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Nature
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Birds, bogs and forestry

The peatlands of Caithness and Sutherland

David A Stroud, T.M. Reed
M.W. Pienkowski and R.A. Lindsay
Edited by D.A. Ratcliffe and P.H. Oswald

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1.1 The peatlands of Caithness and Sutherland: the rise of conservation problems

Mountains and moorlands are the most extensive natural and semi-natural terrestrial habitats remaining in Britain, covering at least one quarter of the country (about 6-7,000,000 ha), mainly in the west and north. Their vegetation consists of grassland, dwarf shrub heath, peat bog and marsh, alpine 'meadow', moss and lichen heath, and fell-field. The local pattern in upland vegetation depends on topography, especially steepness and range of altitude, on the nature of the underlying rock and derived soils, and on land-use. Superimposed upon these local variations are broad geographical trends reflecting the main gradients of climate, of decreasing temperature from south to north, and of increasing oceanicity (particularly increasing rainfall, atmospheric humidity and windspeed) from east to west and towards coasts.

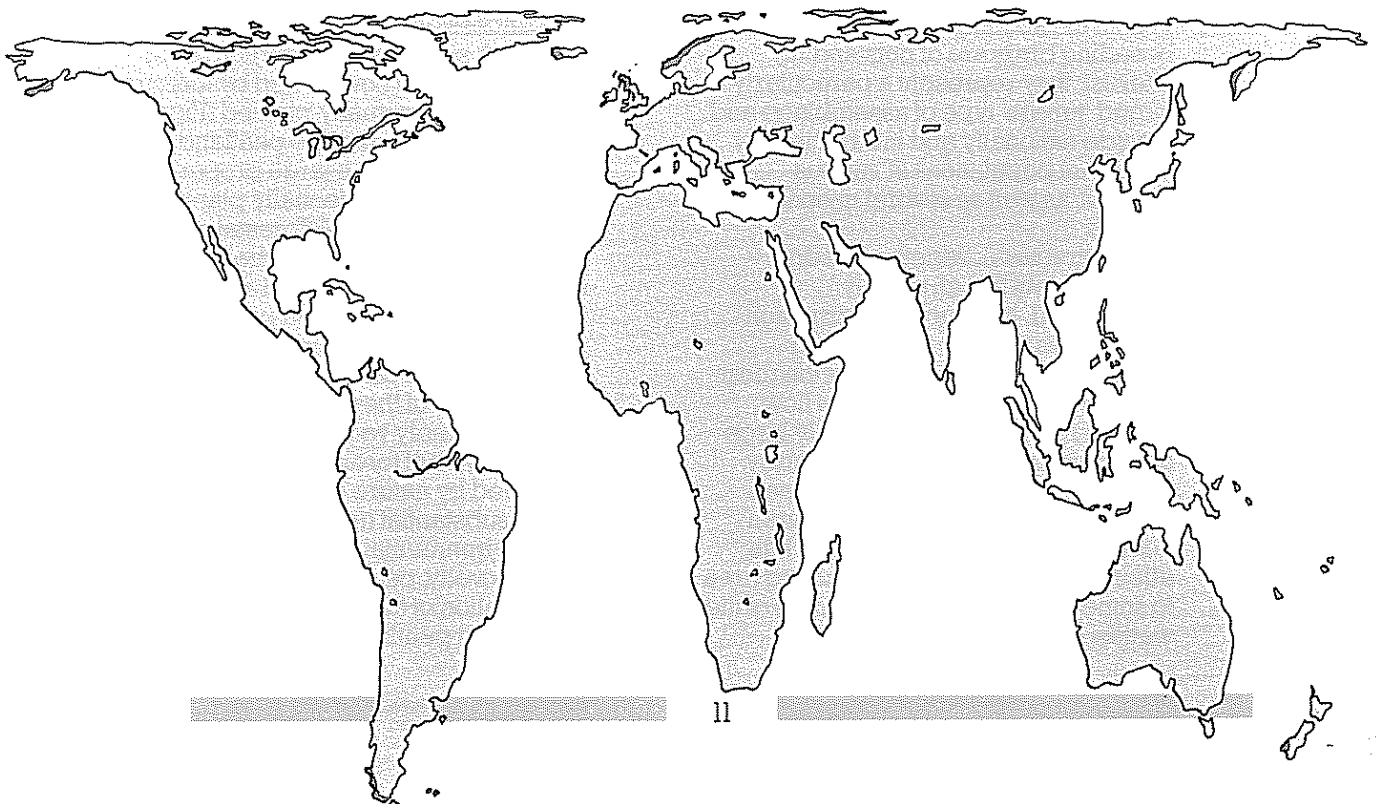
Blanket bog, the particular subject of this report, has developed naturally

where cool, wet climatic conditions have favoured waterlogging of the ground and accumulation of plant remains as peat. It is a formation especially associated with flat or gently sloping ground, but occurs at increasingly low elevations and on increasing inclines as climate becomes more oceanic towards the north and west of mainland Scotland and its islands. Blanket bog covers the high plateau of Dartmoor, but in extreme oceanic areas such as Sutherland, Caithness, Lewis and Shetland and the west of Ireland it is extensive on low-lying moorland down almost to sea level. In these situations it represents a northern tundra-like ecosystem which has developed in these more southerly latitudes because of the highly Atlantic climate.

The largest expanse of blanket bog in Europe, and possibly the largest single area in the world (Figure 1.1), is where the low, rolling moorlands of east Sutherland descend gradually into the plains of Caithness. Further west in Sutherland, blanket bog is still

Figure 1.1 World distribution of blanket bog on Peters' projection, which shows correctly proportioned land areas.

The dark areas show those regions within which blanket bog occurs: the total extent of blanket bog is smaller. Note that blanket bog occurs almost exclusively between 40° and 60° latitude north and south on ocean seaboard



widespread but becomes more dissected by higher mountain ranges. The whole area of the Caithness and Sutherland blanket bogs, lying between 10 and 450m and originally covering 401,375 ha (Figure 1.2), is considered in this report. This area extends well beyond the largest single expanse of bog, sometimes called 'the flow country', occupying much of the area east of a line from Tongue to Lairg (Figure 1.3) or an even more restricted area (Royal Society for the Protection of Birds 1985).

'Flows' are flat or almost flat areas of deep bog which are especially extensive in this region and have in many places developed intricate surface patterns, in the form of complex pool systems. These patterned flows show wide variation in the size, shape and configuration of the pools and intervening ridges or hummocks, and they are of great scientific interest for their hydromorphology (Lindsay, Riggall & Burd 1985). Associated with this structural diversity is a distinctive and varied set of plant communities with dynamic successional relationships and composed of a flora which includes species of different biogeographical affinities. There are also numerous lochs, of widely varying size, and moorland stream and river systems. Within the accompanying fauna, the breeding birds are of outstanding interest: they represent a particularly varied 'tundra' type of assemblage and include nationally and internationally important populations of various species, as well as several national rarities.

The structural, vegetational and faunal variety are all closely interrelated, and survey information will be presented to identify and evaluate their interest. One of the most notable features is that the wet flow ground represents an unusually large area of natural habitat in this country, where so much of the land has been profoundly modified by past human activity. Although moor-burning has affected much of the total peatland area to some degree, quite large areas of the wettest ground have remained

relatively undisturbed, and grazing by large herbivores has been light because of the naturally low carrying capacity. This is, indeed, a region which has largely escaped the more intensive modern kinds of land-use which have affected so many mountain and moorland areas elsewhere in Britain — upland farming and pasture improvement, water and hydro-electric supply, mineral extraction, military training, and the heavier kinds of recreational use. Its nature conservation interest has survived under a combination of traditional management for low-intensity sheep-farming, sporting interest in red deer, red grouse, salmon and trout, and local small-scale peat-cutting.

Concern over nature conservation on the Caithness and Sutherland peatlands has increased in parallel with the rapid advance of commercial afforestation in the region during the last decade. After a long period of forestry expansion elsewhere in the uplands, during which there was little interest in the planting of deep, wet bogs, a combination of silvicultural and technological advance has quite rapidly transformed the situation. Both state and private afforestation have spread rapidly, benefiting from a combination of advantageous grant-aid, tax concessions and land-market factors. A significant proportion of the peatland area is now owned by forestry interests, if not actually planted (Figure 1.4). Because much of the peatland area is at a low elevation, a large proportion of the total area is potentially plantable and therefore at risk. Afforestation causes a transformation of the peatland ecosystem and is regarded as almost totally destructive to its nature conservation interest (Nature Conservancy Council 1986). The replacement of these unique habitats by an extremely widespread and also artificial type of forest ecosystem is regarded by nature conservationists as a very substantial net loss of wildlife and environmental value.

The novelty, pace and scale of afforestation of the Caithness and Sutherland peatlands took conservation

Figure 1.2 Distribution of blanket bog in Caithness and Sutherland before afforestation.

The map of peatland is derived from the soil categories of the Macaulay Institute for Soil Research. All of soil types 3, 4, 4d and 4e were included, with some combinations of other categories where the slope has allowed peat formation. From Lindsay *et al.* (in prep.)

Key


 Blanket bog



Figure 1.4 Distribution of forestry in Caithness and Sutherland in relation to the blanket bog shown in Figure 1.2.

Areas shown are either in Forestry Commission ownership or have Forestry Grant Scheme approval or are dedicated private woodlands. Map as at January 1986, since when there have been many further FGS applications.

Key
Blanket bog
Plantations



interests somewhat by surprise. Incomplete surveys were undertaken by the former Nature Conservancy during the late 1960s to identify a series of areas meriting protection as National Nature Reserves (Ratcliffe 1977b). Subsequently, the portents for land-use developments in various parts of Britain indicated that priorities for allocation of scarce survey resources should lie in other areas, with emphasis on different impacts. The launching of more comprehensive vegetational and ornithological surveys of the Caithness and Sutherland peatlands during 1979/80 has been overtaken by the rapid spread of afforestation, requiring that the conservation case be presented quickly, albeit from incomplete evidence. The uplands are the last great area of undeveloped natural and semi-natural habitat in Britain, and these northern peatlands are outstandingly valuable but especially vulnerable. This report aims to present the case for regarding the Caithness and Sutherland peatlands as both a national and an international scientific and cultural resource.

1.2 Survey methods

Since 1980 NCC has undertaken botanical surveys of the peat bogs within both administrative districts — the Peatland Survey of Northern Scotland. This has concentrated particularly on identifying and studying the patterned flows from large-scale maps and aerial photographs. The sites thus identified have subsequently been examined in detail on the ground. Such a programme of survey is inevitably time-consuming because of the nature of the terrain and the remoteness of many sites, and it is only now nearing completion (Chapter 2). Virtually all major pool systems have been examined in detail, and about 90% of the total area has been assessed at least in outline.

Complementing this survey, a series of ornithological sampling surveys have also been undertaken by NCC since 1979 — the Upland Bird Survey, continuing from 1986 as the Moorland Bird Study (Chapter 3). The practical

difficulties of counting birds over such a wide expanse of peatland have meant that it has not been possible for NCC to survey all areas of the Caithness and Sutherland peatlands for their ornithological interest. The approach taken has been that of sampling representative sites throughout both districts. Thus, this report:

- briefly draws upon the results of NCC's Peatland Survey (the full results of which will be published elsewhere) in order to relate the ornithological surveys to concurrent studies of peatland vegetation and structure and to provide a habitat context for the bird fauna (Chapter 2);
- outlines the methods of data collection used by the Upland Bird Survey (UBS) in 1979-1985, and later the Moorland Bird Study (MBS), to gather information on the ornithological importance of the peatlands (Chapter 3);
- develops and assesses methods of interpolating the results of the survey to the rest of the area, using correlations between breeding densities of waders and features of physical structure and vegetation of peatland, whereby the relative importance of sites for waders can be identified both from maps and on the ground without the necessity for a full field survey (Chapter 4);
- assesses the former and current extent of peatlands and the degree to which bird populations in Caithness and Sutherland have already been reduced by commercial afforestation and then estimates potential future losses (sections 4.4 and 6.2);
- summarises the effects of afforestation on the physical and biological components of the peatland ecosystem (Chapter 6);
- assesses the international importance of the peatlands according to the requirements of the UK's treaty arrangements (Chapter 7);
- evaluates the overall biological importance of the peatlands, using information gained from both of the bird surveys, the Peatland Survey and other sources, and synthesises the total conservation case (Chapter 8).