WOODLAND

LORNE GILL/SNH

BLACK WOOD OF RANNOCH

"We have a domestic wildlife that is worthy of our special care. The so called Common Frog is really very rare in global terms, whilst our familiar bluebell is a wildflower that occurs in almost no one else's ancient woods but ours."

PROF. CHRIS BAINES

Tayside Biodiversity Partnership

BIODIVERSITY
THE VARIETY OF LIFE

WOODLAND

Introduction

There are few areas of Scotland which offer the range and variety of the woodlands found in Tayside. They range in type from the wet woodlands on the banks of the River Tay to the ancient Scots pine woodlands in the Black Wood of Rannoch. Many of these woodlands are steeped in a rich historical and cultural background which has led famous poets and songwriters to such works as Robert Burns' "The Birks o' Aberfeldy". One needs look no further than the renowned Fortingall Yew - reputedly Europe's oldest tree at around 3,000 years old - which might be reviewed as the outstanding icon of Tayside's tree and woodland heritage.

Perthshire has been titled "the cradle of Scottish forestry" partly in recognition of the Planting Dukes of Atholl in the late 18th Century. Many of the original introductions of larch, spruce and Douglas fir were undertaken in Perthshire. As a result, the area's planted forests are perhaps older and more diverse than anywhere else in Scotland with important biodiversity gains as a consequence.

The total area presently occupied by trees in Tayside totals approximately 103 thousand hectares, which is around 13% land coverage. Around a fifth is of ancient or semi-natural origin and comprises an amazing 13 different categories of woodland (or National Vegetation Classification types as classified by woodland ecologists). Whilst the outlook for Tayside's native woodland habitats and the habitat value of the region's other woodlands is undoubtedly better than it has been for a very long time, there still remains a number of threats to individual woods and species (such as the Capercaillie) which represent a real challenge.

The other 80% of woodlands comprise chiefly of introduced conifer woodlands (although planted Scots pine often of Caledonian origin is an important component). Some of these are amongst the longest established in the British Isles. In the past forest management practice had, of necessity, to be predominantly influenced by the need to maximise timber production. In recent times, however, biodiversity benefits arising out of different management practices such as greater species diversity, long-term retentions and continuous cover silvicultural systems have been widely recognised. The challenge now is to optimise those benefits.

The Habitat Action Plans seek to recognise the steps required to assess the status of each woodland type and address the action required to protect and enhance their biodiversity value. The diverse nature of all of these woodlands has been categorised and further Action Plans will follow in the next Tranche.

Native Pinewoods W1

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NATIVE PINEWOOD, PERTHSHIRE

DEFINITION

Native pinewood habitats are relicts of the Caledonian Forest which once covered a large part of the Scottish Highlands and are an important western representative of the European boreal forests. They are dominated by self-sown Scots pine *Pinus sylvestris* and occur throughout the central and north-eastern Grampians and in the northern and western Highlands of Scotland. Pinewood remnants are mostly found on poor podsolised soils and are confined to the upland areas of Tayside.

Pine is the characteristic tree species in native pinewoods though they also contain varying amounts of Birch *Betula spp.* and other broadleaves, with Juniper *Juniperus communis* often an important component in the understorey. The National Vegetation Classification (NVC) divides pine woodland (W18) into 5 sub-communities. Tayside's native pinewoods include elements characteristic of the drier eastern areas (*Luzula* sub-community – W18c and the *Spagnum – Erica* sub-community – W18d) found mainly in the wetter west.

CURRENT STATUS AND EXTENT OF HABITAT

The Forestry Commission's Caledonian Pinewood Inventory of 1998 indicates the total CPI pinewood area in Tayside as 1,288 hectares.

A survey carried out by the Tayside Native Woodland Initiative in 1995 estimated that native pinewoods accounted for 8% (1,454 ha.) of the total native woodland resource in Tayside. A review of Woodland Grant Scheme activity for this Habitat Action Plan between 1995 and 2000 identified that new native pinewood creation through new planting and regeneration has increased this area to a total of 4,104 ha, more than doubling the resource since the original survey in 1995.

W1 Native Pinewoods

KEY SITES

The UK Pinewood Habitat Action Plan is concerned with woodlands covered by the Caledonian Pinewood Inventory. This is somewhat restrictive for the purposes of the local Biodiversity Action Plan as Tayside only contains two CPI woods at Black Wood of Rannoch and Meggernie, Glen Lyon. There are plenty of other good pinewood habitats, including some newly created ones. There is a total of some 12,275 ha. of Scots pine woodland in Tayside, including the Caledonian remnants which were extensively planted for timber over the last 300 years often using native origin seed. In recent years there has been a deliberate programme of identifying and establishing new woodlands which simulate the conditions found in the ancient Caledonian pinewoods.

Caledonian Pinewood Inventory sites:

Black Wood of Rannoch
Meggernie, Glen Lyon

Other examples can be found at:

Montreathmont, Angus
Cross Bog, Glen Clova
Meikleour Estates, Blairgowrie
Bruar, Clunes, Deuchary Hill and Glen Derby (Atholl Estates)
Dunfallandy, Pitlochry Estates
Glenogil, Angus
Craiganour, Highland Perthshire
Talladh-A-Bheithe, Rannoch.

NATURE CONSERVATION IMPORTANCE

Native pinewood remnants generally occur on heavily leached, podsolic soils and do not support the same diversity of plants and animals compared with other habitats. There is, however, a characteristic plant and animal community, including many rare species associated with this habitat.

KEY SPECIES

P = UK Priority species **C** = UK species of conservation concern

Mammals	Red squirrel	*Sciurus vulgaris*	**P**
	Pine marten	*Martes martes*	**C**
Birds	Capercaillie	*Tetrao urogallus*	**P**
	Redstart	*Phoenicurus phoenicurus*	**C**
	Great spotted woodpecker	*Dendrocopus major*	**C**
	Scottish crossbill	*Loxia scotica*	**P**
	Spotted flycatcher	*Muscicapa striata*	**P**
Invertebrates	Narrow-headed wood ant	*Formica exsecta*	**P**
	Shining guest ant	*Formicoxenus nitidulus*	**P**
	Scottish wood ant	*Formica aquilonia*	**P**
	Caledonian sac spider	*Clubiona subsultans*	**P**
	a spider	*Diploena torva*	**C**
	a spider	*Haplodrassus soerenseni*	**C**

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	a spider	*Robertus scoticus*	C
	Cuckoo wasp	*Chrysura hirsute*	P
	Pearl-bordered fritillary	*Boloria euphrosyne*	P
	Cousin German moth	*Paradiarsia sobrina*	P
Higher Plants	Wild hyacinth	*Hyacinthoides non-scripta*	C
	Juniper	*Juniperus communis*	P
	Small cow-wheat	*Melampyrum sylvaticum*	P
	Twinflower	*Linnaea borealis*	P
Fungi and Lichens	Blue corky spine fungus	*Hydnellum caeruleum*	P
	Brown corky spine fungus	*Hydnellum peckii*	P
	Drab tooth fungus	*Bankera fuligineoalba*	P
	Globe scented pine fungus	*Phellodon tomentosus*	P
	Stump lichen	*Caldonia botrytis*	P

NATIONAL BIODIVERSITY CONTEXT

Within the European Community this priority habitat type occurs only in Scotland. Although Scandinavian countries hold a far greater amount of Scots Pine woodland, some Scottish pinewoods represent genetically distinct oceanic variants and are, therefore, extremely important in a European context. The *Pinus sylvestris* found here has been identified as an endemic sub-species scotia. Studies of the terpenes in the resin of shoots have shown that there are biochemical differences between the pinewoods which prove the genetic differences. These studies have identified seven distinct biochemical regions: Tayside's native pinewoods are found within the South Central biochemical zone.

These forests are important western representatives of the European boreal forest in which structure and succession are determined mainly by fires caused by lightening. Although they do not support a large diversity of plants and animals compared with some more fertile habitats, there is a characteristic plant and animal community which includes many rare and uncommon species.

The objectives of the UK Habitat Action Plan for Native Pinewoods are:

- Maintain remnant native pinewood areas listed on the Caledonian Pinewood Inventory and restore their natural diversity of composition and structure.
- Regenerate and expand a total of 35% (5,600 ha.) of the current wooded area of remnant native pinewoods equalling 16,000 ha. (1995 figures) by 2005, predominantly by natural regeneration within the core and regeneration zones.
- Create the conditions by 2005 for a further 35% of the current area to be naturally regenerated over the following 20 years, mainly by the removal of non-native planted species and/or genotypes and the control of browsing levels.

In the local context, the Tayside share of the UK HAP figure for the expansion of Caledonian Pinewood Inventory core area should be 400 ha. Another aim within Tayside is to create a further 4,530 ha. elsewhere within the pinewood range by 2005. The Tayside Biodiversity Action Plan (TBAP) share of this target is 3,210 ha. within the Perth and Kinross local authority area and 1,320 ha. in the Angus local authority area. These figures have been calculated by reference to the biological potential for pinewoods in the TBAP area.

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ECOLOGY AND MANAGEMENT

Native pine woodlands are relict indigenous forests dominated by self-sown Scots pine *Pinus sylvestris* that occur throughout the central and north-eastern Grampians and in the northern and western Highlands of Scotland.

Native pinewoods occur on infertile, strongly leached podsolic soils. The main tree species is Scots pine although Birch *Betula spp.*, Rowan *Sorbus aucuparia*, Alder *Alnus glutinosa*, Willow *Salix spp.* and Bird cherry *Prunus padus* are also found.

A shrub understorey, where browsing levels are low, includes Juniper, Aspen *Populus tremula*, Holly *Ilex aquifolium* and Hazel *Corylus avellana*. The field layer is characterised by acid-tolerant plants like Bell heather *Erica cinerea*, Blaeberry *Vaccinium myrtillus* and Crowberry *Empetrium nigram*. Many uncommon and rare species are found in this habitat including the specialist hoverfly *Callicera rufa*, Scottish wood ant *Formica aquilonia*, Narrow-headed ant *Formica exsecta* and the distinctive bird species Capercaillie *Tetrao urogallus*. Britain's only endemic bird species, the Scottish crossbill *Loxia scotica* and rare species such as Twinflower *Linnaea borealis* and One-flowered wintergreen *Moneses uniflora* are also found in the larger native pinewoods.

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TWINFLOWER

Narrow-headed Wood Ant

This ant is localised, but widely distributed in Europe. It has been recorded in only two main habitat types in the UK: on lowland heathland in southern England and in native pine forests in the Scottish Highlands. It is listed as 'endangered' on the GB Red List.

Most historical records in Scotland originate from mid-Strathspey with outlying locations in Easter Ross and Rannoch Moor, Perthshire.

Current factors causing loss or decline:

- The loss of suitable heathland due to destruction and inappropriate management, for example through agriculture and urban development, inappropriate afforestation and encroachment by scrub, trees and bracken leading to shading out of nests
- Loss of natural and semi-natural habitats in Scotland, e.g. Caledonian Pine Forest, and the intensive management of moorland for game birds and red deer.

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CURRENT FACTORS CAUSING LOSS OR DECLINE

Through the dual influences of climate change and man these once extensive forests have been reduced considerably to only about 1% of their former range. Such fragmentation and therefore isolation of individual woods has reduced the wildlife value and genetic variation of this now rare woodland type. Although some woodland may have degenerated owing to climate change, as with oakwoods, large areas of native pinewood have been directly influenced through exploitation over the last 250 years by felling and under-planting of exotics in the mid 20th century. A current factor impeding the development of native pinewoods is grazing, both by wild herbivore and domestic stock. Deer, in particular, have had a major impact in recent years on the ability of pine seedlings to survive.

Species	Habitat type and characteristics	Factors causing decline or threats to current populations (relevant to FC in Scotland)
Red squirrel *Sciurus vulgaris*	all woodland types, except where ousted by grey squirrel.	spread of grey squirrels; habitat fragmentation; disease; spread of large seeded broadleaves into conifer forests.
Capercaillie *Tetrao urogallus*	mostly native pinewoods.	predation; collision with forest fences; inappropriate habitat management; weather and climate change; disturbance.
Black grouse *Tetrao tetrix*	moorland / woodland edges, young conifer plantations and clear felled sites with rushes, cotton grass, heather etc.	fragmentation and inappropriate management (drainage, re-seeding, frequent muirburning) of open ground habitat and canopy closure of forests; field layer of predation; disturbance of leks.
Scottish crossbill *Loxia scotica*	pinewood fragments.	loss of habitat.
Spotted flycatcher *Muscicapa striata*	mature broadleaved woodlands preferred.	not well known, but believed to include loss of nest sites (mature trees); recent climatic trends.
Scottish wood ant *Formica aquilonia*	undisturbed woods esp. pine/birch, and plantation clearings.	loss or inappropriate management of (pinewood) habitat.
Narrow-headed ant *Formica exsecta*	pinewoods, heath/scrub.	loss, or inappropriate management, of moorland niches within Caledonian pinewoods.
Hairy wood ant *Formica lugubris*	woodland clearings mainly in pine and oakwoods.	loss or inappropriate management of habitat.
Shining guest ant *Formicoxensus nitidulus*	nests of wood ants within pine/ birch and oakwoods of habitat.	decline not confirmed, but assumed to reflect decline in other ants due to loss or inappropriate management.
Caledonian sac spider *Clubonia subsultans*	pinewoods – under bark, stones, in litter, amongst moss, on branches of pines and juniper.	changes in habitat such as (high) tree density and extent of pinewoods.
Cuckoo wasp *Chrysura hirsuta*	parasitic on Osmia spp, occurring in base rich grassland and pinewoods.	loss of dead wood and open glades in pinewoods, and herb-rich grasslands.

Pearl-bordered fritillary *Boloria euphrosyne*	woodland clearings, (esp. in upland oakwoods), often south facing; unimproved grassland with scattered scrub and bracken.	loss of clearings by planting or regeneration (e.g. following fencing or control of browsing); neglect of coppice and decline in coppicing practices.
Cousin German moth *Paradiarsia sobrina*	foliage of blaeberry and heather, scrubby birch and old pinewoods.	inappropriate grazing management; muirburning.
Juniper *Juniperus communis*	pinewoods, dunes & chalk downlands.	cutting, burning, overgrazing preventing establishment and undergrazing allowing other woody vegetation to dominate the site.
Small cow-wheat *Melampyrum sylvaticum*	Flushed sites in woodlands of fairly open canopy in northern UK.	Development of non-native evergreen woody vegetation at extant sites. Also inappropriate grazing and agricultural intensification at edges of woodland habitat.
Twinflower *Linnaea borealis*	primarily native pinewoods occasionally pine plantations and in birchwoods.	overgrazing in pinewood areas; shading from developing tree canopy; damage from forest operations; fragmentation / genetic isolation.
Green shield-moss *Buxbaumia viridis*	decaying conifer wood in sheltered and shaded situations.	removal of deadwood.
Stump lichen *Cladonia botrytes*	cut surfaces of pine stumps in vicinity of native pinewoods, also heather stems and peaty ground.	unknown, but believed to reflect reduction of tree felling in native pinewoods and lower cut stumps and stump treatment in pine plantations.
Tooth fungi (6 species) *Hydnoid*	mostly pinewoods, some oakwoods.	historic loss of pinewoods and other habitats and changes in habitat management including loss of continuity of mature trees.

OPPORTUNITIES AND CURRENT ACTION

The outlook for native pinewoods as a habitat is probably better now than it has been for the last 300 years.

The government, through the Forestry Commission (FC), regulates the management of all woodland in the UK. The Commission also encourages forestry expansion through the payment of grants where creation of new woodland is in accordance with forestry and conservation policies. Such policies are informed by both national and international priorities and these are set out in a series of publications that provide the framework for environmental regulations and incentives. The UK Forest Standard defines and applies government commitments to sustainability and biodiversity and this is augmented by a series of environmental guidelines on conservation, landscape and water. The Scottish Forestry Strategy contains a commitment to achieve the current Action Plan targets.

In recent years forestry policy has moved to recognise the value of native pinewood from a habitat, landscape and cultural perspective and has put in place a number of initiatives to both protect and enhance its status and extent.

There are a number of resources available, both financial and advisory support, for native woodland management and establishment. The main sources of funding are through the FC which offers a wide range of grants to private landowners to assist specifically for native pine woodland management, improvement and expansion. Considerable effort has already been put into protecting and expanding the existing remnants, establishing new woodlands simulating the pinewood habitat, as well as encouraging sympathetic management practices in other Scots pinewoods of high habitat value. These initiatives can act as an exemplar of the potential for habitat restoration not only for other woodland types but also for all habitat types.

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Opportunities are also available through ensuring management plans for all designated pinewood sites are kept in place and current. For example, the SSSI/Natura group identifies various examples of best practice and lists these in a way that publicises current management practices and highlights future opportunities:

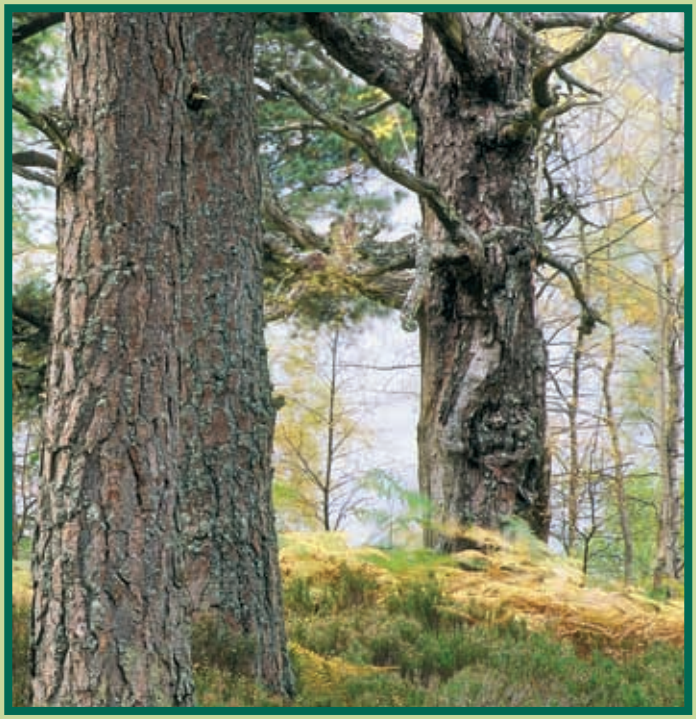
1. Black Wood of Rannoch is identified as a Caledonian Pinewood of 'A' Grade interest. This recognises the excellent structure and condition of the pinewood as the best example of its kind in Tayside.
2. Juniper woodland at Glenartney, South of Comrie. This is a 'B' Grade interest. This recognises that the woodland structure is well conserved and future restoration will be possible with minimal effort.

Case Study

BLACK WOOD OF RANNOCH

The Black Wood of Rannoch on the southern shores of Loch Rannoch, Perthshire, is one of only 35 surviving remnants of the native pinewoods of Scotland. It is the largest native Scots pinewood in the Southern Highlands and is isolated from other native pinewoods by some 10miles, the nearest being the Old Wood at Meggernie in Glen Lyon. It was acquired by the Forestry Commission in 1947.

The Black Wood extends to 912 ha. and has been part of a larger SSSI since 1955. In 1975 the Forestry Commission designated it a Forest Nature Reserve and more recently in 1993 a Caledonian Forest Reserve as part of the Forest Enterprise initiative to promote the remnants of Caledonian forests under its management. Ten year Management Plans, formally agreed with SNH, have been in place since 1975.



LORNE GILL/SNH

BLACK WOOD OF RANNOCH

The wood's importance as a historic and scientific site was appreciated from the start and a series of eight vegetation plots, each consisting of 2 acres, was established and surveyed in 1948. Monitoring continues to this day, giving over 50 years of information.

The most recent SSSI notification describes the wood as: 'of major importance for its lichens and fungi with a number of rare species and species characteristic of old pinewoods. It is of national importance for the range of highland woodland and its birds, including several uncommon species. The site has the largest number of very rare insects of any Scottish site outside Speyside and is the prime example of the outstanding insect fauna of the Tummel - Garry valley system. In particular there are rare species of moths, dragonflies, beetles, flies and bugs. The beetle fauna includes a large number of species indicative of ancient woodland.'

Aims

- To maintain and enhance the historic, landscape and scientific interest of The Black Wood as a semi-natural Caledonian pinewood with its associated fauna and flora
- Perpetuate the genetic purity of local Rannoch pine

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Objectives

High:

- Maintain and enhance the pinewood ecosystem.
- Create conditions for natural regeneration of a new generation of native trees.

Medium:

- Study and research The Black Wood.
- Study development of pinewood ecosystem.
- Provide objective data for preparation of future Management Plans.

Low:

- Production of timber from removal of introduced species.
- Create open access policy allowing public to use tracks within the Reserve on an informal basis.

Prescriptions

- Remove introduced species e.g. Sitka Spruce, Lodgepole Pine and other conifers.
- Monitor on a long term basis.
- Collect some of the pinewood seed source for research and regeneration.

Case Study

Capercaillie

The Capercaillie *tetrao urogallu* is one of three bird species that is restricted to pinewood and other conifer habitat in northern Scotland; the other two are the Crested tit *Parus cristatus* and the Scottish crossbill *Loxia scotia*. It prefers old, open pine forests with lush ericaceous ground cover though in summer it is occasionally found in mature oakwoods. It may also be found in woods of other species such as larch and spruce.

The Capercaillie became extinct in Scotland in 1785, mostly because of loss of habitat when the old forests were felled, and through overshooting. In 1837 the birds were successfully reintroduced into planted woodlands by Lord Breadalbane at Drummond Hill, by Taymouth Castle, and they rapidly re-colonised the local woods, including the pinewood remnants. Soon other re-introductions were made in various pinewood localities in Scotland using descendants of the original Taymouth Castle population combined with additional capercaillie brought from Scandinavia.

FORESTRY COMMISSION

Unfortunately today Capercaillie are once again facing a crisis, not only in Scotland, but across the whole of the species' European range. Recent figures from the RSPB/Scottish Natural Heritage joint survey indicate that Scottish Capercaillie numbers have declined to around 1,000 individuals - a halving of the population in just the last five years. This serious reduction is due to a combination of factors.

- An increase in adverse weather conditions during June when chicks are newly hatched;
- Predation due to a reduction in keepering;
- Over-grazing by deer and sheep reducing the vigour of ground vegetation;

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- Collisions with deer fences;
- Over-shooting and human disturbance.

The species is recognised at an international level as worthy of protection under the European Bird Directive.

Capercaillie make full use of a varied pinewood habitat. In summer they need good ground cover of shrubby vegetation for nesting and chick rearing. Capercaillie feed close to and even on the ground, their diet consisting of buds, shoots, seeds and berries. This dictates their preference for open pinewood habitats with lush ground cover of Heather *Calluna vulgaris* and dwarf shrubs that provide not only ample food but protection too. In winter they are arboreal and pine needles are eaten by nipping off the leading shoots of conifers.

The species' reliance on, and exacting needs of a varied but specific habitat has led to their extinction in the past. Though hunting played a part, it probably only accelerated the inevitable process. Today Capercaillie are under threat from various factors. Research has shown that Capercaillie densities are highest in semi-natural woodland, but despite this 60% of the population is found in plantation type woodlands.

Capercaillie can be surprisingly nimble when climbing the branches of pine trees. They are renowned for being shy and very difficult to see except during the displaying season. If they are disturbed they will initially freeze; if flushed they take off with a characteristic crashing as the bird leaves the foliage and they can fly with surprising agility between trees, even in dense forest.

OBJECTIVES AND TARGETS

The UK Habitat Statement for native Scots pine gives a conservation direction to Local Biodiversity Action Plans which may adopt some of or all of the relevant measures identified nationally and to be applied locally. The targets established for this plan are based on maintaining the current extent of native pinewoods and encouraging the balance of appropriate management regimes with regions and across the distribution of the type.

	Objectives	Targets
1	Maintain existing pinewood area and prevent net loss or reduction in quality of native pinewoods in Tayside. The Caledonian Pinewood Inventory (FC, 1998) core areas for UK total 17,882 ha. The Tayside area is 1,288ha.	By pro-rata assessment of the UK figures to Tayside area the following target can be identified - Expand pinewood areas in CPI regeneration zones to 1,700 ha. by 2005.
2	Ensure that native pinewoods within the Caledonian Pinewood Inventory area are managed to increase their biodiversity/conservation value.	Raise the awareness of the importance of native pinewoods to woodland owners through examples of good practice, workshops, publicity and other promotional opportunities. Provide habitats for associated key species utilising current European LIFE funding initiatives (such as Capercaillie).
3	Increase the establishment of new native pinewoods on suitable sites within Tayside.	Revised IFS (Indicative Forestry Strategy) to be drawn up by Local Authorities incorporating the figures below by 2005. Create a further 4,530 ha. elsewhere within the pinewood range by 2005. The Tayside LBAP share of this target is 3,210 ha. in the Perth and Kinross local authority area and 1,320 ha. in the Angus local authority area. These figures have been calculated by reference to the biological potential for pinewoods in the Tayside LBAP area.

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4	Ensure the long term future of this habitat.	Raise the public's awareness of the importance of native pinewoods and newly planted pinewoods within the Tayside area through examples of good practice, workshops, publicity and other promotional opportunities.
5	Ensure the long term future of native pinewoods.	Ensure all new native pinewood sites are incorporated into positive management through the new Scottish Forestry Grant Scheme by 2005.
6	Extend and enhance native woodlands by developing Forest Habitat Networks as detailed in the Scottish Forestry Strategy.	Priority action point in SFS document. Partnership involvement from grant setting (FC) to guidance (SNH) and adoption by private sector, FE and woodland initiatives providing ongoing advice. Target is to act on advice and recommendations currently being prepared by FC and SNH. Also required are revised IFS (Indicative Forestry Strategies) to be drawn up by Local Authorities incorporating the figures below by 2005.
7	To improve the ecological value of native woodlands, through work related to native woodland Habitat Action Plans.	To deliver new FC grants by April 2003 that will be designed to contribute towards costs for work that achieves at least one of the following: - improves the natural heritage value of semi-natural woodlands; - restores native woodlands on ancient woodland sites; - secures natural regeneration within or immediately adjacent to native woodlands.
8	To improve the environmental value of woods and forests through work related to Biodiversity Action Plans (Habitat and Species Action Plans, Local Biodiversity Action Plans) and designated sites or species listed in the schedules of the Wildlife and Countryside Act or the EU Habitats and Species Directive.	To deliver new FC grants by April 2003 that will be designed to contribute towards costs for work that is necessary to implement agreed HAPs, SAPs and LBAPs including work in open space and non-woodland habitat within the woodland or forest area.
9	To put forward recommendations for changes to the Woodland Grant Scheme and farm Woodland Premium Scheme in Scotland so as to improve their effectiveness in delivering priorities identified in the Scottish Forestry Strategy.	A joint Forestry Commission/Scottish Executive Steering Group report submitted for European approval in autumn 2002. Provisional launch of new scheme (Scottish Forestry Grants Scheme) in April 2003. Revised IFS's put in place across Tayside incorporating HAP and LBAP targets by 2005.

Stakeholders

- Landowners and woodland owners; forestry and woodland organisations; members of public; tourists and local visitors; countryside organisations; local authorities

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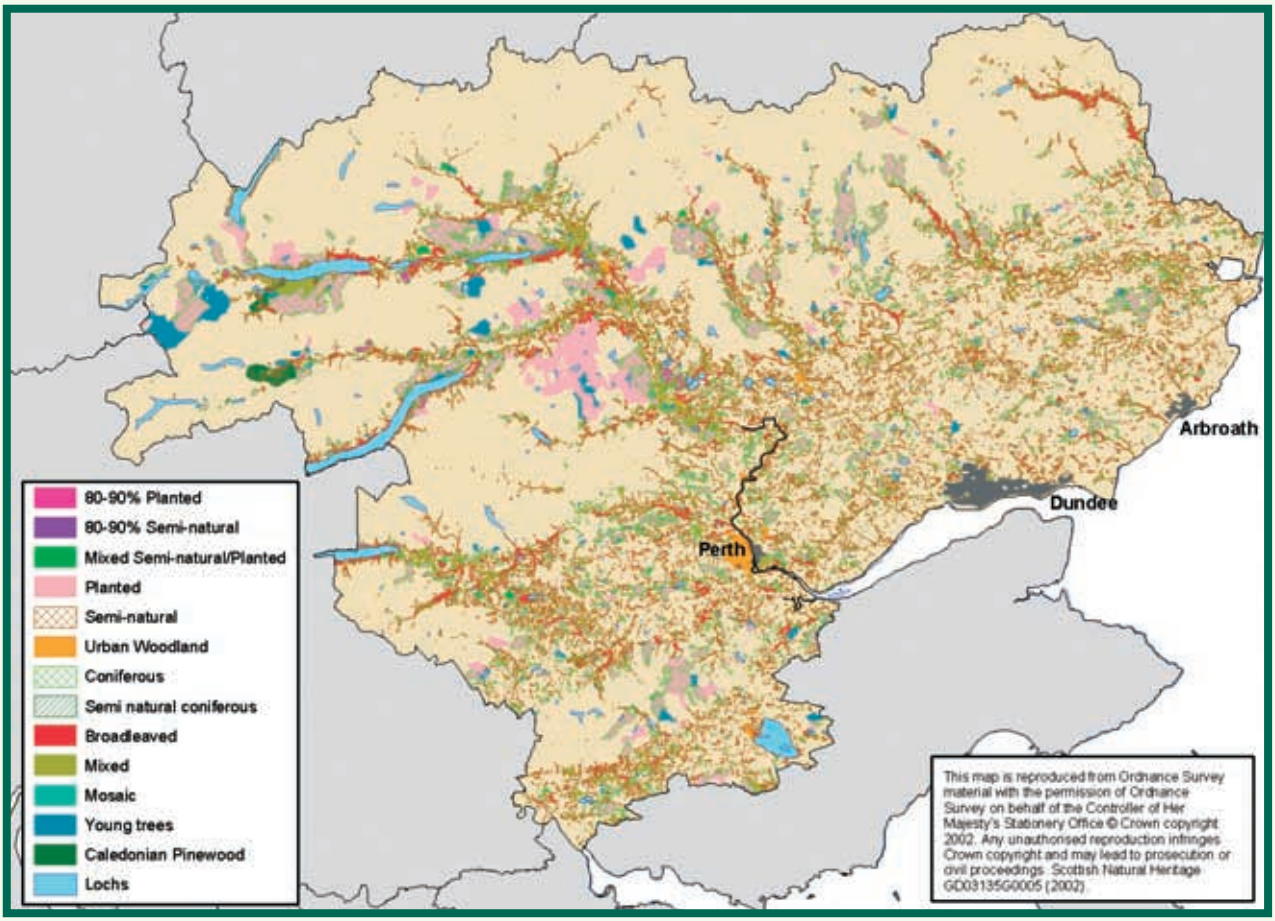
ACTION FOR BIODIVERSITY

		Action - Native Pinewood	Deliverers		To take place by								Meets Objective No.
			Lead Partners	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	**A**	**Policy and legislation**											
W1	1	Ensure that the opportunities to realise the pinewood potential of suitable land are identified within the development of Indicative Forestry Strategies by the local authorities.	AC DCC PKC	TBP				#					1,3,4,6,9
W1	2	Provision of financial grant support for appropriate management of native pine woodland through the Scottish Forestry Grants Scheme.	FC			#	#	#	#	#	#	#	All esp. 7,8
	B	**Site safeguard and management**											
W1	1	1. On FE managed land, ensure appropriate management of native pine woodlands for biodiversity (such as at the Black Wood of Rannoch). 2. Ensure biodiversity details are incorporated into the FE 10 Year Plans.	Forest Enterprise	TBP	#	#	#	#	#	#	#	#	1,2
W1	2	Establish sites that can be used to demonstrate good practice of pine woods and which identify linkage work that will complement other habitats.	FC	FE TBP				#					2
W1	3	Promote the use of long term (20 year) Forest Plans that highlight woodland owner objectives and their aims for existing or potential pine woods.	FC	Woodland owners and advisors		#	#	#	#	#	#	#	2
W1	4	Encourage grant applications that contribute to the development of Forest Habitat Networks together with effective management of existing native woods under the Scottish Forestry Grants Scheme.	FC	SNH Woodland owners and advisors		#	#	#					5
	C	**Advisory**											
W1	1	Provide management advice to owners of existing native pinewood and also to those who wish to create new native pinewoods.	FC SNW		#	#	#	#	#	#	#	#	All
W1	2	Provide advice to woodland owners and managers to encourage the improvement of woodland structures for the benefit of specific species such as Capercaillie and Black grouse.	SNH RSPB		#	#	#	#	#	#	#	#	2,4
	D	**Research and monitoring**											
W1	1	Promote the use, and identify sources, of local native tree stock for woodland planting where appropriate alongside natural regeneration.	FC	SNH		#	#	#	#	#	#	#	3
	E	**Promotion and awareness-raising**											
W1	1	Highlight the values of native pinewood to owners, managers and the general public.	FC	SNH SNW RSPB TBP	#	#	#	#	#	#	#	#	All
W1	2	Monitor and review this plan – ensure this plan is being delivered annually and in detail after 5 years.	TBP		#	#	#	#	#	#	#	#	
W1	3	Engage the tourism industry to participate in woodland biodiversity projects and awareness raising for all their visitors, service providers, operatives and staff.	Perthshire Tourist Board TBP	Angus & Dundee Tourist Board, Angus Rural Partnership, Perthshire Rural Partnership, NTS, SWT, FC, FE, BTCV	#	#	#	#	#	#	#	#	

Woodland Habitat

This illustrative map shows a few key examples of the woodland habitat. Please note that many sites of interest are privately owned and owners' permission should be sought for any access.



Upland Oakwoods W2

LORNE GILLSNH

UPLAND OAKWOOD, PERTHSHIRE

DEFINITION

Upland Oakwoods are defined as those woodlands dominated by oak; Sessile oak *Quercus petraea* usually dominates, with Pedunculate oak *Quercus robur* locally. Birch *Betula spp.* is generally present in the canopy with varying amounts of Holly *Ilex aquifolium* (not often found in Tayside), Rowan *Sorbus aucuparia,* Hazel *Corylus avellana* and occasionally Aspen *Populus tremula* present as the predominant understorey species.

Oak-dominated woods are defined by the National Vegetation Classification (NVC) in the following extract from the Ecological Classification of Woodland HAP Types:

Upland Oakwoods	woodland within the upland region of UK generally dominated by oak or, in Scotland with at least 30% of the canopy cover comprising oak. Small areas of other communities may occur, for example along streams (W7 - Alder-ash woodland with yellow pimpernel) or towards the base of slopes which experience flushing (W9 - Upland mixed broadleaved woodland with dog's mercury).
NVC Types	W10 - Lowland mixed broadleaved woodland with bluebell/wild hyacinth W11 - Upland oak-birch woodland with bluebell/wild hyacinth W16 - Lowland oak-birch woodland with bilberry/blaeberry W17 - Upland oak-birch woodland with bilberry/blaeberry

CURRENT STATUS AND EXTENT OF HABITAT

Across the UK the extent of this woodland type is estimated between 70,000 -100,000 hectares, concentrated mainly in the western half of the country. These woodlands are recognised as being of international importance due to the extent and distinctiveness of the flora (especially bryophytes) and fauna they support. For some of these species Britain and Ireland hold a substantial part of the world and European population. Upland Oakwoods are at the limit of their northern range in Scotland.

The Tayside Native Woodland Inventory of 1995 indicates the total Upland Oakwood area in Tayside as 1,900 ha.

W2 Upland Oakwoods

KEY SITES

CASE STUDY

	Carie	Fonab
Grid reference	NN613574 to NN615569	NN940539
Oakwood Status & History	The oak woodland was part of an extensive semi-natural deciduous woodland which extended along Loch Rannoch. The oak was almost certainly managed during the 18th and 19th century for timber and tanbark. This was followed by a period when the woodland was grazed as woodland pasture. The site was acquired by the Forest Enterprise from Dall Estates in 1958. Management during the 1960's sought to convert some of the oak and most of the birch woodland to conifers by underplanting. Recently an extensive programme of conifer removal has been carried out.	The woodland was probably planted during the 18th or early 19th century on an ancient woodland site. The current crop consists of planted maidens or carefully singled coppice. The site was acquired by Forest Enterprise from the Hydro Electric Board in 1952. Management has included thinning of most of the wood, several group fellings, bracken control and some (largely unsuccessful) replanting in felled areas.
Total area	19.5 hectares	18 hectares
NVC type	W17: Upland oak-birch woodland with bilberry/blaeberry.	W11: Upland oak-birch woodland with bluebell/wild hyacinth.
Oak Species	Pedunculate oak *Quercus robur*	Pedunculate oak *Quercus robur*
Present stocking	80 - 150 stems per hectare	100 - 300 stems per hectare
Other species	Downy birch *Betula pubescens* 50%; Silver birch *Betula pendula* 10%; Aspen *Populus tremula* 1%; Rowan *Sorbus aucuparia* 1%.	Silver birch *Betula pendula* 5%.
Potential	To continue to increase the area of oak/birch woodland by removal of conifer crops from under existing areas of mature trees and by felling blocks of conifer within the woodland. Options for extending the woodland beyond its current compartment boundaries are more limited. Regeneration will initially clearly be largely of birch, but oak would be expected to colonise the woodland in the long term.	There are several options for increasing the area of woodland by removing blocks of conifer within and adjacent to the main area of oak woodland. Regeneration has largely failed in the past due to deer browsing pressure. Therefore selecting the most appropriate deer management must be a priority.

NATURE CONSERVATION IMPORTANCE

Upland Oakwoods take a long time to evolve ecologically and are valuable wildlife sites. The ground flora associated with this woodland type varies according to the NVC type. Upland Oak-birch with bilberry/blaeberry (W17) is located on very acid, shallow soils where the tree growth is usually slow. The ground vegetation here is dominated by blaeberry. Upland Oak-birch with bluebell/ wild hyacinth (W11) however, is found on acid freely draining leached brown earths. The tree growth is stronger here and bracken is often dominant in the ground layer. Both NVC types occupy well-drained slopes.

Upland Oakwoods W2

Wildcat *(Felis sylvestris)*

Ecology - Wildcats have increased in both numbers and range in Scotland in the past century and have benefited from afforestation. The species is found mainly in upper valley slopes and steep hillsides, on moorland and peatland and in rough grassland or forest, as well as in the lowland margins. They have also been recorded at higher altitudes, above 800m. It is listed as a 'Species of Conservation Concern' in Tayside.

Distribution - Widespread, except in the lowlands in the far east of Tayside. More abundant in Angus and east Perthshire. In recent decades there has been little change in overall range and the population in most areas appears stable.

LAURIE CAMPBELL

There is a strong understorey and structure associated with this woodland holding a strong climax woodland community. Oakwoods and their associated open areas provide a rich and diverse habitat for a variety of invertebrates, including the Pearl-bordered fritillary *Boloria euphrosyne*. A large proportion of species listed in the following table are associated with the open ground areas of oakwoods.

KEY SPECIES

P = UK Priority species **C** = UK species of conservation concern

Mammals	Red squirrel	*Sciurus vulgaris*	**P**
	Wildcat	*Felis sylvestris*	**C**
	Badger	*Meles meles*	**C**
	Brown long-eared bat	*Plecotus auritus*	**C**
	Pipistrelle bat	*Pipstrellus pipstrellus*	**C**
Birds	Wood warbler	*Phylloscopus sibilatrix*	**C**
	Spotted flycatcher	*Muscicapa striata*	**P**
	Redstart	*Phoenicurus phoenicurus*	**C**
	Great spotted woodpecker	*Dendrocopus major*	**C**
Amphibian	Great crested newt	*Triturus cristatus*	**P**
Invertebrates	Pearl-bordered fritillary	*Boloria euphrosyne*	**P**
	Hairy wood ant (Northern)	*Formica lugubris*	**P**
Higher Plants	Wild hyacinth	*Hyacinthoides non-scripta*	**C**
	Small cow-wheat	*Melampyrum sylvaticum*	**P**
	Wilson's Filmy Fern	*Hymenophyllum wilsonii*	**C**

NATIONAL BIODIVERSITY CONTEXT

In the UK, upland semi-natural oakwoods have declined by about 30 - 40% in area over the last sixty years as a result of replanting, mainly with introduced conifers, clearance for quarries or other developments and conversion to rough grazings. Recent changes have greatly reduced the amount of inappropriate management of these woodlands.

W2 Upland Oakwoods

The objectives of the UK Biodiversity Action Plan for Upland Oakwood are:

- Maintain the existing area of upland oakwood (70,000 - 100,000 ha.) and improve its condition by a mixture of management for timber (predominately as low intensity high forest), as sheltered grazing and minimum intervention.
- Avoiding other habitats of high nature conservation value, expand the area of upland oakwood by about 10% on to currently open ground by some planting, but particularly by natural regeneration by 2005.
- Identify and encourage the restoration of a similar area of former upland oakwood that has been degraded by planting with conifers or invasion by Rhododendron *Rhododendron ponticum*.

In the context of Scotland, the estimated area of all upland oakwoods is in the region of 35,000 ha. of which ancient semi-natural woodland (ASNW) accounts for 24,000 ha. The Scottish targets are to initiate action in 80% of all HAP sites (i.e. 28,000 ha.) by 2004 and achieve favourable condition in over 50% by 2010. Within these figures the target is to initiate action in 100% of HAP sites occurring within SSSIs and SACs by 2004 and achieve favourable condition in over 70% by 2010.

The restoration figures for upland oakwood in Scotland are 3,000 ha. by 2010. This includes 10 ha. in Angus and 350 ha. in Perth & Kinross.

The expansion targets for upland oakwood in Scotland are 3,000 ha. by 2005. This includes 110 ha. in Angus and 280 ha. in Perth & Kinross.

ECOLOGY AND MANAGEMENT

Sessile oak *Quercus petrea* and Downy birch *Betula pubescens* dominate this woodland type. However where *Quercus robur* occurs, especially in eastern Scotland, it is usually of planted origin. The lack of oak dominance in woodland on higher slopes can often be attributed to past management and is not a true reflection of the natural species composition of this woodland type. However with increased altitude Birch becomes the dominant species. The field layer is dominated by three types namely grasses, bracken and ericoid sub-shrubs. The relative proportions of these vary with soil type, shade, grazing and topography.

The oak woodlands are in general a mosaic of different NVC communities with W11 and W17 the major community types.

NVC W11 This is the most common oceanic type of woodland community with base-poor brown earth soils dominated by Oak species and Downy birch *Betula pubescens*. Where oak dominates, it forms a high forest with a closed canopy of tall oak with poor crown development derived principally from coppice and planted oak of unknown origin. Where birch is more dominant the canopy is more open. The occasional Ash *Fraxinus excelsior* may be found with, locally in Tayside, Rowan *Sorbus aucuparia* and Hazel *Corylus avellana* more common.

NVC W17 These communities are less frequent than the W11, but these woodlands have very acid shallow soils with Oak and Downy birch still the dominant species. Where the oak is dominant the trees are of a poorer quality and smaller than W11 oakwoods. Where the Birch is more dominant, Rowan is present as a co-dominant species. The commonest other species are Holly *Ilex aquifolium* though generally quite scarce, with Ash and Hazel which tend to be found in pockets of base-rich wet flushes.

The cessation of coppicing and the increased grazing pressure from both permitted grazing of domestic animals and browsing by wild animals has contributed to a decrease in the structural diversity of this woodland type. It must be pointed out that oakwoods that are not, or have never been, coppiced are not necessarily biodiversity poor. The removal of substantial amounts of timber throughout the early 20th century also contributed significantly to the changing composition and structure seen in Tayside's upland oakwoods today.

Upland Oakwoods W2

CURRENT FACTORS CAUSING LOSS OR DECLINE

In Scotland large scale planting of oaks was undertaken on estates between 1780 and 1830 for tanning bark, timber, coppice for charcoal making and general landscape value. In the last hundred years, the advent of the First World War saw a severe decline in oakwoods which continued during the Second World War as timber was utilised for the war effort. There has been a decline of about 30 - 40% of oakwoods across the British Isles over the last sixty years.

Lack of management of the remaining oakwoods, grazing pressure and adjacent land use changes (for example development pressures such as new roads, quarrying and recreational access) have led to a limited age structure within most of these woods. With increased planting of exotics from 1940 onwards the last sixty years has seen a further reduction. In more recent times such woods have remained relatively stable with only slight decreases being recorded by the Forestry Commission between 1980 and 1995.

There is, however, a wide range of factors that have contributed to Upland Oakwood decline. Those contributory factors, specific to Tayside, are listed below in order of priority of seriousness:

1.	Historical under-planting of oakwoods with coniferous species, for example Carie Oakwood (case study).
2.	The spread of Bracken *Pteridium aquilinum* which can limit regeneration. Because the oak is a strong light demander, regeneration of oak under oak canopy is difficult enough without other competition. Invasion of species such as Rhododendron *Rhododendron spp.* and Sycamore *Acer pseudoplatanus* also provides competition against oak seedlings.
3.	In some cases unsympathetic forest management practices do not produce the biodiversity benefits such woodlands can provide, for example inappropriate planting for game cover or a lack of appropriate management.
4.	Limited markets for hardwood timber products produced in Scotland.

OPPORTUNITIES AND CURRENT ACTION

The government through the Forestry Commission (FC) regulates the management of all woodland in the UK. The Commission also encourages forestry expansion through the payment of grants where creation of new woodland is in accordance with forestry and conservation policies. Such policies are informed by both national and international priorities and these are set out in a series of publications that provide the framework for environmental regulations and incentives. The UK Forest Standard defines and applies government commitments to sustainability and biodiversity and this is augmented by a series of environmental guidelines on conservation, landscape and water. The Scottish Forestry Strategy contains a strong commitment to achieve the current Action Plan targets.

There are a number of resources available, both financial and advisory support, for native woodland management and establishment. The main sources of funding are through the FC which offers a wide range of grants to private landowners to assist specifically for native woodland management, improvement and expansion.

Opportunities are also available through:

- The introduction of a new grants initiative - Scottish Forestry Grants Scheme - to be launched in April 2003. The key changes to the FC grants will allow greater focus on the management of existing oak woodlands and will target grants towards areas where significant Habitat Action Plan (HAP) targets can be met.
- LIFE European funding to manage SAC (Special Areas of Conservation) designated oak woodland sites (for example: Comrie woods cSAC)
- Ongoing development and promotion of training on the conservation and management of oak HAP types with particular reference to the problems associated with regenerating oakwoods. At present, for example, Scottish Native Woods organises a range of courses tackling the issue of regeneration.

W2 Upland Oakwoods

Case Study

COMRIE WOODS

The Comrie Woods SSSI and cSAC lies just north of the town of Comrie and the Highland Boundary Fault. This part of the wood is situated to the west of the River Lednock gorge.

As a whole the SSSI is a primary woodland site representing the largest area of acid sessile oakwood (*Quercus petrea/Betula pubescens/Dicranum majus* W17 community) in Perth & Kinross. In addition, the Lednock gorge and adjacent areas contain fragments of richer mixed ash, hazel, wych elm woodland (W9b) whilst bluebell dominated oakwood (W11) is characteristic on more neutral soils.

The primary objectives of management are:

- To enhance and safeguard the integrity of natural woodland communities on the site principally by managing beech colonisation and promoting regeneration of native species.
- To maintain the intrinsic qualities of the woodland experience available to visitors. The factors that define this experience also include large veteran trees and conifers.

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BLUEBELL

OBJECTIVES AND TARGETS

The UK Habitat Statement for Upland Oakwoods gives a conservation direction to Local Biodiversity Action Plans which may adopt some or all of the relevant measures identified nationally to be applied locally. The targets established for local plans are based on maintaining the current extent of Upland Oakwoods and encouraging the balance of appropriate management regimes across the distribution of the type.

	Objectives	Targets
1	Maintain existing area and improve the condition of Upland Oakwoods in Tayside and prevent net loss or reduction in area. The core areas for Scotland total 30,000 ha. The Tayside area is approximately 2,600 ha.	All 2,600 ha. to be identified and managed to increase their biodiversity value whilst not compromising any existing commercial operations or other nature conservation interests by 2005.
2	Restoration of upland oakwood cover. The restoration figures for upland oakwood in Scotland are 3,000 ha. by 2010. This is made up of 10 ha. in Angus and 350 ha. in Perth & Kinross.	Restore 360 ha. by 2015, completing half of this by 2010.
3	To bring under management existing upland oakwoods to increase their biodiversity/ conservation value.	Raise the awareness of the importance of upland oakwoods to woodland owners through examples of good practice, workshops, publicity and other promotional opportunities. Provide habitats for associated key species utilising current European LIFE funding initiatives (such as at Comrie Wood cSAC and SSSI case study).

Upland Oakwoods W2

4	Increase the area of upland oakwoods on suitable sites within Tayside. The expansion targets for upland oakwood in Scotland are 3,000 ha. by 2005. This is made up of 110 ha. in Angus and 280 ha. in Perth & Kinross.	Revised IFS (Indicative Forestry Strategy) to be drawn up by Local Authorities incorporating the figures below by 2005. Expansion of upland oakwood area, preferably through natural regeneration, in suitable sites in Tayside by 390 ha. by 2005.
5	Ensure the long term future of this habitat.	Raise the public's awareness of the importance of upland oakwoods and newly planted oakwoods within the Tayside area through examples of good practice, workshops, publicity and other promotional opportunities.
6	Ensure the long term future of upland oakwoods.	Ensure all new upland oakwood sites are incorporated into positive management through the new Scottish Forestry Grant Scheme by 2005.
7	Extend and enhance upland oakwoods by developing Forest Habitat Networks as detailed in the Scottish Forestry Strategy.	Priority action point in SFS document. Partnership involvement from grant setting (FC) to guidance (SNH) and adoption by private sector, FE and woodland initiatives providing ongoing advice. Target is to act on advice and recommendations currently being prepared by FC and SNH. Also required are revised IFS (Indicative Forestry Strategies) to be drawn up by Local Authorities by 2005.
8	To improve the ecological value of native woodlands through work related to native woodland Habitat Action Plans.	To deliver new FC grants by April 2003 that will be designed to contribute towards costs for work that achieves at least one of the following: - improves the natural heritage value of semi-natural woodlands; - restores native woodlands on ancient woodland sites; - secures natural regeneration within or immediately adjacent to native woodlands.
9	To improve the environmental value of woods and forests through work related to Biodiversity Action Plans (Habitat and Species Action Plans and Local Biodiversity Action Plans) and designated sites or species listed in the schedules of the Wildlife and Countryside Act or the EU Habitats and Species Directive.	To deliver new FC grants by April 2003 that will be designed to contribute towards costs for work that is necessary to implement agreed HAPs, SAPs & LBAPs including work in open space and non-woodland habitat within the woodland or forest area.
10	To put forward recommendations for changes to the Woodland Grant Scheme and Farm Woodland Premium Scheme in Scotland so as to improve their effectiveness in delivering priorities identified in the Scottish Forestry Strategy.	A joint Forestry Commission / Scottish Executive Steering Group report submitted for European approval in autumn 2002. Provisional launch of new scheme (Scottish Forestry Grants Scheme) in April 2003. Revised IFS's put in place across Tayside incorporating HAP and LBAP targets by 2005.

Stakeholders

- Landowners and woodland owners; forestry and woodland organisations; countryside organisations; local authorities; members of public.

W2 Upland Oakwoods

ACTION FOR BIODIVERSITY

		Action - Upland Oakwood	Deliverers		To take place by								Meets Objective No.
			Lead Partners	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	**A**	**Policy and legislation**											
W2	1	Ensure that the opportunities to realise the upland oakwood potential of suitable land are identified within the development of Indicative Forestry Strategies by the local authorities.	AC DCC PKC	TBP				#					1,3,4,7,10
W2	2	Provision of financial grant support for appropriate management of upland oak woodland through the introduction of the Scottish Forestry Grants Scheme.	FC			#	#	#	#	#	#	#	AllEsp. 8,9
	B	**Site safeguard and management**											
W2	1	1. On FE managed land, ensure appropriate management of upland oak woodlands for biodiversity. 2. Ensure biodiversity details are incorporated into the FE 10 Year Plans.	Forest Enterprise	TBP	#	#	#	#	#	#	#	#	1,2,4,5
W2	2	Establish sites that can be used to demonstrate good practice of oakwoods which identify linkage work that will complement other habitats.	FC	FE TBP				#					2,4,5
W2	3	Compile a list of all landowners with upland oakwood on their land.	FC	Landowners				#					1
W2	4	Promote the use of long term (20 year) Forest Plans that highlight woodland owner objectives and their aims for existing or potential upland oakwoods.	FC	Woodland owners and advisors		#	#	#	#	#	#	#	2,4,5
W2	5	Encourage grant applications that contribute to the development of Forest Habitat Networks and effective management of existing native woods under the Scottish Forestry Grants Scheme.	FC	SNH, Woodland owners, advisors		#	#	#					6
	C	**Advisory**											
W2	1	Provide management advice to owners of existing upland oakwoods and also to those who wish to create new upland oakwoods.	FC	SNW	#	#	#	#	#	#	#	#	All
W2	2	1. Encourage and provide advice on the marketing and sustainable use of products from oakwoods as a means of supporting appropriate management. 2. Provide advice on silvicultural methods to obtain woods products and on marketing and utilisation.	Forestry Industry Cluster Group SNW	FC Woodland owners, advisors	#	#	#	#	#	#	#	#	1,3,5,6
W2	3	Provide advice to woodland owners and managers to encourage the improvement of woodland structures for the benefit of the associated key species.	SNH RSPB		#	#	#	#	#	#	#	#	1,2,3,5
	D	**Research and monitoring**											
W2	1	Promote the use, and identify sources, of local native tree stock for woodland planting where appropriate alongside natural regeneration.	FC	SNH		#	#	#	#	#	#	#	4
	E	**Promotion and awareness-raising**											
W2	1	Highlight the values of upland oakwoods to owners, managers and the general public.	FC	SNH SNW RSPB TBP	#	#	#	#	#	#	#	#	All
W2	2	Monitor and review this plan - ensure this plan is being delivered annually and in detail after 5 years.		TBP	#	#	#	#	#	#	#	#	