

Study finds changing dissolved organic carbon in Maine lakes key to maintaining drinking water quality

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Monitoring concentrations of dissolved organic carbon in Maine lakes before and after severe rainstorms could inform management strategies to help ensure consistent, high-quality drinking water, according to University of Maine researchers.

In their study, working with local drinking [water](#) districts, Kate Warner and Jasmine Saros, researchers in UMaine's Climate Change Institute and the School of Biology and Ecology, found that increasingly frequent and extreme rain events can contribute to short-term abrupt changes in the quantity and quality of lakes' dissolved organic [carbon](#), which is derived from leaves, pine needles and other terrestrial debris in watershed runoff.

The goal was to better understand the effect of severe rainstorms on [freshwater ecosystems](#) and, in particular, how dissolved organic carbon is changing in Maine drinking water lakes.

By sampling dissolved organic carbon in six Maine lakes before and after five severe rainstorms, the researchers found three response patterns. Some lakes had an initial spike in dissolved organic carbon that returned to prestorm levels within days. The largest lakes sustained no changes in the concentrations of dissolved organic carbon.

In other lakes, dissolved organic carbon levels increased and remained

high. Such a sustained response is particularly important for water districts, which might have to modify treatment strategies following extreme storms.

"Dissolved organic carbon is one of the most important substances in [lake](#) ecosystems—particularly drinking [water lakes](#)—and yet it's not talked about that often," says Saros, professor of paleoecology and associate director of the Climate Change Institute. "It can interact with some of the drinking water treatment processes and form some harmful byproducts. That's why it's important that we monitor what's happening with this material to adapt treatment strategies as needed after storms."

Maine has 6,000 lakes, 45 of which are sources of drinking water, according to the researchers, who published their findings in the journal *Water Research*.

Other studies have confirmed that the northeastern U.S. has experienced a 70 percent increase in extreme precipitation events since 1950—the highest percent increase in the nation. Concentrations of dissolved organic carbon from forest and soil sources that enter aquatic ecosystems in runoff ultimately affect the chemical and biological quality of lake ecosystems, including those that are sources of [drinking](#) water.

Concentrations of dissolved organic carbon have been increasing during the last two decades in Maine, Saros says. Effects of dissolved organic carbon in lakes include changes in water transparency, oxygen availability, and processing of nutrients and toxic compounds. In lakes used as water supplies, increased dissolved [organic carbon](#) can contribute to harmful byproducts, such as trihalomethanes, and higher levels of heavy metals and pollutants.

The six Maine lakes in the study were Chases Pond in York County; Sebago Lake in Cumberland County; Nokomis Pond in Penobscot

County; Jordan Pond and Floods Pond in Hancock County; and Young Lake in Aroostook County.

Provided by University of Maine

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