WOODLAND HABITATS

CONTENTS

WOODLAND INTRODUCTION:

The term woodland can be used to describe all tree cover in the Cairngorms. This is defined to include *'all groups, stands and blocks of trees >0.25 ha except for suburban trees, and including scattered trees where there are more than 30 trees at a density of not less than 4 per hectare, excluding trees of less than 2 metres in height'*. The woodlands of the Cairngorms can be further classified broadly according to predominant tree species, whether planted or self-sown, and to tree age and woodland site antiquity.

The woodlands of the Cairngorms are of national and international importance because they contain the largest remaining areas of semi-natural woodland habitats in Britain. The Cairngorms area occupies just less than 10% of Scotland's land mass, yet contains 25% of the entire Scottish resource of native woodlands and its Caledonian pine woodlands are greater in total area and individual size than anywhere else in Scotland. The extent of native woodland is important for many specialist species of plant, animal and fungus that depend upon this habitat. Native tree species comprise 79% of the Cairngorms woodlands and in recent years there has been a deliberate shift towards planting or regenerating native tree species in the core area. Associated with these woodlands are a number of populations of species found nowhere else in Great Britain. These woodlands are also important components of the landscape, covering about 800km^2, or 12.5% of the Cairngorms area. The woodlands are concentrated in the main river valley areas, almost all of which lies below 600m elevation, as a result there are practically no woodland habitat links between different catchments.

The current extent, distribution, size and composition of Cairngorms woodlands has largely been determined by historical human activities, such as woodland clearance, planting and prevention of natural tree regeneration by burning and grazing. Much attention has centred on the ecological importance of the larger stands of trees, as the only instances where natural processes can support a continuity of supply of key micro-habitats. However, recent discoveries (for example on Aspen) have demonstrated the outstanding biodiversity importance of some small woodland stands and lone wayside trees for bryophytes and lichens. Thus, such important sites should be targeted for further study and conservation despite their small size and often isolated location.

The historic loss of native woodland habitats has largely been halted and reversed in recent years, with the Cairngorms broad woodland habitats generally in a better state of management that at any time in recent history. However, there are areas of specific concern and some native woodland types have not fared so well and need particular targeted attention. This document identifies the current strategic biodiversity objectives and delivery mechanisms for the three principal woodland habitats; broadleaved woodland, native pine woodland and planted conifer woodland and their key associated woodland habitats in the Cairngorms.

The links between woodlands and other habitats is extremely important for many species. The habitat mosaics that exist in the Cairngorms result in the high populations of several species that use more than one habitat as well as being important for some species that particularly use edge habitats. Therefore, it is important to understand and consider the biological links between adjacent habitats. For example: woodland/farmland mosaics favour Roe deer and Badgers; woodland/water mosaics favour Grey wagtail, Osprey and Goldeneye; woodland/upland mosaics favour Red deer, Golden eagle and Kentish glory and woodland/upland/farmland mosaics favour Black grouse, Juniper and Buzzards.

It is the purpose of this chapter to:

- *Identify, where possible, the biodiversity issues and opportunities to maintain and enhance the important Cairngorms woodland habitats and species through the actions of local people and partners.*

OPPORTUNITIES FOR ACTION IN THE CAIRNGORMS:

There are several groups of local partners who are working together towards delivering the Cairngorms Partnership's strategic objectives for woodland habitats in the Cairngorms (e.g. The Forest of Spey Project, The Deeside Forest Project). These strategic objectives make specific mention of nature conservation, habitat expansion or appropriate management of the woodlands in the Cairngorms. Therefore, the sustainable management of the woodland habitats and species (biodiversity) is important to the core delivery of strategic woodland objectives for the Cairngorms area.

The partners are taking forward these objectives at a number of strategic and practical levels. The Cairngorms Forest and Woodland Framework, identifies the strategic opportunities for the biodiversity development of forests and woodland in the Cairngorms area. It is widely recognised that woodland cover should increase in the Cairngorms over the coming decades, but there is no agreement about where the trees should go. The Cairngorms Forest and Woodland Framework is primarily designed to give broad guidance on the nature and location of this new woodland and to encourage good management of existing stands across the area. It has a vision where '*Woodland expansion and management should be environmentally, economically and sociably sustainable and integrated with other land uses*'. The Framework represents a further development of this existing vision for woodlands with the following aims and objectives to conserve and enhance the natural heritage, biodiversity and cultural interest of the area by:

- Encouraging the management, conservation and expansion of native woodland in appropriate places, including high altitude scrub.
- Enhancing the conservation value of existing woodlands by developing effective habitat networks.
- Guiding the achievement of HAP objectives.
- Maintaining and enhancing the visual amenity, landscape character and existing diversity of the natural heritage interest of the area.
- Protecting and enhancing the cultural heritage in its widest sense.

A large proportion of the woodlands of the Cairngorms is covered by national conservation designations such as Sites of Special Scientific Interest (SSSIs), Special Protected Areas (SPAs), Special Area of Conservation (SACs), National Nature Reserves and National Scenic Areas. Land managers and foresters manage most of the woodlands in the area, much of which is covered by various designations. These designations are designed to help conserve specific areas where landscape, wildlife and historic interest are of particular or exceptional importance.

There are many delivery mechanisms for action on woodlands habitats and species and the following list identifies some of the most important ones for the area. As already stated, the historical loss of most woodland habitats has been halted and now reversed. Most of the work necessary is about habitat improvement through targeted biodiversity management and the policy drivers and practical measures listed reflect this:

Policy drivers:

- Scottish Forestry Strategy.
- UK Forest Standard and a suit of environmental and general Forest Practice Guidelines.
- Indicative Forestry Strategies and local forestry frameworks, such as the Cairngorms Forest and Woodland Framework.
- The Cairngorms Management Strategy identifies strategic issues and provides a vision for the sustainable management of woodlands in the Cairngorms.
- The Natura sites network and other designations.
- Individual Forest Management Plans, including widespread local consultation.
- Local authority development plans provide guidance on landuse/development issues.

Practical measures:

- Woodland Grant Scheme (WGS) – Forestry Commission (FC) general incentives and constraints which promote the management of existing woodlands (inc. natural regeneration) and expansion of new woodlands including improving the connectivity of existing stands through Forest Management Plans. Woodland Improved Grants are single discretionary payments to encourage a range of work, especially improving targeted habitat conditions in existing woodlands. Challenge Funds are discretionary payments targeted at specific habitats, species and areas. It should be noted that the WGS is currently under review and operational details could change.
- Farm Woodland Premium Scheme – an incentive specifically targeting woodland expansion and management on farms and crofts.
- Agri-environment schemes. The Environmentally Sensitive Area's scheme and its successor the Rural Stewardship Scheme can help management where farm livestock is a key landuse and be used to link existing woodlands in a modest way.
- Targeted management by private land owners and managers.
- SSSI, SAC and SPA designations can provide advice and supporting management incentives and monitoring for particularly important areas and species.
- SNH's various conservation grants for positive management of both designated and non-designated sites and especially their Community Grant Scheme and new '*Natural Care*' programme.
- Heritage Lottery Funding targeted at Area Partnerships and Habitat Action Plan projects.
- New Opportunities Fund – the Community Land Fund.
- HIE and LEC Community Grant Fund
- European transitional funds – Community Economic Development Fund for local community development.
- Rural Challenge Funding.
- Forest Enterprise owns and manages significant woodland holdings for the public benefit in the Cairngorms.
- European funding sources, such as EU LIFE and LEADER can support biodiversity management in Cairngorms woodlands.

There are a number of actions that would improve the biodiversity of the Cairngorms woodlands. Action in adjacent '*non-woodland*' habitats, such as deer management on moorland, may have profound effects on woodland habitat and species compositions. There are many areas where important woodland habitats and species are thriving in the Cairngorms and these can be used to demonstrate good biodiversity management practice. Opportunities taken for promoting and developing good woodland management may increase tourism and recreation opportunities and foster a greater understanding of the role of woodland management in shaping the famous wooded landscape of the Cairngorms.

The best way forward for biodiversity conservation in the Cairngorms woodlands is through a holistic approach to all woodland management. However, some specific issues and pressures need to be tackled as well. This document identifies the important habitat and species issues that are specifically associated with woodland biodiversity. Where possible, it suggests how to carry these forward amongst the local partners.

THE MAIN WOODLAND BIODIVERSITY ISSUES:

The following six main issues currently affect or influence, to a greater or lesser degree, practically all the important woodland habitats and species in the Cairngorms. Biodiversity actions to address these main issues are likely to benefit a whole range of habitats and species in the area and promote woodland management that would be more sustainable than that generally adopted so far. Specific issues related to individual habitats or species are described

in the relevant individual accounts.

The interaction of two or more of these key factors often greatly increases the overall impact on woodland biodiversity e.g. (1) lack of co-ordinated deer management to a level to allow regeneration will reduce or halt natural tree regeneration, causing (2) woodlands to become fragmented and isolated which poses significant problems in terms of natural ecological processes (e.g. species dispersal).

1. Lack of data/important information:

The issues:

- Although most semi-natural woodlands in the Cairngorms have now been surveyed and mapped, there is a lack of basic up-to-date information on the size, quality or management of some rare/threatened woodland habitats (e.g. Aspen woodland) in the Cairngorms.
- Several organisations have produced reports, papers, booklets and leaflets on different aspects of woodland habitat and species management. There is no catalogue or inventory of this information to make this valuable resource more readily available.
- Some of the published information on the threats to important habitats and species in the Cairngorms is based on data collected in southern Britain and may have little relevance to activities undertaken in the Cairngorms.

The solutions, actions and targets:

- Identify the total area, and where possible quality and management, of any outstanding important Cairngorms woodland habitats *by – 2004*. This work should be related and compatible with the Scottish Native Woodland Inventory.
- Map extent of, and then model contribution of recent woodland regeneration to the Cairngorms Forest Habitat Network – *by 2007*. From this analysis, identify strategic priorities in developing the Forest Habitat Network – *by 2010*.
- Where appropriate, commission relevant research on local issues of concern to important woodland habitats and species in the Cairngorms – *ongoing*. For example, two rare fungi of the genus *Squamanita* (*S. pearsonii* and *S. contortipes*) have each only been found once in Britain in the vicinity of native pine woodlands in the Cairngorms, but nothing else is known about these species.
- Produce and make freely available a regularly updated inventory of relevant information and advice on woodland habitat and species management in the Cairngorms – *by 2004*.

2. Awareness raising:

The issues:

- Some planted woodland habitats are of great importance for biodiversity, but often are undervalued because of their perceived 'artificial' nature or poor public image (e.g. planted conifer woodlands for Capercaillie and Twinflower).
- Woodland owners and managers need free advice on all key BAP woodland habitats and species in the area to enable them to manage their land for the maximum benefit of biodiversity.

The solutions, actions and targets:

- Properly consider the requirements of all key BAP species dependent upon woodland areas need to be considered when reviewing or negotiating changes to, or reform of woodland fiscal support measures – *effective immediately*.
- Produce and make freely available a regularly updated inventory of relevant information and advice on woodland habitat and species management – *by 2005.*
- Ensure all woodland management follows the best practice guidelines and advice available issued by the FC (through their various grant schemes) and other partners, including the use of local provenance native stock for planting – *effective immediately*.
- All forest managers entering into conservation management agreements involving public money on woodland habitats and species should be encouraged to attend local training

courses on environmental/biodiversity issues – *by 2007*. This could form part of a wider targeted awareness raising programme tied into action rising out of the latest research developments on Priority woodland habitats and species.
- Environmental assessments should particularly consider impacts of existing and forthcoming woodland management programmes on important adjacent habitats and species in the Cairngorms – *by 2010*. For example, the planting of unimproved grassland corners with trees can have detrimental impacts on important grassland fungi.
- The local partners should consider employing a small team of woodland advisors (such as for the Forest of Spey and Deeside Forest), with no commercial obligations, to visit land managers on a regular basis to advise and educate them on relevant environmental/biodiversity issues – *at the earliest opportunity*.
- Raise the profile of the contribution of native and non-native productive woodland to biodiversity of the Cairngorms by encouraging all partners to recognise the importance of well managed productive woodland to biodiversity conservation in the Cairngorms – *ongoing.*
- Link awareness raising issues with the wider Cairngorms Education for Sustainable Development programme – *ongoing.*

3. Access to appropriate policy and funding sources:

The issues:
- Land managers may wish to carry out management activities beneficial to biodiversity, but are limited or unable to do so due to lack of realistic payments.

The solutions, actions and targets:
- Consider/develop the case for extra funding where existing sources of funding are considered inadequate or inappropriate – *at the earliest opportunity*.

4. Habitat loss, fragmentation and inappropriate management:

The issues:
- Changes in land use. The direct destruction of important woodland habitats (particularly as a result of past practices) is an important biodiversity issue for a number of key habitats and species.
- The degradation of woodlands leading to the indirect loss of woodland habitats through neglect, abandonment, or over-exploitation is an important issue for many key habitats and species. For example, both under-grazing and over-grazing have profound biodiversity implications on vegetation structure and the removal of both standing and fallen dead wood also has important implications for organisms such as fungi and invertebrates.
- Deer are an essential component of woodland biodiversity, but in many areas their densities are such that they pose one of the greatest threats to existing woodland and to future woodland regeneration and expansion.
- Habitat fragmentation or isolation. Some habitats (e.g. Aspen woodland and montane scrub) are now found only in small, isolated and discontinuous patches. This habitat fragmentation may pose significant problems for natural ecological processes and species dispersal in particular, making their key species particularly vulnerable to chance extinction.

The solutions, actions and targets:
- Develop and promote cost-effective management for important woodland habitats and species in the Cairngorms, so that criteria for any grant scheme are met - *ongoing*.
- Given that high deer densities are such an important threat to woodland biodiversity, partners should continue to support Deer Management Groups on a catchment level – *ongoing* - and set and revise site specific cull targets based on objectives for the site, and the (monitored) response of woodland and non-woodland vegetation – *by 2007*.
- Ensure that all land managers wishing to enter a suitable and properly funded woodland biodiversity management scheme are able to do so, as they are in most other European

National Parks – *by 2005.*
- Promote the importance of existing productive woodlands as important for biodiversity management with local partners – *ongoing*.
- Consider important strategic woodland habitat networks when developing new landuses or encouraging changes in current management. In particular, bring existing strategically important woodlands into favourable management and target any future woodland expansion into 'gaps' to create habitat networks – *by 2005.*
- Bring neglected woodlands back under favourable biodiversity management before attempting habitat restoration schemes – *completion dates will vary according to habitat type under the UK BAP*.
- Ensure that any future expansion in woodland does not threaten other important BAP Priority habitats and species in the Cairngorms (e.g. where a new woodland would threaten or severely compromise an important strategic non-woodland habitat network) – *on-going.* To achieve this, ecological criteria need to developed for important non-woodland habitats at the earliest opportunity.

5. Climate change and pollution:

The issues:
- Climate change may have profound and unforeseen changes on many upland areas, including woodland habitats and species. Some sensitive habitats, like native pine woodland, and their characteristic species e.g. Capercaillie and Twinflower are likely to decline as current habitats become unsuitable.
- Acidification as a result of atmospheric sulphur and nitrogen deposition may alter nutrient levels in the soil and affect the composition and structure of vegetation communities.
- Inappropriate forest management can damage surrounding species and habitats. For example, chemical sprays may harm lower plants such as fungi and lichens. Herbicides and insecticides may also runoff into adjacent sensitive habitats such as watercourses and wetlands. However, the FC's Forest and Water Guidelines have virtually eliminated this from happening in recent years.

The solutions, actions and targets:
- Tackling the issue of climate change is discussed in the Introduction under the theme of common threads and recurring issues across all action plans.
- Reduce spraying whenever possible and ensure that any spraying is tightly controlled (by following the FC's Forest and Water Guidelines) and takes account of the lower plant interest on a site by site basis – *effective immediately*.

6. Non-native/alien species:

The issues:
- Introduced non-native species* into the wild can potentially kill, harbour diseases or compete with native species (e.g. Sika deer and Grey squirrel) and significantly impact upon a range of biodiversity based economic activities.

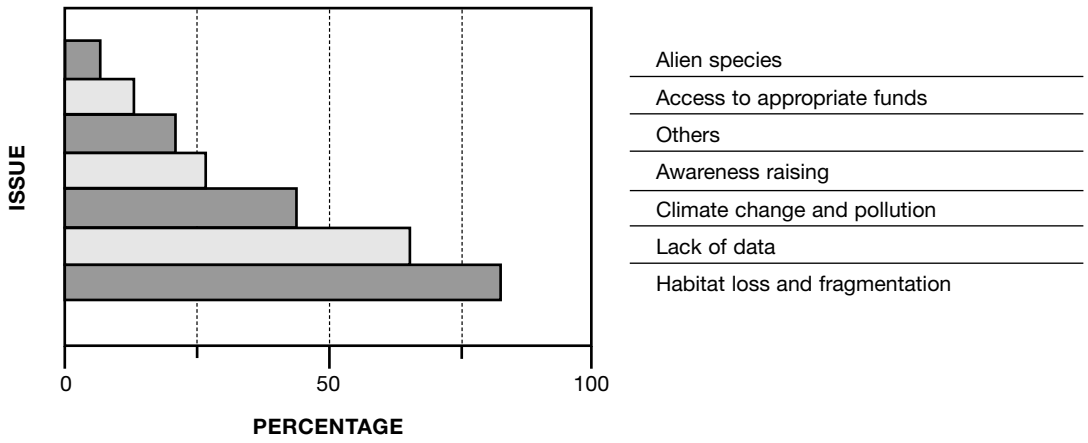
The solutions, actions and targets:
- Tackling the issue of non-native species is discussed in the Introduction under the theme of common threads and recurring issues across all action plans.

*Excludes tree species. The Cairngorms Partnership's Management Strategy recognises that some productive conifer woodlands will compromise non-native species. However, there is a presumption in favour of native tree species in the Cairngorms Management Strategy. For example, 66% of new plantings and restocks have been carried out with native species and 34% with exotic species in Forest Enterprise's Strathmashie, Inshriach and Glenmore woodlands since 1990.

MAIN THREATS TO UK WOODLAND PRIORITY SPECIES IN THE CAIRNGORMS:

Figure 4 identifies the main locally important issues affecting the 45 woodland Priority species in the Cairngorms. Direct habitat loss and fragmentation was an important issue for over three quarters (82%) of woodland UK Priority species. Most of this habitat loss and fragmentation was historical and was not necessarily current, thus this threat may be diminishing with the current levels of native woodland expansion. Nevertheless, this historical habitat loss and fragmentation still has profound effects on the current status of many woodland Priority species. Lack of important data on the basic ecology and threats to local populations was considered an important issue for 67% of Priority woodland species. 44% of woodland Priority species are currently affected by, or vulnerable to, pollution and climate change. For over a quarter (27%) of these woodland Priority species, the need for awareness raising of species specific issues was considered important.

Figure 4. Locally important issues for UK Priority species (N=45) in Cairngorms woodland habitats.



20% of species require actions that are outwith the remit of the woodland HAP. These 'Other' issues may be related to actions needed to be undertaken in other adjacent habitats or may refer to activities that might have little to do with direct habitat management. 13% of Priority woodland species required access to appropriate policy and funding mechanisms that are apparently limited or lacking at present. Finally three Priority species (7%) have been adversely affected by non-native or alien species introductions to the Cairngorms area.

Please note that some caution should be used when interpreting the data illustrated in Figure 4. The main issues and threats that score most highly for Priority species, may not necessarily be the ones which should be addressed most urgently. For example, 'Awareness raising' of specific issues could solve many of the problems identified under the 'Habitat loss and fragmentation' heading.

UK PRIORITY SPECIES AND LOCALLY IMPORTANT SPECIES ACCOUNTS:

The following Cairngorms woodland species accounts list the known local issues affecting both the UK Priority species and Locally important species (whose populations are considered to be of high UK importance). Where possible, each locally important issue is linked (by numbers in superscript) to the relevant '*Main woodland biodiversity issues*' section. For some species, a single over-riding issue is of paramount importance (e.g. the Rannoch sprawler moth is threatened by loss of old birch woodland), whereas others require a suit of co-ordinated action on issues across more than one habitat (e.g. Black grouse). Action by local partners targeted at these broad biodiversity issues is likely to deliver substantial benefits for a range of important woodland species. However, some issues (referenced by [#]), e.g. collection by botanists [#], are not strictly related to woodland habitat management and require additional efforts outwith the direct remit of this HAP. For further information on the local distribution of many Priority and Locally important species and the factors affecting local populations, please refer to the '*Biodiversity of the Cairngorms*' publication.

Pipistrelle bat:

A locally common species found along rivers with large trees and other suitable roost sites. Action for this species is likely to help other non-Priority listed bats.

Locally important issues:

- Loss of winter roost sites in buildings and old trees [1,2,4,#].
- Disturbance and destruction of roosts, including the loss of maternity roosts due to the use of toxic timber treatments [#].
- The reduction in insect prey abundance, due to atmospheric acid deposition and inappropriate riparian management is thought to be important elsewhere, but relevance in the Cairngorms is thought to be minimal.

UK importance of Cairngorms population:

Moderate. UK Priority species and Locally important species.

Wildcat:

Widespread, but uncommon across the Cairngorms. Despite deliberate persecution the species has benefited from the recent expansion in woodland cover across the area.

Locally important issues:

- Illegal persecution in some areas[#].
- Hybridisation with domestic cats threatens the genetic integrity of populations and the legal protection that Wildcat receives[2,#].

UK importance of Cairngorms population:

High. UK Species of Conservation Concern and Locally important species.

Pine marten:

The species has expanded dramatically in Strathspey recently, probably benefiting from the recent expansion in woodland cover in the area.

Locally important issues:

- The current distribution of this species in the Cairngorms and the issues relating to it are poorly known[1].

UK importance of Cairngorms population:

Moderate-high? UK Species of Conservation Concern and Locally important species.

Red squirrel:
Red squirrels can thrive in a wide range of native and non-native productive conifer woodlands. Red squirrels are widespread in the Cairngorms and this area is now one of the last strongholds for this species in Britain.

Locally important issues:

- Invasion and spread of the introduced non-native Grey squirrel – inadvertently helped by the establishment of large seeded broadleaved trees[6].
- Habitat fragmentation and resultant isolation of Red squirrel populations[4].
- Disease. The *parapox* virus is lethal to Red Squirrels and is carried by Grey squirrels, which remain unaffected[6].

UK importance of Cairngorms population:
Very high. UK Priority and Locally important species.

Red deer:
Red deer densities are unnaturally high and in many places they seriously damage the woodland habitat. Nevertheless, Red deer are a natural component of woodlands in the area.

Locally important issues:

- Management of deer numbers in the Cairngorms is now largely controlled by weather conditions, habitat quality and human intervention[#,4]. Historically humans wiped out all large predator species that killed deer, but the role of predators in controlling deer numbers is questioned.
- Red deer are threatened by hybridisation with the introduced non-native Sika deer[6].
- Quality of population data (and resultant culling targets) due to the removal of fences and the unrestricted deer access[1].

UK importance of Cairngorms population:
High. UK Species of Conservation Concern and Locally important species.

Capercaillie:
Capercaillie can thrive in well-managed native and non-native productive conifer woodlands and the Cairngorms are the last main stronghold for this species in Britain. There is a dedicated Capercaillie Project Officer who offers free independent advice to land managers in the area. Partners are urgently tackling most of the following issues across the area under the banner of the EU LIFE Capercaillie project.

Locally important issues:

- An increase in adverse weather conditions during the breeding season[5].
- Collision with deer fences (now being urgently tackled by partners)[4].
- Historical loss of suitable habitats resulting in small isolated populations that are susceptible to chance events and extinction[4]. It is unclear how relevant this is to the Cairngorms because of the size of the remaining 'meta-population'.
- Snaring. Accidental captures in fox and rabbit snares under canopy can kill Capercaillie[2].
- Predator control. Foxes and crows can significantly reduce breeding success[3,#].
- Habitat deterioration as a result of inappropriate grazing regimes (both over and under grazing) may reduce the suitability of understorey vegetation, especially a reduction in blaeberry cover[4].
- Human disturbance during the breeding season, particularly by birdwatchers at the lek sites may now be a contributory factor to poor breeding success. This threat is likely to increase as populations elsewhere decrease and more visitors come to the Cairngorms to see the remaining Capercaillie[#].

UK importance of Cairngorms population:
Very high. UK Priority and Locally important species.

Black grouse:

Black grouse are largely dependent upon suitable management of moorland, farmland and woodland edge habitats, including various stages of rotation in conifer woodlands. The Cairngorms are one of the last main strongholds for this species in Britain. The UK population has declined dramatically, mainly due to detrimental changes to several components of its habitat. It is currently the subject of local on-going research and conservation management across the CP area, where numbers are believed to be less than 2000.

Locally important issues:

- Habitat deterioration as a result of inappropriate grazing regimes (mainly by deer and sheep) has removed key food plants such as blaeberry, heather and birch scrub. This may also lead to fragmentation and isolation of habitats and subsequently small isolated Black grouse populations[3,4].
- The shading out of suitable understorey in maturing productive conifer woodlands[4].
- Loss of wet flushes through drainage in afforested areas reduces key invertebrate food supplies for chicks[2,4].
- Reseeding of traditional hay meadows and losses of upland arable production may have removed important sources of autumn and winter food[#].
- Inappropriate muirburn[#].
- Collision with deer fences (now being urgently tackled by partners)[4].
- Predator control. Foxes and crows may significantly reduce breeding success[3,#].
- Human disturbance during the breeding season, particularly by birdwatchers may now be a contributory factor to poor breeding success. This threat is likely to increase as populations elsewhere decrease and more visitors come to the Cairngorms to see Black grouse[#].

UK importance of Cairngorms population:

High. UK Priority and Locally important species.

Osprey:

Ospreys recolonised Scotland in the 1950s and have consolidated their position since then. Strathspey and parts of Tayside are now probably the core UK area for this fish-eating species as it expands its range.

Locally important issues:

- Availability and suitability of nest sites. Many artificial sites have been successfully used in the area [#].
- Illegal egg collecting, disturbance and persecution [#].

UK importance of Cairngorms population:

High. UK Species of Conservation Concern and Locally important species.

Goldeneye:

Strathspey is the core UK area for this rare and localised breeding duck.

Locally important issues:

- Availability and suitability of nest sites. Many artificial sites have been successfully used in the area [#].
- Increase in predation of nest sites by American mink[6] or Pine marten.
- Potential competition for nest sites with non-native Mandarin ducks[6].

UK importance of Cairngorms population:

Very High. UK Species of Conservation Concern and Locally important species.

Wryneck:

Wryneck occasionally breed in the Cairngorms in mixed Scots pine, Aspen and Birch woodland. The potential for recolonisation depends largely on favourable climate (warmer and drier

summers) and the status of the source Scandinavian population.

Locally important issues:

- The reasons for the historical decline in the Cairngorms are unknown[1].

UK importance of Cairngorms population:

High. UK Priority species.

Nightjar:

Formerly bred in low numbers throughout the Cairngorms. The species is capable of recolonising heathland and recently felled productive conifer woodlands in the area during periods of warmer and drier summers.

Locally important issues:

- Unknown[1].

UK importance of Cairngorms population:

Currently negligible – not known to be present. UK Priority species.

Song thrush:

This common species is widespread throughout the CP area. However, the population trend of Song thrushes in the Cairngorms is unknown.

Locally important issues:

- Song thrushes use a wide variety of habitats for feeding and nesting. The reasons for the national decline on farmland are not well known, but are thought to relate to detrimental changes in the wintering lowland areas [#] and lie outwith the influence of the Cairngorms. It is possible that these changes in the species wintering sites affect numbers returning to breed.

UK importance of Cairngorms population:

Moderate-high. UK Priority species and Locally important species.

Spotted flycatcher:

This summer migrant is widespread throughout mixed woodland and farmland habitats in the Cairngorms but may have declined, as it has in other parts of the UK.

Locally important issues:

- The reasons for the historical decline in the Cairngorms are unknown[1]. Elsewhere, the largest declines have occurred in areas of intensive agricultural production. This decline has also coincided with inclement weather conditions both during the breeding season and on migration [5].

UK importance of Cairngorms population:

Moderate. UK Priority species.

Crested tit:

Crested tits have a very local UK distribution concentrated in Strathspey and the glens around Inverness. It is likely that Crested tit distribution once matched that of Caledonian pine woodland which extended over much of the Highlands. The species has colonised some former areas with the recent increase in planted conifer woodland and new native pine woodland.

Locally important issues:

- None known. Crested tit does not appear to be threatened in any way.

UK importance of Cairngorms population:

High. UK Species of Conservation Concern and Locally important species.

Scottish crossbill:
Despite much recent research, the taxonomic status of Scottish crossbill, Britain's only endemic bird, is still uncertain. However, if the species is a race of Parrot Crossbill, this should not alter the practical measures taken to encourage favourable management. The reasons for any historical decline or recent threat are largely unknown, with only two key issues identified.
Locally important issues:
- Historical decline and habitat loss of native Caledonian pine woodlands[4]. This species can also use planted conifer woodland.
- Habitat requirements are poorly understood[1].

UK importance of Cairngorms population:
Very high. UK Priority and Locally important species.

Bullfinch:
The Bullfinch is a common breeding species found at low densities throughout woodlands and gardens in the area. In the autumn, Bullfinches also feed in flocks on heather seeds at the edge of moorland. The recent national decline on farmland was associated with loss of hedgerows and possibly the loss of arable weeds associated with farm intensification.
Locally important issues:
- Not currently well known[1], but none of the detrimental factors identified nationally are thought to be particularly relevant to the Cairngorms.

UK importance of Cairngorms population:
Moderate. UK Priority species and Locally important species.

Siskin:
From a small core population at the beginning of the 20th Century in northern Scotland, Siskins have increased dramatically across northern Britain due to a massive increase in their conifer woodland habitat.
Locally important issues:
- None known. It does not appear to be threatened in any way.

UK importance of Cairngorms population:
Moderate-high. UK Species of Conservation Concern and Locally important species.

Narrow-headed woodant:
Narrow-headed woodant uses native woodland and adjacent heathland at sites in Strathspey and Deeside.
Locally important issues:
- Historic loss of semi-natural habitats in Scotland, e.g. native pine woodland[4].
- Inappropriate grazing (both over and undergrazing)[4].
- Forest succession resulting in shading over of nests[4].
- Development of nest sites for footpaths, roads etc[4].

UK importance of Cairngorms population:
High. UK Priority and Locally important species.

Scottish woodant:
Scottish woodants are found in native pine woodlands in Strathspey and Deeside.
Locally important issues:
- Historic loss of semi-natural habitats in Scotland, e.g. native pine woodland[4].
- Intensive afforestation, destructive felling operations, loss of sunny rides and clearings due to natural succession[4]. So-called '*appropriate*' forest management is not currently well known[1],

but is the subject of on-going research work.

UK importance of Cairngorms population:
High. UK Priority and Locally important species.

***Hairy woodant**:*
Hairy woodants are found in native pine woodlands in Strathspey and Deeside

Locally important issues:

- Historic loss of semi-natural habitats in Scotland, e.g. native pine woodland[4].
- Intensive afforestation, destructive felling operations, loss of sunny rides and clearings due to natural succession[4]. So-called *'appropriate'* forest management is not currently well known[1], but is the subject of on-going research work.

UK importance of Cairngorms population:
High. UK Priority and Locally important species.

Pearl-bordered fritillary:
This rapidly declining butterfly requires open woodland and woodland/moorland edge, often with a south facing aspect.

Locally important issues:

- Scrubbing over of woodland glades and edges e.g. where woodland regeneration programmes exclude grazing animals[2,3,4].
- Over-grazing in open woodland, especially by sheep[3,4].

UK importance of the Cairngorms population:
Moderate-High. UK Priority and Locally important species.

Cousin German:
This moth species initially uses blaeberry and heather before over-wintering on extensive areas of low young scrubby birch to complete its life cycle.

Locally important issues:

- Inappropriately grazed management of Birch (and mixed Scots pine-Birch) woodland[4].
- Inappropriate muirburn[4].
- Raise the profile of the importance of this essentially transitional habitat stage for the species[2].

UK importance of the Cairngorms population:
High. UK Priority and Locally important species.

Square-spotted clay:
This moth species occurs in broadleaved woodland (predominantly Birch in the Cairngorms) where the undergrowth is sparse and contains patches of scrub and bare ground.

Locally important issues:

- The larval food plant is not even known and this makes it difficult to assess threats or key issues in light of the scant knowledge of ecological requirements[1]. However, woodland management with plenty of open spaces may be important.

UK importance of the Cairngorms population:
Low. UK Priority and Locally important species.

Argent and sable:
This moth species occurs in woodland with birch regeneration and in open moorland and bog areas. The larval food plants are Birch (probably *Betula pubescens*) and Bog myrtle *Myrica gale*.

Locally important issues:

- Lack of Birch regeneration at woodland/moorland edges and on rides in high forest systems[4,#].
- Over-grazing by sheep on moorland/woodland edges, preventing birch regeneration and impacting on Bog myrtle stands[4,#].

UK importance of the Cairngorms population:
Low. UK Priority and Locally important species.

Dark-bordered beauty:
This very rare moth is associated with suckering Aspen of not more than c1 metre high in open areas and is only known from 3 Scottish locations, all of which are in the Cairngorms.
Locally important issues:
- Insufficient regeneration. Appropriate grazing is critical to the survival of Aspen suckers[4].
- Lack of important basic information on lifecycle[1].
- Small size and isolation of Aspen stands. General expansion of the Aspen resource and where possible the creation of an Aspen habitat network crucial[2,3,4].
- Continued management of wayleaves[2].

UK importance of the Cairngorms population:
Very high. UK Priority and Locally important species.

Rannoch sprawler:
This moth is confined to areas of old natural Birch woodland.
Locally important issues:
- Historic loss of old Birch woodland is the key identified threat[2,4].

UK importance of Cairngorms population:
High. UK Species of conservation concern and Locally important species.

Kentish glory:
This moth inhabits open Birch woodland and moorland with scattered Birch regeneration.
Locally important issues:
- Habitat loss through succession of Birch woodland or other activities which prevent Birch regeneration on moorland edges (e.g. over-grazing and burning)[2,4].

UK importance of Cairngorms population:
Medium-high. UK Species of conservation concern and Locally important species.

Welsh clearwing:
This under-recorded moth is confined to areas of old natural Birch woodland.
Locally important issues:
- Lack of basic information on current distribution[1].
- Historic loss of old Birch woodland is the key identified threat[2,4].

UK importance of Cairngorms population:
Medium-high. Locally important species.

Ancylis tineana:
This moth is associated with stunted Birch woodland on wet heaths.
Locally important issues:
- Lack of important basic information on the ecology of the species[1].
- Habitat loss through prevention of Birch regeneration on wet moorland edges (e.g. through over-grazing and burning)[2,4].

UK importance of Cairngorms population:
Unknown, but thought to be high. Locally important species.

Aspen hoverfly:
Aspen hoverfly is a flagship species representing the entire fauna of deadwood or saproxylic *Diptera* of Aspen.
Locally important issues:
- Small size and isolation of Aspen stands. General expansion of the Aspen resource and where possible the creation of an Aspen habitat network is crucial[2,3,4].
- Removal of dead standing and fallen timber. Constant supply of suitable dead Aspen wood in key sites is essential[2,4].
- Insufficient regeneration. Appropriate grazing is critical to the survival of Aspen suckers (and also the long-term survival and supply of suitable future dead wood habitats)[4].

UK importance of the Cairngorms population:
Very high. UK Priority and Locally important species.

Pine hoverfly:
Blera fallax, the recently named Pine hoverfly, is a hoverfly of native pine woodland and planted conifer woodland, where the larvae feed in wet rot holes associated with secondary decay of dead pine wood. Apparently, it is restricted to Scots pine woodlands in the Cairngorms. Factors causing the decline of this formerly more widespread species are currently not well known[1], but are thought to include the following:
Locally important issues:
- Large scale clear-felling. The issue of felling coupe sizes is hopefully soon to be the subject of new research[4].
- Paucity of breeding sites. Suitably large pine stumps with wet pockets of decay are thought to be severely limited and inhibits the recovery of this species[4].
- Potential threat of over-collecting by entomologists[#].
- Unsympathetic mechanical harvesting of timber and ground preparation for replanting[4].
- Chemical treatment of stumps[4].

UK importance of Cairngorms population:
Very high. UK Priority species.

Lipsothrix ecucullata*:*
This rare cranefly is found only on or close to wet seepages in damp, non-acidic deciduous woodlands.
Locally important issues:
- Not currently well known[1].

UK importance of Cairngorms population:
Uncertain, but probably high. UK Priority species.

Cryptocephalus decemmacuatus:
A rare leaf beetle found on Dwarf willow and Birch in quaking bog areas.
Locally important issues:
- Loss of habitat through inappropriate scrub management and site drainage[2,3,4].

UK importance of the Cairngorms population:
Not known. UK Priority species.

Orange fruited elm lichen:
Formally found mainly on Elms throughout UK. Now found on a few remaining live Elms and a number of other species.
Locally important issues:
- Felling of host trees[2,4].
- Loss of habitat due to Dutch Elm disease[6].

UK importance of the Cairngorms population:
Uncertain, found on border of Cairngorm Partnership area in Angus. UK Priority species.

Stump lichen:
Poorly understood, although the following forest management issues may be involved:
Locally important issues:
- Habitat requirements are poorly understood[1].
- Reduction in tree felling in the vicinity of known sites[4].
- Lower cutting height of stumps[4].
- Chemical treatment of stumps[4,5]. The decline in the number of records coincided with the use of urea as stump treatment.

UK importance of Cairngorms population:
High. UK Priority species.

Pale bristle moss:
Found on the bark of mature broadleaved trees, often by rivers. Main threats not currently well known, but likely to include the following issues:
Locally important issues:
- Felling of host trees[2,4].
- Ignorance about the species and its ecological requirements[1,2].

UK importance of the Cairngorms population:
High. UK Priority species.

Blunt-leaved bristle moss:
This very rare moss is an epiphyte on wayside trees and in Aspen woodlands. Formally common on Elm, the species has been recently discovered on at least two new Aspen sites in the Cairngorms. The Cairngorms are now the UK stronghold for this rare species.
Locally important issues:
- Loss of host trees to Dutch Elm disease[6].
- Removal of host trees through road improvements[4].
- Ignorance about the species and its ecological requirements[1,2].
- Historically, the species became extinct elsewhere due a combination of atmospheric pollution and collecting[2,5,#].

UK importance of the Cairngorms population:
Very high. UK Priority species.

***Green shield moss*:**
This very rare moss was rediscovered in the Cairngorms on decaying pine logs in Rothiemurchus and Abernethy in 2001 and 2002 respectively.
Locally important issues:
- Poorly understood[1].
- The removal of dead wood[4].
- Botanical collection[#].

UK importance of the Cairngorms population:
Very high. UK Priority species.

Clubonia subsultans:
This relatively widespread pine woodland spider is found under conifer bark and among pine needles.
Locally important issues:
- Former loss of semi-natural habitats in Scotland, e.g. native pine woodland[4].
- 'Inappropriate' woodland management. Forest expansion should help this species, but dense regeneration or planting is unsuitable[4].

UK importance of Cairngorms population:
High. UK Priority species.

Juniper:
This widespread species is found throughout the Cairngorms on farmland, grassland, moorland and woodland sites and is important for several BAP species including Black grouse.
Locally important issues:
- Excessive grazing which prevents establishment of young bushes[5].
- Insufficient grazing which reduces the area suitable to Juniper regeneration. This may also cause the loss of adult bushes as other tree species shade out Juniper[5].
- Direct clearance of stands[4].
- Excessive burning which may destroy young regeneration and adult bushes[5].
- Low economic and cultural value attached to the species[2].

UK importance of Cairngorms population:
Moderate. UK Priority species and Locally important species.

Woolly willow:
Woolly willow is now restricted to damp mountain ledges on basic rock and is found in several suitable sites across the Cairngorms.
Locally important issues:
- Grazing has removed it from accessible ground, making it restricted to small niches on very steep areas, where it is more vulnerable to chance events such as erosion, rock falls and snow avalanches[4,5].
- The lack of recruitment in the very small remaining populations, especially where single sex populations are isolated are threats to survival[4].

UK importance of Cairngorms population:
High. UK Priority species.

Twinflower:
Although often thought of as a native pine woodland specialist, Twinflower populations can do well in appropriately managed planted Scots pine woodlands and some upland heath sites.
Locally important issues:
- Unsympathetic mechanical harvesting of timber and ground preparation for replanting[4].
- Excessive grazing by deer and sheep[4,#].
- Reproductive isolation of populations consisting of single clones[4].
- Shade resulting from dense tree regeneration and a lack of thinning[4].

UK importance of Cairngorms population:
High. UK Priority and Locally important species.

Boletopsis leucomelaena:
Both known UK sites of this rare fungus are in the Cairngorms**.**
Locally important issues:
- Poorly understood[1]. The factors causing the loss/decline of this fungus are unknown.
- Air pollution can damage such fungi [5].

UK importance of Cairngorms population:
Unknown, but probably high. UK Priority species and Locally important species.

Squamanita pearsonii and S. contortipes:
Both fungi have each only been found once in Britain in the vicinity of native pine woodland in the Cairngorms.
Locally important issues:
- Poorly understood[1].

UK importance of Cairngorms population:
Unknown, but probably high. Locally important species.

Aspen bracket fungus:
The Aspen bracket fungus *Phellinus tremulae* was only discovered in the UK as recently as 1999. Recent surveys suggest that the distribution of this fungus coincides with that of its host tree Aspen.
Locally important issues:
- Appropriate grazing is critical to the survival of Aspen suckers and the future supply of suitably aged trees for fungal colonisation[2,3,4,5].
- Dead wood should be left in situ to enable colonisation by other rare, Aspen specific fungi[2,4].
- Air pollution can damage such fungi [5].

UK importance of Cairngorms population:
Very high. The species is not listed in the UK BAP because it has only recently been discovered in Britain. Therefore, it is currently only considered a Locally important species.

An encrusting fungus – Cytidia salicina
Locally important issues:
- Data deficiency[1].
- Maintenance of humid *Salix* (Willow) stands. The fungus occurs on the branches of standing trees[1,2,3,4].
- Air pollution can damage such fungi[5].

UK importance of Cairngorms population:
Unknown, two old records of this fungus were from Strathspey. It is only known from one other site in the UK. Locally important species.

16 threatened tooth fungi:
These species (names listed in Table 4) are mycorrhizal so the retention of their host trees, with minimal adjacent ground disturbance is important.
Locally important issues:
- The exact species requirements are unknown[1].
- Avoid use of herbicides, fertilisers and stump sprays[5].
- 'Inappropriate' large-scale harvesting regimes. Shelterwood/continuous canopy cover, rather than large clear-fell areas favours maintaining the fungal mycelium clones[4].
- Air pollution can damage such fungi [5].

UK importance of Cairngorms population:
High. 13 species are UK Priority species and 3 are Species of Conservation Concern. All are also considered Locally important species.

49 additional mycorrhizal fungi

The dominant genera are *Cortinarius, Russula* and *Tricholoma* (names listed in Table 4). None of the species is fully understood, but the important issues are thought to include the following:

Locally important issues:

- Data deficiency[1].
- Large areas of clear-fell will damage the symbiont organisms. Shelterwood systems/continuous canopy cover favours maintaining the fungal mycelium and will maintain humidity[2,3,4].
- Soil disturbance or compaction by repeated trampling or heavy machinery can disrupt mycelia[2,4].
- Avoid the use of fertilisers, herbicides and stump sprays[2,4,5].
- Anecdotal evidence suggest that an increase in ground flora, resulting for instance, from a reduction in grazing, will suppress fungal fruiting[1,2,3,4]. However, there is no evidence to suggest that this actually harms the mycelia.
- Appropriate grazing levels to ensure tree regeneration for future food supply[2,3,4].
- Air pollution can damage such fungi [5].

UK importance of Cairngorms population:
Likely to be high. All 49 species are UK Species of Conservation Concern and Locally important species.

23 litter decomposing fungi

None of the species (names listed in Table 4) is fully understood, but the important issues are thought to include the following:

Locally important issues:

- Data deficiency[1].
- Large areas of clear-fell will remove the food source for these fungi. Clear-fell also reduces the humidity which does not favour fungal growth[2,4].
- Repeated trampling or disturbance can disrupt mycelia[2,4].
- Avoid the use of fertilisers, herbicides and stump sprays[2,4,5].
- Appropriate grazing levels to ensure tree regeneration for future food supply[2,3,4].
- Air pollution can damage such fungi [5].

UK importance of Cairngorms population:
Likely to be high. All 23 species are UK Species of Conservation Concern and Locally important species.

7 additional wood decomposing fungi

None of the species (names listed in Table 4) is fully understood, but the important issues are thought to include the following:

Locally important issues:

- Data deficiency[1].
- Removal of dead timber will remove the food source for these fungi. Beneficial management could include raising the cutting height of a small percentage of trees during felling programmes[2,4].
- Reduction in grazing levels leading to an increase in ground flora and humidity levels may be beneficial to these fungi[2,3].
- Avoid the use of fertilisers, herbicides and stump sprays[2,4,5].
- Appropriate grazing levels to ensure tree regeneration for future food supply[2,3,4].

- Air pollution can damage such fungi[5].

UK importance of Cairngorms population:
Likely to be high. All 7 species are UK Species of Conservation Concern and Locally important species.

4 species of slime mould

None of the species (*Craterium aureonucleatum, Diderma astroides, Physarum penetrale, Physarum rubiginosum*) is fully understood, but the important issues are thought to include the following:

Locally important issues:

- Data deficiency[1].
- Deforestation[2,3,4].
- Maintenance of woodland floor with areas of undisturbed leaf litter[2,4].
- Avoid the use of fertilisers, herbicides and stump sprays[2,4,5].
- Appropriate grazing levels to ensure tree regeneration for future food supply[2,3,4].
- Air pollution can damage such fungi [5].

UK importance of Cairngorms population:
Likely to be high. All 4 species are UK Species of Conservation Concern and Locally important species.

A rust fungus - Hyalopsora aspidiotus

This species is associated with Oak fern.

Locally important issues:

- Data deficiency[1].
- Deforestation[2,3,4].
- Repeated trampling or disturbance of hoist plant[2,4].
- Avoid the use of fertilisers, herbicides and stump sprays[2,4,5].
- Air pollution can damage such fungi5.

UK importance of Cairngorms population:
High. UK Species of Conservation Concern and Locally important species.

BROADLEAVED WOODLAND – GENERAL ISSUES

Habitat definition:
Broadleaved woodlands comprise all broadleaved stands and mixed broadleaved and conifer stands (>0.25 ha) which have more than 20% of their cover made up of broadleaved species. Contrary to popular belief, as with native pine woodlands, remnant broadleaved woodlands in the Cairngorms are the product of human management over thousands of years. Nevertheless, broadleaved woodland habitats possess a number of characteristic animal and plant communities, some of which include many rare and threatened species (e.g. those of Aspen woodland).

Current status, distribution and significance of the habitat:
Broadleaved woodland is of limited extent in the Cairngorms Partnership area, covering 14,700 ha, with a further 3,000 ha of mixed broadleaved and conifer woodland. This represents 18% of the current total Cairngorms woodland resource and only about 2% of the Cairngorms Partnership area. The commonest type of broadleaved woodland is birch woodland with 13,400 ha, representing c91% of broadleaved woodlands in the area. There are a number of other small native broadleaved woodlands, totalling 850 ha or c6% of the broadleaved woodland in the area. These include small areas of the following important habitats: upland Oak woodland, upland Ash woodland, riparian woodland and Aspen woodland. Further details for each of these are provided in the following individual habitat accounts.

The national biodiversity context:
There is a UK Habitat Statement for broadleaved woodland. This gives the following conservation direction to LBAPs, which may adopt some or all of the relevant measures identified nationally:

"*Maintain the extent and habitat quality, especially of ancient and semi-natural broadleaved woodland and expand broadleaved woodland, particularly with new native woodlands linked to existing ancient and semi-natural woods*."

Measures identified on a UK wide basis to consider further include:
- Develop a strategy to implement the 1993 Helsinki protocols on the '*Conservation of biodiversity of European Forests*'.
- Restore selected ancient woodland sites that have been replanted by converting them back to semi-natural conditions.
- Restrict new woodland planting on sites where this would adversely affect the existing conservation value.
- Produce advice on conservation and sustainable broadleaved woodland management for woodland managers and policy makers.
- Encourage research into the effects of natural processes of woodland disturbance, succession and the interactions between herbivores and woodland plant communities.

Targets:
The following six objectives and targets have been identified for broadleaved woodlands in the Cairngorms:

Main objectives/targets:
Target 1: *Ascertain the distribution, area and ecological status of broadleaved woodland habitats in the Cairngorms – by 2005.*
Target 2: *Ensure no net loss of key broadleaved woodland habitats in the Cairngorms – by 2005.*
Target 3: *Ensure good ecological status/quality* of key broadleaved woodland habitats in the Cairngorms – by 2010.*
Target 4: *Direct existing woodland management systems towards prescriptions likely*

to enhance Priority BAP species associated with important broadleaved woodland habitats in the Cairngorms – by 2005.
Target 5: *Ensure no net loss in the number and/or range of key BAP species associated with broadleaved woodland habitats in the Cairngorms – by 2010. To achieve this, wherever possible, target new plantings to 'plug gaps' linking isolated woodland patches, creating 'functional' habitat networks.*
Target 6: *Identify and encourage the restoration of former broadleaved woodlands that have been degraded by planting with conifers or invasion by non-native species like Rhododendron – by 2005. Completion dates will vary according to habitat type under the UK BAP.*

* whilst allowing some fluctuations in the boundaries of individual woods to accommodate natural dynamics.

Current factors affecting the habitat in the Cairngorms:
The following specific broadleaved woodland issues were identified over and above those important issues detailed in the '*Main woodland biodiversity issues*' section.

Awareness raising:
The issues:
- Some conservation policy makers and land owners have under-valued the broadleaved woodland resource in the Cairngorms.

The solutions, actions and targets:
- Raise the general awareness of policy makers and land managers to the strategic importance of broadleaved woodland, through a series of new workshops, presentations and publications – *ongoing.*
- Use opportunities afforded by native pine woodland action to raise the profile of the importance of the broadleaved component to Scotland's remnant Boreal forest habitat – *ongoing.*

Inappropriate management:
The issues:
- Appropriate grazing management is the key issue for most broadleaved woodlands in the Cairngorms.

The solutions, actions and targets:
- Ensure adequate funding mechanisms are available to land managers who wish to bring their broadleaved woodlands under favourable grazing management status – *by 2005*.

BIRCH WOODLAND – SPECIFIC ISSUES

Habitat definition:
Birch is the dominant tree species in almost all Cairngorms Broadleaved woodlands. Both Downy birch *Betula pubescens* and Silver birch *Betula pendula* are present, with the former more common on wetter soils. Birch grows on soils of a higher fertility range than Scots pine and often grows in association with Scots pine in a number of mixed woodlands. Birch is often a pioneer colonist that is followed by Scots pine.

Current status, distribution and significance of the habitat:
Birch woodland is by far the most extensive Broadleaved woodland type in the Cairngorms (13,400 ha). It occurs across the Cairngorms Partnership area, with extensive semi-natural woodlands in Strathspey, Deeside, Donside and the Angus and Atholl glens. A range of structural conditions are desirable within Birch woodlands to provide appropriate habitats for many specialist species. These conditions include: presence of deadwood and; contiguous mosaics of open space, regeneration thicket stages, mature and veteran trees. Felling and under-planting with non-native conifer species was extensively practised from the 1950s-1980s and conifers have now shaded out Birch wood features in many cases. The historical loss of old Birch woodland in the Cairngorms has generally ceased, with an increase in the overall area of managed Birch ongoing. However, some stands have been greatly damaged and destroyed by heavy '*selective felling*'.

The national biodiversity context:
Unfortunately, the UK HAP listing process for broadleaved woodlands was biased towards southern woodland habitat types and has tended to undervalue many Scottish broadleaved woodland habitats. This inadequacy is currently being addressed on a number of levels nationally with separate UK HAPs in preparation for, amongst others, Birch woodland. There are no precise data on the total extent of upland birch woods in the UK, but two separate estimates suggest the total area to be between 36,000 ha and 64,000 ha, depending upon the definition of Birch woodland and riparian woodland used.

Targets:
The following Birch woodland targets have been identified over and above those for broadleaved woodland. In working through general broadleaved targets, try to achieve the following for Birch woods, using natural regeneration in preference to planting. Significant biodiversity work has been carried out on a local level despite Birch woodland not being a recognised UK HAP target.

Target 1: *Ensure woodland survival where existing Birch woods that are declining and senescent are likely to be lost in the next 20 years – effective immediately.*
Target 2: *Encourage mosaics of different age classes around core forest areas – by 2010.*
Target 3: *Use Birch woodland expansion to help create natural tree-lines and montane scrub habitats – by 2010.*

Current factors affecting the habitat in the Cairngorms:
There were no specific local Birch issues identified over and above those listed for broadleaved woodland in general. Appropriate grazing management is the main issue for Birch woodland, as it is for all woodland, in the Cairngorms.

ASPEN WOODLAND – SPECIFIC ISSUES

Habitat definition, status and distribution:
Although Aspen *Populus tremula* as a species is widely distributed in Great Britain, only 160 ha of aspen woodland remains, mainly as pure woodland stands in North and East Scotland. Some of the largest remaining stands occur in the Cairngorms Straths, with Strathspey and Deeside holding particularly important sites. The large Aspen stands of the Scottish Highlands are a remnant of the ancient boreal woodlands that colonised the area after the end of the last glaciation. The reproduction of Aspen in Scotland is mainly by vegetative root suckers, called ramets, leading to large areas of clones if grazing pressure is low. Aspen often grows with Hazel on better soils e.g. on the Rivers Dee, Avon and Spey.

The national biodiversity significance and context:
Unfortunately, like Birch, Aspen is not currently well served by the current UK BAP process. Nevertheless, Aspen woodlands support many rare and specialist scarce species including moths, flies, fungi, lichens and mosses that occur nowhere else in the UK and this seems at odds with its lack of formal recognition in the current national vegetation classification system and UK BAP process

Associated with Aspen is a community of saproxylic species that are so localised in their distribution that their presence can be regarded as indicators of forests of international importance. The diverse saproxylic insect fauna has strong similarities with semi-natural forests found in Scandinavian countries, Finland and Russia.

In terms of biodiversity, the critical aspect of an Aspen community is in the transition from groups of scattered individual trees to a larger more homogeneous Aspen stand which acts as an ecological entity. Much attention has centred on the importance of these largest Aspen stands because it is only these larger stands that can support the rich saproxylic insects which depend upon a regular supply of dead wood and decaying trees for larval development. However, recent discoveries have demonstrated the outstanding importance of some small Aspen stands and lone wayside Aspens for extremely rare bryophytes and lichens.

There are over 30 species of fungi associated with Aspen in Scotland, many of which are worth considering in Aspen management plans. Some species are principally detrivores, part of the decay cycle of leaves and wood, but quite a few are mycorrhizal and act as parasites hastening the death of parts or all of the tree. These species are an integral part of the special saproxylic Aspen community. Threats to these species would include excessive trampling and acidic deposition from air pollution. As with *Diptera* species (flies), leaving and providing additional dead wood is likely to be the most useful management tool for the fungi of existing Aspen stands.

Targets:
The following five Aspen objectives and targets have been identified in addition to those objectives listed for broadleaved woodlands in the Cairngorms:

Main objectives/targets:
Target 1: *Ensure that all large Aspen woods (>5ha) and a significant proportion of smaller stands are under positive biodiversity management – by 2006.*
Target 2: *Ensure that all new woodland plantings in the Cairngorms contain a significant proportion of Aspen trees (of local provenance) and carefully plant Aspen into some degraded semi-natural woodland where it is missing – by 2006.*
Target 3: *Direct positive management towards supporting a significant proportion of dead wood in all Aspen woodland – by 2010.*
Target 4: *Given that the Cairngorms contains the most important and largest area of Aspen in*

the UK, treble the existing small area of Aspen dominated woodland in the Cairngorms, at the same time as avoiding other habitats of high conservation value – by 2020.
Target 5: *Enhance the existing habitat network by increasing the connectivity of Aspen stands, wherever possible through natural regeneration in its core areas of Badenoch, Strathspey and Deeside – effective immediately.*

Current factors affecting the habitat in the Cairngorms:
The following Aspen woodland specific issues were identified over and above those listed in the '*Main woodland biodiversity issues*' section.

Lack of data/important information:
The issues:
- There is lack of basic information on many of the species associated with Aspen stands (e.g. dispersal distances between sites).
- Improve the knowledge on connectivity of sites by undertaking an inventory of the current Aspen sites in the Cairngorms.

The solutions, actions and targets:
- Commission relevant research to 'plug' important gaps in basic lifecycle information on Aspen species and the distribution of current Aspen stands in the Cairngorms - *ongoing*.

Awareness raising:
The issues:
- The national biodiversity importance of Aspen woodlands has, until recently, been largely under-estimated.

The solutions, actions and targets:
- Raise the profile of Aspen to different key audiences through a number of local Aspen Action events, such as seminars, workshops and publications – o*ngoing*.
- For many of the rare '*Aspen dependent*' species, chance events or uninformed management could be devastating for entire populations. Adequate baseline surveys should be carried out prior to any management, so that site managers know the exact location of important trees – *effective immediately*.

Access to appropriate policy and funding sources:
The issues:
- The practical (inc. financial) problems associated with successful and appropriate commercial nursery production of Aspen have not been widely investigated and opportunities to expand the area of Aspen in the Cairngorms have been missed due to a lack of suitable (local provenance) planting stock.

The solutions, actions or targets:
- Support the development of an Aspen seed/gene/clone bank and facilitate the development of propagation facilities so that local nurseries can produce significant quantities of suitable Aspen stock for planting – *by 2005*.
- Ensure that all future plantings use local provenance Aspen stock – *effective immediately.*

Habitat fragmentation and inappropriate biodiversity management:
The issues:
- Habitat fragmentation particularly in relation to new and dead Aspen wood resources.

The solutions, actions and targets:
- To ensure that Aspen stands can continue to be capable of supporting the saproxylic fauna, carry out effective long-term management to provide a constant supply of suitable fallen timber – *effective immediately*.
- Improve the current connectivity of sites by approaching land owners and managers to increase the amount of Aspen in key areas, through planting, regeneration and restructuring to develop functional Aspen habitat networks – *by 2007*.

Practical action:

Aspen awareness raising and action:
On the 25th May 2001, as apart of a general awareness raising strategy, 120 Aspen experts and enthusiasts from around the UK and overseas attended a one day seminar in Kingussie on *'The Biodiversity and Management of Aspen Woodlands*'. The day concentrated on the unique biodiversity associated with Aspen, how to practically manage Aspen stands effectively, and importantly, how to raise the profile of this Locally important 'Cinderella' species/habitat to wider audiences. Remarkably, the recent interest shown in Aspen has resulted in the discovery of a number of new species for Britain, the rediscovery of species thought to be extinct and '*new species for science*' in the Cairngorms during the last few years. The seminar proceedings have now been published and will hopefully be used to spearhead more concerted Aspen action in the years ahead. Free copies of these proceedings, the first such compendium of Aspen related information published in the UK, have been provided to interested woodland owners, managers, advisors and tenant farmers and crofters who hold significant Aspen stands. The seminar proceedings are now available electronically on the Trees for Life website (www.treesforlife.org.uk) or as hard copies from the Cairngorms LBAP Officer.

UPLAND OAK WOODLAND – SPECIFIC ISSUES

Habitat definition:
Upland Oak woodlands are characterised by a predominance of Sessile oak *Quercus petraea*, sometimes locally with Pedunculate oak *Quercus robur*. The woodland generally contains Birch and other broadleaved species such as Rowan, Alder and Holly.

Current status, distribution and significance of the habitat:
Although Oak is widely distributed in Great Britain, Oak woodlands in the Cairngorms are relatively uncommon and form only a small proportion of the broadleaved woodlands in the area. Most of the Oak woodlands in the Cairngorms occur in Deeside and sparingly in Strathspey, the Atholl and Angus glens and it seems likely that most, but not all (e.g. Darach in place names) existing stands were planted. The Cairngorms upland Oak woodlands are only a very small proportion of the UK total which is concentrated on the west coast. In some areas, e.g. Forest of Birse, Oak is an important component of ancient Scots pine and Birch woodland.

The national biodiversity context:
There is a UK Habitat Action Plan for upland Oak woodland. This gives the following conservation direction to LBAPs, which may adopt some or all of the relevant measures identified nationally.

Measures identified on a UK wide basis to consider further include:
- Maintain the existing area of upland oak woodland and improve its condition, by a mixture of management for timber, as sheltered grazing and minimum grazing.
- Avoiding other areas of high nature conservation value, expand the area of upland oak woodland by 10% on to open ground through planting and natural regeneration – by 2005.
- Identify and encourage restoration of a similar area (c10%) of former oak woodland that has been degraded by planting with conifers and invasion by rhododendron.

Targets:
There are no specific upland Oak objectives and targets above those listed for broadleaved woodland in general for the area.

Current factors affecting the habitat in the Cairngorms:
No specific upland Oak woodland issues were identified over and above those detailed in the section '*Main woodland biodiversity issues*' section.

UPLAND MIXED ASH WOODLAND – SPECIFIC ISSUES

Habitat definition:
Upland mixed Ash woods are characterised by a predominance of Ash *Fraxinus excelsior* in the company of other broadleaved species e.g. Birch, Hazel, Cherry and Wych-elm.

Current status, distribution and significance of the habitat:
Ash is a common and widespread native tree, but it is rarely the dominant tree species in the woodlands of the Cairngorms area. A few scattered stands in Strathspey, Donside and Deeside contain significant proportions of Ash, but the richest surviving example of native Ash woodland is in Angus at the Den of Airlie on the border of the Cairngorms Partnership area. Upland Ash woodlands are characteristic of western Scotland and only a tiny proportion of the UK total is in the Cairngorms.

The national biodiversity context:
There is a UK Habitat Action Plan for upland mixed Ash woodlands. This gives the following conservation direction to LBAPs, which may adopt some or all of the relevant measures identified nationally.

Measures identified on a UK wide basis to consider further include:
- Maintain the current extent of ancient semi-natural woodland and the total extent and distribution of upland mixed Ash woods.
- Initiate measures intended to achieve favourable condition (e.g. management and restoration) in 70-100% of designated sites and 50% of the total resource – by 2010.
- Initiate colonisation or planting of 6,000 ha of upland mixed Ash wood on unwooded or productive conifer woodland sites – by 2015.

Targets:
There are no specific upland mixed Ash woodland objectives and targets above those listed for broadleaved woodland in general for the area.

Current factors affecting the habitat in the Cairngorms:
No specific upland mixed Ash woodland issues were identified over and above those detailed in the section '*Main woodland biodiversity issues*' section.

WET/RIPARIAN WOODLAND – SPECIFIC ISSUES

Habitat definition:
Wet woodlands occur on poorly drained or seasonally wet soils, usually with Alder, Birch and Willow as the predominant tree species, but sometimes with Ash, Oak and Scots pine on drier riparian areas. They are found on floodplains, as successional habitat on fens, mires and bogs, along streams and hill-side flushes and in peaty hollows.

Current status, distribution and significance of the habitat:
In the Cairngorms wet woodlands occur on a range of soil types and hydrological conditions. Therefore, wet woods frequently occur in mosaics with other important habitats and consequently their ecological importance is particularly site specific. Fragments of ancient floodplain forest are rare in the UK, but some of the best surviving examples are in the Cairngorms, although many of the sites comprise only mature trees and some are moribund. Where these woodlands have been minimally managed, the resultant combination of dead wood and high humidity levels can sustain especially important communities of lower plants and fungi. These sites include habitats such as '*residual alluvial forests*' and '*bog woodland*' identified under international conservation designations. There are no precise data on the extent of wet woodlands in UK, and it is unclear whether those of the Cairngorms form a particularly large proportion of the national resource or not. However, the high ecological quality and importance of riparian woodland in the Cairngorms, especially in Strathspey and Deeside, is probably unsurpassed in a UK and in some cases European context.

The national biodiversity context:
There is a UK HAP for wet/riparian woodlands. This gives the following conservation direction to LBAPs, which may adopt some or all of the relevant measures identified nationally.

Measures identified on a UK-wide basis to consider further include:
- Maintain current area of ancient semi-natural wet woodlands.
- Initiate measures intended to achieve favourable condition (inc. restoration) in over 70% of designated sites – by 2010.
- Encourage appropriate management regimes (e.g. re-establishment of natural hydrological systems by blocking drains or removing unnecessary embankments) using site native species.
- Initiate colonisation and/or new planting of wet woods on unwooded or productive conifer woodland sites – by 2015.

Targets:
The following four objectives and targets have been identified for wet woodlands in the Cairngorms:

Main objectives/targets:
Target 1: *Encourage all riparian forest restructuring to target wet woodland recreation – by 2006.*
Target 2: *Reinstate 20% of wet woodland sites where it has been lost through neglect or poor management in the Cairngorms – by 2010.*
Target 3: *Arrange, wherever possible, for new plantings or restructuring to 'plug gaps' linking isolated riparian or wet woodland patches, creating 'functional' habitat networks – on-going.*
Target 4: *Establish the past and current extent of riparian woodland in the remainder of the Cairngorms, as has already been done for the Forest of Spey - by 2006.*

Current factors affecting the habitat in the Cairngorms:
The following specific wet woodland issues were identified over and above those listed in the '*Main woodland biodiversity issues*' sections:

Access to appropriate policy and funding sources:
The issue:
- Despite over half of the estates in Strathspey holding riparian woodland, hardly any have entered into Woodland Grant Schemes to encourage favourable management. A recent survey suggested that there was widespread interest amongst owners in restoring the favourable conservation status of their riparian woodland for a range of reasons, but two key constraints stopped them from doing so: (1) Financial cost of restoration, and (2) Loss of grazing land, especially on the floodplain.

The solutions, actions and targets:
- Target funding to take account of multiple benefits of riparian woodland e.g. ensure that financial incentives take account of the extra establishment and maintenance costs of riparian schemes – *by 2005*.
- Consider allowing the introduction of targeted and controlled seasonal grazing by cattle on larger floodplain schemes – *by 2005*.
- Encourage neighbour co-operation and joint riparian schemes for more cost effective and useful biodiversity benefits. This links closely with objectives for key habitat networks and links to be made between different woodland patches – *effective immediately*.

MONTANE SCRUB – SPECIFIC ISSUES

Habitat definition:
Montane scrub can be defined as the habitat on mountains in which trees and shrubs grow at altitudes higher than the timberline (above which trees can no longer sustain an upright growth form, with good quality timber trunks). It is characterised by a range of shrub and tree species, growing in a low twisted, wind-pruned form, together with a variety of flowering plants, fungi, lichens, insects, birds, and other species particularly associated with this zone.

In Scotland there are thought to be remnants of four distinct types of montane scrub, which are characterised by the dominate tree/scrub species: (1) Krummholz Scots pine scrub, (2) Alpine/ subalpine or Montane Willow scrub, (3) High altitude Juniper scrub and (4) Dwarf Birch (*Betula nana*) scrub.

Current status, distribution and significance of the habitat:
Montane scrub is the rarest and most threatened of our native woodland types and is confined largely to remnant patches on remote and inaccessible cliffs in Scotland. It is present in no more than a few hundred localities, and is most evident as scattered trees on cliff faces (well above any woodland on the open hill) showing the upper limits of tree-growth but not forming a continuous treeline. The best example of a continuous treeline in Britain is at Creag Fhiaclach, above Inchriach, where a complex of Scots pine and Juniper scrub has developed at 550 to 650m a.s.l. Other natural treelines are regenerating well, particularly in the northern Cairngorms around Meall a'Bhuachille. Such scattered fragments offer a glimpse of what must have once been much more widespread.

Due to the impoverished condition of most of the remnant patches, it is very difficult to know what species (if any) are missing from our montane scrub habitats. There are no obvious flagship species associated with montane scrub, but some unexpected and charismatic species e.g. Bluethroat *Luscinia svecica* might potentially (re)colonise the habitat once it becomes re-established again. The Woolly willow *Salix lanata* is an important UK BAP species associated with this habitat and any action taken for montane scrub, will probably benefit this Priority species.

The national biodiversity context:
Several partners, primarily under the auspices of the Montane Scrub Restoration project, fronted by Highland Birchwoods, the Mountain Scrub Action Group and the Millennium Forest for Scotland Trust are taking action forward for montane scrub. However, until relatively recently, little research has focussed on this habitat and much is still waiting to be discovered. This lack of information is primarily due to a general lack of knowledge on the original and present extent of the habitat and its management needs. A great deal has recently been achieved and is summarised in the excellent publication '*Montane scrub: the challenge above the treeline*' (Highland Birchwoods, 2002). There is a danger of dealing with montane scrub in isolation from adjacent habitats; both woodland and open ground. Thus, delivering on this plan should be seen along side, not separate from action on adjacent habitats.

Targets:

Main objectives/targets:
Target 1: *Ensure no loss of key montane scrub remnants in the Cairngorms – ongoing.*
Target 2: *Ensure good ecological status/quantity of key montane scrub remnants in the Cairngorms through innovative restoration programmes by 2010.*
Target 3: *Double the area of montane scrub in the next decade by directing existing relevant management and expansion of woodland 'up the hill' to regenerate high altitude scrub and to reinstate natural treelines – ongoing.*

Current factors affecting the habitat in the Cairngorms:
The montane scrub habitat is really in need of '*emergency first aid*' across its entire British range to reverse hundreds of years of decline. The following montane scrub issues were identified over and above those important issues detailed in the '*Main woodland biodiversity issues*' section.

Lack of data/important information:
The issues:
- There is a basic lack of information on many of the species associated with the different types of montane scrub.

The solutions, actions and targets:
- Commission relevant innovative research to 'plug' important gaps in the basic ecological information of montane scrub species in the Cairngorms – *ongoing.*

Awareness raising:
The issues:
- Due to their remote location and tiny extent, very few people see the tiny montane scrub remnants and recognise the missing part of the Cairngorms landscape. Consequently, the role of montane scrub habitat for rare species, and its wider benefits for soil conservation, water quality improvements and enhanced visual appearance in the landscape have been largely ignored or downplayed.

The solutions, actions and targets:
- Support the range of imaginative pilot and demonstration restoration schemes that have recently been established.
- Distribute and promote the information and practical guidance currently available on montane scrub restoration and the eligibility of well thought out schemes under FC Woodland Grant Schemes to target audiences.

Access to appropriate policy and funding sources:
The issues:
- Inappropriate grazing levels (primarily from Red deer) are a serious constraint against montane scrub regeneration and expansion in many areas and the main reason why there is so little in existence today.

The solutions, actions and targets:
- Modify deer management in conjunction with estates, local Deer Management Groups and the Deer Commission for Scotland by developing Deer Management Plans that identify damage to the natural heritage and population levels that will achieve montane scrub habitat restoration - *ongoing*.

PLANTED CONIFER WOODLAND

Habitat definition:
Woodlands composed wholly or mainly of planted conifer species, both native (e.g. Scots pine) and introduced (e.g. Sitka and Norway spruce, Lodgepole pine and Larch). The stands are usually of a single species and their structure varies with age of the stand and management. However, at the forest scale, species composition is normally mixed with some broadleaves usually planted or self-sown along the forest edge, on inaccessible steep ground or in openings and glades. Where light penetrates to the forest floor, native trees and herbs often develop as an understorey. For the purpose of this HAP, the habitat definition also refers to self-sown trees from planted conifer woodlands.

Current status, distribution and significance of the habitat:
Planted conifer woodlands occur on the lower ground in most of the Cairngorm Straths. Much of the planted conifer woodland is Scots pine (but not necessarily of local provenance), which produces seed which can give rise to self-sown woodlands that resemble native Caledonian pine woods. In an effort to preserve the distinctive geneotypes, buffer zones have been created around native Caledonian pine woods. The remaining planted conifer stands are predominantly Lodgepole pine, Sitka spruce, Norway spruce, Larch (European and Japanese) and Douglas fir. Most of these trees were planted after the formation of the Forestry Commission in 1919 and tend to be dominated by uniform stands of young (<30 yr) and intermediate (30-60 yr) age classes. The LCS88 survey recorded 45,539 ha of planted conifer woodland in the Cairngorms Partnership area, with a further 8,714 ha of recent planting and 1,758 ha of felled woodland. This proportion equates to c7% of the total Cairngorms Partnership area and is similar to the national average for Great Britain as a whole.

Planted conifer woodlands are not a threatened habitat. The existing, and particularly the potential importance for biodiversity of the large planted conifer woodlands in the Cairngorms is often under-estimated and maybe over-looked in the move to expand native Caledonian pine woods. The conservation value of such productive woodlands can be enhanced by increasing forest diversity, with a greater variety of species and age structures, creation of dead and dying trees and open space. Indeed, the biodiversity value (for certain important BAP species) of some well-managed planted conifer woodlands may be equal to that of adjacent native pine woodlands (e.g. Capercaillie, Twinflower and fungi). Thus, at least in the short-term, targeted action towards appropriate management of existing planted '*productive*' conifer woodlands may yield great '*value for money*' biodiversity improvements.

The national biodiversity context:
There is a UK Habitat Statement for planted conifer woodland. This gives the following conservation direction to LBAPs, which may adopt some or all of the relevant measures identified nationally:

"Maintain and enhance the wildlife potential of the existing conifer resource through continued forest restructuring and diversification."

Measures identified on a UK wide basis to consider further include:
- Develop a strategy to implement the 1993 Helsinki protocols on the '*Conservation of biodiversity of European Forests*'.
- Continue to direct the expansion of planted conifers to land of low conservation value ensuring that habitats of high conservation value are not further threatened – using Indicative Forestry Strategies where available.
- Promote forestry management which enhances conservation value through habitat restructuring and diversification.

- Develop systems of monitoring the biodiversity conservation value of planted conifer woodlands, for example by assessing critical habitat features or indicator species.

Targets:
The following five objectives and targets have been identified for planted conifer woodlands in the Cairngorms:

Main objectives:
Target 1: *Ascertain the distribution, area and ecological status of planted conifer woodland in the Cairngorms – by 2005.*
Target 2: *Ensure good ecological status/quality of important planted conifer woodlands in the Cairngorms by directing existing woodland management systems towards adopting systems which accelerate the development of suitable conditions for key BAP species associated with planted conifer woodlands – by 2008.*
Target 3: *Develop (and subsequently use) protocols and practical management techniques for planted conifer woodlands that would benefit key native pine woodland species – ongoing.*
Target 4: *Use the opportunity presented by plantation restructuring and phasing of felling and restocking to increase biodiversity by creating more open space, dead wood, a wider variety of species and ages classes and targeting management for key native pine woodland species. In some situations, and where conditions permit, consider removing inappropriate plantations and converting them to other important habitats – effective immediately.*
Target 5: *Ensure no net loss in the number and/or range of key BAP species associated with planted conifer woodlands systems in the Cairngorms – by 2010.*

Current factors affecting the habitat in the Cairngorms:
The following specific planted conifer woodland issues were identified over and above those listed in the general '*Main woodland biodiversity issues*' section:

Habitat loss, fragmentation and inappropriate management:
The issues:
- Most of the Priority species associated with this habitat are present when forest management tends to mimic that of native Caledonian pine woodlands. Therefore, the appropriate biodiversity management of existing planted conifer woodlands could potentially benefit a range of nationally rare species, without expanding the area of new woodland plantings.

The solutions, actions and targets:
- Use cost effective management to target Priority species management in planted conifer woodlands in the Cairngorms – *effective immediately.*

Practical action:

Raising the profile – The Deeside Forest Biodiversity Guidance Note:
Until recently, it has been difficult for land managers in Deeside to get up to date relevant information on issues affecting all the UK Priority species in the Deeside Forest. This Note gives practical guidance to woodland owners and managers on protecting and enhancing woodland habitat for Priority species in Deeside. It sets out the main issues that are thought to be affecting these, from the Capercaillie and Red squirrels in the tree tops to the woodants and lichens of the forest floor.
This Guidance Note has now been published and distributed to all woodland owners and managers in the area. It should help in the future when reviewing and drawing up woodland management plans. It also provides additional sources of help and advice associated with appropriate management of species highlighted in the Guidance Note.

NATIVE PINE WOODLAND

Habitat definition:
Native pine woodlands, of self-sown Scots pine *Pinus sylvestris*, are relicts of the ancient Caledonian Forest, which formerly covered much of the Scottish Highlands. In the past these indigenous forests may have covered more than 1.5 million ha of Scotland, but today less than 1% of the former range now remains. Where they occur now is determined largely by lack of intensive human activities. However, contrary to popular belief, remnant native pine woodlands are the product of human management over thousands of years. Scots pine woodlands usually contain varying amounts of Birch and other broadleaved trees, with Juniper often an important understorey species. They occur on infertile, strongly leached podzolic soils and do not support a large diversity of animals and plants compared to more fertile habitats. However, they possess a characteristic plant and animal community, which includes many rare, uncommon and highly distinctive species.

Current status, distribution and significance of the habitat:
Strathspey and Badenoch hold the largest area of native pine woodland in the Cairngorms, while most native pine woodlands in Deeside are smaller and more fragmented. Most remnant pine woodlands are well below the natural tree line and have been studied and mapped in detail. A list of all the Cairngorms sites is provided in the FC's Caledonian Pinewood Inventory. Planted conifer woodlands occur on the lower ground in most of the Cairngorm Straths. Much of the planted conifer woodland is Scots pine (but not necessarily of local provenance), which produces seed that can give rise to self sown woodlands resembling native 'Caledonian' pine woodlands. To preserve the distinctive genotypes, so called 'buffer zones' have been created around native 'Caledonian' pine woodlands (i.e. those listed in the Inventory).

The native 'Caledonian' pine woodlands are of disproportionate importance for biodiversity. In the UK, native pine woodlands occur only in Scotland and the total area remaining is c18,000 ha. The Cairngorms is very important for this habitat, holding between 60%-80% of the UK total (depending upon definitions used). The highest estimate represents only about 2% of the Cairngorms Partnership area. The significance of the remaining woodlands are reflected in the many conservation designations associated with the largest and most important sites.

The national biodiversity context:
There is a UK Habitat Statement for native pine woodland. This gives the following conservation direction to LBAPs, which may adopt some or all of the relevant measures identified nationally:

"Maintain and enhance the structure and wildlife interest of native pine woodlands and encourage natural regeneration in core areas aiming to restore degenerated areas and to bring them into appropriate management."

Measures identified on a UK wide basis to consider further include:
- Promote the expansion of existing areas of native pine woodland.
- Encourage the protection of small pine wood remnants from grazing and encourage expansion, thereby reducing fragmentation and isolation of pine woodland.
- Restore pine woodland underplanted with other species.
- Follow current guidelines to conserve the genetic integrity of populations of native pine woodland species.
- Take opportunities to produce useable wood.

Targets:
The following four objectives and targets have been identified for native pine woodlands in the Cairngorms:

Main objectives:
Target 1: *Ensure no net loss of key* native pine woodlands in the Cairngorms – effective immediately.*
Target 2: *Ensure good ecological status/quality of key native pine woodlands in the Cairngorms by directing woodland management to enhance key BAP species associated with native pine woodlands.*
Target 3: *Ensure no net loss in the number and/or range of key BAP species associated with native pine woodlands in the Cairngorms – by 2010. This is linked with strategic evaluation of other habitats such as moorlands.*
Target 4: *Focus any further expansion of native pine woodlands towards connecting isolated stands and thereby supporting functional native pine wood habitat networks – effective immediately.*

* Defined by inclusion in the FC's Caledonian Pinewood Inventory

Current factors affecting the habitat in the Cairngorms:
The following specific native pine woodland issues were identified over and above those listed in the general '*Main woodland biodiversity issues*' section:

Habitat loss, fragmentation and inappropriate management:
The issues:
- The UK native pine woodland HAP expansion target has been reached. However, the age class structure of some remnant native pine woodlands shows a paucity of young trees. The desired old growth habitats and species associated with these stands will diminish over time unless suitable adjacent productive conifer woodlands are managed as potential old growth habitat.
- The ability of native pine wood habitat networks to function properly can be compromised by poor management, in particular inappropriate muirburn. However, the best natural regeneration of Scots pine and Birch often follows fire.

The solutions, actions and targets:
- Suitable productive conifer woodlands should be identified and managed to mimic old-growth habitat. Regardless of new planting and regeneration, maintenance of BAP species will be achieved only by an integrated approach that includes native pine woodlands and productive conifer woodlands. Current woodland management should encompass this – *effective immediately*.
- Functioning habitat networks can be achieved in the short-medium term only through the integrated management approach of native pine woodland and productive conifer woodland. The information for this type of approach should be used *immediately* when revising all forest design plans. It is important that this is done both within and across estate boundaries.
- All estates and land managers should practice the revised Muirburn code to avoid damage to native pine woodlands – *effective immediately.*
- The lack of young trees in some commercially productive pine plantations/woodlands suggests that although area targets may have been achieved, there is a legitimate argument for planting areas in lieu of those woodlands lacking young trees – *effective immediately*.
- The use of prescribed fire as a management tool to improve forest regeneration and woodland habitats should be trialed and its wider applicability as a conservation tool appraised - *by 2008*.

Practical action:

Capercaillie in crisis:
The Capercaillie is one of the most threatened and declining bird species in the UK and the Cairngorms area is the most important (and largest) remaining stronghold. Local partner

organisations have worked on many different levels in a concerted effort to save the species from extinction in the UK for a second time.

- Building on projects already carried out by forest managers and owners to improve conditions for woodland grouse, the Scottish Executive has provided an additional £700,000 to help deal with the backlog of forest fence removal and marking in core areas. Local foresters, fencing contractors and sawmills have already begun developing effective working methods for this removal and marking.
- Local partners have been successful in securing nearly £5 million (through matched European LIFE funding) for assistance to improve Capercaillie habitat and breeding success in the remaining core areas. The five year project got underway in spring 2002 and most of this money will be spent in the Cairngorms area.
- The LBAP project officer worked with local gamekeepers and estate managers to identify an additional and preventable cause of Capercaillie mortality (accidental captures in snares). The work has been published in a journal and local co-operative work is now underway to ensure that this preventable threat is tackled in an effective manner.

Table 4. 'Key' Cairngorms woodland species

Woodland habitat codes: Bl wood = Broadleaved woodland, Bir wood = Birch woodland, Asp wood = Aspen woodland, Rip wood = Riparian woodland, Pla conif = Planted conifer woodland, Nat pine = Native pine woodland. ◆ = regularly used by species. *(P)* = UK Priority species, *(C)* = UK Species of conservation concern, *(L)* = Locally important species.

Species	Bl wood	Bir wood	Asp wood	Ripw wood	Pla conif	Nat pine
Red squirrel *Sciurus vulgaris (P)(L)*					◆	◆
Pipistrelle bat *Pipistrelus pipistrellus (P)(L)*	◆				◆	◆
Natterers' bat *Myotis nattereri (C)(L)*	◆				◆	◆
Daubenton's bat *Myotis daubentonii (C)(L)*	◆					
Nathusius' pipistrelle Bat *Myotis nathusii (C)(L)*	◆					◆
Brown long-eared bat *Plecotus auritus (C)(L)*	◆				◆	◆
Hedgehog *Erinaceus europaeus (C)(L)*	◆				◆	◆
Water shrew *Neomys fodiens (C)*				◆		
Common shrew *Sorex araneus (C)*	◆					
Pygmy shrew *Sorex minutus (C)*	◆					
Pine marten *Martes martes (C)(L)*	◆				◆	◆
Stoat *Mustela erminea (C)(L)*	◆				◆	◆
Weasel *Mustela nivalis (C)(L)*	◆				◆	◆
Badger *Meles meles (C)(L)*	◆				◆	◆
Wildcat *Felis sylvestris (C)(L)*	◆				◆	◆
Red deer *Cervus elaphus (C)(L)*	◆				◆	◆
Roe deer *Capreolus capreolus (C)(L)*	◆				◆	◆
Fox *Vulpes vulpes (L)*	◆				◆	◆
Goldeneye *Bucephala clangula (C)(L)*				◆	◆	
Red-breasted merganser *Mergus serrator (C)(L)*				◆	◆	◆
Goosander *Mergus merganser (C)(L)*				◆	◆	◆
Capercaillie *Tetrao urogallus (P)(L)*					◆	◆
Black grouse *Tetrao tetrix (P)(L)*	◆				◆	◆
Goshawk *Accipiter gentilis (C)(L)*	◆				◆	◆
Sparrowhawk *Accipiter nisus (C)(L)*	◆				◆	◆
Golden eagle *Aquila chrysaetos (C)(L)*						◆
Buzzard *Buteo buteo (C)(L)*	◆				◆	◆
Osprey *Pandion haliaetus (C)(L)*						◆
Kestrel *Falco tinnunculus (C)(L)*	◆					◆
Merlin *Falco columbarius (C)(L)*					◆	◆
Woodcock *Scolopax rusticola (C)(L)*	◆				◆	◆
Common sandpiper *Actitis hypoleucos (L)*				◆		
Tawny owl *Strix aluco (C)(L)*	◆				◆	◆
Long-eared owl *Asio otus (C)(L)*	◆				◆	◆
Short-eared owl *Asio flammeus (C)(L)*					◆	◆
Green woodpecker *Picus viridis (C)(L)*	◆					
Great spotted woodpecker *Dendrocopus major (C)(L)*	◆					◆
Tree pipit *Anthus trivialis (C)*	◆				◆	◆
Meadow pipit *Anthus pratensis (C)(L)*	◆				◆	◆

Grey wagtail *Motacilla cinera (C)(L)*				◆		
Pied wagtail *Motacilla alba (C)(L)*				◆		
Dipper *Cinclus cinclus (C)(L)*				◆		
Wryneck *Jynx torquilla (P)*	◆					◆
Nightjar *Caprimulgus europaeus (P)*					◆	◆
Dunnock *Prunella modularis (C)*	◆				◆	◆
Redstart *Phoenicurus phoenicurus (C)*	◆					◆
Whinchat *Saxicola rubetra (C)*	◆				◆	◆
Stonechat *Saxicola torquata (C)*	◆					
Robin *Erithacus rubecula (L)*	◆					
Wren *Troglodytes troglodytes (L)*	◆					
Song thrush *Turdus philomelos (P)(L)*	◆				◆	◆
Blackbird *Turdus merula (L)*	◆					
Fieldfare *Turdus pilaris (C)*	◆					
Redwing *Turdus iliacus (C)*	◆					
Pied Flycatcher *Ficedula hypoleuca (C) - Oak spp*	◆					
Spotted Flycatcher *Muscicapa striata (P)*	◆					
Sedge warbler *Acrocephalus schoenobaenus (C)*				◆		◆
Grasshopper warbler *Locustella naevia (C)*	◆				◆	◆
Whitethroat *Sylvia communis (C)*	◆					
Garden warbler *Sylvia borin (C)*	◆					
Blackcap *Sylvia atricapilla (C)*	◆					
Chiffchaff *Phylloscopus collybita (C)*	◆					
Willow warbler *Phylloscopus trochilus (C)*	◆				◆	◆
Wood warbler *Sylvia sibilatrix (C) - Oak spp*	◆					
Goldcrest *Regulus regulus (C)(L)*					◆	◆
Long-tailed tit *Aegithalos caudatus (C)(L)*	◆					
Blue tit *Parus caeruleus (C)(L)*	◆					
Great tit *Parus major (C)(L)*	◆					◆
Crested tit *Parus cristatus (C)(L)*					◆	◆
Coal tit *Parus ater (C)(L)*					◆	◆
Treecreeper *Certhia familiaris (C)(L)*	◆					◆
Chaffinch *Fringilla coelebs (L)*	◆					
Bullfinch *Pyrrhula pyrrhula (P)(L)*	◆				◆	◆
Greenfinch *Carduelis chloris (C)(L)*	◆					
Redpoll *Carduelis flammea (C)*	◆				◆	◆
Siskin *Carduelis spinus (C)(L)*					◆	◆
Scottish crossbill *Loxia scotica (P)(L)*					◆	◆
Parrot crossbill *Loxia pytyopsittacus (C)(L)*						◆
Common crossbill *Loxia curvirostra (C)(L)*					◆	◆
Slow worm *Anguis fragilis (C)(L)*	◆					
Adder *Vipera berus (C)(L)*	◆				◆	◆
Narrow-headed woodant *Formica exsecta (P)(L)*					◆	◆
Scottish woodant *Formica aquilonia (P)(L)*					◆	◆
Hairy woodant *Formica lugubris (P)(L)*					◆	◆
Pearl-bordered fritillary *Boloria euphrosyne (P)(L)*	◆					
Small pearl-bordered fritillary *Boloria selene (C)(L)*	◆					
Cousin German *Paradiarsia sobrina (P)(L)*		◆				

Square-spotted clay *Xestia rhomboidea (P)(L)*		◆				
Argent and sable *Rheumaptera hastata (P)(L)*		◆				
Rannoch sprawler *Brachionycha nubeculosa (C)(L)*		◆				
Kentish glory *Endromis versicolora (C)(L)*		◆				
Welsh clearwing *Synanthedon scoliaformis (L)*		◆			◆	◆
A moth *Ancylis tineana (L)*		◆				
A micro moth *Leucopterix sinuella (L)*			◆			
Chocolate-tip moth *Clostera curtula (L)*			◆			
Dark-bordered beauty moth *Epione paralellaria (P)(L)*			◆			
Aspen hoverfly *Hammerschmidtia ferruginea (P)(L)*			◆			
Pine hoverfly *Blera fallax (P)*					◆	◆
A hoverfly *Parasyrphus nigritarisis (L)*	◆					
A cranefly *Lipsothrix ecucullata (P)*				◆		
A robber fly *Lapria flava (C)*						◆
Poplar longhorn beetle *Saperda carcharius (L)*			◆			
A leaf beetle *Cryptocephalus decemmacuatus (P)*	◆					
A slug *Limax tenellus (L)*	◆					
A spider *Clubonia subsultans (P)*					◆	◆
A spider *Dipoena torva (C)*					◆	◆
A spider *Haplodrassus soerenseni (C)*					◆	◆
A spider *Pelecopsis elongata (C)*						◆
Orange fruited elm lichen *Caloplaca luteoalba (P)*	◆					
Caledonian pannaria *Pannaria ignobilis (L) - Ash spp*	◆					
Stump lichen *Cladonia botryes (P)*					◆	◆
Forked hair-lichen *Bryoria furcellata (C)*					◆	◆
Pale bristle moss *Orthotrichum pallens (P)*	◆					
Blunt-leaved brittle moss *Orthotrichum obtusifolium (P)*			◆			
Green shield moss *Buxbaumia viridis (P)*						◆
A liverwort *Plagiochila puctata (L)*	◆					
A liverwort *Plagiochila spinulosa (L)*	◆					
One-flowered wintergreen *Moneses uniflora (C)*					◆	
Heath cudweed *Gnaphalium sylvaticum (C)*					◆	
Twinflower *Linnaea borealis (P)(L)*					◆	◆
Woolly willow *Salixi lanata (P) - Montane scrub spp*	◆					◆
Juniper *Juniperus communis (P)(L) - Montane scrub spp*	◆				◆	◆
An encrusting fungus *Cytidia salicina (L)*	◆			◆		
A rust fungus *Hyalopsora aspidiotus (C)(L)*	◆	◆				
A slime mould *Craterium aureonucleatum (C)(L)*	◆					
A slime mould *Diderma asteroides (C)(L)*	◆					
A slime mould *Physarum penetrale (C)(L)*	◆					
A slime mould *Physarum rubiginosum (C)(L)*						◆
A poroid fungus *Boletopsis leucomelaena (P)(L)*	◆					
A poroid fungus *Boletus citrinovirens (C)(L)*	◆	◆				
A poroid fungus *Boletus junquilleus (C)(L)*	◆	◆				
A poroid fungus *Gyroporus cyanescens (L)*	◆	◆				
A poroid fungus *Suillus nueschii (L)*					◆	
A poroid fungus *Leccinum percandidum (L)*	◆	◆				
A poroid fungus *Leccinum vulpinum (C)(L)*						◆

A poroid fungus *Suillus flavidus (C)(L)*						◆
An agaric fungus *Calocybe onychina (C)(L)*						◆
An agaric fungus *Chrysomphalina chrysophylla (C)(L)*						◆
An agaric fungus *Collybia acervata (C)(L)*						◆
An agaric fungus *Collybia prolixa (C)(L)*						◆
An agaric fungus *Collybia putilla (C)(L)*						◆
An agaric fungus *Collybia racemosa (C)(L)*						◆
An agaric fungus *Cortinarius allutus (melliolens) (C)(L)*	◆					
An agaric fungus *Cortinarius crassus (C)(L)*	◆					
An agaric fungus *Cortinarius cyanites (C)(L)*	◆					
An agaric fungus *Cortinarius decolorans (C)(L)*	◆	◆				
An agaric fungus *Cortinarius olidus (C)(L)*	◆	◆				
An agaric fungus *Cortinarius saginus (C)(L)*	◆	◆				
An agaric fungus *Cortinarius turbinatus (C)(L)*	◆	◆				
An agaric fungus *Cortinarius violaceus (C)(L)*	◆	◆				
An agaric fungus *Cortinarius xanthocephalus (C)(L)*	◆	◆				
An agaric fungus *Cantharellus pallens (C)(L)*						◆
An agaric fungus *Cortinarius caledoniensis (C)(L)*						◆
An agaric fungus *Cortinarius camphoratus (C)(L)*						◆
An agaric fungus *Cortinarius corrosus (C)(L)*						◆
An agaric fungus *Cortinarius durus (C)(L)*						◆
An agaric fungus *Cortinarius fervidus (C)(L)*						◆
An agaric fungus *Cortinarius laniger (C)(L)*						◆
An agaric fungus *Cortinarius limonius (C)(L)*						◆
An agaric fungus *Cortinarius scaurus (C)(L)*						◆
An agaric fungus *Cortinarius subtortus (C)(L)*						◆
An agaric fungus *Cortinarius talus (C)(L)*						◆
An agaric fungus *Entoloma roseum (C)(L)*						◆
An agaric fungus *Fayodia bisphaerigera (C)(L)*						◆
An agaric fungus *Hygrophorus nemoreus (L)*	◆					
An agaric fungus *Hygrophorus nemoreus (L) - Oak spp*	◆					
An agaric fungus *Inocybe jacobi (C)(L)*						◆
An agaric fungus *Lactarius musteus (C)(L)*						◆
An agaric fungus *Lactarius terenopus (C)(L)*						◆
An agaric fungus *Mycena purpureofusca (C)(L)*						◆
An agaric fungus *Mycena rosella (C)(L)*						◆
An agaric fungus *Mycena septentrionalis (L)*						◆
An agaric fungus *Mycena urania (C)(L)*						◆
An agaric fungus *Mycena viridimarginata (L) - new to Britain 2001*						◆
An agaric fungus *Pholiota astragalina (C)(L)*						◆
An agaric fungus *Psathyrella rannochii (C)(L)*						◆
An agaric fungus *Psathyrella caput-medusae (C)(L)*					◆	
An agaric fungus *Russula badia (C)(L)*						◆
An agaric fungus *Russula cessans (C)(L)*						◆
An agaric fungus *Russula decolorans (C)(L)*						◆
An agaric fungus *Russula fusconigra (L) - new to Britain 2001*						◆

An agaric fungus *Russula polychroma (C)(L)*						◆
An agaric fungus *Russula vinosa (C)*						◆
An agaric fungus *Russula vinosobrunnea (L) - new to Britain 1999*						◆
An agaric fungus *Russula xenochlora (L)*						◆
An agaric fungus *Russula font queri (L)*	◆	◆				
An agaric fungus *Russula lundellii (C)(L)*	◆	◆				
An agaric fungus *Russula scotica (C)(L)*	◆	◆				
An agaric fungus *Russula violaceoides (C)(L)*	◆	◆				
An agaric fungus *Stropharia hornemannii (C)(L)*						◆
An agaric fungus *Tephrocybe fuscipes (C)(L)*						◆
An agaric fungus *Tricholoma apium (C)(L)*						◆
An agaric fungus *Tricholoma focale (C)(L)*						◆
An agaric fungus *Tricholoma robustum (C)(L)*						◆
An agaric fungus *Tricholoma stans (C)(L)*						◆
An agaric fungus *Xeromphalina caulicinalis (C)(L)*						◆
A tooth fungus *Hydnellum scrobiculatum (P)(L) - Oak spp*	◆					
A tooth fungus *Bankera violascens (C)(L)*					◆	◆
A tooth fungus *Bankera fuligineoalba (P)(L)*						◆
A tooth fungus *Hydnellum aurantiacum (P)(L)*						◆
A tooth fungus *Hydnellum auratile (C)(L)*						◆
A tooth fungus *Hydnellum caeruleum (P)(L)*						◆
A tooth fungus *Hydnellum concrescens (P)(L)*						◆
A tooth fungus *Hydnellum ferrugineum (P)(L)*						◆
A tooth fungus *Hydnellum peckii (P)(L)*						◆
A tooth fungus *Phellodon confluens (P)(L)*						◆
A tooth fungus *Phellodon melaleucus (P)(L)*						◆
A tooth fungus *Phellodon niger (C)(L)*						◆
A tooth fungus *Phellodon tomentosus (P)(L)*						◆
A tooth fungus *Sarcodon glaucopus (P)(L)*						◆
A tooth fungus *Sarcodon imbricatus (P)(L)*						◆
A tooth fungus *Sarcodon scabrosus (P)(L)*						◆
A cup fungus *Cudonia circinans (C)(L)*						◆
A cup fungus *Cudonia confusa (C)(L)*						◆
A cup fungus *Flavoscypha cantharella (C)(L)*					◆	
A cup fungus *Pseudoplectania nigrella (C)(L)*					◆	
A cup fungus *Flavoscypha phlebiophora (C)(L)*	◆	◆			◆	
A cup fungus *Gyromitra infula (C)(L)*						◆
A fairy club fungus *Ramaria suecica (C)(L)*						◆
A bracket-like fungus *Stereopsis vitellina (L)*						◆
A bracket fungus *Hapalopilus salmonicola (C)(L)*						◆
A bracket fungus *Osmoporus odoratus (C)(L)*						◆
A parasitic bracket fungus *Phellinus tremulae (L) - new to Britain 2000*			◆			
A parasitic agaric fungus *Squamanita pearsonii (L)*						◆
A parasitic agaric fungus *Squamanita contortipes (L)*						◆