

Seeing the Woods for the Trees



A palaeoecological investigation of past woodlands to inform present and future woodland conservation management strategies in northern Scotland

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Summary

This study explored the natural woodland development in northern Scotland over the course of the Holocene in order to inform whether such woodlands can be reinstated on present and future upland areas across northern Scotland under the care of Forestry and Land Scotland (FLS).

Sediment sequences for palaeoecological study were obtained from peatland areas located in the Flow Country, northern Scotland with peat formation occurring from 10,700 cal BP. Since the 1940s through to the 1980s and the early 1990s these peatland areas have been extensively covered with non-native conifer plantations, which drastically affected the landscape and present ecosystems.

To restore these peatlands, plantations are felled, and different restoration management approaches are put into practice. In addition, FLS who maintain most of the afforested peatland is keen on developing policies on the reinstatement of native woodland in these areas.

Past native woodland community development was described for three locations in Caithness and Sutherland (most northern Scottish counties), including riparian and upland sites within FLS peatland areas. Palaeoecological data, including pollen, non-pollen palynomorphs (NPP) and microscopic charcoal was used to create long-term, high resolution vegetation records showing changing woodland communities over space and time.

The main woodland communities of the past show similarities with present-day semi-natural woodlands in these areas, including priority woodland types of wet woodlands, upland birchwoods and native pinewoods. These communities developed and changed during the Holocene and episodes of disturbances and demise have been identified and linked to both biotic and abiotic agents and processes. This includes changes in past climate, volcanic eruptions, pathogenic attacks, human woodland exploitation, grazing activities and burning.

Woodland resilience to these events was explored and used as a possibly analogy for understanding present and future responses of woodland communities to disturbances in northern Scotland. Furthermore, present and predicted future climate, together with topographic setting, were used to assess whether these identified past woodland communities would thrive and sustain themselves if reinstated today or in the future.

Concludingly, if the aim is to establish natural woodland in these areas, the main focus should be on the reinstatement of wet woodlands and upland birchwoods with the main species being downy birch (*Betula pubescence*), hazel (*Corylus avellana*) and alder (*Alnus glutinosa*); the latter also being the main species promoted as riparian woodlands.

The results and links with previous and ongoing research showed that palaeoecological data provides important insights and tools to understand causes of woodland disturbances in the past, showing potential analogies with predicted future scenarios.

It is the first study to incorporate this type of data in woodland conservation for northern Scotland and the first time Scottish Forestry and FLS are using palaeoecological studies to be informed about possible new land-use policies, sustainable practices and climate change in relation to natural woodlands.