

From Amy Smagula **the Editor**

This issue of *LakeLine* explores topics related to lake browning. Now, most of us probably worry about our lakes turning green (or even blue-green, for that matter) from increases in algal growth over time. Most of us can recall the spectrum of lakes we've had an opportunity to visit,



from very dark brown tannic (or tea-colored) waters that are hard to see into, to only slightly colored waters, to the waterbodies that appear crystal clear and colorless, where you can see far down into the depths. But there is more to lake browning than the color of the water and how far we can see into the lake. Lake browning is an actual process, with causal factors, it is happening over time, and it has some pretty complex ramifications for lakes and aquatic life. There is even evidence that brown is a natural state for many lakes, and that after decades, and more likely centuries of flux, lakes are reverting back to brown.

For those who attended the plenary session at the 38th Annual NALMS Symposium in Cincinnati, Ohio, Craig Williamson gave an excellent presentation on the topic of lake browning, and the implications that lake browning has on the physics, chemistry, biology and ecology of our lake systems. He and a network of researchers and students across the globe are working on various angles of this process, and some of that work is compiled here in this issue of *LakeLine*.

First, **Craig Williamson** shares an introduction to the process and impacts of lake browning, which uses some of the same images and content from his plenary presentation in Cincinnati, for those who

LakeLine encourages letters to the editor. Do you have a lake-related question? Or, have you read something in *LakeLine* that stimulates your interest? We'd love to hear from you via e-mail, telephone, or postal letter.

may have missed it. His overview is a great introduction to lake browning, and provides a backdrop for the other articles in this issue, that explore various aspects and impacts of lake browning.

Kevin Rose and **Jonathan Stetler** from Rensselaer Polytechnic Institute in New York discuss their work with dissolved organic matter (DOM) in lakes in the Adirondacks of New York, including an overview of how lake color is measured in the laboratory, some of the drivers associated with lake browning, and implications of browning based on data from the Adirondacks of New York and the Poconos of Pennsylvania.

Chris Solomon with the Cary Institute of Ecosystem Studies and **Stuart Jones** with the University of Notre Dame co-authored an article on their work looking at implications of lake browning on food web dynamics in lakes, from the base of the food web (the algae), up through other levels of the food web, including invertebrates, zooplankton (microscopic animals), and fish. They discuss varied and unique ways in which different species are affected by consequences of lake browning, from light or nutrient levels to temperature and oxygen levels, and adaptations and evolution of these organisms to the changing conditions of lakes. They also discuss the spectrum of lake browning geographically, and provide input on what lake browning could mean for your lake.

Next, **Keiko Wilkins** shares information from her graduate work with freshwater zooplankton in lakes, where

she evaluates potential impacts of DOM derived from a common native and a common invasive plant species in watersheds, and looks into the question of whether it is DOM quantity versus quality that could be a deciding factor in some food web impacts.

Our Student's Corner this month was written by **Rachel Pilla**, a Ph.D. candidate at Miami University in Ohio, whose focus is on using advanced sensors, statistics and analytics to better understand lake ecosystem structure and function, with a focus on the impacts of lake browning.

I hope you find this issue of *LakeLine* to be interesting and informative! This is the start of the second year that *LakeLine* has been electronic, and NALMS will soon be developing and sending out a survey to request your input on the format change for the magazine, as well as to invite your input for topics, content, and direction for *LakeLine* in the future.

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LAKELINE SUMMER 2020:

The summer issue of *LakeLine* will focus on the basics of lake and watershed stewardship, and will include a range of topics about the basics of limnology, watershed protection, lake and watershed associations, and more. If you have special requests for content, or would like to contribute an article, please reach out to the *LakeLine* editor.

