Study reveals UK upland waters are recovering from acid rain

August 19 2010

(PhysOrg.com) -- Upland waters damaged by acid rain are beginning to recover according to UCL research published today.

Academics from the UCL Environmental Change Research Centre (ECRC) undertook the study for the Department for Environment, Food and Rural Affairs (Defra).

The report's conclusion is based on data from the Acid Waters Monitoring Network (AWMN), a Defra - and Devolved Authority - funded research network of 22 lakes and streams that have been studied closely by scientists over the last 22 years.

However, while the evidence for chemical recovery is strong, the report suggests there is a long way to go before the plant and animal communities in these systems will be restored to full health, and there is concern that other factors, such as climate change, might mask, slow down or even prevent a full recovery. Emeritus Professor Rick Battarbee said:

"We have been carefully monitoring acidified upland lakes and streams in the UK for over 20 years, ever since the decision by the Thatcher government to introduce controls on the emissions of acid gases from coal and oil burning power stations.

"We are now seeing clear evidence of decreasing acidity in our upland waters, and at last the plant and animal communities, including fish

populations, are beginning to recover. However, we still have a very long way to go to return these systems to full health, and there is real concern that a full recovery might be prevented by climate change.

"In particular, our modelling suggests that the increase in winter precipitation predicted for UK upland regions in future may decrease the ability of lakes and streams to neutralise acidity and that additional controls on the emissions of acid gases, especially nitrogen oxides, may be necessary.

"More generally these results underline conclusions from other studies we have conducted in the ECRC that our freshwaters are threatened by many different pressures and that attempts to restore them require us to understand not only the individual impact of those pressures but also how they interact, especially with climate change.

"They also illustrate the importance of high quality, long-term ecological networks that we need to monitor, measure and model environmental change. These results have proved the value of such networks, and it is critical that Defra and other sponsors maintain their funding support for it and enable it to be further developed to track future changes in upland water quality and biodiversity."

Over the last 20 years there have been major reductions in the emissions of sulphur and nitrogen gases from power stations and other sources across the UK and Europe. This has caused a significant reduction in acid deposition and a consequent improvement in water quality at all acidified sites.

Aquatic plant and animal communities are now recovering, as shown by changes in diatom (algal) populations, the re-appearance of plant species at many sites, an increase in the abundance of some insect species and the reappearance of snail populations. Native brown trout, a prominent

casualty of acidification, have returned to a few of the most acidified sites and have increased in abundance at others.

Despite the improvement, biological recovery is still limited and there is a concern that it might not be sustained, falling short of the targets set by the main legislative programmes.

The results of the research illustrate the importance of the monitoring network, not only in tracking responses to the reduction in acid rain but in providing early warning of overall changes in the health of the upland environment, including water quality and aquatic biodiversity, caused by these new, additional and interacting pressures.

Provided by University College London