

# INTEGRATED RESEARCH SUPPORTING THE MANAGEMENT OF UPLAND ECOSYSTEMS

The internationally important uplands of Scotland are home to some unique, yet fragile habitats. The fine balancing act of managing these wild places has been going on for centuries, but today they are coming under increasing threat from both climate change and pollution.

To continue to successfully meet the needs of the local livelihoods that depend on these areas, whilst protecting our precious natural heritage, we require a greater understanding of how different upland habitats and water catchments will respond to changes in climate, pollution and land management.

## UNDER THREAT

For many years, parts of northern Europe suffered from the devastating effects of acid rain. Upland areas are particularly sensitive to the high levels of nitrogen still present in rain, snow and cloud. Our soils, waters and plants are all particularly vulnerable.

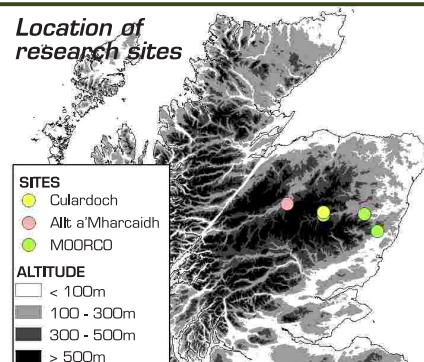
In addition, the impact of pollution has been made potentially much worse by our rapidly changing climate, and again it is predicted that upland areas will suffer more.

This obviously has implications for both our managed and wild landscapes.

## FINDING SOLUTIONS

To assist in the management and conservation of these areas, our research is considering the relative importance of pollution, climate change and management at sites ranging from the lowest moorland to the highest mountain peaks.

We are integrating experimental data with our understanding of the workings of the wider upland environment, allowing us to develop and recommend appropriate management actions.



## MOORLAND

Native woodland is starting to re-colonise many areas of moorland across Scotland

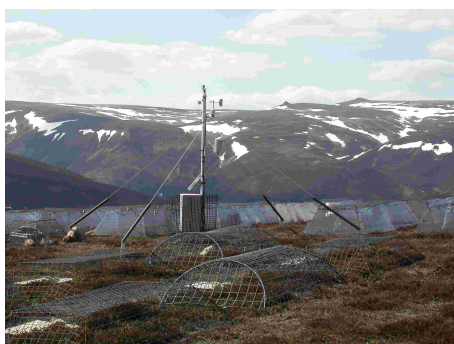
– but what are the implications for future management and balance between both of these important habitats?



## MOUNTAINS

How do nitrogen pollution, climate, burning and grazing interact and shape montane ecosystems?

In relation to pollution, we are particularly interested in where nitrogen goes and how it influences biodiversity once it enters the upland environment.



## ACROSS THE UPLANDS

What implications do our studies have for the management and future of Scotland's uplands?

By developing our understanding of how the wider ecosystem functions, we can make recommendations to inform future policy on water and land management issues.

