Moray and Aberdeenshire Forest District

Dyce Woods

Land Management Plan

Approval date:

Plan Reference No: LMP 28

We manage Scotland's National Forest Estate to the United Kingdom Woodland Assurance Standard – the standard endorsed in the UK by the international Forest Stewardship Council® and the Programme for the Endorsement of Forest Certification. We are independently audited.

Our land management plans bring together key information, enable us to evaluate options and plan responsibly for the future. We welcome comments on these plans at any time.

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FOREST ENTERPRISE - Application for Forest Design Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	Moray & Aberdeenshire FD
Woodland or property name:	Dyce Woods
Nearest town, village or locality:	Dyce
OS Grid reference:	NJ 850 127

Areas for approval

	Conifer	Broadleaf
Clear felling	30.9 ha	
Selective felling		
Restocking	59.5 ha	8.8 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

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 …… Forest District Manager

Signed …… Conservator

District Moray & Aberdeen Forest District

Conservancy Grampian

Date ……

Date of Approval ……

Date approval ends: ……

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Land Management Plan Summary

This plan is a review of Forestry Commission Scotland's management of Dyce Woods forest.

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 this woodland is to provide a recreational resource for Aberdeen and the surrounding area.

A proportion of the plan area has been selected for LISS management due to the suitable species, soil types and the reduced impact on the forest environment this system of management will have on an area with a very high recreation value.

The development of additional recreational facilities has been limited in recent years due to uncertainties such as the impact of the Aberdeen Western Periphery Route (AWPR). During this same period the use of Kirkhill has continued to increase and therefore we will undertake a review and scoping exercise of recreation provision at Kirkhill & Tyrebagger later in 2015. This will lead to the creation of a Visitor Experience Plan for these woods.

Areas of the highest biodiversity value have been identified and will be retained and managed in a network of natural reserves and open space and complimented with additional broadleaf planting.

1.0 Introduction

Refer to Map 1: Location.

1.1 Setting and context

Dyce Woods encompasses two forest blocks: Kirkhill and Parkhill. Kirkhill covers an area of 494 ha located approximately 5 miles north-west of Aberdeen between Blackburn and Dyce. Parkhill Wood covers an additional 43.5 ha located to the north of Aberdeen, near the suburbs of Dyce and Bridge of Don.

Kirkhill lays at the summit of Tyrebagger Hill with the main body of the block on the north side of the A96 road, with Tyrebagger Wood to the south. The land was acquired by Forestry Commission in 1921 and 1945; some further planting was carried out in the 1970s. This mainly coniferous plantation has a fairly diverse species composition, see map 3 – Existing species for details.

Parkhill is a relatively young, predominately conifer plantation established mainly during the 1960's and 70's.The main exception is an area of Scots pine planted in 1925. Additionally there is a small area of conifers and birch planted in the 1980's in the south-west corner of the wood (see map 3 – Existing species). Parkhill is only 1.5 miles from the city of Aberdeen.

The forest is currently being managed using both clearfell and low impact silviculture systems (LISS). LISS, including long term retention (LTR) and natural reserve (NR) currently covers around 300 ha or 58% of the plan area.

1.2 Land Management Objectives

The purpose and objectives for managing these blocks of woodland have been identified following a review of:

- The physical context and existing woodland;
- The land management objectives of other statutory bodies;
- The physical capability of the woodland;
- The locational objectives identified in the Moray & Aberdeenshire Forest District Strategic Plan.

Analysis of the available information has lead to two **primary objectives** for this block depending on the area in question. In Tyrebagger and south Kirkhill the primary objective is the management of the woodland to provide a recreational resource for Aberdeen and the surrounding area. This includes the maintenance and enhancement of the Tyrebagger Christmas tree sales centre, a key public engagement mechanism for the district.

For north Kirkhill and Parkhill the primary objective is the production of a quality crop of timber.

An additional **secondary objective** for the future management of all the woodland has been identified as:

- The control of grey squirrels and delivering management regimes to benefit red squirrels.

2.0 Analysis of previous plans

Previously Kirkhill and Parkhill had two separate forest design plans, approved in 2005 and 2003 respectively.

The objectives set in the previous plans do not fit neatly with the current FES national themes. However the table below attempts to set the objectives of the previous plans against these current themes and summaries the progress made towards achieving them during the last plan period. It also shows which of the objectives, if any, will be carried forward into the next plan period, as they still meet our current aspirations for the management of the blocks.

Theme	**Priority** (in previous plan)	**Objective** (in previous plan)	**Progress to date** **1** – Nominal progress **2** – Some progress **3** – Progress as per LMP	**Proposals for current plan**
Climate Change	**Not considered**	No objectives set.		- Use the Ecological Site Class (ESC) decision support system to help inform the selection of species appropriate to the current and potential future climatic conditions of the sites. - Restock with a range of species to create woodlands that are at least as diverse as the current woodland.
Timber	**Medium**	Provide a sustainable level of timber production from thinning and felling, and through an increased use of alternative systems to clearfell.	**3 –** Coupes identified in LMP have been felled as per plan.	- Timber production will continue to be major objective in the new plan. - A range of species, suited to the site conditions, will be used for restocking to maintain or increase the diversity of the LMP species make up. - Species for restocks will be selected with the help of ESC. A range of productive species will be considered, including broadleaves on suitable sites.
Access & health	**High**	Provide, maintain, enhance and expand recreational facilities in partnership with other organisations.	**2** – Formal recreation facilities maintained and enhanced during the plan period but little co-operation with partners possible due to lack of interest on their part.	- Maintain the current level of facility provision over the period of the new LMP. There are unlikely to be resources available for additional facilities unless the current financial situation changes. - Undertake a review and scoping exercise of recreation provision at Kirkhill & Tyrebagger later in 2015. This will lead to the creation of a Visitor Experience Plan for these woods.

		Identify opportunities to facilitate link paths and recreational access from Dyce, local communities and neighbouring properties.	**1 –** No progress on this to date.	- This is unlikely to be possible in the new plan given the current resource situation. However it will be retained as an aspiration, linked with the other improvements, if the resource situation changes in the period of the plan.
Environmental quality	**Medium**	Use open space and broadleaves to create habitat networks.	**1 –** Little progress during plan period as no appropriate coupes felled.	- Areas of broadleaves and existing open space will be maintained and enhanced. They will be connected into existing or new habitat networks as adjacent coupe management allows.
		Protect and enhance all heritage features within the forest.	**3 –** All features identified in work plans and appropriately protected.	- Manage scheduled monument according to the plan agreed with Historic Scotland. - Other features to be protected during operations and any new features discovered recorded on GIS layer. Protection prescription for individual features to be agreed with conservation team at work plan stage.
		Develop riparian woodland along watercourse and expand areas of open wetland.	**1 –** Little progress during plan period as no appropriate coupes felled.	- Areas within riparian zone will be maintained, enhanced and connected into habitat networks as operations in scheduled coupes is undertaken.

Biodiversity	**High**	Increase provision of deadwood to benefit invertebrates and other wildlife.	**3** – Deadwood provision undertaken as per prescriptions agreed with conservation team at work plan stage.	- Deadwood provision will be part of the wider biodiversity improvements for the blocks. This will be undertaken according to the revised FES deadwood policy.
		Prevent expansion of population of the Grey Squirrel.	**3 –** Grey squirrel control has been undertaken and operations have been undertaken as per the approved LMP.	- The management of the blocks will be aimed at improving the habitat for red squirrel populations as per FCS Guidance Note 33: Forest operations and red squirrels. - Grey squirrel control will continue to be undertaken.
		Protect and expand the populations of species of woodland flora and fauna.	**1** – There have been no studies or surveys undertaken to establish baseline figures or any changes during the plan period.	- There will be no aim to change specific populations (except red and grey squirrels – see above) as it is assumed that maintaining and enhancing areas with a high biodiversity value will have a positive impact on the overall biodiversity value of the woodlands.
		Maintain wildlife corridors for the Red Squirrel and Otter.	**1 –** There is no clear detail in the previous plan where the 'corridors' were meant be so it's not possible to decide if their maintenance has been achieved.	- There will be no aim to maintain specific corridors in the new plan but the wider biodiversity actions will have a positive impact on the quality of the woodland for red squirrel and otters.

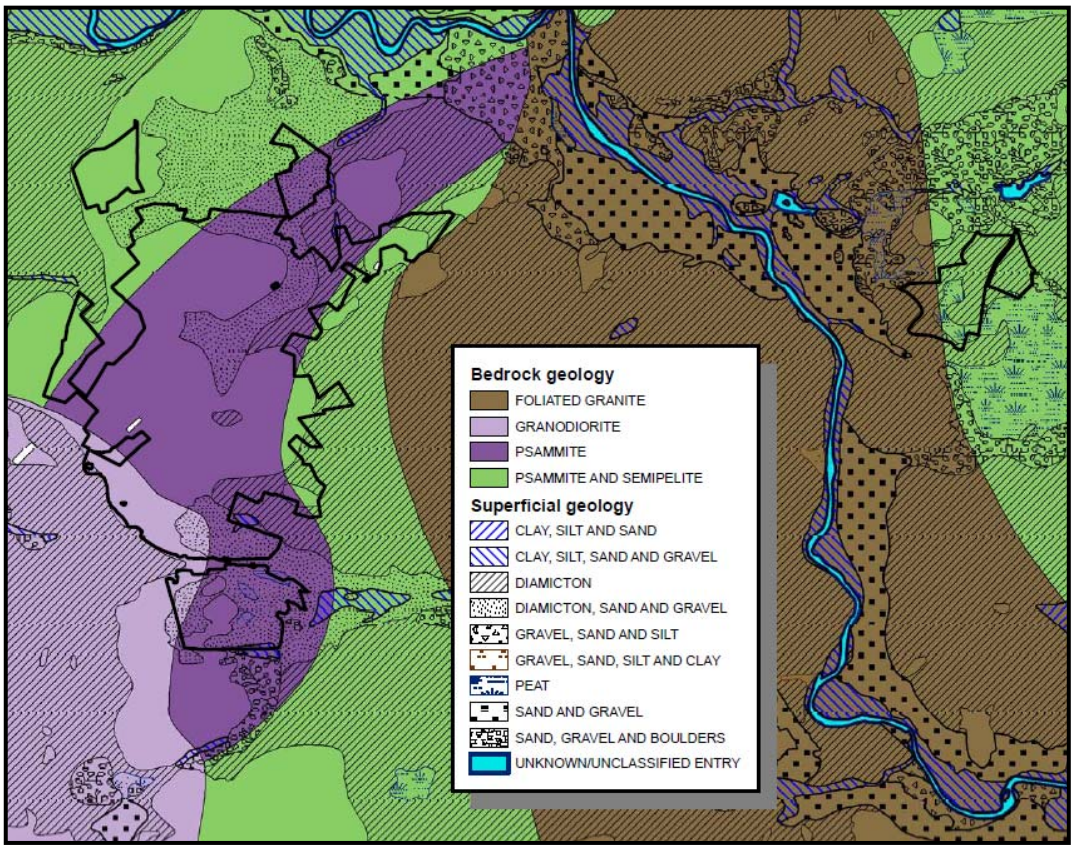
3.0 Background information

3.1 Physical site factors

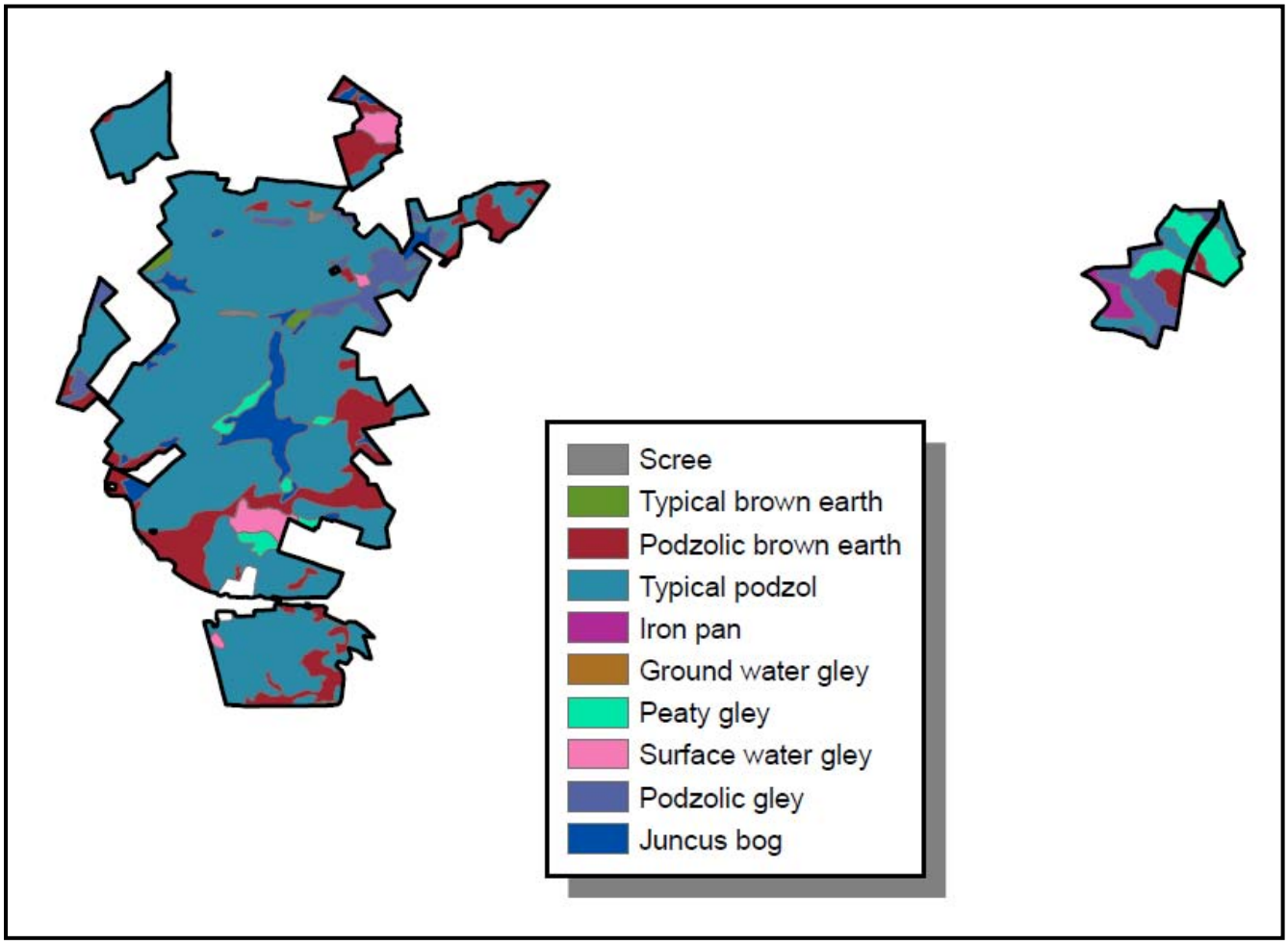
Refer to Map 2: Key Features.

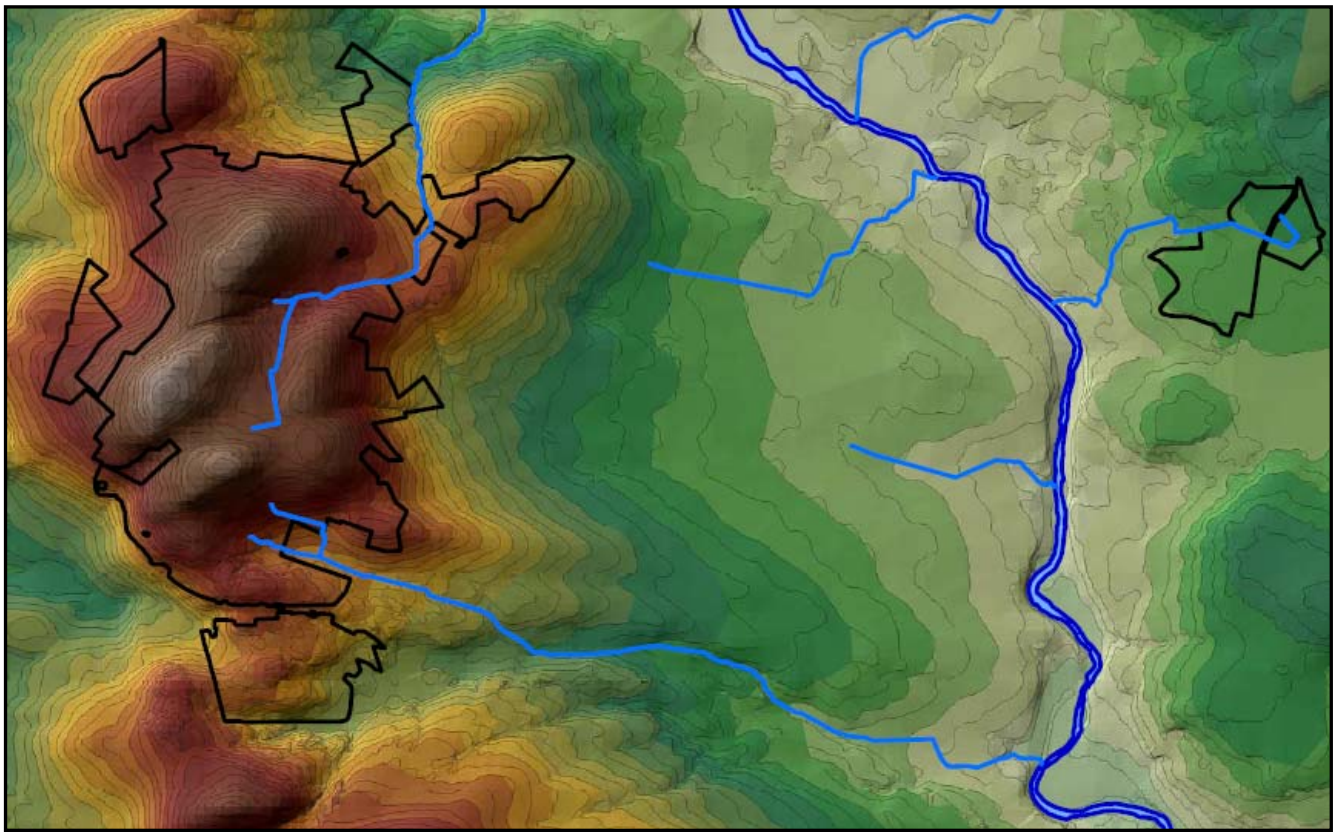
3.1.1 Geology, soils and landform

Geology - According to the British Geological Survey (Geological Map of the UK), the land management plan area is underlain by the three different geological groups. The majority of the bedrock is either sandstones or siltstones. It is partially concealed by superficial deposits shown on the map below. All the bedrock and superficial combinations in this area create soils with a medium level on nitrogen availability.



Soils – The majority of the soils are podzols, which are free draining and have relatively good conditions for rooting. The strong acidity and low nutrient levels of many podzols rarely appear to represent a limitation to the growth of the major coniferous species as yield classes are usually high. Some wetter sites with bogs provide more nutrients; brown earths are also present in places but only in a podzolic phase.





Topography - The elevation of the land management plan area runs from about 60 meters to approximately 250 meters at the top of Tyrebagger Hill. The block is situated on the east and west facing slopes of an NE-SW ridge.

3.1.2 Water

Dyce Woods lays within the Scotland River Basin District which is covered by Scotland River Basin Management Plan published by SEPA in 2009.
The groundwater bodies' ecological status is recognised by SEPA as good with no notified threats.

There are only minor watercourses within Kirkhill Forest which are tributaries of the River Don. (See image 3 – Topology) There are also two private water supplies that have their source within the forest.

There are limited water features in Parkhill Wood, with only man-made ditches present. These have some importance as the wood lies within the catchment area of the River Don.

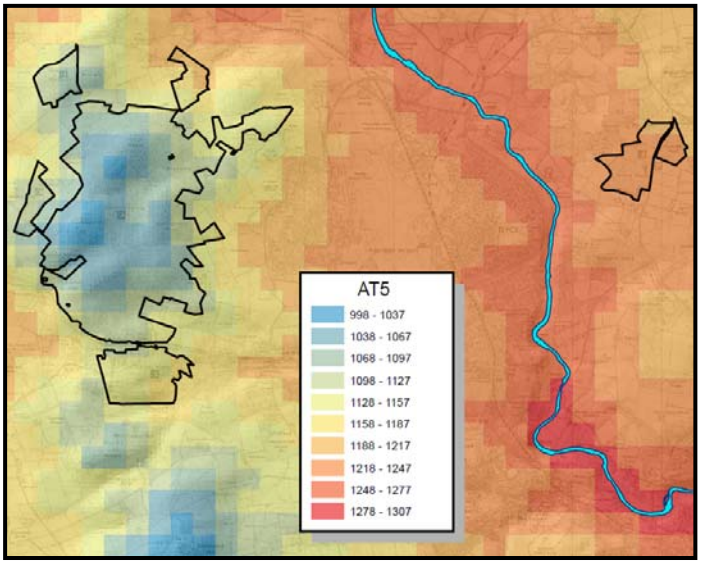
There are no bodies of open water within the forest.

3.1.3 Climate

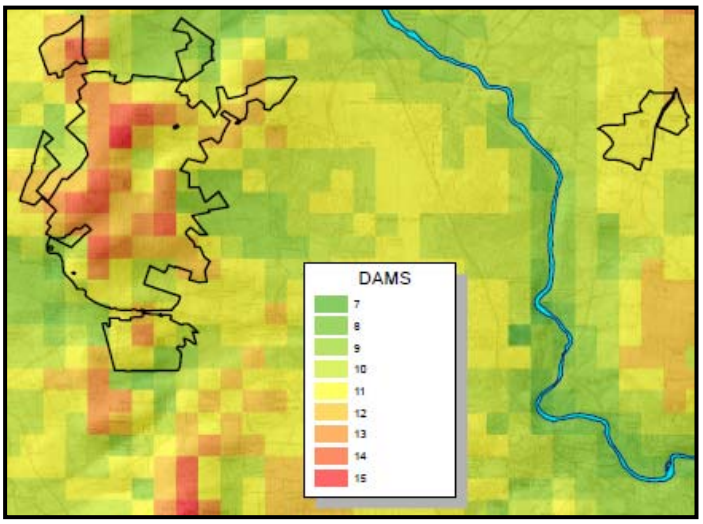
The climate data for the land management plan area is obtained from the Ecological Site Classification system (ESC).

The results of interrogating this system gave the following data.

AT5	DAMS	MD
1018 - 1237	8 - 15	94 - 142

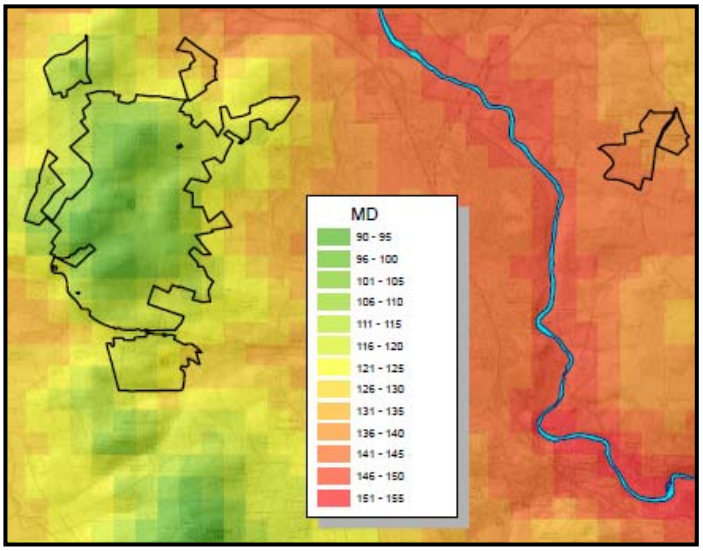


AT5 is the accumulated total of the day-degrees above the growth threshold temperature of 5º, which provides a convenient measure of summer warmth. The results for AT5 place these blocks on the boundary of the “cool” and “warm” .



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 limiting factor to tree growth at higher elevations in Britain. A score above 16 is associated with exposed sites and below 12 with sheltered sites. This score determines the thinning potential for the woodland. The DAMS score for these blocks is between 8 and 15. This means that all of the area can be thinned, in theory. In practise this also depends on soil conditions and the past management of the stand.



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). The results for this area place the blocks within the “moist” zone.

These results will be used to help assist in the choice of tree species for restocking in this LMP. Each tree species has tolerances for these and other factors and they will 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

There are currently no biodiversity designations in place within Dyce Woods.

A number of UKBAP species are known to be present within the LMP area and management operations will be planned to ensure these species are not put at risk, and where practical work will be undertaken to encourage them.

Of the UKBAP species present only the Red Squirrel is one of the six key species identified in the FCS Biodiversity Action Plan. Therefore good forest design and operational practice will be undertaken to benefit red squirrels according to FCS Guidance Note 33: Forest operations and red squirrels. This will include planning forest operations to minimise damage to red squirrel dreys and populations by undertaking survey work to locate dreys prior to

felling operations. It will also mean that planning the structure and composition of the forest will be undertaken to suit red squirrels.

There are a number of badger setts within the block that will be protected during operations.

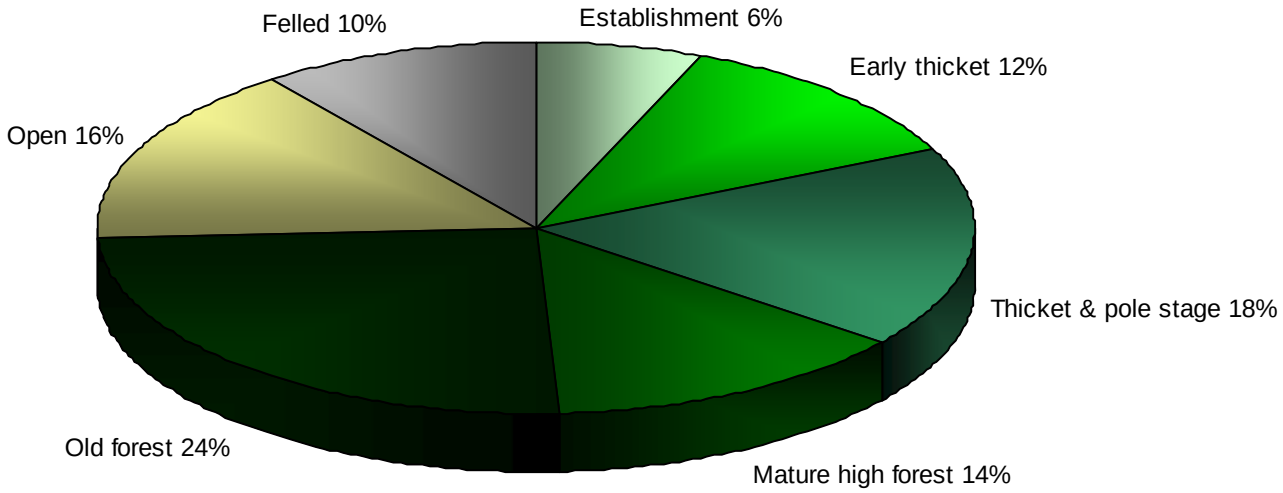
3.3 The existing forest

3.3.1 Age structure, species and yield class

Age Structure

Old forest makes up the largest proportion of the plan area due to the area currently being managed as LISS.

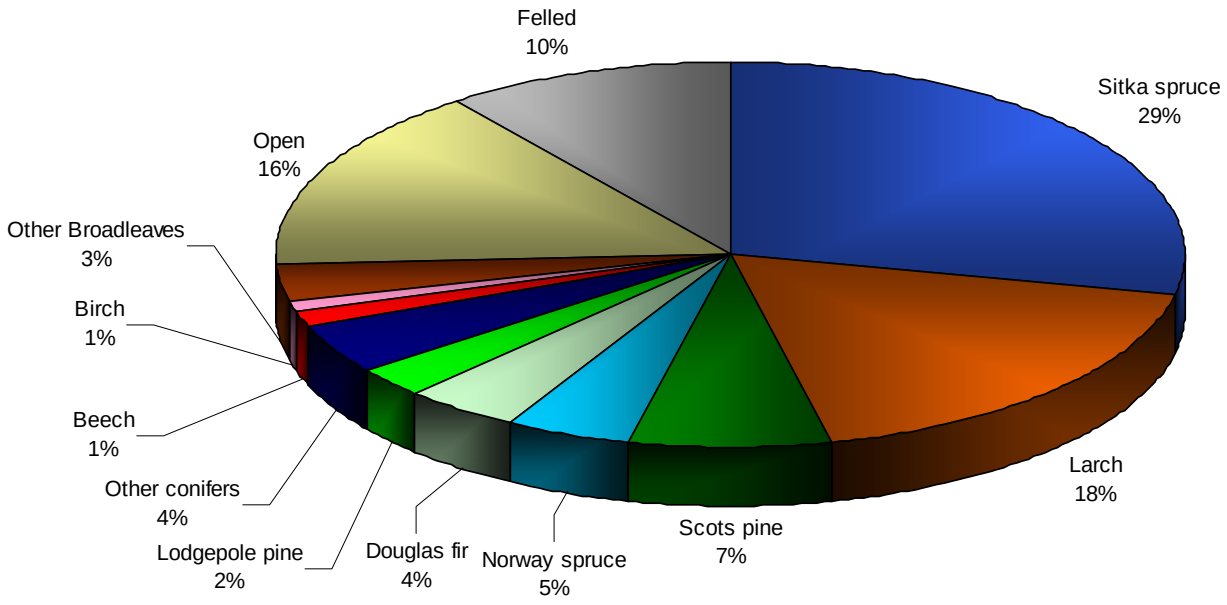
Ages of trees (years)	Successional stage	Area (ha)	%
0 - 10	Establishment	32.7	6.2
11 - 20	Early thicket	61.7	11.8
21 - 40	Thicket & pole stage	92.4	17.6
41 - 60	Mature high forest	71.0	13.5
60+	Old forest	131.5	25.1
	Open ground	81.6	15.6
	Felled	53.8	10.3



Species

Nearly a third of the plan area is currently stocked with Sitka spruce. This is due to past policies of planting the species on these types of soil conditions. Larches and Pines account for another 25% of the total forest area.

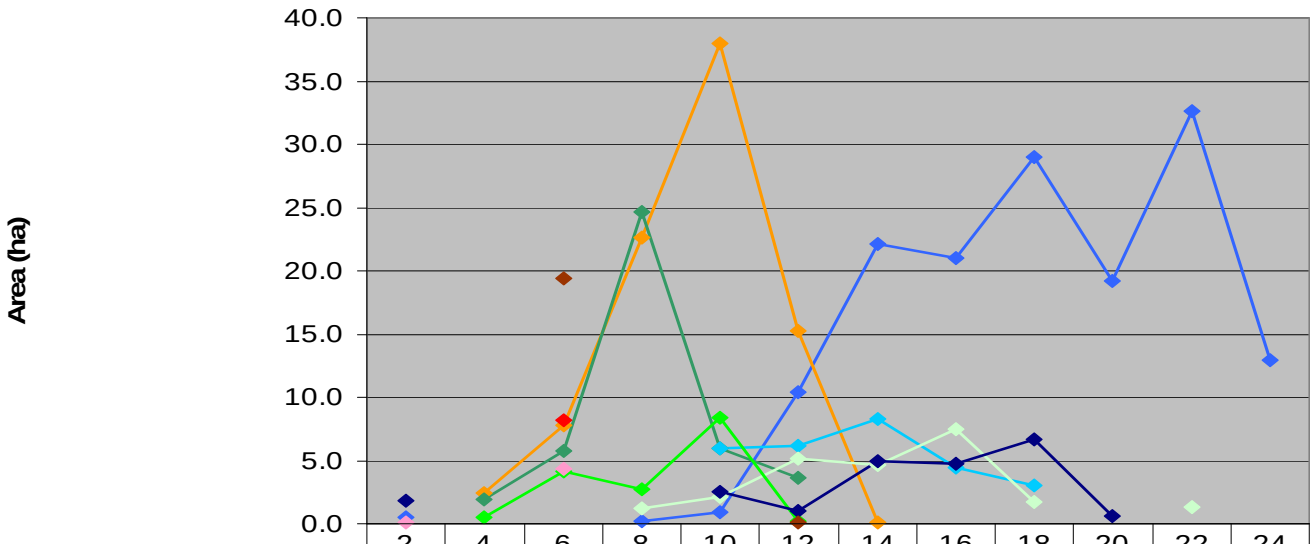
Species	Area (ha)	%
Sitka spruce	148.1	28.2
Larch	94.7	18.0
Scots pine	38.0	7.2
Norway spruce	24.0	4.6
Douglas fir	22.2	4.2
Lodgepole pine	12.0	2.3
Other conifers	21.9	4.2
Beech	7.3	1.4
Birch	4.4	0.8
Other broadleaves	19.8	3.2
Open	81.6	15.5
Felled	53.8	10.3



Yield Class (YC)

Currently the average YC for Dyce Woods is around 12.

Sitka Spruce, the dominant species, has an average YC of 18 and proves to be the most productive species. Other conifers that are growing well are Douglas fir and Norway spruce. Broadleaves planted in small dispersed areas on poor soils are the least productive of the species, though they play an important role for biodiversity.



	2	4	6	8	10	12	14	16	18	20	22	24
Sitka spruce	0.6			0.2	0.9	10.4	22.1	21.0	29.0	19.2	32.6	12.9
Larch		2.5	7.8	22.6	38.0	15.3	0.1					
Scots pine		2.0	5.7	24.6	5.9	3.6						
Norway spruce					5.9	6.2	8.3	4.4	3.0			
Douglas fir				1.2	2.2	5.2	4.6	7.5	1.8		1.3	
Lodgepole pine		0.5	4.1	2.8	8.4	0.2						
Other conifers	1.8				2.5	1.0	4.9	4.7	6.7	0.6		
Beech			8.1									
Birch	0.1		4.4									
Other broadleaves			19.4			0.1						

3.3.2 Access

Access to and within the blocks in this plan area is good. The A96 divides the northern and southern sections of Kirkhill and provides excellent access to them both. Parkhill is split by the Whitestripes road that joins the B997 just north of the wood.

Dyce woods have a good forest road network and there are no requirements for additional forest road provision in the period of this plan.

The route of the new AWPR cuts through the eastern side of the Kirkhill block in two locations, see map 2 - Key features. An area of 2.6ha is isolated from the main block near Howemoss. Due to the small size of this area no provision has been made as part of the AWPR process for continued access from the main block. Therefore access will need to be taken from the east via the Howemoss farm tracks. However these are not suitable for the extract of timber, therefore this area will become an area of minimum intervention.

The area to the north will still be accessible via an overbridge that will be suitable for lorry access. Therefore this area will continue to be managed for timber production. See appendix 3 for details of access provision.

3.3.3 LISS potential

In the existing plan just over 56% of the design plan area is designated for management under LISS (Low Impact Silvicultural Systems).

These management systems are defined as: '… silvicultural systems whereby the forest canopy is maintained at one or more levels without clear felling.'

LISS prescriptions mean that no area larger than 2 ha may be felled at any one time.

The majority of the existing LISS is currently designated for managed by group shelterwood system (see image below).

The potential for LISS is based on the wind hazard class of the crop, the soil nutrient regime, the suitability of the species to the site and the history of thinning of the site. Currently the issue that is limiting the success of LISS within these blocks is the recruitment of natural regeneration in a block with very heavy recreation pressure making the control of browsing mammals

(deer and rabbits) difficult. Additionally the current ground vegetation is not conducive to natural regeneration.

LISS group shelterwood system

Mature pine LISS coupe with no regeneration due to dense bracken competition, Parkhill

3.3.4 Current and potential markets

The current breakdown of the timber being harvested from the existing plan 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%
Short log	Pallets & slats	25%
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 facilities.

The only change to the figures above in this plan period is likely to be the increase in material going into the local fuelwood market. This market is likely to be of a limited scale and will have only a minor impact on the current product percentage breakdown.

3.4 Landscape and land use

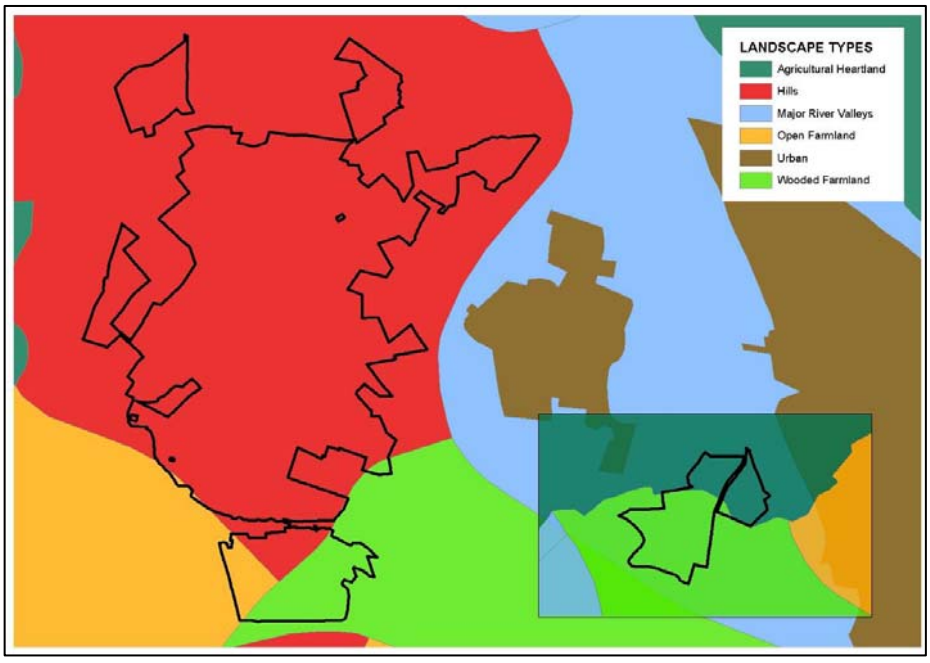
3.4.1 Landscape character and value

The visual amenity of Dyce Woods 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 the preparation of all land management plans.

The Dyce plan area is covered by two Landscape Character Assessments, No80 Aberdeen and No102 South and Central Aberdeenshire.

The majority of Kirkhill falls into the hill landscape type of the Aberdeen assessment with only small areas of Tyerbagger falling into the open farmland and wooded farmland areas of the same assessment.
The southern section of Parkhill is within the wooded farmland landscape type of the Aberdeen assessment while the northern section is in the agricultural heartland of the South and Central Aberdeenshire assessment. See map below.



The hill landscape character type comprises of the highest ground locally and forms distinctive landmarks or skyline features when view from Aberdeen. It is characterised by a gently rounded landform with predominantly smooth slopes. The vegetation cover on the summits varies from open moorland to plantation woodland. Man-made elements are limited in number but tend to be more visible due to their higher elevation. The guidelines for this area are to manage the woodland to maintain the characteristic proportions of woodland to open space and maintain the boundary vegetation.

Kirkhill forming a skyline feature when seen from the east.

The wooded farmland character type is a diverse, undulating and rural landscape which tends to be located close to the major river valleys. It is mainly agricultural but contains a high proportion and variety of woodland cover either as plantations, shelterbelts or clumps of trees. The congruity of open fields to woodland is an important characteristic. The guidance for this area is to undertake tree and woodland management to retain a balance between open and wooded ground and retain the distinctive tree belt landscape.

Kirkhill forming the skyline feature among the other woodlands of the wooded farmland area.

Finally the agricultural heartland varies from broad sweeping valleys and hills to pockets of more confined, small-scale relief. Dense woodland is a consistent feature, be it small coniferous plantations, thick clumps and shelterbelts of beech, large mixed broadleaf policies or meandering riverside glades. The specific guidance is to conserve the wooded character of the area by managing broadleaf woodlands to conserve a mix of species and resist conifer domination. Conifer plantations with stark geometric shapes can conflict with the more natural shapes of the broadleaf woods so the use of a broadleaf edge will better reflect the existing broadleaf woods and create a more natural character.

3.4.2 Visibility

Kirkhill is situated on the higher ground surrounded by low lying farmland. The height of this area makes it highly visible and it forms the termination of many viewpoints from within the city and several approach roads. Together with the farmland around, it provides a visible rural contrast with the nearby areas of urban development and a pleasant backdrop to north western approaches to the city.

The view heading east towards Aberdeen along the A96 with Kirkhill on the skyline.

Parkhill is not a prominent feature due to its location on flatter lower lying ground and its small area.

3.4.3 Neighbouring land use

The land adjacent to Kirkhill is predominately open farmland, open hill, with a shared path network (see key features map), and woodland to the north, west and south. Dyce industrial estate and Aberdeen Airport are to the east of the forest. The A96 trunk road and proposed western peripheral route are adjacent to the forest.

The land adjacent to Kirkhill includes farmland, woodland and industrial areas.

Land adjacent to Parkhill is predominately woodland to the north and west and farmland / open ground to the south and east. See the aerial photo below.

3.5 Social factors

3.5.1 Recreation

Recreation is Dyce wood is split into three distinctive offerings, Kirkhill, Tyrebagger and Parkhill, each offering different atmospheres and levels of formal infrastructure for recreation. Each attracts different audiences from those looking for an informal walk or bike route to those looking for a more led experience on easier routes. With each wood being within the City boundary and two of the three being connected to the city centre by public transport it is reasonable to suggest these woods are accessible by the full population of Aberdeen city and mid Aberdeenshire. Being on a main arterial route these woods also attract visitors from further afield with many stopping for a short walk as part of a visit to Aberdeen or indeed making a specific visit, for example to enjoy the mountain biking opportunities of Kirkhill.

Tyrebagger

To the west of the A96 this wood attracts around 90,000 visits per annum. The wood contains two car parks and two formal forest trails. Each trail is surfaced to a high standard and while not to a full Countryside for all standard one of the routes approaches that standard for much of its length. It is also worth noting that much of the trail network has core path designation. The wood contains remnants of a sculpture trail which still attracts some interest but in the main it attracts those looking for an easy family walk or short dog walk.

The wood has some use for informal mountain biking and the well thinned nature of the wood makes it particularly accessible for this. Tyrebagger is adjacent to Elrick Hill, with is managed by Aberdeen City council for semi formal recreation. The path network on Elrick Hill links with the route in the wood and forms part of the Aberdeen City 4 hills trail.

Tyrebagger also hosts the district Christmas tree sales centre which, over the course of each December, attracts around 20,000 visits and sees around 6500 Christmas trees sales.

Kirkhill

This is the largest of the three woods and is on the opposite (west) side of the A96 from Tyrebagger. The wood attracts around 70,000 visits per annum and sees a more evenly mixed use by walkers, mountain bikes and horse riders than the other woods.

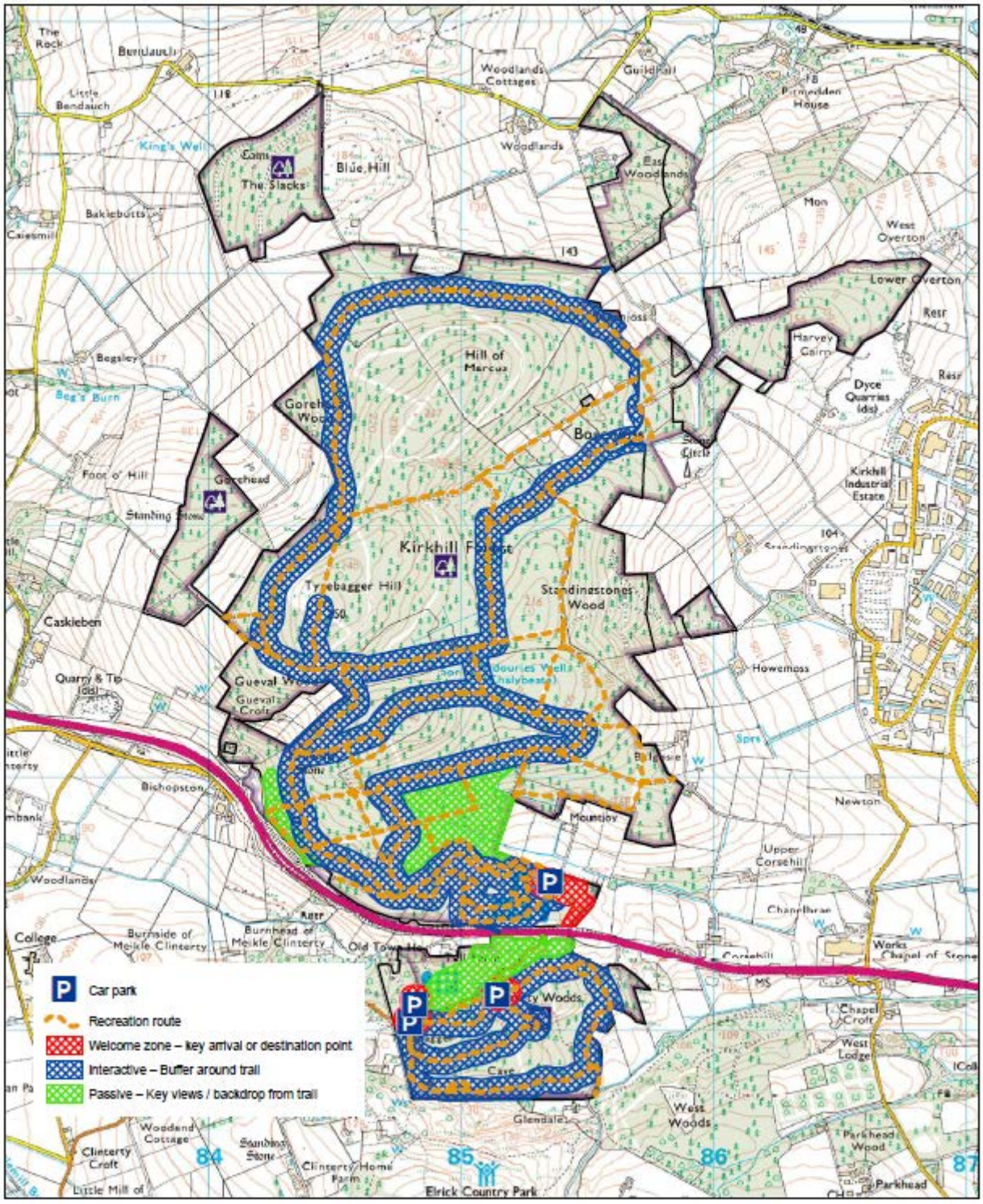
The formal trails provided focus primarily on the use of the extensive network of forest tracks, from lorry roads to old minor vehicle access tracks. The main destination in Kirkhill is Tappie tower which provides a panoramic view looking over Aberdeen city and a large part of northern Aberdeenshire. The opportunity to fully way mark the trial network has however been recently restricted by the start of works to create the Aberdeen Western Peripheral Route. This will pass along the southern edge of the forest and intersects with one of the longer routes previously promoted.

We recognise that the development of recreation facilities at Kirkhill has been limited recently. This is the result of a number of challenges including the AWPR and an only part implemented plan to increase mounting biking opportunities. At the same time use of Kirkhill continues to increase and we are committed to undertake a review and scoping exercise of recreation provision at Kirkhill & Tyrebagger in 2015 leading to the production of a Visitor Experience Plan for these woods.

Parkhill

Parkhill more remote than the other two woods and sees around 15000 visits each year, although may of these visitors never leave the car park. Due to a period when the wood gained a reputation for antisocial behaviour, which is still pertinent today, the waymarking of a short trail was removed in 2008 and the car park has been managed on a less formal basis. There are no plans to reinstate a formal trail network here at present.

The AWPR will undoubtedly have an impact on the accessibility of these woodlands though its actual impact is difficult to predict. It has the potential to open up these woods to greater access for communities around Westhill to the west of Aberdeen. However it may also increase the barriers on access to the woods from the city centre.



Recreational features Kirkhill

The visitor experience of the forest depends on the intimacy of the landscape and the stage of their journey. Therefore the forest is split between three zones that are frequented by visitors. These are:

- **Welcome zone** – the “arrival” point and associated access, parking and immediate backdrop. The “high impact” zone and our shop window.

- **Interactive zone** – a 50m buffer either side of a designated facility or well-used informal route. What the visitors directly experience whilst using our facilities.

- **Passive zone** – the area of landform backdrop close to a facility where a level of management intensity higher than “normal” forestry practice will make a significant improvement to the visitor experience.

3.5.2 Community

There is a strong community use of the forests from Aberdeen and the surrounding towns. The closest to Kirkhill are Dyce to east, Blackburn to west and a few smaller scattered settlements. Parkhill is surrounded by a few farm houses and Dyce to south-west. Despite this heavy usage there is currently no drive from them to become involved in the planning and management of the woodlands.

3.5.3 Heritage

There is one scheduled monument of national importance within the woodland plus a number of non-scheduled monuments of regional and local importance.

The scheduled monument is known as ‘The Slacks’ and is located in the north west part of Kirkhill. It was placed on the Historic Scotland Schedule of Monuments in 2001 and is covered by a management plan (‘The Slacks’ ref 9245 for 2010-2015). The site comprises a circular burial cairn, three hut circles, a further four possible hut circles and a cairnfield. All survive within the woodland as upstanding monuments. There is a forest track and a fence passing through the area. The scheduled area is of irregular shape and includes an area around the actual features. It is shown on the map 2 - Key Features.

Details of the non-scheduled monuments are recorded by FES and the details are appended to work plans for specific operations to ensure no damage is done to the features.

3.6 Pathogens and diseases

3.6.1 Hylobius

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 the 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.

3.6.2 Dothistroma needle blight

Dothistroma needle blight is a fungal pathogen affecting the woods within Moray & Aberdeenshire forest district. It is present within Dyce Woods, potentially already affecting pine stands both in Kirkhill and Parkhill.

Dothistroma needle blight is an economically important disease affecting a number of coniferous trees, pines in particular. 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 there is now a five-year moratorium on the planting of Corsican Pine on the national forest estate.

The 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 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 extent and severity of DNB in Dyce has become worse in the last few years. An amendment was obtained to the previous plan to allow a coupe of

30 ha to be felled due to infection. A thinning regime is in place to remove lodgepole pine when it is in mixture in order to help control the spread of the disease. We will keep up to date with the latest research and implement the guidelines produced.

3.6.3 Chalara fraxinea

Ash dieback is an aggressive fungal disease and is caused by Chalara fraxinea, including its sexual stage, Hymenoscyphus pseudoalbidus. The disease causes leaf loss and crown dieback in affected trees, and usually leads to tree death. Ash trees suffering with the infection have been found widely across Europe since trees believed to have been infected with this newly identified pathogen were reported dying in large numbers in Poland in 1992. These have included forest trees, trees in urban areas such as parks and gardens, and also young trees in nurseries. Currently the closest recorded outbreaks are approximately 57km south west around Brechin.

3.6.4 Phytophthora ramorum

P. ramorum is a fungus-like plant pathogen which attacks a wide range of tree and shrub species. It was first found in nursery stock in Scotland in 2002 and in an established garden in September 2007. It was first detected on Japanese larch in south west England in 2009 and in Scotland late in 2010.

Although European and hybrid larch are also susceptible to P. ramorum, current evidence indicates that the impact of the disease is greatest on Japanese larch which can die within one to two seasons, with consequential economic, environmental and amenity impacts. The disease on larch showed a significant expansion in 2013 with a core area of some 5-6000 ha of larch within South West Scotland showing extensive signs of infection. Further, smaller and more sporadic infections have also been identified along the western seaboard of Scotland principally in the Argyll and Cowal areas. There have also been four isolated outbreaks in the north east of Scotland. The total infected area within Scotland is estimated to be now in excess of 6,500 ha.

3.7 Statutory requirements and key external policies

This Forest Design Plan has been drafted to ensure that planning and operations functions 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 2011 – Forests and biodiversity, Forests and water
- Deer (Scotland) Act 1996

Climate Change

- The United Nations Framework Convention on Climate Change
- The Kyoto Protocol
- EC Directive 2003/87/EC
- Climate Change (Scotland) Act 2009
- UK Forestry Standard 2011 – Forests and climate change

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
- UK Forestry Standard 2011 – Forests and historic environment

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
- UK Forestry Standard 2011 – Forests and people, Forests and landscape

Soils

- Control of Pesticides Regulations 1986
- The Waste Management Licensing Regulations 1994
- European Soil Charter
- UK Forestry Standard 2011 – Forests and soil

4.0 Analysis and Concept

Refer to Map 4: Analysis and concept

Issue	Analysis	Concept
Timber production	The forest produces a sustainable supply of quality timber from thinning, clearfelling and LISS operations.	Restock felled areas with species appropriate to the site conditions and that will continue to produce a sustainable supply of timber in the future. Unless other objectives are of a higher importance for a site.
Community engagement	Local communities are the main users of the forest though they show little interest in having a high level of involvement in the planning process.	Continue current level of involvement with the various user communities to maintain their interest in the area. Include both statutory and non-statutory consultees during the planning process.
Recreation	Existing facilities serves a wide range of users.	Maintain the provision at its current level and standard and improve facilities as resources allow.
Species & habitats	There is good potential to improve biodiversity value to benefit priority species such as red squirrel.	Develop permanent habitat networks of biodiversity value. Consider the needs of priority species while designing and managing the forest and comply with appropriate regulations and action plans.

5.0 Forest Design Plan Proposals

5.1 Management

Refer to Map 5: Management.

5.1.1Thinning

Wherever possible the district will continue to maximise the area managed through thinning. The 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;
- The area is out with the thinning window;
- The basal area of the crop does not meet the required level;
- Thinning is unlikely to improve poorly stocked or poor quality crops.

Within Dyce woods, in addition to the conifer crops, suitable stands of broadleaves will be thinned. Broadleaf areas will be managed with the objective of being productive. Productivity for these areas could range from the production of quality timber through to fuel wood.

The existing avenues of mature beech will be gradually thinned in order to break up the lines and make them less attractive to grey squirrels as a corridor for expanding their range.

Where Lodgepole pine occurs in mixtures with other crops it will be targeted for removal during thinning operations to reduce the potential for the spread of DNB. This has been a successful practice in the past (see image below).

Larch stand after removal of Lodgepole pine in Kirkhill

The ex Christmas tree plantations will be included in the thinning regimes to gradually return them to standard productive conifer coupes now they have out grown their value for Christmas tree production.

The blocks are split into thinning coupes, which will be worked on a 5 year cycle (this may vary in Continuous Cover areas, see detailed prescriptions). See Map 6 – Thinning.

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

5.1.2 Clearfell

The main silvicultural system employed in British forestry is 'patch' clear-felling followed by restocking 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 suitable for LISS. In

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

Although clear-felling can appear to have a negative impact on landscape and habitat it is still an important management system. To a degree it mimics the natural disturbances caused by natural processes such as fire or windblow in a forest. It 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 replanting also creates transient open habitat that is exploited by several species such as voles, deer and raptors.

The scale of clearfells will be in keeping with the scale and topography of the local landscape.

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

5.1.3 Low Impact Silviculture System (LISS)

LISS is defined as a silvicultural system 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. It also helps to create a diverse forest structure which will increase its biodiversity potential. LISS also helps reduce the potential issue of soil erosion and subsequent siltation.

In the existing plan just over 260ha were selected for LISS management. While reviewing these coupes many factors were taken into consideration:

- does LISS meet the objectives for that area of the forest?
- is there sufficient site suitability information available (soils, wind hazard data, thinning history)?
- what level of ground vegetation competition is there with any natural regeneration?
- are the existing species suitability for the site?

- is any advanced natural regeneration present?

Following the consideration of the above factors the total area of LISS in this plan has been decreased to 161ha. The main reason for this is that LISS management does not meet the primary objective set for the area of the block where the coupe is situated.

The preferred restocking method is by natural regeneration. The limiting factor to a wider adoption of LISS across the plan area is the stability of the existing crops in the face of potential windblow. The crops have not been thinned with LISS objectives in mind and any attempt to convert them at this late stage in their rotation is unlikely to be successful as there is insufficient time to create a stable crop of large crowned trees to provide a reliable source of seed. Additionally many of the sites have a dense ground vegetation layer that makes natural regeneration less likely to be successful. Therefore any attempt to use LISS is unlikely to produce a fully stocked, fairly regularly spaced, next rotation of trees. Therefore this is not the most appropriate management system in the areas where the production of a quality timber crop is the primary objective.

The areas retained in LISS management are around the main recreation facilities as these will benefit most from the positive aspects of LISS management. That is, less visual disturbance and the creation of a more diverse species and age structure. The reduction of the overall LISS area allows resources to be concentrated on the areas where they are going to have the greatest impact. For instance if restocking by natural regeneration is not successful then replanting can be undertaken at a scale that can be successfully managed with the resources available.

A prescription for each of the LISS coupes has been prepared and is included in Appendix 4.

5.1.4 Long Term Retention

There are a number of coupes within Dyce woods have been designated as Long Term Retention (LTR). See Map 5 – Management. Most of these coupes are broadleaves and it is desirable to retain these stands beyond their normal economic maturity for environmental benefits.

A range of management options are appropriate in LTRs depending on stand characteristics and objectives. It is generally desirable to thin cautiously, promoting crown development and stand stability. However, thinning will be inappropriate in less stable LTRs and impractical in very small stands, particularly where they are isolated from adjacent thinnable stands.

Other operations such as felling of dangerous trees around recreation facilities and removal of invasive plants may be required.

5.2 Future Habitats and Species

Refer to Map 6: Future habitats and management.

5.2.1 Restocking

The choice of restock species in this plan has been guided by the ESC results for this climatic area and soil types. This has in fact limited the species choice in some areas due to the amount of soils with a “very poor” nutrient regime. However in areas where more choice is available efforts have been made to select as wide a range of species as possible to create a diverse woodland rather than one with a more limited species mix and therefore potentially more susceptibility to pathogens, such as DNB.

In common with the majority of the national forest 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 abiatis.* See section 5.2.9 - Pests and pathogens for how this pest will be dealt with.

The riparian zones of watercourses have been targeted for broadleaf planting. The aim is to create habitat networks within the forest that are based around existing habitats with a higher biodiversity value, such as watercourses.

The aim of the habitat networks is to:

- break up the conifer blocks;
- bring structural, species and visual diversity;
- protect watercourses from operations on the adjacent land;
- improve the biodiversity value of the forest by creating natural corridors for species migration;
- enrich the water ecosystem with falling leaf litter.

The establishment and management of these areas will involve:

- maintaining and protecting existing broadleaf areas beside watercourses during felling operations;

- maintaining a mixture of native broadleaves and open space (up to 80% open space);
- removing conifer regeneration when it exceeds 10%;
- maintaining deadwood;
- accepting broadleaf natural regeneration.

Where appropriate and the site conditions allow broadleaves will be planted and managed to be productive. Growing broadleaves as a commercial crop requires a long term commitment. Higher establishment costs are inevitable. However the approach will be introduced into Dyce woods not only for the economic benefits (high demand for hardwoods) but also due to the environmental advantages (wood fuel, alternative for replacing conifers struggling with diseases, support for unique fauna and flora species).
Areas suitable for growing productive broadleaves have been identified within the forest. See map 7 – future habitats and species.

To be successful the general prescription will be:

- undertake the appropriate ground preparation;
- choose good quality planting material of the best available provenance;
- select the appropriate planting density (densities for broadleaves will be 4000-5000 stems/ha);
- undertake appropriate weed control;
- undertake appropriate protection from mammals such as voles, rabbits and deer.
- provide the necessary attention in the early stages of stand development to increase the value of the final crop. Operations to be considered will include respacing, early thinning and pruning.

5.2.2 LISS coupe regeneration

Thinning will be undertaken to maintain seed trees with the best phenotypical characteristics. This should help ensure regeneration from the best specimens will form the next crop rotation. Subsequent crops should be better adapted to the local site conditions.

During the process of natural regeneration the species proportions will change. Some species will be more successful at naturally regenerating than others (see image below). Many factors affect which species regenerate most successfully and increase their proportion within future rotations. These factors include:

- reaching max seed production age earlier than other species;
- producing large number of seeds;
- having short intervals between good seed crops;
- producing seeds that disperse easily;
- having a wider tolerance for different light levels and site conditions.

Pine and larch stand with Sitka spruce regeneration from an adjacent stand in Kirkhill.

When dealing with mixtures these factors need to be taken into consideration and each stand will be treated individually.

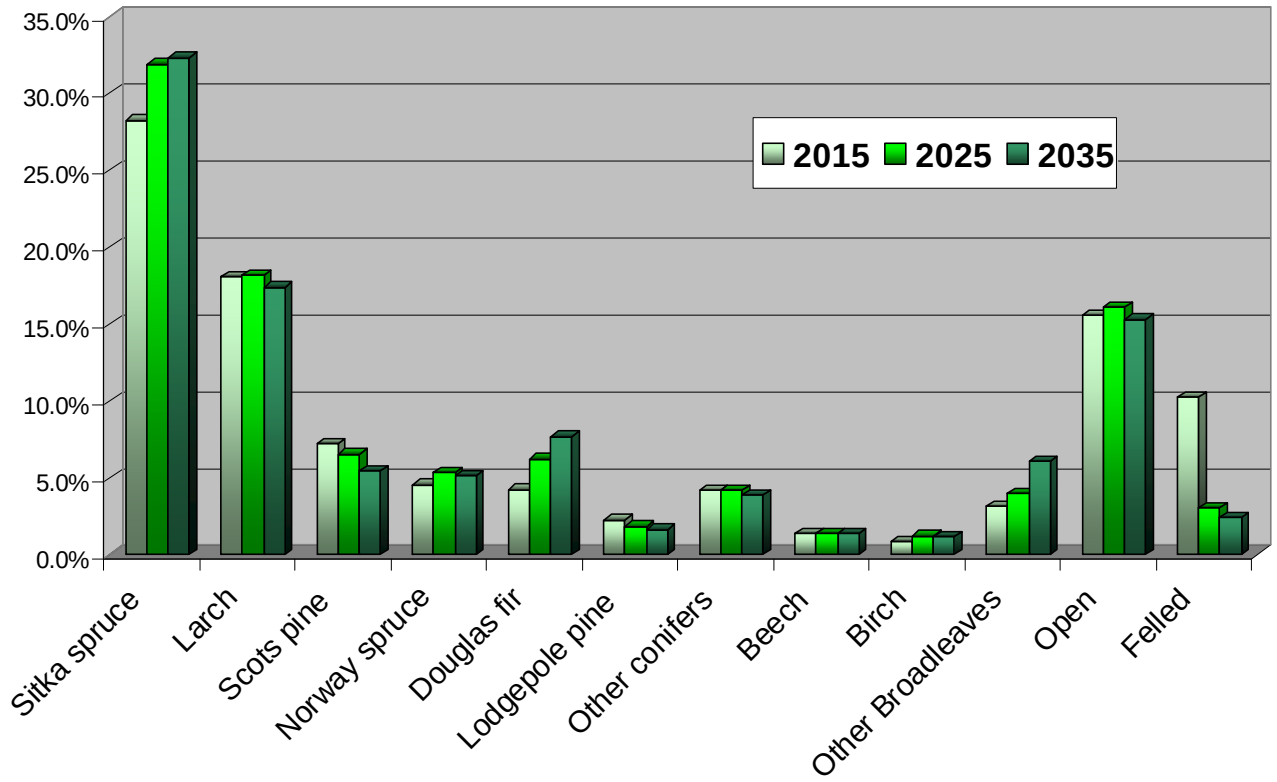
All areas identified for restocking by natural regeneration have been recorded and programmed for inspect on a five yearly basis. If after 20 years, or at any preceding inspection, it is apparent that natural regeneration is not going to be successful then replanting with appropriate species will be undertaken.

A group of broadleaves planted within a LISS coupe, Kirkhill.

Areas not considered for commercial management will include permanent woodland and open habitats, which will be monitored to ensure they deliver the required objectives. Non-desirable species, such as non-native conifer regeneration, will be removed. These areas are concentrated along the watercourses and the aim is to create a habitat network linking existing open habitats.

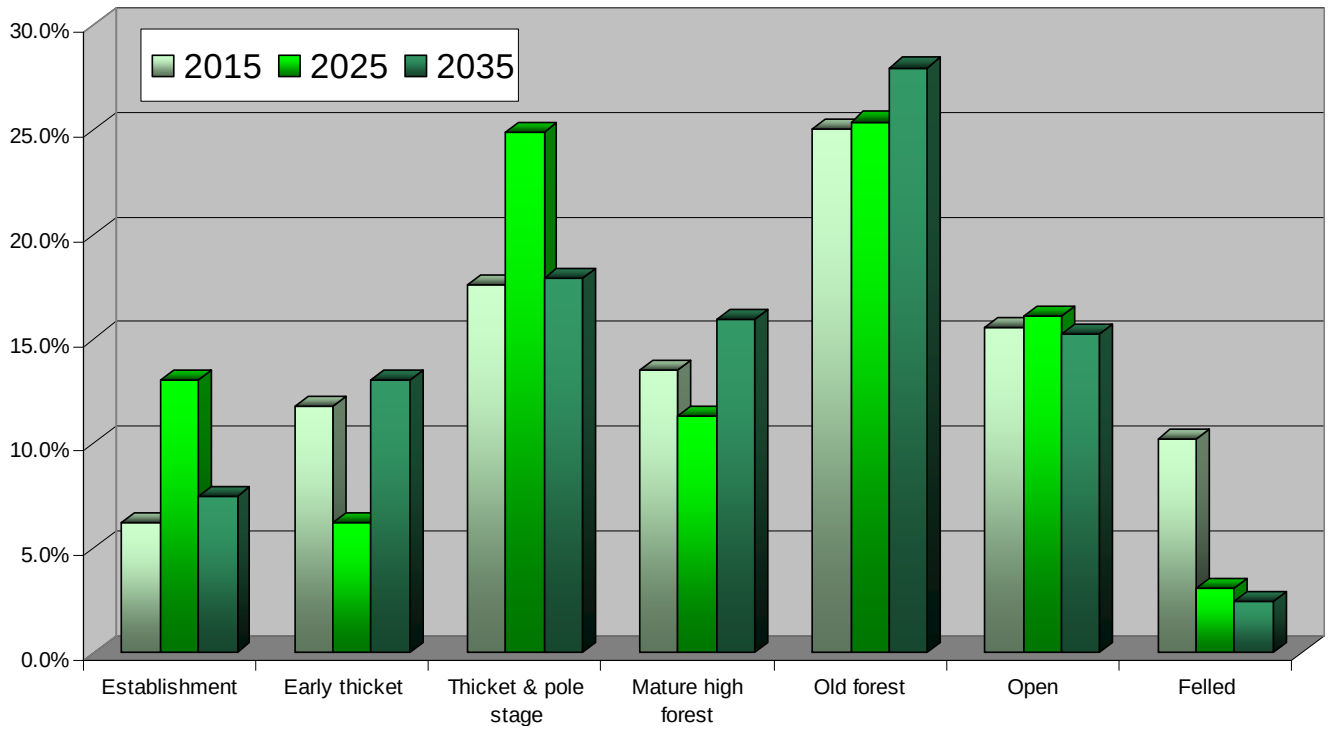
5.3 Species table

Species	Current distribution 2015	Projected distribution 2025	Projected distribution 2035
Sitka spruce	28.2%	31.8%	32.3%
Larch	18.0%	18.1%	17.4%
Scots pine	7.2%	6.5%	5.5%
Norway spruce	4.6%	5.3%	5.1%
Douglas fir	4.2%	6.2%	7.7%
Lodgepole pine	2.3%	1.9%	1.7%
Other conifers	4.2%	4.2%	3.9%
Beech	1.4%	1.4%	1.4%
Birch	0.8%	1.2%	1.2%
Other broadleaves	3.2%	4.2%	6.3%
Open	15.5%	16.1%	15.3%
Felled	10.3%	3.1%	2.4%



5.4 Age structure

Ages of trees (years)	Successional stage	Current Distribution 2015	Projected distribution 2025	Projected Distribution 2035
0 - 10	Establishment	6.2%	13.1%	7.5%
11 - 20	Early thicket	11.8%	6.2%	13.0%
21 - 40	Thicket & pole stage	17.6%	24.8%	17.9%
41 - 60	Mature high forest	13.5%	11.3%	16.0%
60+	Old forest	25.1%	25.4%	28.0%
	Open ground	15.6%	16.1%	15.3%
	Felled	10.3%	3.1%	2.4%



5.5 PAWS restoration

There are no PAWS in the plan area.

5.6 Management of open land

All existing areas of open ground have been considered in order to decide if they should be retained within the new plan. See map 7 – future habitats and species for the location of planned open space within the blocks.

Managed open space fulfils various functions within the forest and delivers many benefits, including:

- improving biodiversity by creating habitats other than woodland;
- protecting archaeological sites;
- contributing to the landscape of the wood, both external and internal views.

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

5.7 Deer management

Wild deer are managed in accordance with the 2014 Deer Management on the National Forest Estate; current practice and future directions document.

The strategy 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.

5.8 Access

As a result of the Aberdeen western periphery route being constructed along the eastern boundary of Kirkhill the east woodlands car park will be closed as there will no longer be a link through to the main block. Additionally two areas will be cut off from the main block. The northern larger area will still have access via a bridge (suitable for lorries) over the by-pass. Therefore this area will continue to be managed for timber production. However the small southern area will not have any access provision (due to its small size) and therefore it will become a minimum intervention area. A green bridge has been planned to be constructed to allow for mammal crossings.

The remaining areas of the plan area have a sufficient road network to provide access for management and timber extraction.

5.9 Pests and pathogens

Hylobius

In common with the majority of the national forest estate, most restocking in the 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 abiatis.* This

species lays its eggs in deadwood and stumps on clearfell sites and the emerging adults feed on the bark of young trees, often with devastating effect on newly planted conifer crops.

Previously this damage was countered by the planting of seedlings treated with insecticide, followed by 'top-up' spraying of the trees during spring and summer. However 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.

From 2008 Moray and Aberdeenshire forest district 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. Please refer to the district fallow policy for details.

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.

Dothistroma Needle Blight

Dothistroma Needle Blight will be addressed differently depending on 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 the infected crop will allow us to prioritise the harvesting of such areas.

The following scale and categorisation has been developed by Forest Research.

Needle retention (years)	Defoliation (%)	Mortality %		
		<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

This has lead 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 land management plan will be required as specified in the tolerance table for felling such areas;
- reassess badly affected blocks and consider if a full review of the land management plan is required;
- planting programs will need to be amended to include replacement species suitable for the site.

12 ha of Lodgepole pine remain in the plan area, the rest has already been felled to remove DNB infected crops. Some is in mixture with SP and is in the 2 and 3 categories. As the affected areas are not large the infected trees will be removed during thinning operations which will be the main way of controlling the disease on these sites. One of the stands is also affected by windblow and is planned to be felled with the first phase of the plan.

5.10 Critical Success Factors

- Undertake the planned thinning programme in order to increase the quality of the timber within the plan area.

- Continue to attempt to manage the spread of Dothistroma Needle Blight through clearfelling and subsequently restocking with appropriate less susceptible species.

- 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 the management of the recreational facilities and access to the block including reducing the impacts of the AWPR.

- Manage deer numbers to allow natural regeneration and planted trees to become successfully established.

Appendix 1 – Consultation record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Aberdeenshire Council Archaeology – Caroline Palmer	20/12/2012 By email	20/12/2012 By email	'Parkhill lies within SMR site NJ81SE0056, which records the remains of the 17th - 19th century designed landscape of Parkhill House, and my only comment is that management of the woodland should maintain the character of the designed landscape'.	District team is aware of the features, detail included in plan.

Dyce and Stoneywood Community Council – Neil MacGregor	24/12/2013 By email	17/01/2013 By email	We are grateful for the work that has gone into the various aspects of Dyce woods; meaning we have a pleasing view, attractive walks, a variety of thought-provoking sculptures, a local source of Christmas trees, exciting mountain-bike trails as well as habitat for a number of species and a sustainable energy source - today the Development Management sub-committee agreed to the Combined Heat & Power plant at Stoneywood. If the new plan can build on these aspects and we can retain tree cover, I will be delighted. Wrapping deciduous feature species round a commercial plantation can, if it is done sensitively, bring several aspects necessary for a sense of well-being.	Most of the area will still be managed by Low Impact Silviculture systems. Recreational facilities will be maintained and developed if possible. The new plan includes increasing the area of broadleaf species.
Aberdeenshire Council - Development Management	20/12/2012 By email	No response to date		

Historic Scotland- Alasdair Young	20/12/2012 By email	24/01/2013 By email	Dyce Woods contains one scheduled monument within its boundary (The Slacks). (…) A management agreement is in place for this monument. (…). As agreed, no work will be undertaken in the scheduled area other than work previously agreed with Historic Scotland and detailed in the plan.	No other work than agreed with Historic Scotland will be done.
Royal Society for the Protection of Birds – Ian Francis	20/12/2012 By email	03/01/2013 By email	'We have no comments to make on these woodlands. I believe that Goshawks are still present but their location is known to you.'	Bird species recognised within the forest, design and forest operations will take them under consideration.
Scottish Natural Heritage- Julia Galley	20/12/2012 By email	04/01/2013 By email	See copy of letter below.	
Scottish Environmental Protection Agency- Johnathan Young	20/12/2012 By email	16/01/2013 By email	The letter provided some general guidance on Forest Plan preparation. More detailed comments can be provided once a Draft Forest Plan has been prepared.	Draft plan will also be consulted with SEPA.

From: Julia Galley [mailto:Julia.Galley@snh.gov.uk]
Sent: 04 January 2013 16:41
To: Reeve, Mark
Subject: Dyce Woods Forest Design Plan

Dear Mark

Review of Dyce Woods Forest Design Plan

Thank you for your letter of 20 December 2012 requesting comments on the above proposal.

The section of woodland called 'Parkhill' appears to be approximately 250 m from Bishops' Loch, which is part of Corby, Lily and Bishops Lochs Site of Special Scientific Interest (SSSI). The site is designated for open water features and transition fen. For more information visit the SNH Sitelink http://hts11:7778/portal/page?_pageid=173,786401,173_890412&_dad=portal&_schema=PORTAL&PA_CODE=401). There is unlikely to be any direct impacts however, should any proposed works be thought to have an impact on the surrounding hydrology there may be connectivity with the site and this should be investigated.

The only other comments we have are that a forest of this scale and stage of growth would benefit from a Deer Management Plan (DMP). This should either be embedded in the LTFP or as a standalone document to which the LTFP might refer. In this plan reference might be made, for example to liaison with neighbours, any constraints on forest operations or choices as a result of deer pressures, what management action is to be taken and what changes in the structure of the forest may be made to facilitate management action. Any DMP should make reference to monitoring of deer impacts so as to inform management decisions.

The former DCS 'Best Practice' web pages are worthy of investigation for the guidance they provide over the structure and content of DMPs and the need to have a short, fit-for-purpose working document. These pages can now be accessed through the SNH website (http://www.snh.gov.uk/land-and-sea/managing-wildlife/managing-deer/) or through this link: http://www.bestpracticeguides.org.uk/planning_dmps.aspx.

Should you have any specific concerns with regard aspects within our remit please do not hesitate to get in touch.

Kind regards
Julia

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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 four 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 four 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 – LMP 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	**Woodfuel** – Utilise lower quality timber and coppice material if available. Aberdeen Royal Infirmary, Marshall College, Bancon Estates are all local users, or potential users, of woodfuel supplies.
	Adapting to climate Change	**Restore moorland areas** – Potential for very limited small scale expansion of moorland area on hill tops to improve forest boundaries. **Forest habitat networks** – Manage riparian zones to maintain and improve existing habitat networks and take opportunities to extend the area where appropriate.
	Flood & catchment management	**River catchments** – All management to be undertaken with the appropriate sensitivity and according to "Forests & Water Guidelines". **Riparian woodland** – See "Forest habitat networks" above.
	Carbon sequestration	**LISS** – Manage sites and plant appropriate species for site type to allow the adoption of low impact silvicultural systems (LISS) where practicable to mitigate the effects of climate change. Review current LISS designation to ensure still appropriate. Identify new areas that can be managed under LISS.
Timber	Timber supply	**Thinning** – Achieve the required stocking densities for planting and regeneration, and undertake thinning of all sites, to produce a sustainable supply of quality timber.

	Timber quality	**Species choice** – Select and plant appropriate species for site type guided by the 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 selection of broadleaved plants. Appropriate stocking densities to achieve good quality timber must be maintained. **Thinning** – Undertake thinning where possible to produce a high quality timber supply.
	Timber transport	**Transport** – Use preferred timber haulage route to minimise potential damage to public roads. No requirement for new forest roads. Aberdeen western periphery route will have an impact on sections on the blocks.
	Hardwood timber	**Niche marketing** – Increase coppice and short rotation forestry encouraging niche markets and local woodfuel supplies where appropriate. **Commercial hardwoods** – Optimise the current hardwood resource and plant appropriate species at commercial spacing on appropriate broadleaf sites.
Business development	Skills	**Volunteers** – No current volunteer base. **Local contractors** – Work with the current base of local contractors, to help maintain this sector and allow it to expand as appropriate, within the requirements of the FC contracting rules.
	Tourism	**Landscape value** – 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.
	Income diversification	**Woodfuel** - Seek opportunities for woodfuel, see Renewable Energy section above. **Non-forest enterprises** – None at present.

Community development	Community engagement	**LMP process** – Consult with both statutory and non-statutory consultees during LMP process. **Local communities** - Engage communities in the forest design plan process and other local issues.
	Learning	**Forest visits** - Use the forests in this design plan area for "What's on events" as appropriate.
	Partnerships	**Partnerships** – None at present.
Access & Health	Recreation	**Planned maintenance** – Maintain existing facilities and improve as resources allow.
	Making access easier	**Core paths** – Work with Aberdeenshire Council to maintain any core paths present. **Appropriate access provision** – Continue to allow access via the forest roads, formal and informal routes.
	Health	**SAMH** – Programme now closed.
Environmental quality	Soil water & air quality	**LISS –** Adopt LISS where appropriate 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	**LISS** – Adopt LISS where appropriate to reduce the landscape impacts associated with clearfell and restock. **Increase nativeness of woodlands** – Increase the percentage of native woodland where appropriate, taking into account site, species and silvicultural context.
Biodiversity	Species & habitats	**Forest habitat networks** – Incorporate provision for forest habitat networks (riparian zones) to improve biodiversity and assist species movement were appropriate.

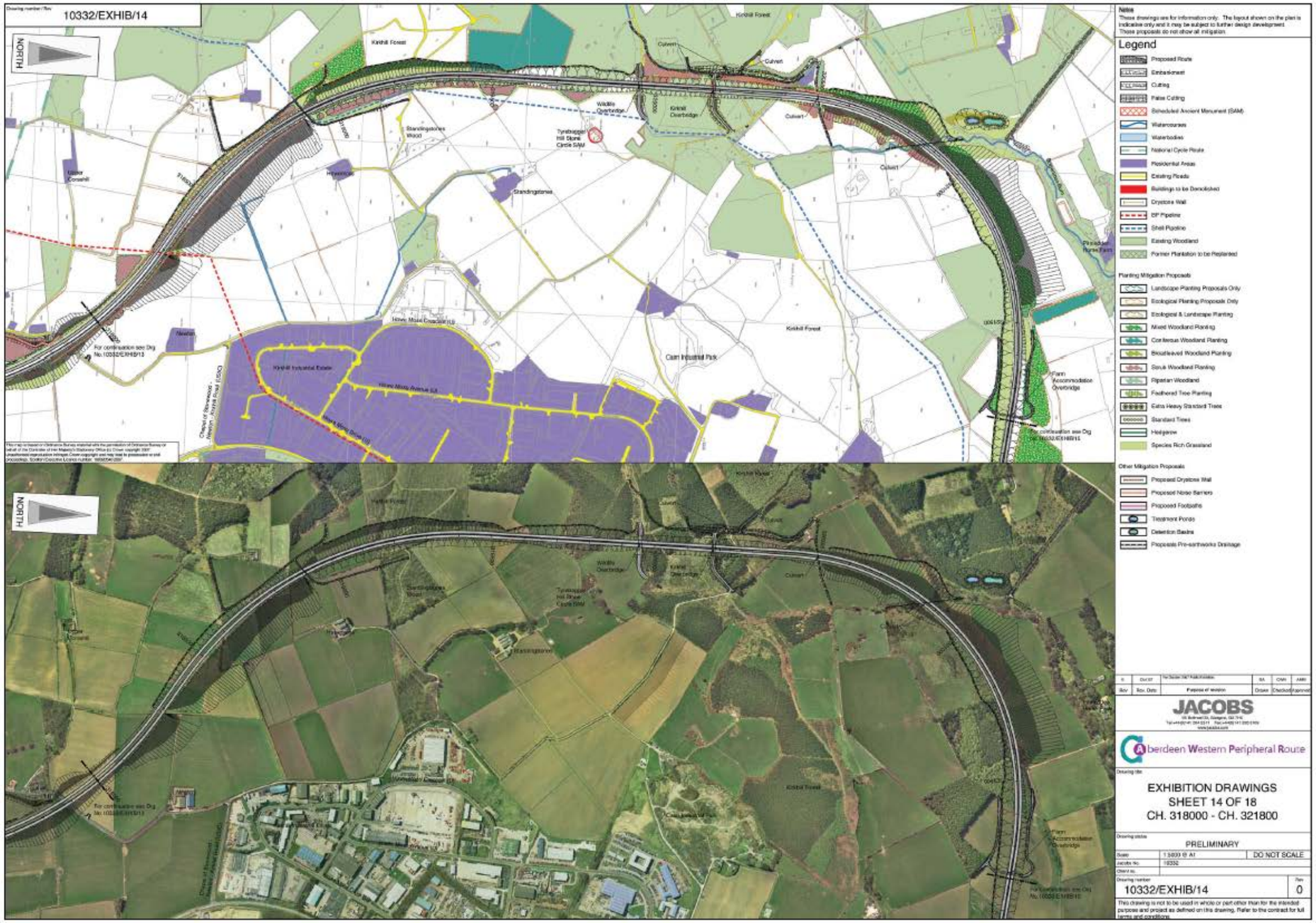
		Deliver targeted improvement works as resources allow, through partnership working wherever possible. **Priority species** – Kirkhill is designated a stronghold wood for Red Squirrel. Address the needs of red squirrel by utilising prescriptions from habitat action plans and species action plans. **UK & LBAP species** - Incorporate management appropriate to UK and local biodiversity action plans.
	Invasive species	**Restrict/eradicate** – Plan control operations where necessary. Control grey squirrels
		Deer management – Review deer management in order to maintain deer numbers low enough to allow timber production and ecological objectives to be met.
	Designated sites	**Management plans –** None present. **PAWS plans** – None present.
	Increasing awareness and improving knowledge	**Interpretation**

Timber	Timber supply	**Thinning** – Aim to thin all of block except the very wettest ground. Ensure a timely first thinning and thereafter transformation to LISS where appropriate.
	Timber quality	**Species choice** – Select and plant appropriate species for site type according to results of ESC assessments and DNB issues. Select good phenotypical specimens to produce seed for natural regeneration. Increased rotation ages to produce larger diameter high value timber where appropriate. 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. **Thinning** – Undertake thinning where possible to produce a high quality timber supply.
	Timber transport	**Transport** – Use preferred timber haulage route to minimise potential damage to public roads.
	Hardwood timber	**Niche marketing** – Potential to plant areas of birch for coppice and short rotation forestry, encouraging niche markets and local woodfuel supplies. **Commercial hardwoods** – No potential for hardwood timber due to very poor soil conditions.
Business development	Skills	**Local contractors** – Work with the locally based contractor base, where available, by providing secondary opportunities for energy production, niche market sawmills and additional added value markets (turnery, firewood etc).
	Tourism	**Landscape value** – 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.

	Income diversification	**Woodfuel** - Seek opportunities for woodfuel, see Renewable Energy section above. **Non-forest enterprises** – Potential site for windfarm development.
	Contribution to rural development	**Partnership with local communities & business** – There are currently no formal partnerships in this plan area but all approaches will be positively considered.
Community development	Community engagement	**LMP process** – Consult with both statutory and non-statutory consultees during LMP process. **Local communities** – Engage with community council during the LMP process to allow local input into plan.
	Learning	**Forest visits** - Consider use of block for "What's on" events and school visits if appropriate.
Access & Health	Recreation	**Planned maintenance** – Maintain forest roads to allow continued informal access.
	Making access easier	**Appropriate access provision** – Maintain forest roads to allow continued informal access.
Environmental quality	Soil water & air quality	**ATC & LISS** – Adopt alternative to clearfell (ATC) or low impact silvicultural systems (LISS) where practicable to reduce impacts on soil and water quality. Undertake all operations in accordance with FCS Forest and Water Guidelines to meet EU water framework directive objectives.
	Landscape	**ATC & LISS** – Adopt ATC and LISS where feasible to reduce the landscape impacts associated with clearfell and restock. **Naturalisation of woodlands** – Progress the naturalisation of woodlands where appropriate, taking into account site, species and silvicultural context.
Biodiversity	Species & habitats	**Forest habitat networks** – Manage riparian zones to maintain and improve existing habitat networks

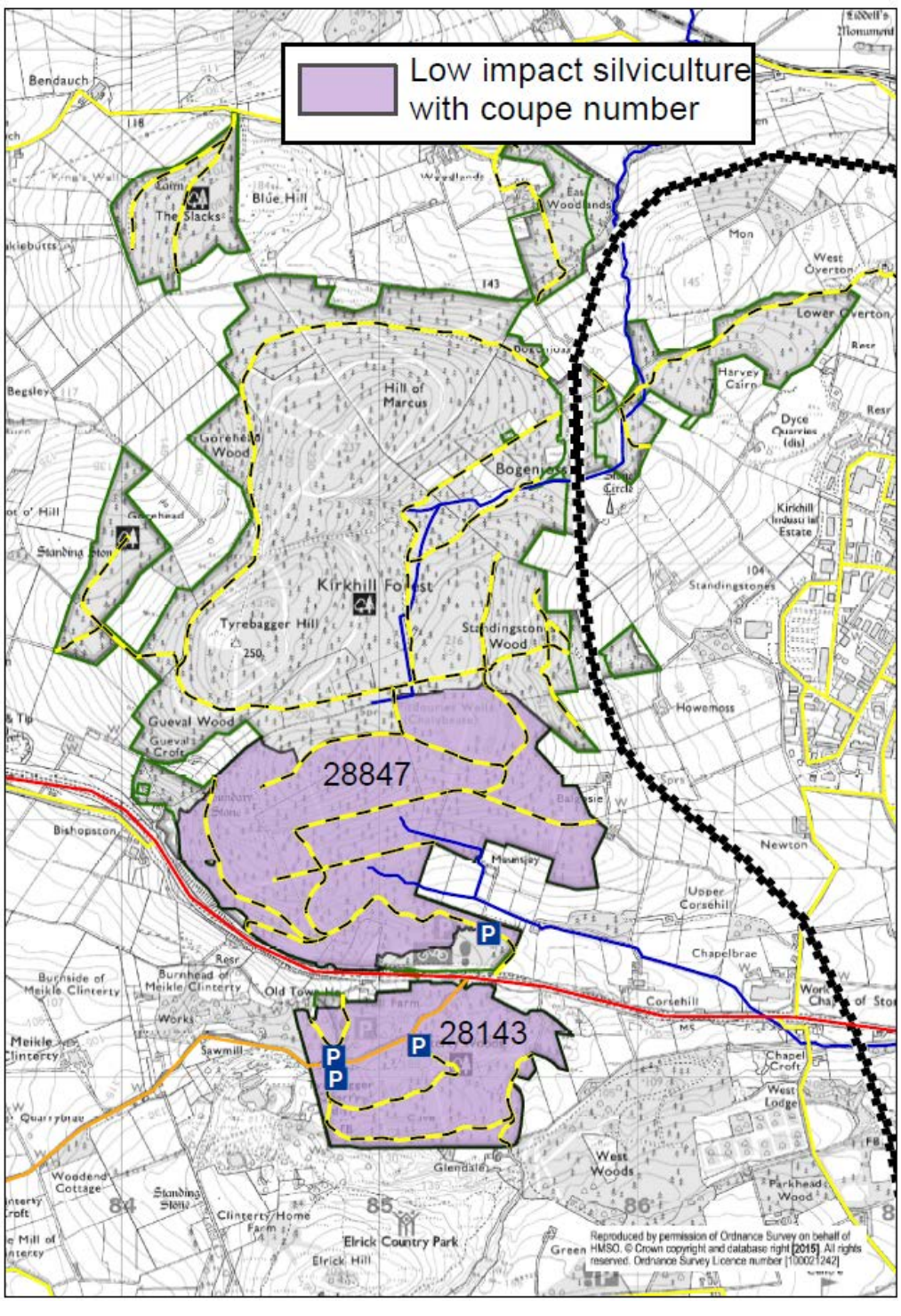
		and take opportunities to extend the area where appropriate. Enhance areas of open water and increase element of both standing and fallen deadwood within these areas. Encourage broadleaved regeneration, augmented by planting where necessary. **Priority species** –Red squirrel, wildcat and badgers are all important species within the LMP area. The plan will aim be to improve the ecological condition and habitat quality for these species.
	Ecosystems	**Species & HAP** – See Species and Habitat section above **Deer management** – Maintain, and review annually, a deer management unit plan to achieve timber production and ecological objectives.

Appendix 4 – AWPR access provision



Appendix 5 – CCF coupes prescriptions

Coupe no. (See map 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
28847	Group selection	Create diverse canopy structure and species mix in area with high recreation value	Complex 60% mixed conifer species & 40% mixed broadleaf species.	Various 100 10	Some SS and MB regeneration. In the other parts regeneration is sparse due to current light levels.	Deer browsing & weed competition.	Matrix thin to MT.	Crop validation prior to next thinning.	Existing felled areas within coupe to be monitored on five yearly basis. Replanting required if nat regen not successful.
28143	Group selection	Create diverse canopy structure and species mix in area with high recreation value	Complex 60% mixed conifer species & 40% mixed broadleaf species.	Various 100 10	Some SS and MB regeneration. In the other parts regeneration is sparse due to current light levels.	Deer browsing & weed competition.	Matrix thin to MT.	Crop validation prior to next thinning.	Existing felled areas within coupe to be monitored on five yearly basis. Replanting required if nat regen not successful.



Appendix 6 – 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 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

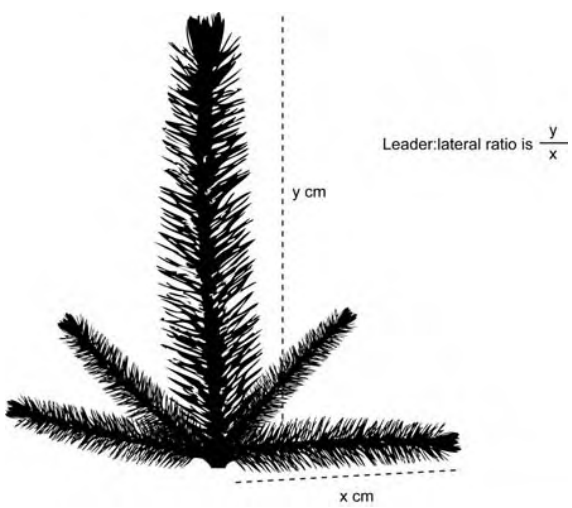
Species/ group	**Shade tolerance of seedlings**	**BA (m2 ha-1) Establishment***	**BA (m2 ha-1) Seedling growth****
Larches	Intolerant	20-25***	15-20
Pines	Intolerant	25-30***	20-25
Sitka spruce	Intermediate	30-35	25-30
Douglas fir	Intermediate	35-40	30-35
Norway spruce	Tolerant	40-45	35-40
Western hemlock	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 ≥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 m2 per ha for larches and pines, and 25-35 m2 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.