

CRITICAL PH LEVELS FOR AQUATIC LIFE IN NORTHEASTERN LAKES

6.5 lake recovered from acid rain

6.0 organisms start to become stressed

5.6 smallmouth bass die

5.5 frog eggs, tadpoles, crayfish & mayflies die

5.0 loons, mink & heron face starvation

4.8 brook trout die

4.2 lake severely impacted by acid rain

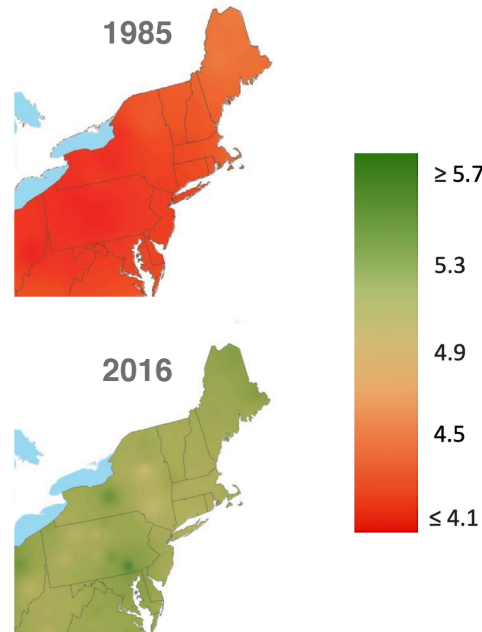
Source: Vermont Dept. of Environmental Conservation

Lake browning: A signal of ecosystem recovery?

Decades of industrial pollution and acid rain caused water bodies in the northeastern US to become strongly acidic. Through national policies like the 1990 Clean Air Act Amendments, industrial polluters were forced to clean up their act. Due to reduced air pollution, both rain and lakes became less acidic. As a result, lake pH increased.

Acid rain caused many lakes to become clear. This is because acidic conditions kill phytoplankton, which float in the water column and reduce clarity. As lakes and the landscape recover and become less acidic, more organisms can survive and more

CHANGING PH LEVELS IN THE NORTHEASTERN US



Source: National Atmospheric Deposition Program

dissolved plant matter flows through the watershed into lakes. Organic matter is brown, which is why lake browning is associated with acid rain recovery.

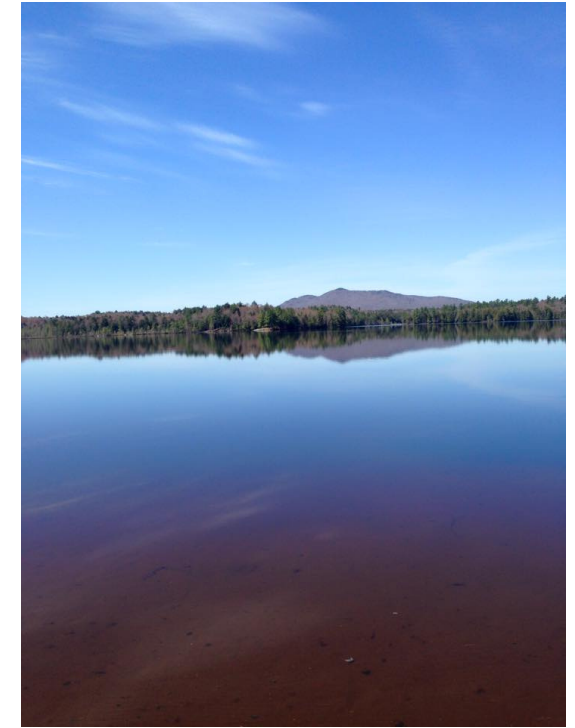
Learn more & connect with scientists!

If you would like to learn more about lake browning, you can find a selection of resources by scanning the QR code here. Have further questions? Connect with lake scientists by following the code for contact info.



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Lakes are browning

Learn why and what this means for lake health

WHY DO LAKES TURN BROWN?

Dissolved Organic Matter (DOM)

Over the past 50 years, the water in lakes has turned increasingly brown. Lake browning is a result of increased concentrations of DOM from land and wetland inputs. It can affect drinking water and lead to reduced fish populations.



waters heat up faster in browner lakes. Reduced water clarity can depress oxygen levels and algal productivity, with implications for aquatic organisms and the lake food web.

Browning is both good and bad. It is a sign of recovery from acid rain, but it's also a result of our activities, like development and climate change. Perceptions of browning are also mixed. Life returning to lakes and watersheds is good. But many people prefer to recreate in clear lakes. And browning can cause changes in lake processes that make the water unsafe for consumption. Understanding these effects can inform smart lake management.

Lakes are connected to their watershed

Plant matter and pollutants from the landscape flow into lakes. Since lakes are often the lowest point in the watershed, they are reliable indicators of watershed health. Landscapes that are heavily forested deliver high amounts of dissolved organic matter (DOM) from decaying leaf litter and soil. Agricultural runoff contributes excess nutrients which fuel algal growth. As landscapes change, so does water clarity and lake chemistry. Monitoring lakes can provide early warning of broader changes across the landscape.

Why are lakes browning?

Lakes turn brown due to an increase in dissolved organic matter. DOM is transported from the watershed and soil into lakes. As the land recovers from acidification, more organic material is released in the soil and flows into lakes. Browning can also occur due to climate change; increased precipitation and storms can increase DOM runoff into lakes.

Why does lake browning matter?

Browner lakes are less clear, which impacts many lake features. Light penetrates shallower in brown waters, so surface

You can help monitor lake health

Water clarity is an important indicator of lake health. The most common way to measure water clarity is with a Secchi disk (pictured below), a tool that has been used for over a century. Scan the QR code to learn how you can create your own Secchi disk, contribute data to lake research, and help protect lakes for future generations.

