



Moray and Aberdeenshire Forest District

## Strathdon

Forest Design Plan



Plan Reference No: FDP43

Plan Approval Date:

Plan Expiry Date:

# Strathdon Design Plan 2013-22

## FOREST ENTERPRISE - Application for Forest Design Plan Approvals in Scotland

### Forest Enterprise - Property

Forest District:	Moray & Aberdeenshire FD
Woodland or property name:	Strathdon
Nearest town, village or locality:	Bellabeg
OS Grid reference:	NJ354131

### Areas for approval

	Conifer	Broadleaf
Clear felling	595 ha	-
Selective felling	-	-
Restocking	659 ha	37 ha
New planting (complete appendix 4)	-	-

1. I apply for Forest Design Plan approval\*/~~amendment approval\*~~ for the property described above and in the enclosed Forest Design Plan.
2. \* I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for ~~afforestation\*/deforestation\*/~~ roads\*/ ~~quarries\*~~ as detailed in my application.
3. I confirm that the initial scoping of the plan was carried out with FC staff on 

October 2012
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4. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.
5. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included.
6. I confirm that consultation and scoping has been carried out with all relevant stakeholders over the content of the of the design plan. Consideration of all of the issues raised by stakeholders has been included in the process of plan preparation and the outcome recorded on the attached consultation record. I confirm that we have informed all stakeholders about the extent to which we have been able to address their concerns and, where it has not been possible to fully address their concerns, we have reminded them of the opportunity to make further comment during the public consultation process.
7. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed ..... Signed .....

Forest District Manager

Conservator

District Moray & Aberdeenshire Conservancy Grampian

Date ..... **Date of Approval** .....

**Date approval ends:** .....

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## Forest Design Plan Summary

This plan is a review of Forestry Commission Scotland's management of forest blocks in Strathdon.

The purpose of the plan is to set out management objectives and prescriptions for the forest for the next ten years in detail, and in more broad terms for the following twenty years, which will fulfil the requirements of the UK Woodland Assurance Scheme.

The main priority for these woodlands is the production of a sustainable timber crop while at the same time maximising their biodiversity value. Areas not considered for commercial management include permanent woodland and open habitats.

The occurrence of Dothestroma Needle Blight (DNB) has had a significant impact on the amount and timing of clearfelling in this block. This, along with the poor soil types in this block, has also had an impact on the species choice for restocking. This has dictated that some of the area will be restocked with a mixture of Sitka Spruce and Japanese Larch, as a nurse in the near future. It is hoped that as our knowledge and management of DNB improves future restocking will be able to be undertaken with Scots Pine to fit with the poor soil nutrients and the biodiversity benefit of this native species.

Advantage has been taken of the limited areas with better soils to plan the planting of other appropriate species, including broadleaves, either for timber production or to increase the biodiversity of the block by planting appropriate native woodland areas.

Much of the mature crops on the north face are planned to be managed under Low Impact Silvicultural Systems (LISS). This fits with the existing crops and the site conditions. It also addresses the issue of landscaping by reducing the impact of clearfelling to the sites where the conditions are not suitable for LISS, such as where the ground is too steep for regular thinning to be undertaken, which is essential for the successful implementation of a LISS system.

Areas of the highest biodiversity value have been identified, along with the important open land habitats, and these will be managed as part of the forest habitat networks.

## 1.0 Introduction

Refer to Map 1: Location.

### 1.1 Setting and context

Strathdon FDP is made up of two previous FDP blocks, namely Bunzeach and Auchernoch. Both blocks lie close to the small Strathdon village of Bellabeg (NJ354131). Together they cover approximately 2130 hectares.

**Bunzeach** is located to the south-east of Bellabeg. It's made up of two areas of woodland, Bunzeach main block and Tom Na Wan, totalling 1817 hectares. The northern section of the forest that is situated on the side slopes of Strathdon and contain some better quality soils. From this point at 290 metres above sea level the block rises towards the south and an altitude of 580 metres on the slopes of Mullachdubh. At this point the sites are much more exposed and on poorer soils on the whole.

**Auchernoch** is located in Glen Nocht, approximately 4 kilometres north-west of Bellabeg. The minor road that links the A944, at Bellabeg, to the A97 at Glen Buchat forms the eastern boundary of the forest with the Water of Nocht forming the southern boundary. The forest covers 313 hectares. The lower south facing slopes of the block adjacent to the Water of Nocht have some better soils but the majority of the crops are on poorer soils.

Both blocks are within the Cairngorms National Park.



## 1.2 History of the woods

Small areas of Auchernoeh and Bunzeach were wooded prior to 1875.



Bunzeach was acquired from the Tornasheen estate in the 1950's and mainly planted in the 1950's and 60's resulting in an even aged conifer block of limited diversity. Additional small areas were planted in the 1970's. There has been a programme of restructuring since felling started which will be continued into this new plan. The majority of Auchernoeh was planted in the 1950's with smaller additional plantings in the 1960's. There are some even smaller areas planted from 1928 to 1949. Therefore the crop is of a relatively even age structure although there has been a programme of felling and restocking to start the process of restructuring the block.

## 2.0 Analysis of previous plans

The previous Forest Design Plan for Buzeach was approved in June 2002 while the plan for Auchernoch was approved in March 2005. As the two plans are being amalgamated they are now due a full 10 year review.

The main objectives stated in the two plans are included in the table below, along with the progress made to date on their achievement and how they will or won't be carried forward into the new plan.



Theme	Priority (in current approved plan)	Objective (in current approved plan)	Management action	Progress to date 1 – Nominal progress 2 – Some progress 3 – Progress as per FDP	Proposed action (in this plan)
Climate Change	Medium	Restock with species appropriate to the site and climatic conditions.	Replant with conifer species appropriate to the site. Accept broadleaf regeneration on sites designated for broadleaved woodland.	3 – Sites replanted with the species approved in the current FDP.	Continue to use the ESC decision support system to guide the selection of species appropriate to the climate and soil conditions of the sites. Continue to accept natural regeneration of broadleaves (and conifers) where this meets the objectives of the FDP. Restock with as wide a diversity of species as the site (climate and soil) conditions will allow.
		Increase the area of the plan managed by systems other than clearfell and replanting.	Identify areas suitable for ATC management. These are likely to be areas of Scots Pine and Norway Spruce.	3 – Areas identified as LISS recorded in FDP GIS layer. Operations, such as thinning, undertaken where scheduled.	Reassess areas designated as LISS in approved FDP to ensure the crops and sites are still suitable for this method of management. Reclassify any that are not now suitable. Look for opportunities to bring other areas of suitable crop in LISS management.
Timber	High	Maximise the production of timber in the plan area.	Use clearfell and restock management system across much of the plan area.	2 – The majority of the coupes identified in FDP have been felled as per plan. Some have been substituted due to the additional felling of lodgepole pine due to DNB.	Timber production will continue to be a high priority objective and as wide a range of species as site conditions allow will be used in the restocking to diversify the FDP species make up. The coupes to be felled, and their phasing, in the ten years of this plan will be largely dictated by the need to remove DNB infected LP crops.

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		Reduce areas of poor quality Lodgepole pine.	Fell pure lodgepole pine crops and replant with Sitka spruce. Thin Sitka spruce and lodgepole pine mixtures to favour the spruce.	<b>2</b> – The majority of the coupes identified in FDP have been felled as per plan. Some have been substituted due to the additional felling of lodgepole pine due to DNB.	Continue the felling of DNB infected lodgepole pine crops. Restocking will be undertaken with species suitable to the site (climate and soil) conditions in as wide a diversity as practicable.
Business development	Low	Enhance the landscape value of the plan area.	Create a more diverse age & height structure. Remove geometric hard edges and create more natural woodland shapes to link to landform.	<b>2</b> – Majority of felling coupes identified in FDP for landscape reasons completed except where windblow and DNB issues have disrupted planned programme.	This will continue to be a driver in the new plan on the northern slopes of Bunzeach which are visible from the A944 running along Strathdon. All coupes will be planned to maintain and where possible enhance how the FDP area fits with the landform and surrounding landscape. The FES landscape architect will view the proposals before final submission to ensure all landscape issues are successfully addressed.
Access & health	Low	Maintain existing recreational facilities.	Explore potential for improving environs of existing facilities.	<b>3</b> – New routes have been created in north Bunzeach in response to a local project run by the community.	There will be no provision for any additional recreational facilities in the new FDP. Informal access will be maintained under the auspices of SOAC.

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Environmental quality	Medium	Create buffers of riparian woodland along watercourses.	Fell conifer crops and encourage broadleaf natural regeneration in riparian zones.	<b>3</b> – Sites identified and recorded in FDP and GIS layers. Coupe plans produced and operations undertaken to manage sites as appropriate.	This will continue to be a driver in the new plan. All areas adjacent to riparian zones will be maintained and, where possible, enhanced by the long term retention of native or biodiversity rich species (i.e. NS for red squirrels), broadleaves and open space and the additional planting of native broadleaves and conifers.
Biodiversity	Medium	Retain older conifer stands and create additional open space.	Older conifer stands identified as long term retentions or natural reserves.	<b>3</b> – Older crops retain except where windblow or DNB have been an issue.	This will continue to be a driver in the new plan. All areas with biodiversity value will be maintained and, where possible, enhanced by the long term retention of native or biodiversity rich species (i.e. NS for red squirrels), broadleaves and open space and the additional planting of native broadleaves and conifers.
		Increase conservation value of forests in plan area.	Increase the area of the plan managed by ATC and the area of broadleaved woodland.	<b>3</b> – Sites identified and recorded in FDP and GIS layers. Coupe plans produced and operations undertaken to manage sites as appropriate.	This will continue to be a driver in the new plan. All areas with biodiversity value will be maintained and, where possible, enhanced by the long term retention of native or biodiversity rich species (i.e. NS for red squirrels), broadleaves and open space and the additional planting of native broadleaves and conifers.

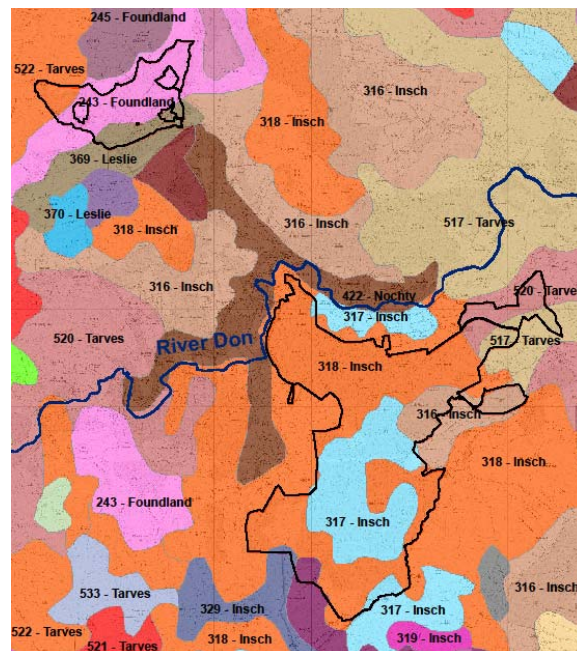
## 3.0 Background information

### 3.1 Physical site factors

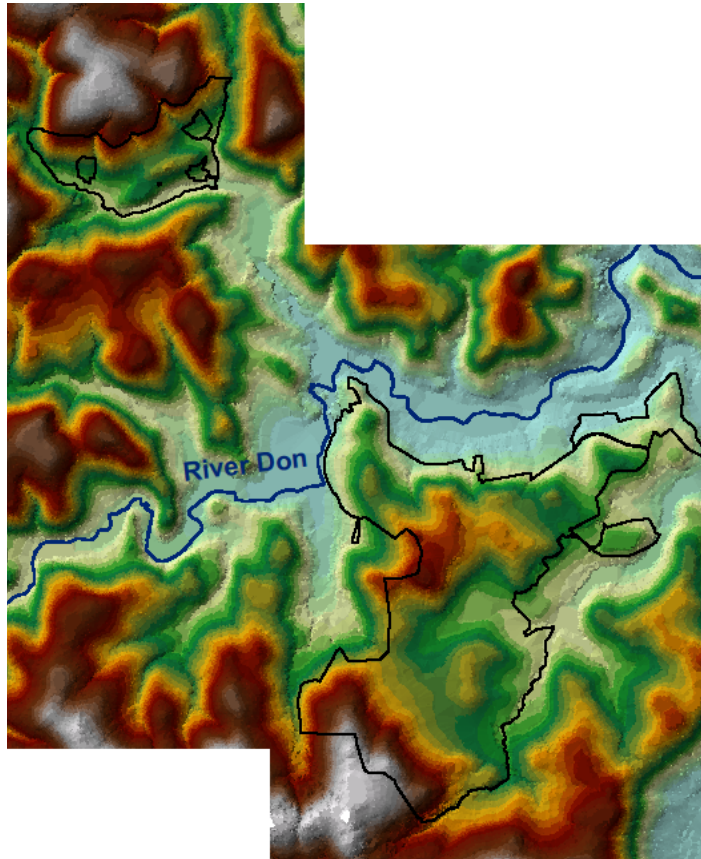
Refer to Map 2: Key Features.

#### 3.1.1 Geology, Soils and topography

**Geology** –The map of the British Geological Survey 1:625,000 scale survey shows that the majority of Bunzeach is situated on gabbros and allied types of igneous rocks. These rocks lead to the creation of soils with a high level of nitrogen availability. The remainder of Bunzeach and about half of Auchernoch are underlain with quartzose-mica-schist, also an igneous rock but one that produces soils with medium nitrogen availability. The final areas of Auchernoch are on graphitic schist and slate, part of the Argyll group of the Dalradian supergroup. This again produces soils with medium nitrogen availability.



**Soils** –The map of the Soil Survey of Scotland shows how the various soil associations are distributed on the two blocks. The soils of the Insch Association underlie most of Bunzeach and are mostly brown earths, humus iron podzols and noncalcareous & peaty gleys. The Foundland soil under most of Auchernoch is characterised by humus-iron podzols with some peaty gleys, peaty podzols and peat.



Topography - The elevation of Bunzeach runs from about 280 metres along the river Don, to approximately 650 meters towards the top of Mullachdubh in the south. While Auchernoch runs from about 330 metres along the Water of Nocht, to approximately 510 meters towards the top of Moss Hill in the north.

### 3.1.2 Water

Bunzeach and Auchernoch are both in the River Don catchment area. The River Don is important for the economy, the local community and the environment of Strathdon. SEPA have classified the river Don as in “Good” condition and have set environmental objectives for this water body over future river basin planning cycles in order that sustainable improvements to its status can be made over time.





River Don with Bunzeach in the background.

### 3.1.3 Climate

The climate in this plan area varies from the harsh "Sub-alpine, wet, severely exposed" at the top of the Bunzeach to "Cool, wet, sheltered" on the lower ground.

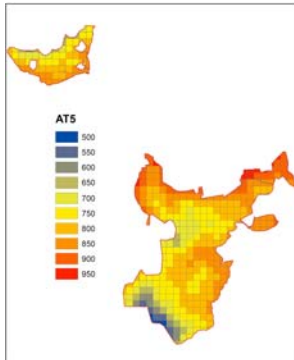
The climate data from interrogating the Ecological Site Classification system (ESC) is:

<b>AT5</b>	<b>DAMS</b>	<b>MD</b>
<b>530.9 – 925.4</b>	<b>13.1 - 22.4</b>	<b>-17.4 – 66.6</b>

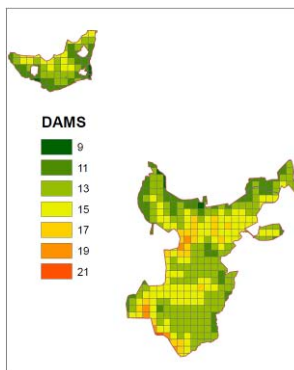


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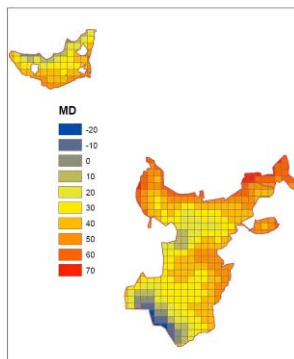
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**AT5** is the accumulated total of the day-degrees above the growth threshold temperature of 5°, which provides a convenient measure of summer warmth. The results for AT5 place these blocks in the “cool” zone.



**DAMS** is the Detailed Aspect Method of Scoring. This represents the amount of physically damaging wind that forest stands experience in the year. The range of DAMS is from 3 to 36 and windiness is the most likely limiting factor to tree growth at higher elevations in Britain.



**MD** is the Moisture Deficit for the area. Moisture deficit reflects the balance between potential evaporation and rainfall and therefore emphasises the dryness of the growing season (rather than the wetness of the winter or whole year). These results place the blocks on the boundary of the “moist” and “wet” zones.

These results will be used to help assist in the choice of tree species for restocking in this FDP. Each tree species has tolerances for these and other factors and they can be used to identify species suitable for the site conditions.

Further information on these criteria and the application of ESC can be found in Forestry Commission Bulletin 124 - An Ecological Site Classification for Forestry in Great Britain.

## 3.2 Biodiversity and environmental designations

A very small part of Bunzeach falls within the Morven and Mullachdubh SSSI. The site supports a wide range of upland habitats. The exposed upper slopes, high top and ridges hold excellent examples of wind-clipped dwarf-shrub heath. The slopes hold exceptionally extensive juniper scrub, amongst sub-montane acidic grassland and dwarf-shrub heath. The deep peats hold well-developed examples of blanket bog. Springs, flushes, fen-meadows and snowbed habitats are also found. This wide range of habitats supports important assemblages of vascular plants and breeding birds.

The several UK BAP species found within the plan area we are aware of are Twinflower, Red squirrel, Black grouse, Song thrush, Scottish Crossbills and Small pearl-bordered fritillary. It is also known that Ring ouzel and cuckoo breed close by and possibly on FCS ground. Additionally there is Siskin, a Scottish BAP species.

Black grouse are found on moorland, rough grazing and young conifer plantations and are one of the fastest declining species in the UK. Management will include restructuring of the forest/moorland boundary by replanting at a lower density to give an edge of scattered trees which will include larch, Scots pine and native broadleaves depending on site conditions. The plan area will be monitored for lek sites and habitat management work will be concentrated around any found.

Red squirrel is a key species identified in the FCS Biodiversity Action Plan. Therefore good forest design and operational practice will be undertaken to benefit this species. This will include the planning of forest operations to minimise damage to red squirrel dreys and populations, including survey work to locate dreys prior to felling operations and the planning of the forest structure and composition to specifically suit red squirrels.

The Scottish Crossbill inhabits both semi-natural stands of Scots pine and other conifer plantations. While suitable semi-natural habitat has declined the amount of plantation woodland has increased substantially during the 20th century. As stated in "FCS Guidance Note 32: Forest operations and birds in Scottish forests" "there are real possibilities of direct and indirect disturbance from forest operations, such as harvesting or extraction, and poorly timed or located leisure and recreation activities". The best way to avoid such disturbance, while at the same time taking opportunities for enhancing bird populations, is by good forest design and forward planning.

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Twinflower is a creeping perennial which spreads vegetatively, producing patches of clones where plants cannot fertilise one another when pollen is from another plant of the same clone. It is currently restricted to the pinewoods of NE Scotland. Heavy shading is considered to be one of the main threats to the species although some light shade is necessary for good growth and flowering. Understanding what light levels are most beneficial and how these can be achieved through stand manipulation is important but currently limited. Preliminary research results suggest increased light levels and/or disturbance have a detrimental effect on twinflower growth and flowering. Therefore coupes with Twinflower colonies will be managed under LISS to maintain the current forest conditions with the minimum of disturbance.

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## 3.3 The existing forest

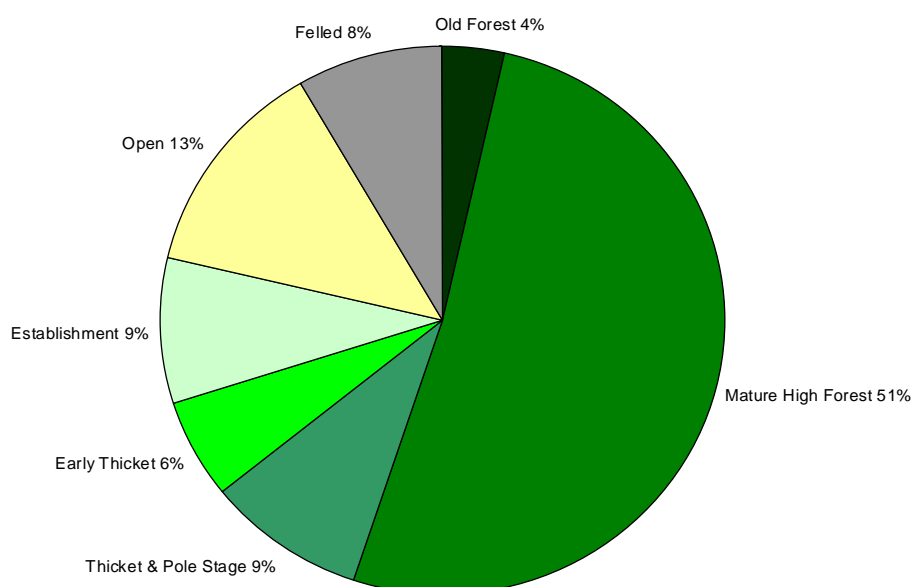
### 3.3.1 Age structure ,species and yield class

#### i. Age Structure

There is a very strong bias towards mature high forest at present. This will change dramatically in this plan due to the issue of DNB infection and its removal.

The high proportion of open space is due the area of moorland at the top of the hills.

Ages of Trees (years)	Successional Stage	Area	%
0 -10	Establishment	182.6	9%
11 - 20	Early Thicket	125.5	6%
21 - 40	Thicket & Pole Stage	192.7	9%
41 - 60	Mature High Forest	1094.7	51%
61+	Old Forest	76.5	4%
	Open space	279.5	13%
	Felled	178.0	8%

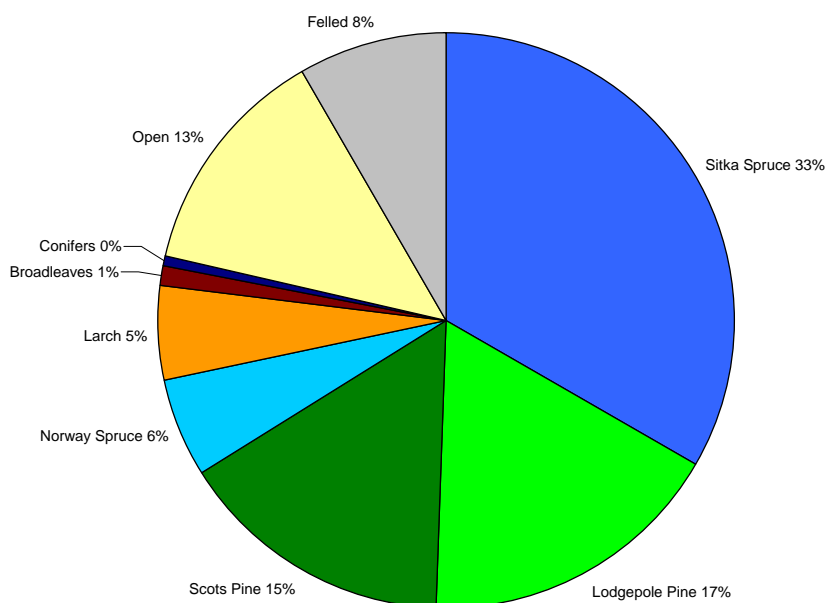


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## ii. Species

Approximately a third of the plan area is currently stocked with Sitka spruce. Lodgepole Pine is the next most abundant species with a limited range of other conifer species represented. Broadleaves make up only 1% of the area. This will need to be addressed in this plan to bring it in line with the minimum requirements of the UK Forestry Standard. The aim of this plan will be to increase the species diversity in these blocks.

Species	Area (ha)	Percentage
Sitka spruce	708.8	33%
Lodgepole Pine	369.0	17%
Scots Pine	328.7	15%
Norway Spruce	119.4	6%
Larch	112.5	5%
Broadleaves	26.4	1%
Other conifers	7.4	0%
Open land	279.2	13%
Felled	178.0	8%

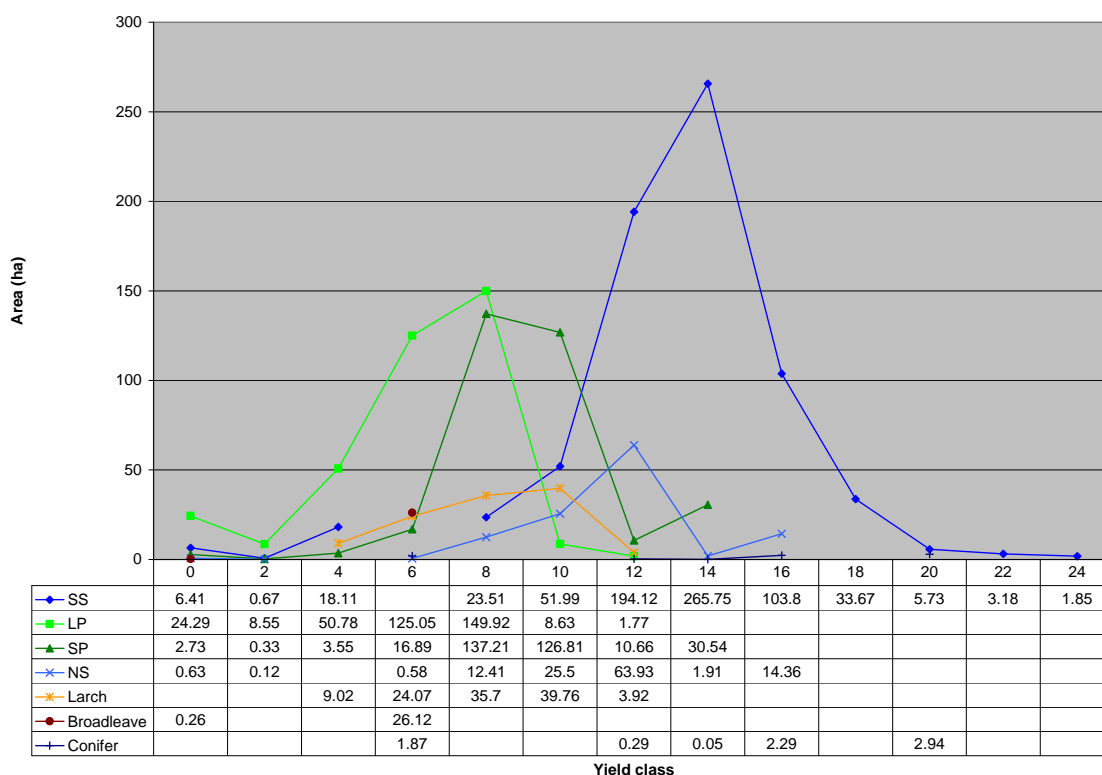


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## iii. Yield Class

The yield classes for the various species are generally low as would be expected of an area with such harsh climate and soil types.

Sitka Spruce, the dominant species, has a range of yield class 10 to 16, this would be considered to be low for this species. The majority of the Scots Pine lies in the range of yield class 8 to 10, about average for this species.



### 3.3.2 Access

Access to the blocks of this design plan area is reasonable given the limitations of the rural road network.

Access within the blocks is good and there are currently no plans for new roads.

### 3.3.3 LISS potential

Currently less than 17% of the area of this design plan has sites designated for management under LISS, (Low Impact Silvicultural System). These management systems are defined as: 'Use of silvicultural systems whereby the forest canopy is maintained at one or more levels without clear felling.'



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LISS means there are no clearfell areas larger than 2 ha.

There are a range of species under LISS including Sitka spruce, larch, Scots pine and Norway spruce.

The potential to extend the LISS area is limited by the issues of disease, poor soil and climate conditions and the steep ground that makes repeated thinning difficult. In addition existing LISS coupes will need to be reassessed in light of these issues and their designation changed if they do not meet the criteria for successful LISS management.



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## 3.3.4 Current and potential markets

The current breakdown of the timber being harvested from this design plan area across the range of sites, species and ages is shown in the table below.

Material	End product	Percentage
Short roundwood	Chip board, Orientated strand board (OSB), Paper	35%
Fencing	Posts & rails	5%
Short log	Pallets & slats	20%
Log	Construction	40%

The vast majority (95%) of this production is sold into markets in the north east of Scotland, with very little travelling more than 50 miles to the processing facility.

The only changes to this are likely to be the increase in material going into the local fuelwood market and the production of hardwood timber, in the long term. Both these markets will be of a very limited scale and will have only minor impacts on the current product percentage breakdown.

## 3.4 Landscape and land use

### 3.4.1 Landscape character and value

The visual amenity of the north face of the Bunzeach, in particular, is important in the context of the local area.

Scottish Natural Heritage, in partnership with local authorities and other agencies have carried out a National Programme of Landscape Character Assessment. This programme aims to improve knowledge and understanding of the contribution that landscape makes to the natural heritage of Scotland. It considers the likely pressures and opportunities for change in the landscape, assesses the sensitivity of the landscape to change and includes guidelines indicating how landscape character may be conserved, enhanced or restructured as appropriate.

These assessments are considered during all Forest Design plan reviews and where appropriate all efforts are made to follow the guidance given, where it matches with current FCS policy.

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The design plan area is covered by Scottish Natural Heritage Landscape Character Assessment No75, Cairngorms, produced in 1996 by Turnbull Jeffrey Partnership.

Most of the design plan area is in the Strathdon area of the Cairngorm Straths zone. The southern end of the Bunzeach is in the North-eastern hills area of the Uplands and Glens zone.

The Strathdon area forms one of the “major eastern glens in the Cairngorms Straths zone, comprising the narrow glen of the River Don contained on either side by a range of rolling, smooth, rounded hills. A series of broad interlocking spurs give the glen a sinuous nature and create an intimate scale within the glen floor”.



The specific guidelines for this area include the aim of “retaining the overall pattern and balance of forested hill tops and farmed strath floor”. However it also recommends “reshaping existing forestry, particularly on the hill tops to ameliorate geometric margins and introduce more species and age diversity”.

The north-eastern hills area forms the foothills of the central Cairngorm massif. “The hills are characterised by their relatively low and rounded summits, gentle slopes and long smooth interlocking spurs. Small burns incise the hillsides and drain into rivers which flow within the undulating valley floors, and these are often more deeply cut into the hills”.



The specific guidelines for this area include encouraging “the establishment of both native and sensitively designed commercial woodlands on lower hill slopes with the aim of enhancing the visual diversity of the landscape, yet conserve the distinctive character of heather clad hill tops and extensive open



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views over them". However it also recommends "redesigning existing intrusive plantations, to improve diversity and scale and ameliorate geometric margins".

## 3.4.2 Visibility

The northern face of the Bunzeach is situated on the higher ground overlooking the River Don strath and so is prominent in the landscape. The rest of the block and the whole of Auchernoch are far less visible and therefore less important in landscape terms.

## 3.4.3 Neighbouring land use

Land use around the woodlands in the plan area is split between agriculture and moorland.

There are some areas of adjacent woodland that are not managed by Forestry Commission Scotland.



## 3.5 Social factors

### 3.5.1 Recreation

There are no formal waymarked FCS trails within either of the blocks in this plan area and there are no plans to change this situation. The blocks are used by locals who know the woods and the accessible routes and do not need formal waymarking to direct them.

There is a public right of way through the Bunzeach to access the summit of Morven and another through Auchernoch to access the Ladder hills.

There is one informal car park on the main access point to the Bunzeach however most of the other access points have sufficient room for some informal car parking. The blocks will continue to be used under the auspices of the Scottish Outdoor Access Code.



Public right of way in the Bunzeach heading south towards Morven.

### 3.5.2 Community

Apart from the village of Bellabeg there are no distinct settlement areas close to the woodlands in this plan. Communities are made up of scattered homes and farms rather than specific villages. The forests do not have a strong community usage.

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## 3.5.3 Heritage

The plan area contains one scheduled monument, Newe's Craig still, which is on the open ground 3950m NE of Morven Lodge. The monument comprises a small, sunken hut interpreted as the site of an illicit still dating to the 18th or early 19th century. It is characteristically isolated and well concealed, in a small gully to the NW of the Deskry Water. This is managed according to a Monument Management Plan agreed with Historic Scotland.

There are many additional unscheduled monuments, the details of which are stored in monument records and all operations are planned to avoid damage to them.



Newe's Craig still SM.



## 3.6 Statutory requirements and key external policies

This Forest Design Plan has been drafted to ensure that planning and operations functions will comply with the following legislation and policies:

### Biodiversity

- Conservation (Natural Habitats) Amendment (Scotland) Regulations 2007
- Nature Conservation (Scotland) Act 2004
- Wildlife and Natural Environment (Scotland) Act 2011
- Land Reform (Scotland) Act 2003
- The Water Environment and Water Services (Scotland) Act 2003
- Water Environment (Controlled Activities)(Scotland) Regulations 2011
- UK Woodland Assurance Standard 2008
- UK Forestry Standard 2012

### Climate Change

- The United Nations Framework Convention on Climate Change
- The Kyoto Protocol
- EC Directive 2003/87/EC
- Climate Change (Scotland) Act 2009

### Historic Environment

- Ancient Monuments and Archaeological Areas Act 1979
- Planning (Listed Buildings and Conservation Areas)(Scotland) Act 1997
- Treasure Trove Scotland
- UNESCO World Heritage Convention
- European Convention on the Protection of the Archaeological Heritage Valetta 1992

### Forests & People

- Control of Substances Hazardous to Health Regulations 2002
- Employers Liability (Compulsory Insurance) Act 1969
- Equality Act 2010
- Gangmasters (Licensing) Act 2004
- Health and Safety at Work Act 1974
- Management of Health and Safety at Work Regulations 1999
- Occupiers' Liability (Scotland) Act 1960
- Provision and Use of Work Equipment Regulations 1998
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
- The Highways Act 1980

## Soils

- Control of Pesticides Regulations 1986
- The Waste Management Licensing Regulations 1994
- European Soil Charter

## 3.7 Pathogens and diseases

*Hylobius* can cause extensive feeding damage to young trees used to restock clearfell sites but damage is often highly variable. Previously it has not been possible to predict damage and so insecticides have been routinely used to protect the trees to try to safeguard this valuable young crop. However, on clearfells where *Hylobius* numbers are low this treatment may be unnecessary and conversely when numbers are very high the treatment may be unable to protect the trees. Both of these situations result in losses in valuable resources.

A major fungal pathogen affecting the woods within Moray & Aberdeenshire forest district is *Dothistroma* needle blight.

This is an economically very important disease affecting a number of coniferous trees, in particular pines. It causes premature needle defoliation, which results in the loss of timber yield and, in severe cases, tree mortality. Due to the high level of Lodgepole pine in these blocks, currently 17%, this will have a major impact on the felling coupe design and schedule of this plan area. See Map 2 – Key features for the widespread distribution of the disease across this plan area.

The disease has a world-wide distribution but until recently was mainly of concern in the southern hemisphere. In much of the world, including Britain, it is caused by the fungus *Dothistroma septosporum*. *Dothistroma* needle blight causes premature needle defoliation, which results in the loss of timber yield and, in severe cases, tree mortality. Since the late 1990s the incidence of the disease has increased dramatically in Britain, particularly on Corsican pine.

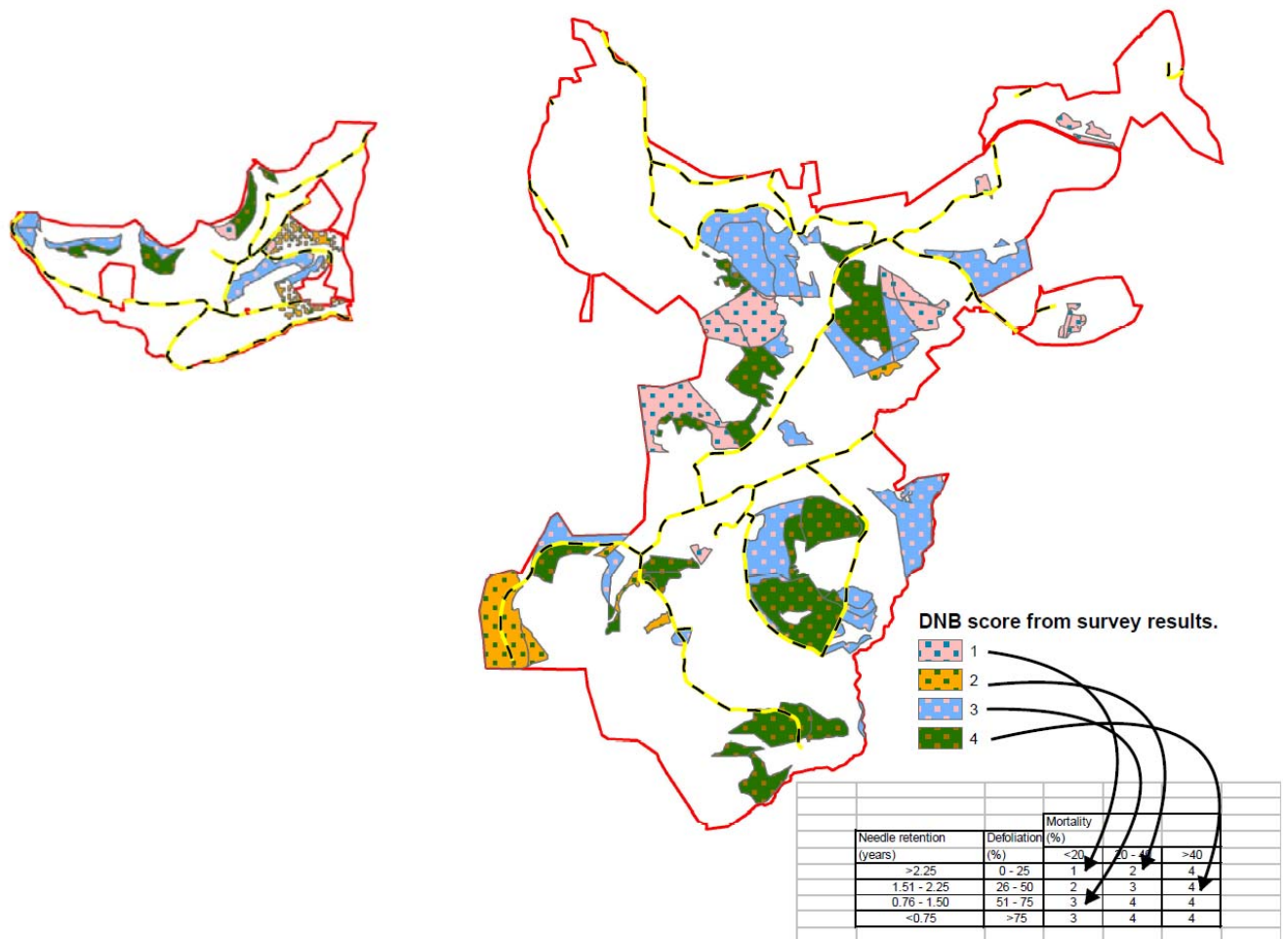
More recently the disease has caused significant damage and death to Lodgepole pine and Scots pine. Due to the extent and severity of the disease on these species there is now a five-year moratorium on the planting of Corsican and Lodgepole Pine on the National Forest Estate. While Scots Pine cannot be planted on or within 550m of DNB infected sites.

Reasons for the increase in the incidence of this disease are unclear but could be due to increased rainfall in spring and summer, coupled with a trend

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towards warmer springs, optimising conditions for spore dispersal and infection. Such conditions may become more prevalent in Britain over the next 20 years if current trends in climate change continue. On the National Forest Estate disease management is currently focused on silvicultural measures to reduce inoculum loads and the use of alternative, less susceptible species in future rotations.

The current surveyed extent of DNB in the plan area is shown on the maps below.



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Phytophthora austrocedrae has been identified in the Juniper within the plan area (around NJ361069). When initially discovered a 400m buffer zone was put in place. There was a policy of not entering this area. Recently this restriction has been lifted and now only those entering the actual juniper area must undertake the bio-security measures put in place. There are no plans to try to eradicate the infected plants but no additional juniper is to be planted. The situation will continue to be monitored and all future actions will be taken in line with the developing scientific research and recommendations.

## 4.0 Analysis and Concept

Refer to Map 4: Analysis and concept.

Theme	Issue	Analysis	Concept
Climate change	Adapting to climate change	There are areas suitable for conversion to LISS to increase carbon capture.	Manage identified areas to create a habitat that requires reduced amount of intervention.
	Adapting to climate change	Soil and climate conditions are harsh in plan area and limit choice of restock species.	Restock with as wide a range of species as possible appropriate to the site, current and potential future climatic conditions.
	Flood & catchment management	Minor watercourses emerge from the blocks and eventually reach the river Don.	Opportunity to manage riparian areas to create naturalised woodlands which have the biggest positive impact on water quality.
	Carbon sequestration	Crop and site characteristics make LISS to be an appropriate management system in some of this plan area.	Increase the area managed under LISS to minimise inputs and increase rotation lengths.



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Timber	Timber supply	Current crop age and condition allows a planned programme of production to be undertaken across the area.	Following on from clearfelling select and plant species appropriate to the site conditions to maintain the overall productivity of the area.
	Timber quality	The ground condition in this plan area allows thinning to be undertaken across most of the area.	Undertake thinning to improve timber quality wherever possible with subsequent conversion to LISS if appropriate.
	Hardwood timber	There are few areas of existing broadleaves or areas with good site conditions suitable for their planting.	Take any opportunity to plant appropriate broadleaves at a commercial spacing and manage them for hardwood production.
Business development	Tourism	The plan area provides a positive contribution to the local landscape.	Plan and undertake all operations to increase the positive contribution by increasing the diversity of species and age class.
Community development	Community engagement	There is currently a very low level of community involvement within the plan area.	Continue current level of involvement with the various user communities to maintain there interest in the area.

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Access & health	Recreation	There is currently provision of informal facilities for recreation activities in the plan area.	Maintain the level of provision at its current level and standard.
Environmental quality	Soil, water & air quality	Over 60% of the soils across the plan area are in the "poor" or "very poor" nutrient regime groups.	Increase the area managed under LISS to minimise inputs and maintain productivity on these soils.
	Landscape	The plan area provides a positive contribution to the local landscape.	Opportunity to diversify the woodlands where appropriate to increase landscape value.
Biodiversity	Species & habitats	A number of priority species are present across the plan area. (See section 3.2)	Plan management regimes and operations to improve the ecological value of the plan area.

## 5.0 Forest Design Plan Proposals

The following proposals have been drawn up following the consultation process undertaken during the preparation of this plan. The results of this consultation exercise can be found in Appendix 1.

### 5.1 Management

Refer to Map 5: Management.

#### Thinning

Wherever possible the district will continue to maximise the area managed through thinning and utilise staff/contractor base to further develop professionalism and thinning expertise. FCS policy assumes that all productive conifer crops will be thinned. The only exceptions are where:

- Thinning is likely to significantly increase the risk of windblow;
- A single thinning operation is likely to require an unacceptably large initial investment in relation to the potential benefits due to access or market considerations; and
- Thinning is unlikely to improve poorly stocked or poor quality crops.

In the Strathdon blocks this means that most of the area will be thinned in order to improve timber quality. It is assumed that the only commercial areas, which will not be thinned, are those with stability or terrain issues or are out with their thinning window. This includes the area to the south of the power line in the Bunzeach. This area will not be thinned due to the soil conditions and the risk of wind blow. All other areas are split into thinning coupes, which will be worked on 5 or 7 year cycles depending on species (this may vary in LISS areas, see detailed prescriptions). See Map 6 – Thinning.

All thinning decisions will be guided by Operational guidance Booklet No 9 'Managing thinning.'

#### Low Impact Silvicultural Systems (LISS)

The main silvicultural system employed in British forestry is 'patch' clearfelling followed by planting or occasionally natural regeneration. However, management under LISS is becoming more common and some sites within the design plan area will be managed under LISS.

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LISS is defined as the use of silvicultural systems whereby the forest canopy is maintained at one or more levels without clearfelling. Clearfelling is defined as the cutting-down of all trees on an area of more than 2.0ha.

The attraction of LISS lies in the fact that this approach is suited to an era of multi-purpose forestry where environmental, recreational, aesthetic and other objectives are as important as timber production. In particular LISS is seen as a means of reducing the impact of clearfelling and the associated changes that this produces in forest landscapes and habitats.

In the plan area those stands selected for LISS management are generally those that are either showing good sign of natural regeneration or have the potential to do so.

Areas selected for LISS management are highlighted on the Management map. Detailed prescriptions have been written up for each area and are held in the coupe records folder for the plan. Each prescription will be included in the site management plan before any operation commences.

Restocking by natural regeneration will be the aim in these areas. For this to be successful some form of temporary deer fencing deer and/or ground preparation will be needed in order for natural regeneration to be successful in some locations. However where this is not successful enough to create a fully stocked crop (stocking density required dependent on site objectives) enrichment planting will be undertaken with appropriate species within 10 years of the felling date.

An increased proportion of the conifer woodland is to be managed under LISS prescriptions to achieve a number of the objectives set for this plan. Firstly it will help create a diverse forest structure which will increase its biodiversity potential. The system will increase the carbon sequestration ability of the forest. The LISS will help reduce the potential issue of soil erosion and subsequent siltation. Finally it will reduce the scale and visual impact associated with the clearfell system in appropriate areas.

## Clearfell

As stated above the main silvicultural system employed in British forestry is 'patch' clear-felling followed by planting or occasionally natural regeneration. There will be areas of woodland in the plan area stocked with fast growing conifers on soils which are not considered stable enough for continuous cover

systems. In order that the timber in these areas is harvested before the onset of windblow, clearfell will remain an appropriate silvicultural system.

Although clear-felling can appear to have a negative impact on landscape and habitat it is still an important management system.

Clear-felling, to a degree, mimics natural disturbances such as fire or windblow in a forest and as such allows the forester to alter the even aged structure of the canopy over a relatively short period of time. The adoption of a 'fallow' period before restocking, (replanting), also creates transient open habitat that is exploited by several species such as voles, deer, raptors such as Kestrel, Buzzard and owls.

This will continue to be one of the silvicultural systems employed in the Strathdon woods. The scale of clearfells will be in keeping with the scale and topography of the local landscape. See section 3.4.1 above for the landscape justification.

Some of the area currently identified as clearfell will be converted to LISS in the next rotation as species more appropriate to the site conditions are planted at restocking.

The felling planned in the first two phases represents approx 20k m<sup>3</sup> over bark. That breaks down to 11,454 tonnes in phase one and 8,470 tonnes in phase two. All timber will leave the forest via the access point at Old Smeil (NJ390116) due to the restrictions placed on the other access points.

## 5.2 Future Habitats and Species

Refer to Map 7: Future habitats and management.

### Restocking

The choice of restock species in this plan has been guided by the ESC results for this climatic area and soil types. Due to the "poor" and "very poor" soil nutrient regimes the choice of potential species has been greatly reduced. (See Section 3.1.1 for further information on the soils.) Where this is not the case efforts have been made to select as wide a range of species as possible to create a diverse woodland rather than a more limited species mix, with potentially more susceptibility to future pathogens or climate change.



In common with the majority of Forest Enterprise Scotland estate, most restocking in the design plan area has traditionally taken place within two years of sites being clearfelled. However, many seedlings were badly damaged or killed by an endemic forest pest known as the Large Pine Weevil, *Hylobius abietis*. Therefore the default fallow period has been extended to four years, restocking may take place before if monitoring, using the Forest Research *Hylobius* Management Support System shows that it is safe to do so. Please refer to section 5.8 Pathogens for further details.

Areas highlighted for broadleaf woodland will be managed as commercially productive woodland provided the site and access is appropriate and this does not compromise other objectives set for the area. Commercial management will range from the coppice of birch for fuel wood to the production of high quality hardwoods. Therefore restocking will be undertaken to achieve a spacing that will allow this management to be undertaken. Thinning and other management operations will be carried out as appropriate for the crop and the final objective.

The forester on the ground will take the site-specific decisions, with their intimate knowledge of the individual sites, but they will be guided by the objectives set for the area in the design plan.

The network of habitat reserves will help to achieve the objective of adapting to climate change by locking up carbon in the longer term.

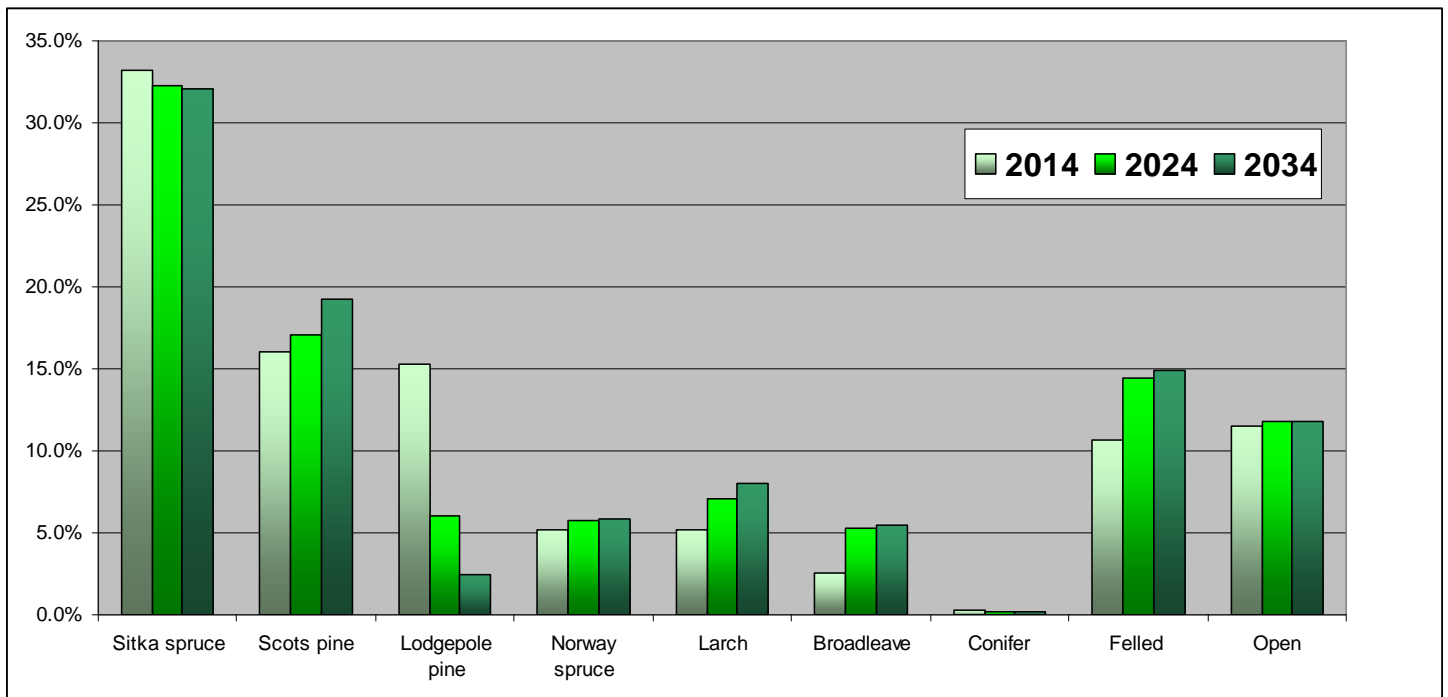
## Non Commercial Areas

Areas not considered for commercial management will include permanent woodland and open habitats, which will require monitoring to ensure they deliver the required objectives. These will be concentrated around the riparian zones to help create a network of areas with more biodiversity value. Non-desirable species, such as non-native conifer regeneration, may require removal.

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## 5.3 Species tables

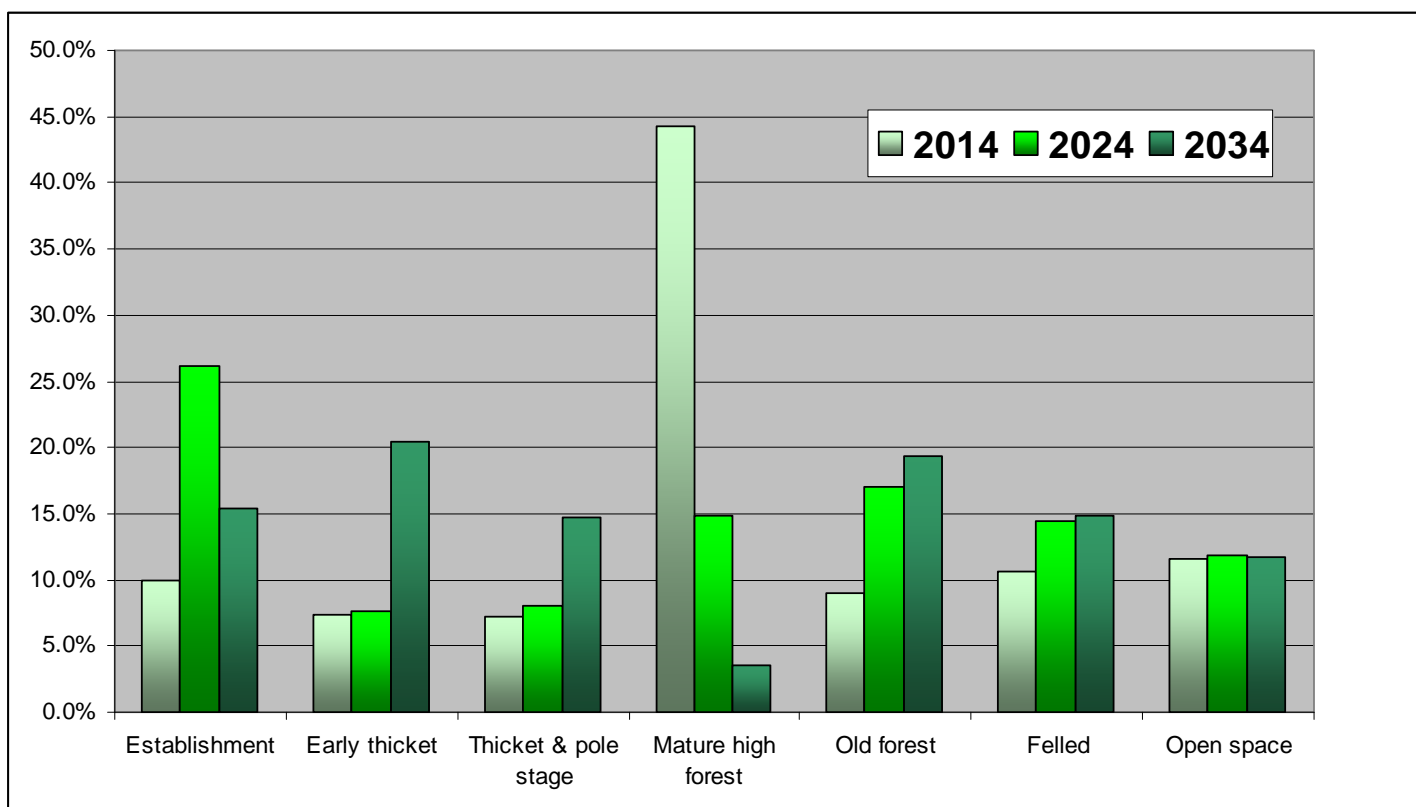
Species	Current species	Projected species 2024	Projected species 2034
Sitka spruce	33.1%	32.3%	32.0%
Scots pine	16.1%	17.1%	19.3%
Lodgepole pine	15.3%	6.0%	2.5%
Norway Spruce	5.2%	5.8%	5.8%
Larch	5.2%	7.1%	8.0%
Broadleaves	2.6%	5.3%	5.5%
Other conifers	0.3%	0.2%	0.2%
Felled	10.7%	14.4%	14.9%
Open	11.5%	11.8%	11.8%



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## 5.4 Age structure

Age of trees (years)	Successional stage	Current age structure	Projected age structure 2024	Projected age structure 2034
0 - 10	Establishment	9.9%	26.2%	15.4%
11 - 20	Early thicket	7.4%	7.7%	20.4%
21 - 40	Thicket & pole stage	7.3%	8.1%	14.7%
41 - 60	Mature high forest	44.2%	14.8%	3.5%
60+	Old forest	9.0%	17.0%	19.3%
Open	Felled	10.7%	14.4%	14.9%
Open	Open space	11.5%	11.8%	11.8%



## 5.5 PAWS restoration

There are no PAWS in the plan area.

## 5.6 Management of open land

Areas designated as permanent open space will be limited to the most biologically important areas, where work may need to be carried out to keep them in good condition. These areas include upland heath land and blanket bog (See map 7 Future habitats and species). Both these habitats will be managed but undertaking a programme of site inspection and removal of regenerating non native tree species on a 5 year cycle.

There will also be a network of transitional open space between the felling and establishment operations. These will provide suitable habitat for several species.

## 5.7 Deer management

Wild deer on the National Forest Estate (NFE) are managed in accordance with the Scottish Government's strategy "Scotland's Wild Deer a National Approach" and under the auspices of the Code of Practice on Deer Management.

The strategy and Code of Practice takes recognition of the fact that Wild deer are an asset, an integral part of Scotland's biodiversity and provide healthy food and recreational opportunities. The challenge of managing wild deer originates in a need to balance the environmental, economic and deer welfare objectives of the Scottish nation with the objectives of private landowners for forestry, agriculture, sporting and other forms of land use.

The principal legislation governing the management of deer in Scotland and hence on the NFE is the Deer (Scotland) Act 1996.

It is therefore FCS deer policy to;

- Prevent adverse deer impacts on commercial tree crops and the wider habitat. In doing so to carry out deer culling in an exemplary and humane way.
- Work closely with relevant organisations and neighbours to make sure that there are integrated deer management plans which seek to recognise the interests of all parties.
- Take opportunities to optimise income from venison from sporting where this does not conflict with our primary objective of maintaining

deer impacts at an acceptable level, in line with Quality Meat Scotland accreditation in the form of The Scottish Quality Wild Venison (SQWV) Assurance Scheme

- Take all practicable steps to slow down the expansion of deer species into areas where they are not currently present.

All deer management will be carried out in accordance with OGB 5 - Deer management.

The aim is to manage deer density safely and humanely at a level which is consistent with acceptable impacts on forests and other habitats. This is likely to be at a density level of 5 to 7 deer per 100 hectares.

Deer cull plans are prepared for each Deer Management Unit and are the responsibility of the Wildlife Ranger Manager.

## 5.8 Access

There are no access issues that need to be addressed in the period of this plan.

## 5.9 Pathogens

As stated in section 3.7 "*Hylobius* can cause extensive feeding damage to young trees used to restock clearfell sites ..."

Previously it has not been possible to predict damage and so insecticides have been routinely used to protect the trees by the planting of seedlings treated with insecticide, followed by 'top-up' spraying of the trees during spring and summer.

Forestry Commission is committed to a policy of chemical reduction on the national forest estate, in line with current European Union directives on chemical use, which has had a significant effect on the way we manage this pest.

The *Hylobius* Management Support System (MSS) is based on a simple monitoring protocol using billet traps to measure *Hylobius* numbers on individual clearfell sites. The numbers recorded are used, with other information entered into the *Hylobius* MSS software, to determine the best way to manage clearfell sites for successful, cost effective and environmentally friendly restocking. This Support System will be used on the vast majority of all restock sites with certain limited exceptions.

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From 2008 FCS has introduced a default four-year fallow period for clearfell sites. This allows for the *Hylobius* population to peak and then drop to acceptable levels before restocking is carried out. Fallowing has been shown in studies to be the most effective method of establishing trees without intensive chemical input. Although the default fallow period is four years, restocking may take place before then if monitoring, using the Forest Research *Hylobius* Management Support System shows that it is safe to do so.

Dothistroma Needle Blight is another pathogen with devastating consequences for the Strathdon blocks and will be addressed differently according to the level of current infection in the crop. The severity of infection and crop symptoms produced range from the dropping of a couple of yield classes to high levels of mortality within the stand. The levels of mortality is the key concern as once dead the integrity of the tree quickly deteriorates to a state where it can not successfully be harvested. Categorisation of infected crop will allow us to prioritise the harvesting of such areas.

The following scale and categorisation has been agreed upon.

		Mortality (%)		
Needle retention (years)	Defoliation (%)	<20	20 - 40	>40
>2.25	0 - 25	1	2	4
1.51 - 2.25	26 - 50	2	3	4
0.76 - 1.50	51 - 75	3	4	4
<0.75	>75	3	4	4

From this the priorities for felling are as follows:

**Highest: Category 3** - Once crops reach category 4 there is a marked reduction of marketable products. Category 3 still produce high proportion of timber before its value drops significantly.

**Medium: Category 4** - Due to recent fuel wood markets crops at category 4 is now merchantable and operations can break even.

**Low: Categories 2 and below** - Once the higher level infection crops have been addresses the prioritisation will move to the lower classes taking into account factors such as rate of infection, area felled already etc.



This has led to the following action plan for dealing with Dothistroma Needle Blight infection:

- Prioritise infected areas to be felled by swapping felling coupes of non infected crops in the current program.
- Include into thinning operations the felling of any infected crops within the area to minimise costs. Amendments to the forest design plan will be required as specified in the tolerance table for felling such areas.
- Reassess badly affected blocks and consider if a full review is required.
- Due to the moratorium on planting CP and LP on all sites and SP on previously infected areas, plus a 500m buffer zone, planting programs will need to be amended to include replacement species suitable for the site.

## 5.10 Critical Success Factors

- Undertake the planned thinning programme in order to increase the quality of the timber within the plan area.
- Undertake the thinning planned for the LISS areas in order to manage the light levels to allow the development of the appropriate ground vegetation and natural regeneration.
- Continue with the maintenance of the forest road network to allow forest operations to be successfully completed.
- Continue to attempt to manage the spread of Dothistroma Needle Blight through clearfelling and subsequently restocking with appropriate less susceptible species where appropriate.

## Appendix 1 – Consultation record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Cairngorms National Park	16/10/12 By email.	13/12/12 Meeting on site	<p>“Following our discussions and explanations of the outline maps you showed us it was clear that most of your objectives and proposed actions are very much concurrent with those of CNPA and will contribute to improvements in biodiversity, landscape and amenity value of the woodlands. Although we broadly support replacement of exotic productive species with native species, we appreciate the limited choice of species for restocking due to commercial factors and especially the need to avoid exposure to heightened disease risk.”</p> <p>“We would be pleased to see consideration given to preserving the avenue of Beech along the right of way on the west side of the Bunzeach plantation to retain</p>	<p>Support appreciated.</p> <p>Beech to be retained and managed.</p>

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	<p>20/9/13 By CD</p>	<p>31/10/13 By email</p>	<p>its landscape and historical interest.”</p> <p>“... there is likely to be large amounts of wood fuel produced in the short to mid-term from extraction of DNB-infected timber. As part of the Cairngorms Wood fuel Action Plan we are keen to see development of wood fuel supply chains within the Park and surrounding area.”</p> <p>“I can confirm that we are supportive of the Plan overall and have no specific objections to the proposals. We appreciate the constraints imposed by the need to maintain commercial viability of the plantations whilst managing the current and future disease threat, and support the management actions to minimise the effects of Dothestroma and pine weevil. Ash is mentioned on the maps, but I am sure you are aware of the current restrictions due to ash die-back risk. We welcome the consideration given to climate change mitigation and adaptation, especially</p>	<p>Wood fuel will be sold according to latest FCS sales guidelines.</p> <p>Support appreciated.</p>
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			<p>through the inclusion of areas of Long Term Retention and natural reserve where appropriate, and support the use of LISS where possible, particularly for its landscape benefits.</p> <p>The biodiversity of the forest will be improved by the proposed increase in broadleaves, an additional benefit to their potential commercial value for hardwood timber and wood fuel. We would welcome a wide range of species choice in broadleaf areas and for enrichment planting, including aspen, hazel and oak if there are sites where conditions are suitable. We would strongly encourage careful planting of broadleaf species and management of regeneration in riparian zones, alongside areas of open ground, to maximise habitat enhancement and water quality improvement. As indicated in the maps, this will tie in with development of woodland habitat networks. More detail of current biodiversity priorities for the National Park can be found in the Cairngorms</p>	<p>The choice of broadleaf trees will be restricted by the fact that the plan is part of a red squirrel stronghold area. This will mean no planting of large seeded broadleaves that are more attractive to grey squirrels.</p>
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			<p>Nature Action Plan (<a href="http:// Cairngorms.co.uk/resource/docs/publications/13052013/CNPA.Paper.1898.Cairngorms%20Nature%20Action%20Plan%202013-2018.pdf">http:// Cairngorms.co.uk/resource/docs/publications/13052013/CNPA.Paper.1898.Cairngorms%20Nature%20Action%20Plan%202013-2018.pdf</a>) which has now replaced the Cairngorms LBAP. We would be pleased to see direct reference to this in the final Plan.</p> <p>We are content with the broad objectives with respect to landscape enhancement and note that in preparing the plans, the differences in landscape character across this part of the National Park have been considered.</p> <p>Regarding public access for recreation, as mentioned in our letter of 18 Dec 2012, we would like to ensure that core paths and promoted paths (see <a href="http:// Cairngorms.co.uk/resource/docs/publications/11102012/CNPA.Paper.1854.Strathdon%20Trails.pdf">http:// Cairngorms.co.uk/resource/docs/publications/11102012/CNPA.Paper.1854.Strathdon%20Trails.pdf</a> ) currently used by walkers, cyclists and horse-riders are taken into account and adequate provision put in place to manage access during forestry operations. We would welcome inclusion of a</p>	<p>The core paths are marked on the key features map and they will be highlighted during the work plan process for operations in coupes adjacent to the core paths.</p>
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			map showing access routes in the final plan.	
Scottish Natural Heritage – Julia Galley	16/10/12 By email.  20/9/13 By CD	30/10/12 By email.  04/11/13 By email	Need for a deer management plan.  Add mention of <i>Phytophthora austrocedrae</i> in Juniper. Show areas of Juniper separately on maps. (NVC type W19 Juniperus-Oxalis woodland). Add Black grouse, Ring ouzel, Cuckoo, Song thrush, Small pearl-bordered fritillary and Siskin to section 3.2.	Details of current deer management policy/plan included in plan text (See 5.7).  Details added to section 5.9.  Maps amended as per suggestion.  Section 3.2 updated.
Scottish Environment Protection Agency – Barry Lucraft	16/10/12 By email.  20/09/13 By CD	30/10/12 By email.  22/10/12 By email	River basin management planning, planting and felling proposals, new supporting infrastructure, potential impacts on peatlands, impacts on wetlands, use of waste on site, including felling waste, pollution prevention and environmental management and protected sites and species.  In general we consider that the Plan incorporates appropriate actions in response to the advice we	All these issues have been addressed in the revised plan.  Support appreciated.



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			<p>gave at the scoping stage and references good practice guidelines. In particular we welcome the references to undertaking all operations in accordance with FCS Forest and Water Guidelines to meet EU water framework directive objectives, opportunities to manage riparian areas to create naturalised woodlands which have the biggest positive impact on water quality, increase broadleaf planting, extend areas of management under LISS, (Low Impact Silvicultural System), maintaining and where possible enhancing areas adjacent to riparian zones and areas with biodiversity value.</p> <p>We note the soils include areas of some peaty gleys, peaty podzols and peat and the deep peats hold well-developed examples of blanket bog. We therefore welcome the commitment, under Section 5.6 Management of open land, to manage areas of upland heathland and blanket bog.</p> <p>We would reiterate that in line with the <a href="#">Forests and Soils Guidelines</a> no new forests</p>	
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			should be planted on peat exceeding 50 cm depth in order to protect any wetland habitats present on the site.	
Royal Society for the Protection of Birds – Ian Francis	16/10/12 By email.	27/11/12 By email.	<p>Retain all Scots Pine and expand the coverage by area.</p> <p>Thin Scots Pine and increase areas of long-term retentions.</p> <p>Thin selected Lodgepole Pine areas and retain for long periods.</p> <p>Retain and thin larch areas.</p> <p>Implement Continuous Cover Forest management in these areas, with only small-scale felling coupes or these mixed with shelterwood system in places; avoid intensive seed tree felling (leave maximum feasible density of seed trees per hectare).</p> <p>Maximise the proportion of open ground within the forest.</p> <p>Identify areas of blaeberry and wetlands, and build management activities</p>	<p>DNB has made this impossible at this point in time.</p> <p>As above</p> <p>As above</p> <p>Larch and other conifers thinned and retained where possible.</p> <p>Areas of LISS reviewed and retained where achievable.</p> <p>Open ground area increased.</p> <p>Important open habitats identified, surveyed and to be managed as part of habitat</p>

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			<p>around their expansion, through either canopy shade manipulation or small-scale thinning/ditch blocking.</p> <p>Identify any parts of the forest with significant potential for the creation of larger forest wetlands and plan and implement this. Remove spruce regeneration from existing areas of opened out bog habitats.</p> <p>Restructure spruce forest edges to create more varied and 'scalloped' edge with more of a soft ecotone to moorland habitats.</p> <p>Plant more native broadleaves, and allow birch, juniper and other trees and scrub to regenerate naturally.</p> <p>For Capercaillie, work towards the identification of all good brood habitat areas, and carry out any possible management to expand them, and to improve or create (if possible) brood habitat near any known recent lekking areas.</p> <p>For Black Grouse, maximise</p>	<p>networks.</p> <p>No large open areas identified do to limited resources available to keep these areas permanently open.</p> <p>Boundary to moorland identified for natural regeneration and MB planting to create feathered edge.</p> <p>Open areas left around juniper colonies to allow for future expansion by natural regeneration.</p> <p>No capercaillie recorded in block since 2008.</p> <p>See details of feathered edge</p>
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	<p>20/09/13 By CD</p>	<p>16/10/13 By email</p>	<p>the amount of 'edge' habitat within the forest, through management of ride and track margins, scrub planting, and 'scalloping' hard edges, mixed with planting of scrub and scattered broadleaves.</p> <p>Continue programme of opening out canopy along burns and planting broadleaves, as well as allowing natural regeneration if source seed trees are broadleaves.</p> <p>Leave appropriate areas of windblown plantation to provide cover and eventually dead wood. This is best achieved close to existing more open areas of woodland or open ground.</p> <p>Identify opportunities to create more dead wood per hectare.</p> <p>No additional comment.</p>	<p>creation on moorland boundary.</p> <p>Riparian management will continue as a part of ongoing operations.</p> <p>Windblow is endemic in this block and it not all cleared.</p> <p>FCS has a deadwood policy that is implemented during harvesting operations.</p>
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Strathdon Community Council - Mrs Margaret Henderson	16/10/12 By email.	No response received to date.		
	20/09/13 By CD	No response received to date.		
Aberdeenshire Council Archaeology – Bruce Mann	16/10/12 By email.	2/11/12 By email.	Shapefile of known archaeological sites provided.	FCS heritage layer checked to ensure all sites present.

## Appendix 2 – Tolerance table

	Adjustment to felling coupe boundaries	Timing of restocking	Change to species	Windthrow response	Changes to roadlines	Designed open space
FC Approval not normally required	0.5 ha or 5% of coupe – whichever is less.	Up to two planting seasons after felling.		Up to 0.5 ha in areas of high sensitivity. Up to 2 ha in areas of low sensitivity.		Location of temporary open space e.g. deer glades if still within overall open space of design.
Approval by exchange of letters and map	0.5ha to 2ha or 10% of coupe whichever less.		Change within species group e.g. conifers, broadleaves.	0.5 ha to 2 ha in areas of high sensitivity. 2ha to 5ha in areas of low sensitivity.	Additional felling of trees not agreed in plan Departures of >60m in either direction from centre line of road.	Increased of 0.5ha to 2ha or 10% whichever is less
Approval by formal plan amendment	2ha or 10% of coupe.	Over two planting seasons after felling.	Change from specified native species. Change between species groups.	>2 ha in areas of high sensitivity. >5 ha in areas of low sensitivity.	As above depending on sensitivity.	More than 2ha or 10%. Any reduction in open space in sensitive areas. Colonisation of agreed open space



## Appendix 3 – FDP Brief

As part of the national forest estate this plan will contribute to the seven key national themes in the Scottish Forest Strategy. The objectives for this plan area are:

National theme	District strategic plan	Forest Design Plan Objective
Climate change	Renewable energy	<b>Woodfuel</b> – Utilise lower quality timber, conifer and broadleaved. Increase broadleaved management and short rotation forestry encouraging niche markets and local woodfuel supply.
	Adapting to climate Change	<b>Restore moorland areas</b> – Potential small scale expansion of moorland area on hill tops. <b>Forest habitat networks</b> – Manage Riparian zones to maintain and improve existing habitat networks and take opportunities to extend the area where appropriate.
	Flood & catchment management	<b>River catchments</b> –The river Don run to the north of the block and some of its tributaries start within it. All management to be undertaken with the appropriate sensitivity and according to “Forests & Water Guidelines”. <b>Riparian woodland</b> – See “Forest habitat networks” above.
	Carbon sequestration	<b>Silvicultural system</b> – Plant appropriate species for site type to allow the adoption of appropriate silvicultural systems to help sequester carbon to assist in the mitigation of the effects of climate change.

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Timber	Timber supply	<b>Thinning</b> – Achieve the required stocking densities for planting and regeneration, and undertake thinning where possible, to produce a sustainable timber supply. Some areas have been designated as non-thin areas due to soil conditions and exposure.
	Timber quality	<b>Species choice</b> – Select and plant appropriate species for site type according to results of ESC assessments Select good phenotypical specimens to produce seed for natural regeneration. Increased rotation ages to produce larger diameter high value timber. Where planting is require the use of improved planting stock to be considered. This applies equally to the quality of broadleaved plants and seed. Appropriate stocking densities to achieve good quality timber must be maintained. <b>Thinning</b> – Undertake thinning where possible to produce a high quality timber supply. Some areas have been designated as non-thin areas due to soil conditions and exposure.
	Timber transport	<b>Transport</b> – Use preferred timber haulage route to minimise potential damage to public roads. Block well roaded.
	Hardwood timber	<b>Niche marketing</b> – Increase broadleaved management and short rotation forestry encouraging niche markets and local woodfuel supplies. <b>Commercial hardwoods</b> – Optimise the current hardwood resource and plant appropriate species at commercial spacing on appropriate broadleaf sites.
Business development	Skills	<b>Volunteers</b> – No opportunities in plan area. <b>Local contractors</b> – Work with the current base of local contractors to help maintain this sector and allow it to expand as appropriate working within FCS procurement rules.
	Tourism	<b>Landscape value</b> – Deliver a positive contribution to the landscape of the area by increasing the diversity of species and age class in accordance with SNH landscape character assessments along the northern face. Other areas not visible.

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	Income diversification	<b>Woodfuel</b> - Seek opportunities for woodfuel, see Renewable Energy section above. <b>Non-forest enterprises</b> – None at present.
Community development	Community engagement	<b>FDP process</b> – Consult with both statutory and non-statutory consultees during FDP process. <b>Local communities</b> - Engage communities in the FDP process and other local issues.
	Learning	<b>Forest visits</b> - Use the forests in this design plan area for “What’s on events” where and when appropriate.
Access & Health	Recreation	<b>Partnerships</b> – No partnerships at present but consider any such approaches.
	Making access easier	<b>Planned maintenance</b> – Undertake a program of planned of roads to allow informal access to continue under SOAC.
Environmental quality	Soil water & air quality	<b>LISS</b> – Adopt low impact silvicultural systems (LISS) where practicable to mitigate the effects of erosion or siltation Undertake all operations in accordance with FCS Forest and Water Guidelines to meet EU water framework directive objectives
	Landscape	<b>LISS</b> – Adopt LISS where feasible to reduce the landscape impacts associated with clearfell and restock <b>Naturalisation of woodlands</b> – Progress the naturalisation of woodlands where appropriate, taking into account site, species and silvicultural context. This will be mostly upland birch woodland in this area.

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Biodiversity	Species & habitats	<p><b>Forest habitat networks</b> – Incorporate provision for forest habitat networks (riparian zones) to improve biodiversity and assist species movement where appropriate. Deliver targeted improvement works as resources allow, through partnership working wherever possible.</p> <p><b>Priority species</b> – Address the needs of priority species by utilising prescriptions from habitat action plans and species action plans. Bunzeach is designated a red squirrel stronghold so plan management according to published guidance (draft at present).</p> <p><b>HAP &amp; BAP</b> - Incorporate management appropriate to UK and local biodiversity action plans.</p>
	Invasive species	<p><b>Restrict/eradicate</b> – None known.</p> <p><b>Control grey squirrels</b> – Not appropriate in this FDP area.</p>
		<p><b>Deer management</b> – Review deer management in order to maintain deer numbers low enough to allow timber production and ecological objectives to be met.</p>
	Designated sites	<p><b>Management plans</b> – One SM in open land.</p> <p><b>PAWS plans</b> – None in plan area.</p>
	Increasing awareness and improving knowledge	<p><b>Interpretation</b> – None planned</p>

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## Appendix 4 – LISS prescriptions

Coupe no. (See map 1 below)	Management objective/Reason for selection	Long-term structure* and desirable species	Age Trans. period and return time (years)	Regeneration and ground flora	Observations (e.g. likely barriers to achieving objective)	Next treatment required**	Proposed monitoring	Other useful information
43193	Biodiversity (capercaillie habitat), landscape & backdrop for recreation. Mixed stand of predominantly SP with Larch, NS, SS and MB.	Complex. 90% MC (> 10% SS) & 10% MB	Mixed age (36 – 62 years) 100 10	Sparse due to current light levels. Grassy ground flora.	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	Retain beech avenue. Protect recreation routes. See appendix 5 - LISS management - section 3. Transformation in older (>40yrs) stands
43370	Landscape. Maintain SP on site and restock with natural regen.	Simple 90% SP 10%MC/MB	Mostly 58 – 63 years. 100 10	Sparse due to current light levels. Grassy tending towards heather in places.	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	Retain some beech as minor component at roadside. See appendix 5 - LISS management - section 3. Transformation in older (>40yrs) stands
43761	Maintain trees longer term in block hit by DNB. Maintain SS on site and restock with natural regen.	Simple 90% SS 10%MC/MB	39 – 63 years. 40 10	Sparse due to current light levels. Grassy ground flora.	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	See appendix 5 - LISS management - section 3. Transformation in older (>40yrs) stands

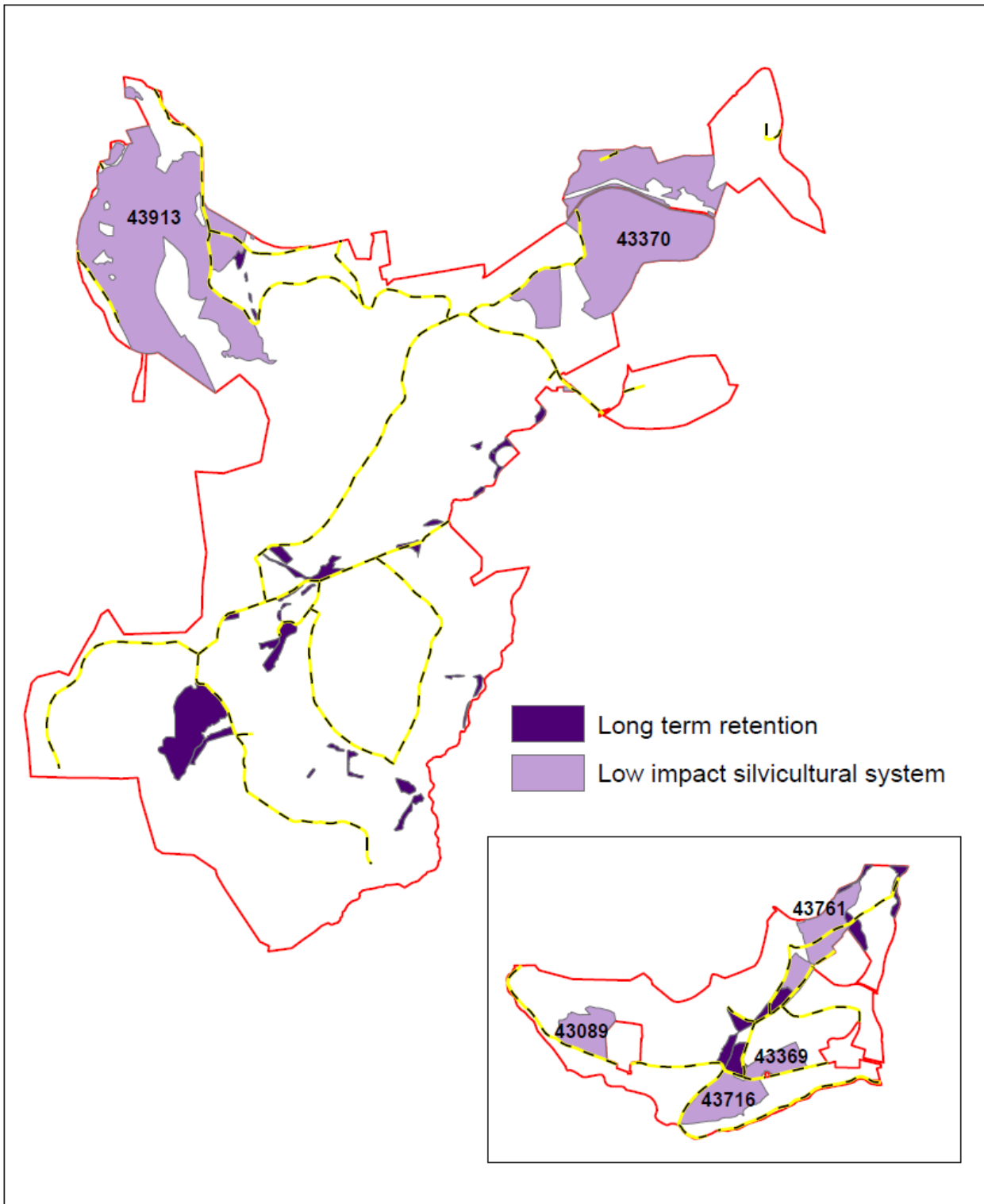
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43089	Maintain trees longer term in block hit by DNB. Maintain SS on site and restock with natural regen.	Simple 90% SS 10% JL	55 – 61 years. 40 10	Sparse due to current light levels. Grassy ground flora.	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	See appendix 5 - LISS management - section 3. Transformation in older (>40yrs) stands
43369	Maintain trees longer term in block hit by DNB. Maintain SS on site and restock with natural regen.	Simple 100% SS	44 years 40 10	Sparse due to current light levels. Grassy ground flora.	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	See appendix 5 - LISS management - section 1. Transformation of a young (<40 yrs) stand to a simple structure.
43716	Maintain trees longer term in block hit by DNB. Maintain current species mix on site and restock with natural regen.	Simple 50% SS 40% SP 10% JL	60 years 30 10	Sparse due to current light levels. Grassy ground flora.	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	See appendix 5 - LISS management - section 3. Transformation in older (>40yrs) stands
Various LTR coupes	Maintain tree cover in blocks badly affected by DNB. Form part of forest habitat networks.	Complex MC/MB With emphasis on native BL and SP/NS/JL	Various	Various	Deer browsing & weed competition	Thin along with adjacent coupe if appropriate to promote stability.	Thinning control.	If windblow occurs most will be harvested and sites restocked with appropriate species to achieve forest habitat network objectives.

\* Continuous cover stands: simple = 1 or 2 layers in canopy structure; complex = 3 or more layers in canopy structure

\*\* Presumption will be that regeneration will be natural, unless otherwise stated.





Map 1 - LISS coupe numbers

## Appendix 5 – LISS management

LISS is an approach to forest management in which the forest canopy is maintained at one or more levels without clearfelling.

The word 'approach' is important because:

- we are not following a system;
- there are no standard prescriptions; and
- flexibility is important – to take advantage of opportunities as they arise.

Any preconceived ideas about systems of managing forests can act as a 'straight jacket' to thinking about CCF.

Stands that have been regularly thinned are more likely to be successful with CCF. Crown thinning will be undertaken when transforming stands to CCF rather than low or intermediate types, as used in plantations. The basis of crown thinning is to remove competition from around selected trees (Frame trees), even if the trees to be removed are as big. Using crown thinning usually increases the average tree size, so there is potential for more income.

There are two main types of structure:

- Simple – in which there will be one or two canopy layers of trees
- Complex – where there are three or more canopy layers of trees

### 1. Transformation of a young (<40 yrs) stand to a simple structure

The objective is to achieve reasonably even regeneration of the desired species and then remove the canopy in a number of thinnings.

Early crown thinning will be heavier (10-20%) than management table intensity and aim to develop 100 equally distributed 'frame' trees per hectare.

'Frame' trees are well-formed dominant trees with good crowns at reasonably even spacing.

When the trees begin to cone (see table 1 below) stands will be thinned to the basal areas shown in table 2 to develop good conditions for regeneration to establish.

If/when natural regeneration occurs it will be more variable than on a planted site, giving more variability in age, density and species.

Canopy removal will aim to maintain a leader-to-lateral ratio of >1 in the regeneration (see figure 1), generally this will be achieved using the basal areas in table 2.

The final removal of the overstorey may not involve all the trees depending on management objectives and windthrow considerations (green tree retention).

If natural regeneration is only partially successful in terms of number and species mix planting will be undertaken. Planting will be concentrated so the location of trees is known and they can be

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maintained. This will be by using a minimum of 16 trees in distinct group with the trees planted at 1.5 m x 1.5 m to form robust groups.

If natural regeneration has been completely unsuccessful and CCF is still seen as appropriate planting will be undertaken to form the new canopy layer.

Before planting the stand will be thinned to the basal areas for 'seedling growth' in the table 2.

The felling and extraction of the canopy trees will be considered when deciding where to plant.

Planting will be at 2500 trees per hectare in a well-defined pattern so they can be found for subsequent maintenance. 'Blanks' will be left when the planting position is close (<1 m) to canopy trees. This should ensure restocking compliance with OGB 4, as the area under the canopy is not part of the net area.

Attention will be paid to site preparation, vegetation management, plant quality and reducing the impact of mammals to make sure of successful establishment. In general opportunities for site cultivation will be constrained by the overstorey.

If the established crop is between the ages of 20 and 40 years, a transformation period of up to 50 years is expected.

Table 1. Species seed production details.

Species	Age of first good seed crop	Age of max seed production	Interval between good seed crops (yrs)
Sitka spruce	25-35	40+	3-5
Scots pine	15-20	60+	2-3
Douglas fir	30-35	50+	4-6
European larch*	25-30	40+	3-5
Japanese larch*	15-20	40+	3-5
Hybrid larch*	15-20	40+	3-5
Western hemlock	25-30	40+	2-3
Corsican pine	25-30	60+	3-5
Lodgepole pine	15-20	30+	2-3
Norway spruce	30-40	50+	**
Noble fir	30-40	40+	2-4
Grand fir	35-45	40+	3-5

Table 2. Basal area guidance for natural regeneration

Species/	Shade tolerance of seedlings	BA (m2 ha-1)	BA (m2 ha-1)

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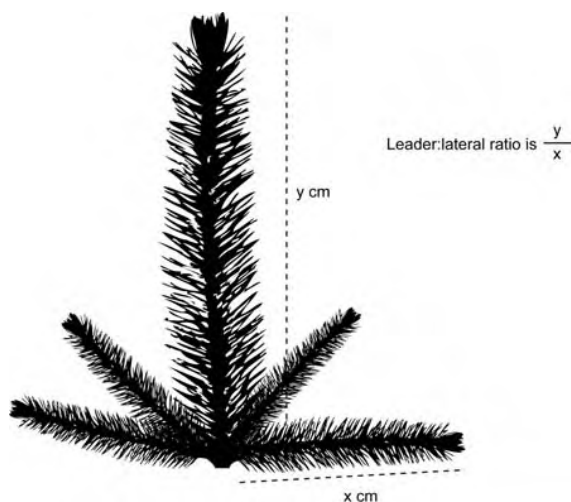
group		Establishment*	Seedling growth**
Larches	Intolerant	20-25***	15-20
Pines	Intolerant	25-30***	20-25
Sitka spruce	Intermediate	30-35	25-30
Douglas fir	Intermediate	35-40	30-35
Norway spruce	Tolerant	40-45	35-40
Western hemlock	Tolerant	40-45	35-40

\* On moderate to fertile sites where vegetation regrowth will be faster and more severe the BA for establishment will be increased.

\*\* Seedlings and saplings are growing well under a canopy when the ratio of the length of the leader to the length of laterals in the upper whorl is  $\geq 1$ , as shown in figure 1.

\*\*\* Stands of larch and pine at these basal areas will usually have well-developed ground vegetation layer and control or cultivation will be needed to start regeneration.

Figure 1. Leader-to-lateral ratio.



## 2. Transformation of a young (<40yrs) stand to a complex structure

The objective is to create a wider dbh range than under a simple system by:

- retaining small trees; and
- encouraging fast growth of selected frame trees

The pattern of regeneration will be different to a simple structure, and will be arranged in groups that only cover up to 20% of the area at any one time.

Up to 50 'Frame' trees will be selected per hectare and these will be crown thinned so as to keep as many small trees as possible.

'Frame' trees are stable, well-formed dominant trees. They may need to be present on the site for a long time; spacing should be 'clumpy' and not regular. Stable trees will have a larger diameter for a given height.

The stand will be thinned to a residual basal area of about 18-25 m<sup>2</sup> per ha for larches and pines, and 25-35 m<sup>2</sup> per ha for spruces and Douglas fir. The choice within this range will depend upon the site and the balance between the overstorey and any regeneration. If there is little or no regeneration a higher value will be chosen to provide suitable conditions for seedlings to establish. If there is enough regeneration, which needs to be released, then a lower value will be favoured. The aim at each thinning is to remove enough trees to achieve the chosen residual basal area. If there is too much regeneration thinning will be concentrated on releasing the best regeneration and attempting to hold it back in other areas.

Planting in complex structures will be considered to increase chances of success.

Trees will be planted in canopy gaps of 0.1 ha minimum size.

Trees will be planted in half the area of the gap in the centre.

Close spacing (1.5 m x 1.5 m) will be used to make the groups robust. For example, when planting a canopy gap of 0.1 ha 200 trees will be planted at 1.5 m spacing on half the area in the middle of the gap. Close spacing will ensure rapid canopy closure and planting only half the area ensures minimal competition from the canopy trees, allowing opportunities for natural regeneration and increasing operational access.

### 3. Transformation in older (>40yrs) stands

Transformation of stands older than 40 years may be possible, especially on wind-firm sites, but the opportunity to steer the development of the young stand in thinning has been lost. The main implications of this are:

for simple systems there will be reduced opportunities for developing the crowns of 'Frame' trees and the window for natural regeneration is reduced. Therefore more 'frame' trees will be retained and a longer regeneration period used.

in complex systems the main risks are that 'Frame' trees will become too large to be marketable, and the stand will still be quite uniform when windthrow starts. The aim is to establish groups of regenerating seedlings under an irregular overstorey while older trees are progressively felled.

