

# Don't judge a brook by its color -- brown waters are more natural

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Over the last 20 years lakes and streams in remote parts of the UK, southern Scandinavia and eastern North America have been increasingly stained brown by dissolved organic matter. In this week's *Nature* journal (22 November) an international team, led by researchers from UCL (University College London) and the US Environmental Protection Agency (EPA), demonstrates that the colour change is indicative of a return to a more natural, pre-industrial state following a decline in the level of acid rain.

Don Monteith, Senior Research Fellow at the UCL Environmental Change Research Centre, says: "A huge amount of carbon is stored in the form of organic deposits in soils, and particularly in the peatlands that surround many of our remote surface waters. In the past two decades an increasing amount of this carbon has been dissolving into our rivers and lakes, turning the water brown.

"There have been numerous attempts to explain what's happening, with everything from global warming to changing land-use cited as the cause. Some studies have suggested that we're seeing an unprecedented phenomenon as soils destabilise with unpredictable consequences for the global carbon cycle."

John Stoddard of the EPA says: "By analysing water chemistry records from over 500 sites across the northern hemisphere we've found that the dominant factor in the whole process is not global warming. The most important driver has actually been the major reduction in acid rain since

the 1970s. As acidity and pollutant concentrations in the soil fall, carbon becomes more soluble, which means more of it moves into our lakes and rivers and more can be exported to the oceans.

“In some ways we’re seeing waters returning to their natural, pre-industrial state. However, more research is needed into the implications for freshwaters. The environmental pathways of heavy metals like aluminium and mercury, for example, are closely tied to dissolved organic carbon, and it’s too early to know how increasing organic matter will affect these toxic compounds.

Chris Evans, from the UK Centre for Ecology and Hydrology, adds: “The suggestion that waters are returning to more natural conditions may be of little consolation to water supply companies as they are faced with the increasingly difficult - and expensive – task of removing the colour from drinking water using treatment facilities that were designed to deal with the lower concentrations experienced in previous years.”

Data for this study was drawn from nationally funded monitoring programs in the UK, USA, Canada, Norway, Sweden and Finland. Trends in dissolved organic carbon, air temperatures and a suite of other chemical variables were assessed using data from 1990-2004. The study is the largest of its kind and the data represents the main source of high quality, long-term information about the condition of our headwater systems.

Ironically many of the study sites, including those in the UK, are under threat of imminent closure or scaling back due to cuts in government funding. This comes despite increasing recognition of the urgent need to monitor the response of natural environments to climate change and other man-made pressures, and the obvious value of these records for increasing our understanding of environmental processes.

Source: University College London

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