Forecasting Freshwater Cyanobacterial HABs for Sentinel-3 Satellite Resolved U.S. Lakes and Reservoirs

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To address the need for a large-scale prediction model, we used an Integrated Nested Laplace Approximation (INLA) model for cyanobacteria presence data derived from Sentinel-3 Ocean Land Color Instrument along with environmental predictor variables from 2016 to 2022 in satellite resolvable lakes across CONUS. This model was applied to forecast World Health Organization recreation Alert Level 1 exceedance >12 μg L−1 chlorophyll-a with cyanobacteria dominance for 2192 satellite-resolved lakes in the United States. The prediction results were compared to independent previous cyanobacteria presence satellite imagery to provide performance statistics.

Office of Water’s Vision for Operationalizing a Nationwide HABs Forecast

Michael Paul, EPA Office of Water

The CyAN near-real-time cyanobacterial biomass tool is a foundation of the EPA National HAB Program and is used by state, tribal, and other partners across the U.S. as a key part of their HAB monitoring programs. The expansion of this tool to provide forecasting information could be transformative for many of these partners as it may enable their monitoring teams to better anticipate blooms to provide more accurate advice to the public. This talk will discuss our plans on how the forecasting information will be operationalized and served through existing HAB data platforms.
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Blake is currently with the Office of Research and Development, Center for Environmental Measurement and Modeling in Durham, North Carolina. His research focus is on the applied use of satellite remote sensing technology to monitor water quality in coasts, estuaries, lakes, and reservoirs. His research niche is the development of applications for water quality monitoring and assessment. Blake earned his Ph.D. in marine, earth, and atmospheric science from North Carolina State University studying harmful algal bloom ecology.

Michael Paul, Ph.D.
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Mike is an aquatic ecologist in the EPA Office of Water, Office of Science and Technology, Health and Ecological Criteria Division in Washington D.C. He has more than 30 years of experience in the research and management of aquatic ecosystems. His work has focused on the ecology of freshwater ecosystems, including 20 years of experience in water quality criteria development across the nation. He now leads the EPA National HAB Program and works on nutrient criteria and biocriteria. He received his B.A. in biology from Colgate University, an M.Sc. in zoology and a Ph.D. in ecology, both from the University of Georgia.

Anne Rea, Ph.D. - Moderator
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Anne is a Senior Science Advisor in the Center for Public Health and Environmental Assessment within the EPA Office of Research and Development in Durham, North Carolina. She leads the integration of cross-cutting research related to nitrogen and associated co-pollutants within EPA and with other federal, state, and NGO partners. She has worked with EPA’s former Ecosystem Services Research Program, the Office of Air Quality Planning and Standards, and the Office of Air’s Ecological Risk Program. Anne earned her doctorate in environmental health sciences from the University of Michigan’s School of Public Health.