THE MACAULAY LAND USE RESEARCH INSTITUTE

Future Climate: Future Environment

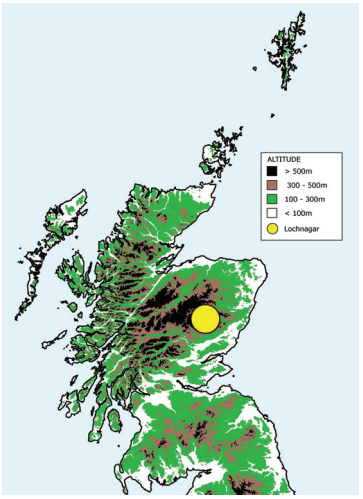
# Implications of climate change and atmospheric nitrogen pollution on rivers and lochs in the Scottish mountains

**The Cairngorm Mountains are famous for their landscapes, native forests, wildlife and pristine rivers and lochs. They are also home to the most extensive area of arctic-alpine habitat in Britain and to 25% of Britain's threatened birds, animals and plants.**

**Mountain ecosystems like the Cairngorms are the first to show early warning signs of climate change and the rivers and lochs of the Cairngorm Mountains are at risk from climate change and atmospheric pollution.**

**Research at the Macaulay Land Use Research Institute aims to discover what the combined effect of atmospheric pollution and climate change will have on water quality in the Scottish mountains.**






**Research site:** The Lochnagar research site is located on the eastern edge of the Cairngorm Mountains. The characteristics of the site are typical of a large part of the Cairngorm mountain area.

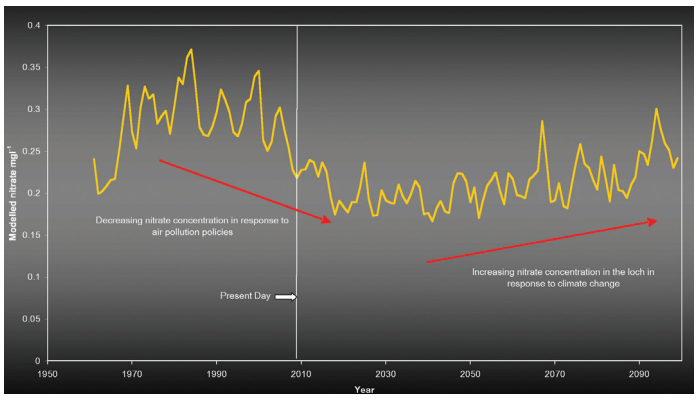
## Results

Lower levels of nitrogen pollution over recent years have led to a decline in nitrate and improved water quality in mountain rivers and lochs.

However, model predictions show that climate change may upset the nitrogen cycle as warmer temperatures are predicted to lead to higher nitrate concentrations in rivers and lochs

- Snow insulates the ground keeping it relatively warm. With less snow cover the soil becomes frozen which can kill many of the organisms in the soil that feed on nitrogen. If this happens the nitrogen (nitrate) may seep into rivers and lochs causing them to become more acidic

- Warmer temperatures stimulate plant growth and when plants die ultimately, nitrogen (as nitrate) is released to rivers and lochs adding to this problem.




- Warmer temperatures mean more precipitation will fall as rain,not snow. Less snow melt will increase river water temperatures, decrease summer water flows and affect the plants, animals and fish that live in and around rivers and lochs.