

## ● Protecting the UK's upland waters from pollution

Geographers have been at the heart of the monitoring of the impacts of air pollution on our upland waters, demonstrating progress towards meeting international agreements on emission reductions

**Key words:** Biodiversity and Conservation; Natural Environment; Pollution

The detrimental consequences for wildlife, forests, soils, and freshwater from 'acid rain' was first identified in the 1970s and sulphur and nitrogen gas emissions from burning fossil fuels were established as the principal cause in the 1980s.

In addition to transboundary 'acid rain' affecting countries 'downwind' of the UK, including those of Scandinavia, the UK has itself experienced severe effects, with freshwater acidification in susceptible uplands (central and southwest Scotland, the Pennines, parts of Cumbria, central and north Wales and parts of Northern Ireland) a severe problem.

In 1987, and in line with international protocols, the UK government established a national programme to reduce emissions and set up a national monitoring network (UK AWMN), funded by a consortium currently led by Defra (Department for Environment, Food and Rural Affairs), with work involving scientists from many universities and research institutes across the UK, to assess the response of freshwater ecosystems to the reductions. The 22 sites in the network are mainly headwater lakes and streams, and include sites with both afforested and moorland catchments spanning a range of sensitivities to acid deposition.

The Environmental Change Research Centre at University College London (UCL), directed by geographer Professor Rick Battarbee, has been at the heart of the UK AWMN's work. According to evidence provided in its latest report of July 2010, upland waters in the UK damaged by 'acid rain' are beginning to show signs of recovery, a likely consequence of the policy decisions

taken in the 1980s to reduce emissions of sulphur dioxide from power stations.



The report shows both improvements and new threats, concluding that acidified lakes and streams are now showing clear signs of both chemical and biological recovery from acidification in all affected regions. Water acidity is decreasing, some species of plants and animals are reappearing and populations of native brown trout are improving.

However, Professor Battarbee argues that the recovery so far is limited and that other threats in future, including from climate change, may prevent a full recovery.

The results illustrate the importance of the monitoring network both in tracking responses to the reduction in acid rain and in providing early warning of overall changes in the health of the upland environment in the UK.

- [Professor Rick Battarbee](#) and [Dr Simon Patrick](#), Environmental Change Research Centre, UCL
- [Further information](#) (UK Acid Waters Monitoring Network Reports, Defra)

