

Introduction

Scots pine (*Pinus sylvestris* L.) has the largest natural distribution of any conifer in the world, ranging from northern Norway to Spain, and from Scotland across Europe and Asia to Siberia and north-east China. It can grow on a range of soil types, surviving where the rainfall is as low as 200mm, and/or where the temperature drops to -64 degrees C.

In Scotland, pines were an important component of post-glacial natural forests (the so-called Wood of Caledon) which covered an estimated 70% of the country. They were largely confined to the poorest soils, often occurring in association with birch, but they also grew in mixture with other species in natural transitions to oak, ash and elm dominated woodland on the better soils, and to willows and alder on wet areas. Over many centuries vast areas of these ancient forests were cleared, and pinewood regeneration was prevented, either by allowing the land to be grazed or by replanting it with other tree species, usually of non-native origin. Other adverse effects were the browsing of deer and 'muirburning' to improve the grazing or the age structure of heather on adjacent grouse moors.



Pinus sylvestris

Introduction

Pinewoods vary enormously in size, structure and natural species diversity. In Deeside, Strathspey and the Beaully catchment the pine-dominated woodlands are relatively extensive, but in Glen Falloch and Glen Loyne there are only a few old trees scattered over a large area. Other pinewoods occur on steep cliff faces, or in gorge woodlands, such as at Glen Avon, Allt Chaorunn and Attadale, where there may be several age classes present. The wet western pinewoods are more fragmented and isolated than most, and are generally regarded as being in the poorest condition, occasionally merging with oak, alder and other woodland types, indicating that there is scope for re-creating large new mixed native forests in those areas.

There are also biochemical differences between pinewoods; these are indicative of genetic variation. Of the seven Regions of biochemical similarity identified, the North West Biochemical Region, near Kinlochewe, is the most distinct, exhibiting considerable differences between individual pinewoods. It is known from the analysis of pollen records taken from peat bogs that pine has been present in North West Scotland for at least 8500 years, but when combined with the genetic information one may begin to speculate that the pines we see now are the direct descendants of trees which survived the last ice age either in Ireland, or possibly on areas of the continental shelf exposed by the lowered sea levels at that time.



Blaeberry

Introduction

The pinewoods of the South West Biochemical Region, around Fort William, are another distinct group. They show less variation between the fragments, although it is believed that they had a similar history to those in the North West Biochemical Region. The biochemical characteristics of the other pinewoods in Scotland are not so dissimilar, and these pinewoods seem to have more in common with Central Europe pinewoods.

In 1959 Steven and Carlisle published their book 'The Native Pinewoods of Scotland', in which they listed and described most of what they regarded as surviving (ex-Caledonian Forest) pinewoods. This stimulated an interest in pinewood conservation, and in due course the introduction of a number of incentives to support pinewood management and expansion. More recently the native pinewoods of Scotland have been listed as an endangered habitat in the EC Habitats Directive. They are also the subject of a costed Habitat Action Plan (prepared under the UK Biodiversity Plan) which gives quantitative targets for the protection, restoration and expansion of the pinewoods by both natural regeneration and replanting. These targets are based on an earlier version of this Inventory.



Scottish Crossbill

The Inventory

To prepare the Caledonian Pinewood Inventory, the current extent of the native pinewoods named by Steven and Carlisle, have been investigated. Some of the pinewood fragments which they thought were too small to form discreet pinewood habitats, have also been considered. The total pinewood area now included in the Inventory is nearly 18000 hectares, and comprises 84 separate pinewoods of various sizes. In all cases the balance of probability suggests that they are genuinely native, that is, descended from one generation to another by natural seeding.

In addition, each pinewood has:

- a minimum density of 4 pine trees per hectare, excluding trees less than 2 metres in height, or at least 50 pine trees per hectare where sites have been extensively underplanted but are deemed capable of restoration to a more natural state;
- a minimum of 30 individual trees, unless the wood has historical, aesthetic or biological significance;
- vegetation which is characteristic of native pinewood, although possibly of a depleted diversity;
- a semi-natural soil profile, but accepting also sites with superficial cultivation such as shallow ploughing or scarification with some widely spaced drains.



Pinus sylvestris

The Inventory Maps

Every pinewood has been mapped, and the maps show:

- Core pinewood area (green line) - essentially the 'heart' of the pinewood, where individual trees are closer than 50 metres apart. This should be a reasonably viable unit for management purposes, based on the assumption that most of the seeds shed by the trees will land, and hopefully germinate, within 30 metres or twice tree length of the parent trees. Minor discretionary adjustments have been made to the core area boundaries of some pinewoods to avoid loss of site integrity by needless fragmentation, for example where the patchy distribution of trees would have resulted in several core areas being situated fairly close to each other. Pinewoods have however been regarded as discreet if their core areas are further than 1.5 kilometres apart. Ownership boundaries are ignored.

- Regeneration Zone (blue line) - a notional area, normally 100 metres wide outwith the core area. This distance is increased if there is existing evidence of natural regeneration occurring further away, or there are good prospects of regeneration due to the prevailing wind direction and the topography. It is reduced where there is a natural barrier to regeneration such as a loch, or some other cause, for example if the pinewoods are believed to have a poor regenerative capacity. The zone is not restricted to ownership boundaries unless it makes sense to avoid minor incursions into other ownerships.



The Inventory Maps

- Buffer Zone (red line) - a notional area, normally 500 metres wide outside the regeneration zone. Buffer zones can sometimes overlap, and expediency occasionally determines that some smaller pinewood fragments and the occasional isolated tree are 'linked' within one large buffer zone, such as in a watershed, though large areas of open water are usually excluded. Potentially overlapping buffer zones are not merged if their respective core areas are biochemically dissimilar, or in doubt. The buffer zone boundaries are then shown as two parallel lines (eg. Glen Derry, Glen Quoich and Glen Lui).

- Adjacent areas of planted Scots pine which are known to be of the correct biochemical origin (hatched) - regarded as part of the regeneration zone if less than a third of the total area, or as part of the buffer zone if more than a third of the total area. Planted areas located more than 600 metres from the core area (ie beyond the buffer zone) are not included.

The symbol ? is used on some maps to indicate:

- pinewood areas previously identified by Steven and Carlisle where the current stocking is well below 4 trees per hectare, and without a measurable core area, but regeneration and buffer zones can be drawn;
- scattered or isolated pine trees, remote from the main pinewood, either where the exact number has not been ascertained, or where the group is too small to map separately, but where there might be a good pinewood flora which is worth conserving by developing the pinewood cover;
- areas where pines may occur, but which have not been surveyed - such as steep sided gorges - or where historical evidence suggests that there was pine in this locality in the past.



The Inventory (as presented in this database)

Although no fieldwork has been done since 1996 all the other information has been updated, giving the Inventory a reference date of 1998. It has been structured as a database of 84 pinewood records, containing the data listed in Appendix 1. Each pinewood record is linked to a locational map*, and some are also cross-referenced to a list of over 800 literature references (Inventory References). The locational maps and the references can be viewed separately on the disk, if necessary. Every pinewood record, locational map and literature reference can be printed by the user in the usual way.

• INVENTORY ANALYSIS •

This is a simple spread-sheet style screen which enables the user to obtain summaries of the Inventory information based on key data.

• INVENTORY REFERENCES •

Over 800 references about pinewoods and other relevant issues are listed. Most of them are taken from the scientific and professional forestry literature, and are a potentially useful source of information on pinewoods in general. Those that are cross-referenced to the pinewoods named in the Inventory (as accessed via the pinewood records) will contain supplementary information specific to each pinewood. The list as a whole is comprehensive but not exhaustive, and the completeness of the cross-referencing to individual pinewoods is not assured.



Capercaillie

Acknowledgements

The Forestry Commission acknowledges the work of the following people in producing this Inventory. Graham Tuley, as the Forestry Commission's Highland Native Woodlands Adviser from 1991 to 1996, collected most of the data for the Inventory (and the maps). These were edited by Peter Quelch and Bob Black. Alister Jones drafted the Overview and edited the Inventory References which had also been compiled by Graham Tuley, and Jo Lenthall checked and matched most of the references to individual pinewoods. The Access Database format and the Inventory Analysis was devised by Gordon Maxwell, who also provided specialist IT advice. The detailed Inventory maps were prepared by Howard Davies, Stephen Cole and Sheila Leckie.



The Forestry Commission

The Caledonian Pinewood Inventory (1998)

The information in each pinewood record is presented under following standard headings:

Name of pinewood used in the Inventory - usually the same as that used by Steven and Carlisle unless their pinewood has been 'subdivided' in accordance with the mapping conventions adopted for the Inventory, in which case all parts are given a new name, or the pinewood is additional (ie not identified / named by them).

Grid Reference and OS Map Sheet no. in the Landranger 1:50000 series.

Biochemical Region based on site specific test data and/or careful interpolation for adjacent areas.

Designation (Natural Heritage), such as SSSI, SAC, SPA , NNR, to indicate conservation status as applicable to all or part of the pinewood. Some pinewoods have several designations.

Ownership category, such as Personal and Family (including Trustees), Business, Voluntary Organisations, Public Body, and Forestry Commission. Some pinewoods cross several ownership boundaries.

Forestry Commission Conservancy in which the pinewood occurs.
(Double click for full address details etc.)



The Caledonian Pinewood Inventory (1998)

Local Authority area in which the pinewood occurs.

Areas in hectares of the (core) pinewood, Regeneration and Buffer zones.

Registered Seed Source(s) where applicable - identifying by name and number the seed collection area(s) occurring in each pinewood.

Pinewood References - listing relevant references to the pinewood in scientific / forestry literature. Completeness of the cross-referencing is not assured. (Double click to view details.)

Comments by Steven and Carlisle - from the book 'The Native Pinewoods of Scotland' by H M Steven and A Carlisle, 1959.

Comments by Bain - from the report 'Native Pinewoods of Scotland - a Review 1957 - 1987, RSPB, Edinburgh 1987

Comments by Tuley - site based observations by Graham Tuley (Forestry Commission Highland Native Woodland Adviser 1991 - 1996) during fieldwork for the Inventory.

Comments about Mapping Details - observations on how the boundaries of individual pinewoods were determined, especially in the more fragmented pinewoods.

Comments about the Biochemical Region - to justify what is stated above.

