactive solutions to improve water quality and control nuisance algae and cyanobacteria.

Dr. Pokrzywinski-Boyd is Chief of the Harmful Algal Bloom (HAB) Forecasting Branch at NOAA's National Centers for Coastal Ocean Science (NCCOS). Dr. Pokrzywinski-Boyd received her PhD in Marine Biosciences from the University of Delaware in 2014, with a specific focus on characterizing a novel, environmentally benign, bacterial algicide for the control of harmful dinoflagellates (red-tides).

Dr. Michalsen is the U.S. Army Engineer Research Development Center's (ERDC's) Harmful Algal Bloom Program Coordinator. Mandy's research interests have included novel applications of groundwater remediation technologies to accelerate cleanup of explosives- and chlorinated solvent-contaminated aquifers, as well as use of polymeric samplers for measuring freely-dissolved contaminants in sediment porewater.

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July 21 | **12:00PM CST** | **From Intake to the Tap** | **~ 1.5 hours**

Toxin-producing cyanobacteria blooms are a growing concern for water utilities that use surface water supplies across the country. To make informed decisions about how to limit exposure to cyanotoxins, water utilities need to understand (1) cyanotoxins occur; (2) their presence in a given water source, (3) management strategies to reduce cyanotoxins in source waters, and (4) treatments to prevent cyanotoxins from reaching customers.

Our first presentation by Ms. Tricia Kilgore will review Beaufort Jasper Water and Sewer Authority's experience with algae blooms, taste and odor, the development of an algae monitoring plan for two drinking water reservoirs, and algae bloom treatment in the reservoir and in the plants. Earlier detection of cyanobacteria blooms has allowed for better mitigation and prevention of taste and odor events and process upsets.

Our second presentation by Dr. Erik Rosenfeldt provides insight on which techniques are effective for addressing cyanotoxins present within intact cyanobacteria cells (intracellular), and which techniques are effective for removing cyanotoxins that are dissolved in the water (extracellular). CyanoTOX ©, an oxidation treatment calculator developed for AWWA, will also be presented.

Ms. Kilgore, PE, is Director of Technology & Innovation at Beaufort-Jasper Water & Sewer Authority in South Carolina. She has worked in the water and wastewater field for 20 years, starting as a state regulator then an engineering consultant before joining the utility side in 2008. At BJWSA, Tricia has worked as Capital Projects Manager and Director of Treatment Operations. She has engineering degrees from Virginia Tech and Loughborough University in the UK.

Dr. Rosenfeldt received his M.S. and Ph.D. from Duke University in 2003 and 2007. During his time at the Duke, he researched advanced oxidation of emerging contaminants. After graduation, he went on to work as an Assistant Professor of Civil and Environmental Engineering at the University of Massachusetts, Amherst. Currently, he is the Director of Drinking Water Process Technologies at Hazen and Sawyer.

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