

Long-term vegetation change can inform landscape management in UK uplands

Evidence from Alston Moor, North Pennines

Background

The UK government has set ambitious targets to plant 50,000 ha of new woodland annually by 2035. Upland environments such as the North Pennines have been targeted for a significant portion of this new woodland planting. Restoration of upland peat by 2045 also aims to help meet the UK's net-zero commitments.

Accurate records of long-term vegetation change in these environments both prior to, and in response to human activity, are crucial to inform planning and decision making around woodland creation and landscape management, to ensure species will thrive, and be self-sustaining. The (pre)historic impact of past industrial activity, especially mining, can also be traced through pollution signals.

We analysed two peat cores from Alston Moor for pollen, fungal spores and metal pollution signals. We reconstructed the impact of pastoral and arable farming on the local and regional vegetation, and traced mining activities back into the Iron Age.

Policy recommendations

When did the vegetation obtain its modern character?

Although heather was long established on the highest part of the moor, the increased importance of grasses regionally goes back only a few centuries. The current open landscape appearance is novel, relating to agricultural intensification, largely through grazing increased numbers of livestock (mainly sheep) on the moor.

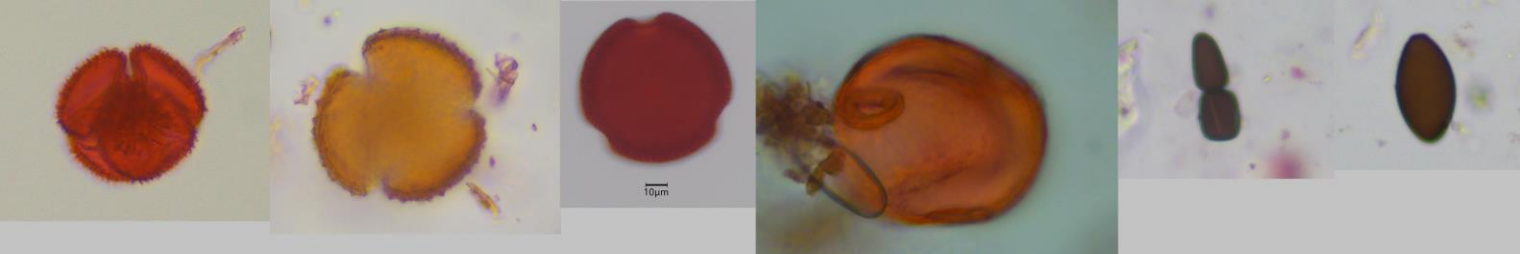
What did the vegetation look like in the past?

Most of the vegetation history of the region was characterised by more extensive tree cover, especially on the lower slopes of the moor. Regionally important taxa include oak, birch, alder and hazel, with smaller numbers of elm, willow and pine. The woodland was likely damp and relatively open.

Where was the treeline?

The treeline remained above 405 m AOD for most of the area's history. The highest part of the moor opened up early on and was dominated by heather and *Sphagnum moss*. Tree planting initiatives in the region involving native deciduous taxa would contribute to the restoration of ecological complexity, but care should be taken to maintain habitats for rare species that expanded after clearance.





The research base

Alston Moor is a large raised mire in the North Pennines National Landscape. The region was occupied from the Bronze Age onwards. The Beaker burial cairn at Kirkhaugh (~2200 BC), on the other side of the River South Tyne, has been associated with early metalworking. The Roman fort at Whitley Castle has long been thought to have been built in connection with the mining and processing of lead ore. Silver-bearing lead ores were mined from shallow deposits from at least the 12th century into recent centuries, with significant impacts on the landscape.

The peat near Whitley Castle is up to 2m deep, although the top is often missing due to drainage. Pollen extracted from the peat can help us reconstruct the local and regional vegetation through time. Plants grown by people and agricultural weeds can tell us about agricultural practices. Dung fungal spores are found where animals were present. Trace metals show us when mining and smelting activities were carried out in the area, and their intensity.



Key findings

- The cores spanned the period of 5825 years ago until ~200 years ago.
- In the core from the top of the moor (563m AOD), mire taxa, particularly heather and *Sphagnum* moss, are abundant throughout. In the core from lower down the moor (405m AOD), the peat contains wood, whilst mire taxa are rare before the Iron Age. This indicates the treeline was located somewhere between these two elevations.
- After an intense phase of woodland clearance during the Iron Age and Roman period, the woodland regenerated and thrived until ~400 years ago.
- The relative abundance of wetland taxa such as alder and willow indicate most of the area was covered in damp woodland. The importance of hazel, a light-loving shrub, suggests the woodland had a relatively open character.
- Lead pollution, and hence mining, began during the Iron Age and Roman period. After a brief slowdown in activities after the Roman withdrawal, pollution increased significantly, reaching a peak in the modern period.
- Long-term vegetation records, especially when co-produced with practitioners, can contribute to evidence-based restoration targets and understanding how the site responded to pressure in the past.



Contact: Dr Eline van Asperen
(envanasperen@palaeo.eu)

Research team: Prof Lisa-Marie Shillito (Durham University), Damian Rudge (Newcastle University), Dr Simon Chenery (British Geological Survey)

This project was funded by:

Royal Archaeological Institute, Catherine Mackichan Trust



ROYAL
ARCHAEOLOGICAL
INSTITUTE



Newcastle
University