

NATIVE



WOODLANDS

of Scotland



Forestry Commission

The Forestry Commission would like to thank the following contributors:

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and the members of the Native Woodland Advisory Panel for their comments.

ISBN 0 85538 357 7

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Design & Production The Almond Consultancy | Edinburgh





NATIVE WOODLANDS *of Scotland*

The state of the world's natural forests, from the tropical rainforests of the Amazonian jungle to the coniferous forests of the north, is a matter for concern. Scotland's native woodlands, though small in global terms and only a vestige of what they once were, are distinctive and unique.

What are native woodlands? What are they used for? Why are native trees important? Why are our native woodlands special?

This booklet offers an answer to these questions and provides a vision of how our native woodlands could flourish in the future.

a wooded land

*Land of brown heath and shaggy wood,
Land of the mountain and the flood*

These lines by Sir Walter Scott present a familiar picture of Scotland as a land of bare mountain and desolate moorland - but also, in Scott's poetic vision of the past, a land clothed in wildwood.

There are softer images, too - as in this verse from a song by Robert Burns:

*The little birdies blythely sing,
While o'er their heads the hazels hing,
Or lightly flit on wanton wing
In the birks of Aberfeldie.*



Our native tree species - trees natural to this country - have been linked with Scottish culture and society throughout history. They are pleasing to the eye. They seem to “belong”. But this is only part of the story. They have been of practical benefit. Over many centuries native woodlands have provided shelter for man and beast, cover for game and timber for our use.



Nowadays the great forests which long ago spread over most of Scotland have gone, although the landscape is by no means bereft of trees. In some places the most obvious woodland features are forests whose trees are frequently not native to Scotland.

But look around.

Dark pinewoods, vestiges of the ancient forest, survive in many northern glens. Birch and rowan trees soften the harsh outline of many remote Highland hillsides or festoon their rocky gorges. Venerable woods of oak and other broadleaved trees fringe the western shores, and areas of the Border country are a patchwork of rolling hill and wooded valley.



There are several ways of classifying native woodlands. The Forestry Commission recognises six main types that exist in Scotland.

NATIVE WOODLAND TYPES - 1

Lowland mixed broadleaved woods: where native oak predominates along with ash and sometimes wych elm. Silver birch and hazel commonly grow in the underwood.

the woods and the trees

What are our native trees?

Best known is the Scots pine, often identified with the legendary Caledonian Forest. But many other species are native. Among them are oak, ash, hazel, birch, rowan, willow, alder, aspen (a kind of poplar), gean (the wild cherry), wych elm (the only elm native to Scotland), hawthorn and the shrubby juniper.

These trees colonised Scotland after the retreat of the last Ice Age, their seeds blown by the wind, carried by water, or given passage in the gut of birds.

Those that failed to colonise of their own accord arrived later, brought in by people. These are often referred to as introduced species. Today they form 75 per cent of our forests - favoured because of their high yield of timber.

Some native woodlands are descended directly from the ancient forest which grew on those sites. Generation followed generation in unbroken succession. But, however ancient such woodlands seem, they are not true wildernesses.

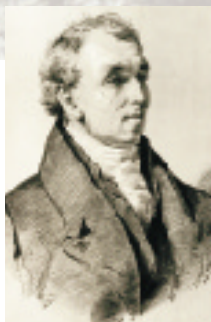




Probably no woodland in this country has been left untouched by humans. Wherever a tree grows a foot has trodden, farm animals may have grazed, or an axe or a saw or a spade has been at work nearby. None of our woods are what an expert would consider truly wild. Technically they are known as “semi-natural woodlands” or, if it can be proved from maps that they go back several centuries, “ancient semi-natural woodlands”.

Woodlands need not be self-sown to be native. Some have been planted - although exactly when is not important - the key factor is that they should consist of native species. Many oakwoods which today look natural were planted in the eighteenth and nineteenth centuries. Many new native woods of both broadleaved trees such as oak and birch and our native conifer, Scots pine, have been planted in the last ten years.

Some introduced species have been growing here for so long (in some cases at least from Roman times) and have adapted so well that they have almost become native by adoption. Beech is an example. European larch is another.



David Douglas

Most common of all the introduced species is Sitka spruce, a relatively recent incomer, quite at home in our climate and valued for the quality and versatility of its timber. Another is Douglas fir, named after the intrepid nineteenth century Scots explorer David Douglas, who introduced more than 200 plant species from North America before his tragic death in Hawaii.

NATIVES AND STRANGERS

Many species of trees and shrubs had reached Britain before it became separated from continental Europe about 7,500 years ago. But others had not. For centuries people have imported tree species from abroad to enhance the beauty or productivity of our woods. These are known as introduced species.

Introduced trees: Sycamore, sweet chestnut, silver fir, Norway spruce and European larch were all brought from continental Europe. Beech was introduced from southern England, although given time it might have arrived naturally. Sitka spruce, the redwoods and Douglas fir came from North America.

Naturalised species: Some introduced species have been here so long and find conditions so agreeable they seem at home. Examples include sycamore, beech and larch.

nature's treasure house

The native woods of Scotland are the western fringe of vast Northern European and Russian forests. Cut off by sea from the continent for 7000 years or more, they have developed a character of their own. In the course of time genetic variation has occurred.

Scots pines grow from here to Siberia, but those adapted to Scotland can be classed as a separate variety. In particular the pines native to Wester Ross, in the neighbourhood of Loch Maree, are distinct from any others.

The woodland that once grew over the greater part of Scotland now covers only a small fraction of the land. These remnants, fragmented and often vulnerable, have immense spiritual force. They are imbued with history and afford a glimpse of prehistory. As one authority has written of the ancient pinewoods, in words that have been much quoted, "To stand in them is to feel the past".



But it would be wrong to think of them simply as ancient monuments. Where trees have grown for thousands of years the woodland ecology is richer than in more recently established woodland. Over time a complex web of relationships has been formed between living things above and below ground.



Lichen on hazel tree

Many fungi form a dense mat around the tips of tree roots where they extract nutrients from the soil for the trees to use. In return, the trees provide essential food in the form of carbohydrates for the fungi.

Some woodland insects also depend on trees for food and breeding places, like hoverflies which can only breed in the tiny puddles that collect where branches of old pine trees fork from the trunk.

Native woodlands are among the most complex ecosystems in nature.

In Scotland, the old pinewoods are home to a distinctive range of animals and birds, such as the red squirrel, the crested tit and the Scottish crossbill. The Atlantic oakwoods and the hazel woods of Argyll are encrusted with many kinds of lichen, which thrive in the warm, moist, pollution-free climate of the west coast. A unique range of lichens, liverworts and mosses are found in the pine and birch woods of Glen Affric, with some of the rarest dragonflies in Europe also found there. Such woodlands are an ecological treasure house.

NATIVE WOODLAND TYPES - 2

Upland mixed ashwoods: usually confined to gullies and fertile damp ground (where they form part of more extensive broadleaved woods). Larger woods are rare, although there are well known free-standing examples at Rassal in Wester Ross and Tokavaig in Skye.



the forest of old

Once, all trees were native. People were absent from what we now call Scotland.
Nature sowed the first forest.



The last Ice Age had wiped the slate clean. When the glaciers melted and a landmass roughly similar to present day Scotland first emerged, it was bare of trees, a bleak desert, and very different from what we see now.

Gradually plant life spread over the cold earth and trees began to grow. In the course of thousands of years the forest crept northwards from the warmer south until it covered much of the land. Different species arrived at different times, and at different rates, washing over the country like the ripples of an incoming tide. The pattern of progress can be

deduced from pollen grains preserved in loch sediments and ancient tree stumps embedded in peat bogs.

Nothing in nature is static. As the climate changed, with alternating spells of warmth and chill, moisture and drought, the make-up and extent of woodland fluctuated. The forest probably reached its greatest extent around 4,000 years ago. Swathes of ancient woodland spread north and south and from shore to shore, a green mantle broken only by high mountain ridges, broad stretches of marshland and inland waters.



No single species of tree dominated throughout, and the character of the forest varied from place to place according to the nature of the trees, the lie of the land, exposure, the soil and local variations in climate.

Scots pine, often thought of as the archetypal tree of the old forest, is believed to have spread far from its present heartland in Wester Ross and the Grampians - north to Caithness and into the south. Often pine and birch - a graceful opportunist always ready to invade new territory-went hand in hand.



Towards the west oak became dominant, from Galloway to Moidart, mixed with other broadleaves like hazel and rowan. Ash found a niche where the soil suited it. Where the ground was damp, especially along the river banks, willows grew and alder flourished in the ooze.

Forest cover was patchy - in some places thick and impenetrable - elsewhere more open with meadows and glades. On exposed higher ground it turned to scrub, where even mature trees grew stunted and wizened, until at last only the dwarf species adapted to the harshest conditions, such as creeping willow and dwarf birch, could survive.

On the islands and western mainland exposed to salt-laden gales, the oak and hazel woods adopted a low profile, bent over with a matted canopy in self-defence.

NATIVE WOODLAND TYPES - 3

Upland oakwoods: these are characteristic of the west side of the country from Galloway to Sutherland, though they are found all over the Scottish uplands. Oaks predominate. In the west bluebells grow beneath the trees, replaced by wood anemones in the colder, drier woods in the east. Blaeberry is common. The West Highland woods host an extraordinary richness of mosses and liverworts.





Sometimes tracts of the forest were destroyed by great storms. From time to time fire raged through the resinous pinewoods when lightning struck. But a forest, left to itself, has a great capacity for survival. Where space was opened up new trees soon grew, and the normal cycle of forest life began again.

Over time, when the weather got colder and wetter, the forest shrank and peat bogs grew. But in the end it was not climate or natural disaster that signalled the end of the primeval forest. It was the arrival of people.

WHERE ELK AND BOAR ROAMED

The ancient forest was home to many creatures no longer at large in Scotland. The bear, the elk, the lynx and the boar roamed there. Beavers constructed their lodges by the waterside woodlands.

These creatures are gone from the wild in Scotland, though they flourish in other parts of the world. Others, such as the long-horned auroch, the wild ox of former times, are extinct.

Red deer, woodland animals by nature, grew to a grander size in the shelter of the forest than their present day counterparts, the deer of the open hill.

When the first herdsmen came their sheep, cattle and pigs - lean and agile ancestors of the modern breeds - foraged in the forest. And there the wolf packs prowled for prey.



exploitation down the ages

When the first bands of hunter-gatherers reached postglacial Scotland between 8,000 and 9,000 years ago they used the forest for their needs. They cut hazel to make wattle walls and screens for their huts. They used birch twigs to bind into ropes, and lopped ash poles to make shafts for spears and other weapons and tools. They picked nuts and berries for food. Above all they gathered and cut firewood. Thus began the exploitation of the forests of Scotland.

By the time of the Neolithic (New Stone Age) period 6,000 years ago, inroads were beginning to be made in the naturally fluctuating forest cover. Trees were felled to free the land for crops and to provide grazing for livestock. Our distant ancestors had the means to do so. A stone-headed axe may seem primitive to us, but it's surprising how efficient it could be in practised hands.

Fire was used as a destructive tool. Trees were also killed by ring-barking. Grazing killed young seedlings and prevented any regeneration of the forest. This early clearance was the starting point for the open landscapes we see now.



When the Romans made their forays into Scotland nearly 2,000 years ago they found much of the Lowland landscape cleared of its forest cover. Despite this the invaders helped to propagate a lasting myth by their references to “the Great Wood of Caledon”.

By the Middle Ages the landscape - in the Lowlands at least - was probably largely open. Flocks of sheep, a mainstay of the medieval economy, grazed on the largely treeless Border uplands. Where woodlands survived it was usually because they were protected to provide a ready supply of timber for local use, to give shelter for farm stock (still an important use for native woodland even today), or because they were used for sport.

In the Highlands extensive woodlands remained because they were remote, the population was relatively sparse, and the soils were often too thin and poor to be profitably tilled. In many parts of the Highlands birch wood was a basic prop of the economy.



By the eighteenth century the early industrial age was drawing heavily on the woodland resource. Charcoal was needed for the iron industry, and leather tanning required the bark of oak. The predominantly oak woods of the west were an important source of bark and charcoal, particularly in Argyll and around Loch Lomond. In fact many oakwoods remain today precisely because the economic value they had at that time meant that they were well managed.

Coppicing was widely practised (taking advantage of the ability of oak and other broadleaved species to send up new shoots from the cut stump). But when new raw materials were introduced for tanning and coke superseded charcoal for smelting, the coppicing stopped and young saplings were left unprotected against the browsing of domestic and wild animals.



Coppice growth from a cut stump

Elsewhere, the introduction of extensive sheep farming in the Highlands from the 1760s, often allied with population clearances, increased browsing pressure and has kept upland landscapes open. Sporting estates grew up in the nineteenth century and management for grouse shooting kept heather moorland bare of trees. Pine forests continued to be exploited to meet industrial demands for timber - and in many places no thought was given to replanting or regeneration.

NATIVE WOODLAND TYPES - 4

Upland birchwoods: here birch is a pioneer species, often short-lived and therefore replaced in time by other species. But downy birch (as distinct from silver birch) becomes dominant in the north-west Highlands where it's too cold, wet and windy for oak and pine, and only rowan, willows and hazel mingle with it. In the central and eastern Highlands silver birch woods are a significant feature of the landscape.

And so only the remnants of the ancient forest survive.

return of the natives

For a time foresters in this country tended to ignore native species (with the exception of Scots pine) and favoured the more productive newcomers. Forest workers were told to “get rid of the birch” where it was considered a weed. Sometimes stands of ancient Scots pine were swamped by new plantings of the faster growing introduced species.



Nowadays we have come full circle. When commercial species are felled, pine, birch or other native trees within the forest are likely to be spared and provide seed for regrowth. You will see these veterans on many a patch of newly bared ground, a living pledge to the future.

Large-scale forestry is important to the economy, and incorporation of native species with faster growing North American conifers can help turn plantations into real forests.



Good forest design uses native broadleaves to provide a haven for wildlife, for example along burnside and at the woodland edge. Still greater diversity is created by judicious use of open space in the forest. The regular structure of the plantation is broken up to form a mosaic of different ages and species, bringing further environmental benefits.



Growers are more likely to plant, and look after, native trees if they know that they can eventually find a market. Scots pine has long been a mainstay of commercial forestry, particularly in the north east of Scotland. There is no difficulty in selling well grown oak, although it takes a long time to grow, and there is a premium on quality ash and elm. But the timber quality of many trees in native woodlands is poor, so they have little commercial value.

However, timber that once was considered fit only for firewood is now being used to make flooring and panelling. Birch has much potential here, as recent experience in Finland demonstrates. Even if some of the other native broadleaves are less suited to the mass markets, new specialist and craft uses are being explored.

There has been a revolution in woodland practice over the last decade or so. Native woodland has come into its own again.

MILESTONES ALONG THE WAY

- 1959** H M Steven and A C Carlisle published their classic book “The Native Pinewoods of Scotland”.
- 1985** The Forestry Commission launched its Broadleaved Woodlands Policy, aimed at maintaining and increasing broadleaved woodland by encouraging good management. It paid special attention to ancient semi-natural woodlands.
- 1989** The Nature Conservancy Council published inventories of ancient, long-established and semi-natural woodland in Scotland. The Forestry Commission introduced a special grant scheme for native pinewoods.
- 1991** The Forestry Commission’s Woodland Grant Scheme provided enhanced incentives for management and regeneration of native woodlands.
- 1992** At the Earth Summit in Rio de Janeiro the UK Government endorsed the sustainable management of forests, the expansion of native woodlands and the maintenance and enhancement of biodiversity. The European Union’s “Habitats Directive” identified Caledonian forest as one type of native woodland requiring priority attention. The Forestry Commission started creating Caledonian Forest Reserves on its own land. The Native Woodland Advisory Panel was established as a forum of experts in Scotland to advise the Forestry Commissioners.
- 1993** At the European Forestry Minister’s conference in Helsinki, the UK, with the other European countries, agreed to implement guidelines for the sustainable management of forests and conservation of biodiversity.
- 1994** The UK Biodiversity Action Plan and the UK Programme for Sustainable Forestry further defined the steps necessary for delivering the principles agreed at the Earth Summit.
- 1995** The UK Steering Group report on Biodiversity set out actions needed to conserve biodiversity. It included costed action plans on, amongst others, upland oakwoods and native pine woodlands, as well as many other native woodland habitats, plants and animals.
- 1998** The UK Forestry Standard was published. In his foreword the Prime Minister said: “We in the UK have a special responsibility to make sure that our forests are a renewable resource and make a positive contribution to the environment”.

new directions



Native woodlands are now at the forefront of the land use debate. Worldwide concern for their conservation and biodiversity was marked at the highest level by the Earth Summit in Rio de Janeiro in 1992 and the Helsinki conference a year later. On a global scale, timber from forest plantations is seen as helping to take the pressure off native woodlands. Within Scotland, Scottish Natural Heritage has earmarked the most important native woodland remnants for special protection.


Throughout Britain it is government policy to encourage native woodlands: to promote their expansion, keep them in good heart, protect their ecological diversity, enhance their appearance, and - where it can be done sensibly - boost the production of marketable timber.



BIRCH

"The Highlanders of Scotland make everything from it, they build their houses, make their beds, chairs, dishes and spoons; construct their mills; make their carts, plows, harrows, gates and fences; and even manufacture ropes of it. The branches are employed as fuel in the distillation of whisky; the spray is used for smoking hams and herrings, for which last purpose it is preferred to every other kind of wood. The bark is used for tanning leather, and sometimes, when dried and twisted into a rope, instead of candles. The spray is used for thatching houses; and dried in summer, with the leaves on, it makes a good bed when heath is scarce."

from J C Loudon (1842): An Encyclopaedia of Trees and Shrubs, being the Arboretum et Fruticetum Britannicum.



The husbandry and expansion of native woodlands is backed by management and planting grants from a number of sources, including the Forestry Commission. Among these are woodland grant schemes, environmental grants, crofter forestry incentives and grants to enable farmers to expand the area of new native woodlands on former agricultural land. On its own land, Forestry Enterprise (an agency of the Forestry Commission) has Caledonian Forest Reserves and is restoring large areas of native woodland.

Lottery money has enabled the Millennium Forest for Scotland project to support numerous native woodland schemes, from a primary school tree nursery to the "Forest for a Thousand Years" that is being planted on Loch Lomondside by the Royal Scottish Forestry Society.

a vision for the future

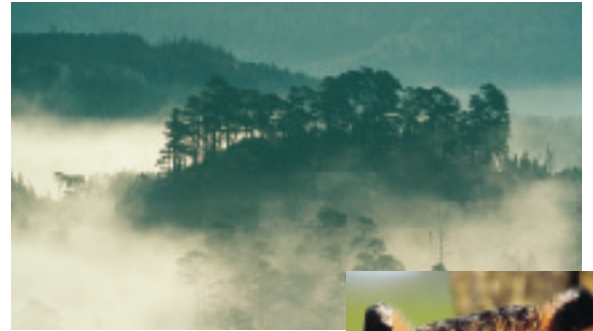
What kind of forests do we want? Where should they be?

Healthy woodlands encourage biodiversity, support a rich range of plants and animals. Forest life in all its diversity enhances the environment, and therefore our lives.

It would be vain to try to recreate the forest as it was some time in the past, even if we could. We have to think of the future.

We have to take into account our need for farm land and for recreation, the demands of urban and industrial development, and our emotional desires.

We expect more from the land now than at any time in the past. Our grand-children and the generations to come will need food, timber, fresh water, shelter, recreation, opportunities to observe and enjoy wildlife as well as freedom to explore and enjoy the landscape. All these needs will affect the forest and the way we manage it.



For a start, many fragmented small patches of native woodland should be enlarged and linked together. We can do this by expanding existing woodlands and creating forest links across the landscape. Such links could follow rivers or roadways (this happens naturally when thickets of trees spring up along abandoned railway lines), allowing woodland plants to spread and woodland animals and insects to move along them. Patches of woodland near to each other will act as stepping stones for wildlife. Clumps and drifts of native trees within large plantations could reach out and connect with native woodlands beyond.

In all, this calls for a greater forest cover than there is now - only 15 per cent of Scotland's land area is wooded at present. Some parts would be thickly covered with trees, elsewhere trees would be thinly spread.

Scale gives many advantages. For example, some people would like to see native Scots pine and other species spreading out almost from coast to coast from the ancient relic that already exists in and around Glen Affric. Conservation work already being done in Affric and Kintail by Forest Enterprise, the National Trust for Scotland and other groups could be a step on the way.

The extensive woodlands in Deeside already show that native trees can contribute much to the character of an area.



NATIVE WOODLAND TYPES - 5

Native pinewoods: Scots pine predominates around the Cairngorms massif, but pinewoods, often mixed with birch, are found scattered through the Highlands. Juniper occurs sporadically in the pinewoods, and rowan can be common where there is not a lot of grazing.

More extensive native woodlands would raise the possibility of bringing back forest birds and animals that have long been absent. It has been done before. The capercaillie, largest of the grouse family, was reintroduced last century after becoming extinct in Scotland more than 200 years ago. Now it's at home again in our native pinewoods.

Many families have watched ospreys in their pine tree nest at Loch Garten in Strathspey. Ospreys were hunted to extinction in Scotland last century, but after one pair returned in 1954, careful conservation has encouraged breeding in growing numbers at Scottish woodland sites.

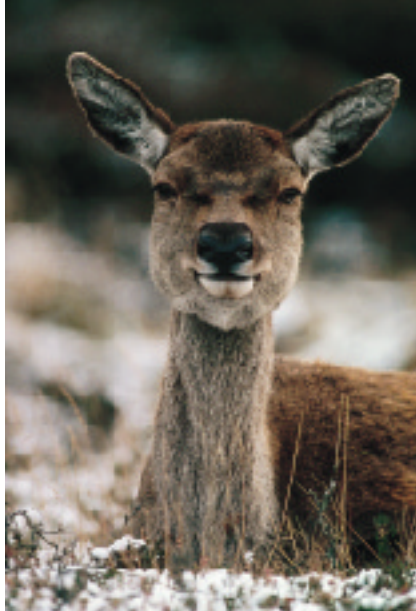
The red kite was recently reintroduced to Scottish forests. The reintroduction of the European beaver, a creature of riverside and lochside woodlands, is another possibility.

Some nature lovers would like, eventually, to bring back the wolf - it has been done in North American wildernesses - but that is more controversial!



NATIVE WOODLAND TYPES - 6

Wet woodlands: dominated either by alder, willow or birch, are found throughout Scotland on wet and poorly drained soils. Mainly they grow as small woods along river valleys, around bogs and mires and between open water and drier ground. They are usually scrubby and transient, drying the land so enabling longer-living trees such as oak or ash to take over. However, some alder woods on slopes are persistent and can be the last survivors of ancient woodland in a landscape.



If we want to mimic nature and establish trees as naturally as possible, natural regeneration is the best way: the trees spread themselves by seed. But sheep and deer eat young trees and heavy grazing has contributed to the steady decline of our native woodlands. Grazing must be reduced to give seedlings a chance to grow. Sometimes this means taking sheep off the hillsides, culling deer to reduce their numbers or fencing animals out of woodland.

In some areas, though, the seed sources are so scarce that some planting may be necessary. Of course these trees themselves will eventually act as seed sources themselves for future generations of young trees.



NATIVE TREES AND THE RIVERSIDE

Trees like alder, willow and birch are particularly well adapted for growing in damp conditions and, with their web of roots, help to prevent erosion of river banks and damage to the spawning grounds of fish by silting. Riverside trees give shade and cool water for fish in the heat of summer and their leaves help to feed a multitude of aquatic life.

Trees and the aquatic food chain:

- Leaves fall into the water.
- They are softened by specialist fungi.
- Fresh water invertebrates consume the softened leaves.
- In turn, these invertebrates serve as food for small fish like trout and young salmon.

the heart of it

Future generations are sure to appreciate native woodlands for their beauty and for the diversity of animal and plant life they sustain. As native trees supply timber for a growing number of markets they will provide jobs. They can also help to protect our watercourses, reduce land erosion and provide shelter for stock. And since growing trees are a store for carbon, they will play a part in minimising global warming.



All over Scotland increasing tree cover will link islands of native woodland with each other and with plantation forests. Isolated species of plants and animals will come together and flourish. Paths and rides will enable people to wander through the forest landscape, unaware of the subtle blending of commercial plantation with native woodland.

Scotland's forest will be treasured -
and native woodland will be at the heart of it.



“... that over time all existing native woodland should be conserved, improved and extended to provide long-term environmental, recreational and timber benefits. This strategy will create a mosaic of native woodland interspersed with heather moorland, grassland, peatland and wetland and, on the lower ground in particular, agricultural land and productive forest of native and non-native species. Heather moors will still be extensive in some parts and used for grouse shooting and open hill deer stalking”

“The proposed forest expansion should take place over a very long time-scale of more than 100 years with perhaps half occurring in the first 50 years. The natural heritage, employment, tourism, sport, wildlife and the owners of the land should all benefit greatly from the major changes proposed”.

- Cairngorms Working Party



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