



Moray and Aberdeenshire Forest District

Mearns

Land Management Plan



Plan Reference No: LMP 38

Plan Approval Date:

Plan Expiry Date:

Mearns Forest Design Plan 2015-24

FOREST ENTERPRISE - Application for Forest Design Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	Moray & Aberdeenshire FD
Woodland or property name:	Mearns
Nearest town, village or locality:	Auchenblae
OS Grid reference:	NO72727890

Areas for approval

	Conifer	Broadleaf
Clear felling	766	0.6
Selective felling	N/A	N/A
Restocking	751	142
New planting (complete appendix 4)	N/A	N/A

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

April 2014

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 & Aberdeenshire FD

Conservancy Grampian

Date

Date of Approval

Date approval ends:

Mearns Forest Design Plan 2015-24



Forestry Commission Scotland
Coimisean na Coilltearachd Alba

Environmental Impact Assessment

Determination Enquiry Form

Complete this form to find out if you need consent, from the Forestry Commission (under the EIA Regulations 1999), to carry out your proposed work.

Section 1 Proposed work (See Map9:- Planned Roads)							
Please put a cross in the box to indicate the type of work you are proposing to carry out. Give the area in hectares and where appropriate the percentage of conifers and broadleaves.							
Proposed work	cross	Area in hectares	% Conifer	% broadleaves	Proposed work	cross	Area in ha
Deforestation					Forest roads	X	16.8ha (5600meters of road, 30m wide)
Location and District			Mearns, Moray & Aberdeenshire				

Please attach map(s) showing the boundary of the proposed work and also give details of the operations.

Section 2 Property details	
Property Name	Mearns
Grid Reference (e.g. AB 123/789)	NO72648448
Local Authority	Aberdeenshire
Nearest Town	Auchenblae

Section 3 Applicant's category (please put a cross in one box)				
PE	Personal occupier		PU Public ownership	X
BU	Business occupier		OT Other	
VO	Voluntary organisation		CT Crofting tenant	

Mearns Forest Design Plan 2015-24

Section 4 Applicant's type (please put a cross in one box)			
LS Lessee		OW Owner	X
TE Tenant		TR Trust	

Section 5 your agent or woodland manager's details					
Title		Initials		Surname	
Organisation					
Address					
				Postcode	
Tel No				Mobile	
Fax				e-mail	
Is this the address for correspondence?				Yes	No

Section 6 Applicant's details					
Title	Mr	Initials	I	Surname	Walker
Organisation	Forestry Commission Scotland				
Address	Moray & Aberdeenshire FD, Portsoy Road, Huntly				
				Postcode	AB54 4SJ
Tel No	01466 794161			Mobile	07876456654
Fax	01466 794986			e-mail	lain.walker@forestry.gsi.gov.uk
Is this the address for correspondence?				Yes	No

Mearns Forest Design Plan 2015-24

Section 7 Sensitive Areas: Give the area of the proposal that is covered by any of the following designations	
Sensitive Area as listed in “Schedule 2” of the 1999 EIA Regulations Area (ha)	Area in hectares
a. Sites of Special Scientific Interest (SSSI) or Proposed Sites of Special Scientific Interest (PSSSI)	0
b. SSSI's with a Nature Conservation Order (Section 29 of the Wildlife and Countryside Act 1981)	0
c. National Park (NP)	0
d. The Broads	0
e. World Heritage Site	0
f. Scheduled Ancient Monument (SAM)	4.2
g. an area designated as National Scenic Area	0
h. Area of Outstanding Natural Beauty (AONB)	0
i. “Natura 2000” site – (European network of special areas of conservation and special protection areas under the Wild Birds Directive)	0

Contents

Forest Design Plan Summary

1.0 Introduction

- 1.1 Setting and context
- 1.2 History of the forest

2.0 Analysis of previous plans

3.0 Background information

- 3.1 Physical site factors
 - 3.1.1 Geology, soils and topography
 - 3.1.2 Water
 - 3.1.3 Climate
- 3.2 Biodiversity and environmental designations
- 3.3 The existing forest
 - 3.3.1 Age structure, species and yield class
 - 3.3.2 Access
 - 3.3.3 LISS potential
 - 3.3.4 Current and potential markets
- 3.4 Landscape and land use
 - 3.4.1 Landscape character and value
 - 3.4.2 Visibility
 - 3.4.3 Neighbouring land use
- 3.5 Social factors
 - 3.5.1 Recreation
 - 3.5.2 Community
 - 3.5.3 Heritage
- 3.6 Pathogens and disease
- 3.7 Statutory requirements and key external policies

4.0 Analysis and Concept

5.0 Forest Design Plan Proposals

- 5.1 Management
- 5.2 Future Habitats and Species
- 5.3 Species tables
- 5.4 Age structure

Mearns Forest Design Plan 2015-24

- 5.5 PAWS restoration
- 5.6 Management of open land
- 5.7 Deer management
- 5.8 Access
- 5.9 Pathogens
- 5.10 Critical Success Factors

Appendices:

- Appendix 1 – Consultation record
- Appendix 2 – Tolerance table
- Appendix 3 – FDP Brief
- Appendix 4- LISS prescriptions
- Appendix 5- LISS management
- Appendix 6- Drumtochty AWS & LISS recommendations

Support documents:

- Map 1: Location.
- Map 2: Current Species.
- Map 3: Key Features.
- Map 4: Analysis and concept.
- Map 5: Management.
- Map 6: Thinning.
- Map 7: Future habitats and management.
- Map 8: 10 year restock on current species.
- 3D Visualisations

Forest Design Plan Summary

This plan is a review of Forestry Commission Scotland's management of Mearns Forest which is located near Stonehaven. The forest is the amalgamation of three former forest district plans Fetteresso, Glenfarquhar & N.Drumtochty and S.Drumtochty. Currently these forest design plans expire on 28/9/15 for Fetteresso, South Drumtochty on the 7/2/15, whereas Glenfarquhar & N.Drumtochty expired on 25/7/13 and currently is on an extension from Grampian Conservancy until 25/7/15. 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 period, which will fulfil the requirements of the UK Woodland Assurance Scheme.

The main priorities/objectives of this plan are as follows:-

- The production of timber from the forest will need to be optimised in order to meet demands. New roads will be constructed to facilitate harvesting programme.
- Identify areas within the forest most suited to low impact silviculture systems.
- Maintain the scheduled monument areas as open as per agreed management plans.
- Prioritise Dophistroma infected crop for removal in order to maximise value of timber and reduce inoculum levels.
- Restructuring and increased species diversity will improve the environmental value of the Finglennie, Cowie and Bervie.
- Where there is opportunity utilise the ecological site classification to increase species diversity and specifically to meet the 5% broadleaf target.
- For the forest to tie in with the landscape character its shape, scale and diversity should relate to dominant characteristics of the landscape.
- Smaller coupes along the Cowie and Bervie watercourses will have a positive impact on water catchment and flooding.
- The forest will favour species more suited towards red squirrels. However, it will still be possible to plant large seeded trees where there are no linkages created.
- Opportunities should be taken for edge prescriptions for Black Grouse.
- On non-priority deep peat sites restock will be undertaken to comply with the FCS Peatland guidance, UK Forestry Standard and the Scottish government's policy on control of woodland removal.

Mearns Forest Design Plan 2015-24

- The planted ancient woodland sites will be enhanced/restored as appropriate to site.
- The big tree country in Drumtochty glen will be maintained where they do not infringe on other objectives.

1.0 Introduction

Refer to Map 1: Location.

1.1 Setting and context

Mearns FDP area is made up of three previous FDP blocks namely Fetteresso, Glenfarquhar & N.Drumtochy and S.Drumtochy and the combined area is 6677ha. It is located in the eastern foothills of the Grampians to the west of Stonehaven. The forest area lies in a north east to south west direction and extends from the A957 Slug road to the north east to the B974 in the south west. The forest is predominately an upland environment with poorer soils which have been planted with commercial conifers in the past, and forms one of the main production areas of the forest district.

The main areas of diversity can be found in and around Drumtochy Castle which is associated with old estate plantings. The area to the south of Strath Finella offers forestry which is more visible within the landscape. 2013 saw the start of the construction of Midhill wind farm which will be completed by the end of 2014. This area is leased and there are legal agreements in place.

The forest is important to both the Mearns Community Council and Stonehaven and District Community Council.

1.2 History of the forest

Reference to OS 1inch 1856-1891 maps shows that the current Forest area was largely moorland except at the lower reaches of the Cowie (Wood of Mergie), along the southern edges at Bogton, Cleuchhead, Bervie water, Drumtochy Glen, Garrold Wood, Drumelzie Wood, Coullies Wood and Hill Wood. Reference to historic maps such as Ordnance survey map 25inch 1855-1960, shows the start of the large scale planting of the 1950s and 60s. A final batch of planting was carried out in the 1980s on areas lying above the 1950s and 60s upper margin.

There is a great variety of trees along Drumtochy Glen and these are a legacy left by the Gemmel family, one-time owners of Drumtochy Castle.

Mearns Forest Design Plan 2015-24



1856-1891, 1inch, 1st edition OS map of Scotland gives an image of the forest prior to large scale planting.

1.3 Analysis of previous plan

Theme	Priority (in current approved plan)	Objective (in current approved plan)	Management Indicator	Progress to date 1- Nominal progress 2- Some progress 3- Progress as per FDP	Proposed action (in this plan)
Climate Change	Low	To restore priority heather moorland.	Moorland	3- Existing priority moorland areas are associated with the higher ground. Otherwise there have been no opportunities for restoring heather moorland.	On non-priority deep peat sites restock will be undertaken to comply with the FCS Peatland guidance, UK Forestry Standard and the Scottish government's policy on control of woodland removal.

Mearns Forest Design Plan 2015-24

Timber	High	To provide a sustainable volume of marketable timber.	Timber Production	3- The forest has been one of the main timber production areas of the forest district.	The production of timber from the forest will need to be optimised in order to meet demands.
		Identify new forest road requirements and extraction routes to facilitate business planning.	New Roads	2- In the main the forest has a good road network. However, there are some areas within the design plan which are deficient and this has led to some coupes being delayed.	New roads will be constructed to facilitate harvesting programme.
Community Development	Med	Coupes should be correctly scaled and shaped to fit and compliment the landscape.	Landscape	3- Coupes have been designed to fit in appropriately with the large and smaller scale landscapes.	For the forest to tie in with the landscape character its shape, scale and diversity should relate to dominant characteristics of the landscape.

Mearns Forest Design Plan 2015-24

Access & Health	Low	Enhance and improve recreational facilities.	Recreation	2- Recreation has been rationalised over the last few years where the forest is now not a priority for recreation within the district.	No objective.
Environmental quality	Med	Increase use of alternative systems to clearfell.	Low impact silvicultural system (LISS)	1- A large area of the forest was designates as LISS however in the main most of these areas have been established on areas that are steep and without access. This has led to a lack of thinning.	Identify areas within the forest most suited to low impact silviculture systems.
Biodiversity	High	To enhance the riparian features of the Forest	Habitat networks for biodiversity	2- The habitat networks are definitely work in progress where there has been some restructuring with broadleaves and other non Sitka Spruce species planted.	Restructuring and increased species diversity will improve the environmental value of the Finglennie, Cowie and Bervie.

Mearns Forest Design Plan 2015-24

		To develop ponds and wetland	Wetlands	2- Some ponds have been created in association with Forest Management operations.	No objective.
		To maintain and enhance Fetteresso Forest as a Core Red Squirrel Area	Red Squirrels	3- The forest has been favoured for red squirrels in the past although the forest is not a stronghold. NS and Larch have been favoured and retained where possible with restriction being placed on species such as Beech.	The forest will favour species more suited towards red squirrels. However, it will still be possible to plant large seeded trees where there are no linkages created.
		Protect and enhance heritage features.	Heritage	3- . The two scheduled areas are to be managed as open and this is being achieved. Both areas are inspected once a	Maintain the scheduled monument areas as open as per agreed management plans.

Mearns Forest Design Plan 2015-24

				year. Otherwise archaeology has been protected as per Historic Scotland's guidelines.	
		Enhance the biodiversity value of the PAWS sites.	Planted Ancient Woodland Site (PAWS)	2- The PAWS areas are being restored enhanced as per the districts conservation plan.	The planted ancient woodland sites will be enhanced/restored as appropriate to site.
		To improve forest structure and retain older forest elements.	Forest structure	2- A number of areas in the previous plan were identified as minimum intervention, long term retention and natural reserves. Otherwise the forest is being restructured where possible through clearfell coupes.	Identify areas within the forest most suited to low impact silviculture systems.
		To maintain and	Soil, Water	2- The forest &	Restructuring and

Mearns Forest Design Plan 2015-24

		enhance water quality in the streams.	& Air quality	water guidelines are followed. The main watercourses, Finglennie, Bervie and Cowie have been targeted for restructuring and increased species biodiversity.	increased species diversity will improve the environmental value of the Finglennie, Cowie and Bervie.



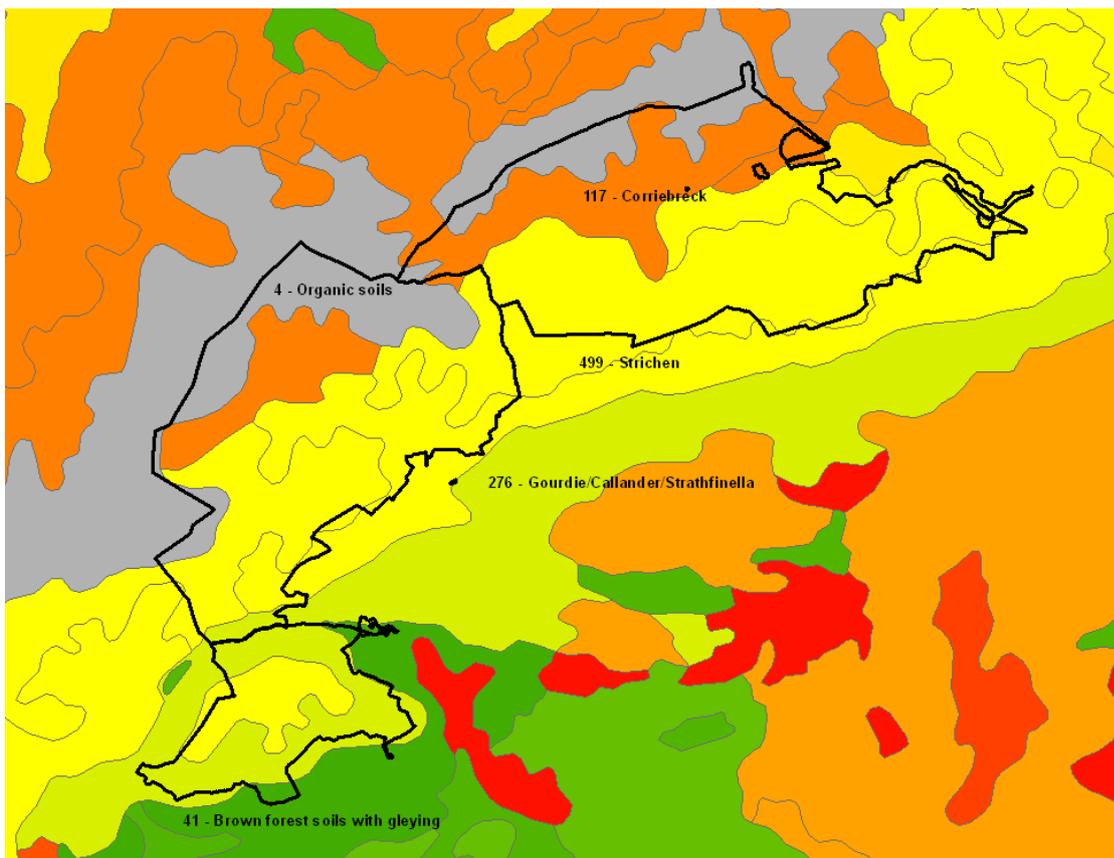
3.0 Background information

3.1 Physical site factors

Refer to Map 2: Key Features.

3.1.1 Geology, soils and topography

Geology- According to the British Geological Survey Geological Map of the UK the forest plan area is underlain by several rocks types which include igneous rocks (Silurian and Devonian periods), arenaceous/argillaceous schists (Dalradian period), metamorphic rocks (Dalradian period) and sandstones (Palaeozoic era/Devonian period). These have led to the production of soils with medium to high nitrogen availability.

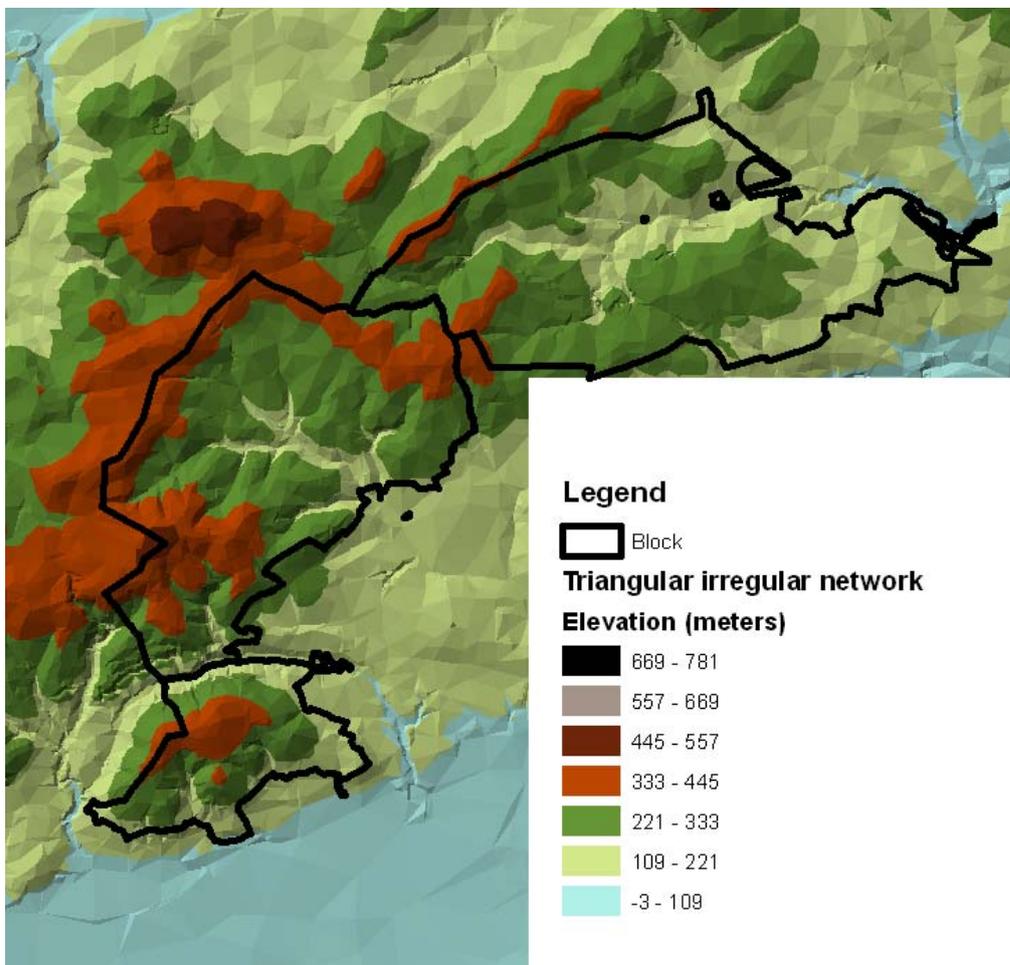


Soils - The Soil Survey of Scotland map shown above reveals the soil associations underlying Mearns.

Mearns Forest Design Plan 2015-24

The Organic soils comprise of blanket peats, Corriebreck soils comprise of peaty podzols; some humus-iron podzols and gleys, Strichen soils comprise of peaty podzols, humus-iron podzols, gleys and some brown forest soils. Gourdie/Callander/Strathfinella soils comprise of humus-iron podzols; some brown forest soils, peaty podzols and gleys. Brown forest soils comprise of brown forest soils and noncalcareous gleys.

Topography – The hills form a dominant ridge running northeast-south west, which loom over the flat farmland of Howe of Mearns. To the east, around Stonehaven, the foothills are less dramatic as they tumble down to the coast, with a more gradual transition to the farmland. The elevation runs from 70 to 460 meters.



Mearns Forest Design Plan 2015-24

3.1.2 Water

The design plan area falls within three catchment areas, the Bervie Water (Bervie water & tributaries), the Luther Water catchment (Pamphil Burn) and the catchment Kincardine and Angus coastal (Cowie & Finglennie). The latter catchment area has proved in the past to be problematic for flooding at Stonehaven. Currently SEPA has identified the Bervie and Luther as of low ecological value.

Tributaries of the forest lead to the Dee and Carron and together with the Cowie and Bervie these watercourses are all important for salmon, where both the Esk and Dee fishery boards are keen for ecological improvements to be made where possible. Typically this involves restructuring conifer plantations, increasing species diversity, increasing the broadleaf element and opening up watercourses as per the forest & water guidelines. The local fishery boards find it acceptable to leave trees in streams as they act as mitigation to flooding, although some blockages could lead to spawning grounds becoming inaccessible.

There is little standing water within the Mearns forest design plan apart from several small lochans, some which have been man made. The FC Forests and Water Guidelines should be followed during all operations and private owners consulted as appropriate. There are several private water supplies which originate on FC land.

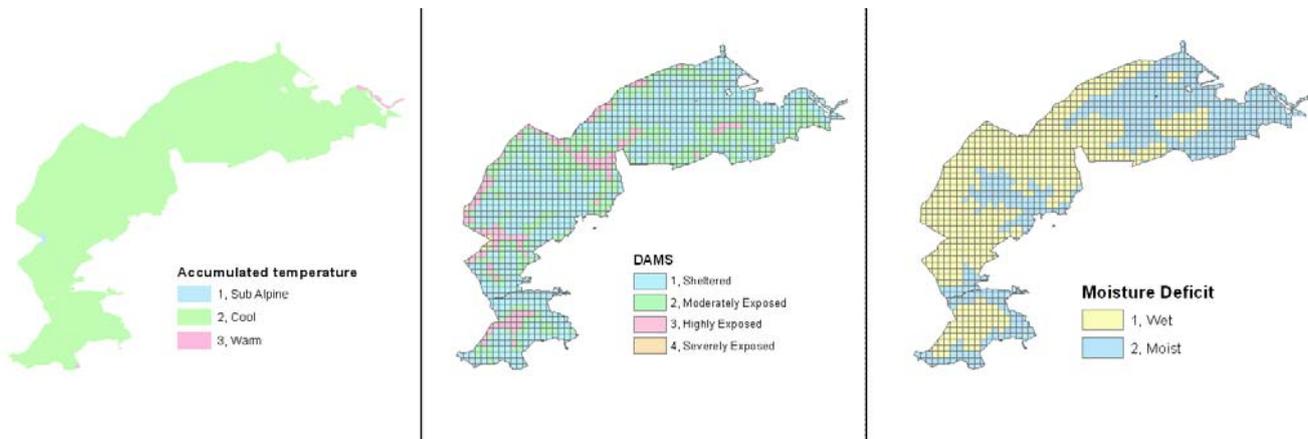
3.1.3 Climate

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

The results of interrogating this system gave the following data.

	AT5	DAMS	MD
Range	765-1231	6-19	36-135
Average	1007	12	87

Mearns Forest Design Plan 2015-24



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 majority of the forest falls within the cool zone, where <775dd = alpine, 775-1200dd = cool and >1200dd = 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 6-19 and windiness is the most likely limiting factor to tree growth at higher elevations. DAMS is categorised as follows:- <13 sheltered, 13-16 moderately exposed, 16-19 highly exposed, 19-22 severely exposed and >22 too exposed for commercial forestry.

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). It can be seen that there is a large area of wet soils within the forest, where <900mm = wet, 90-160mm = moist and >100mm = dry.

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.

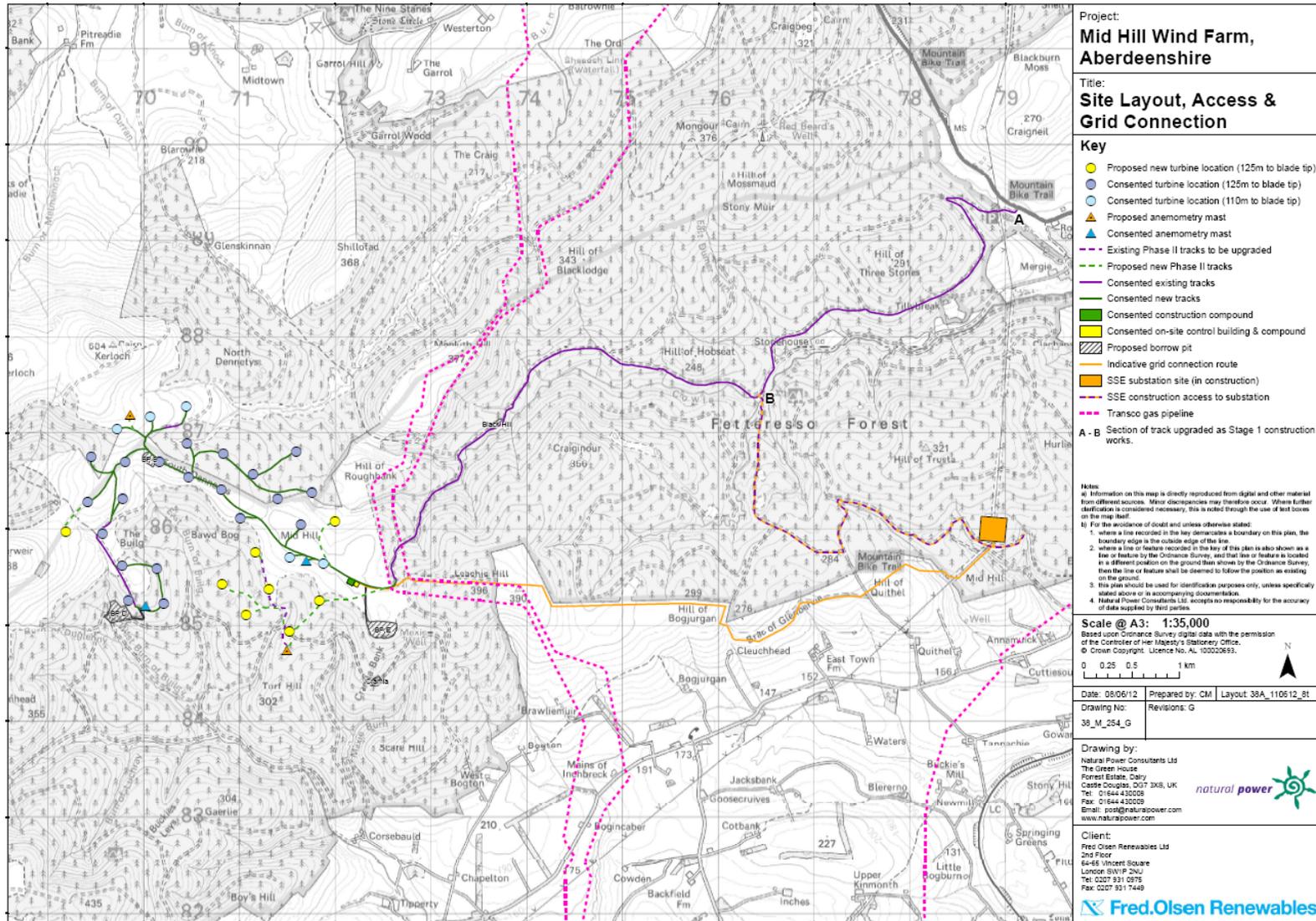
Further information on these criteria and the application of ESC can be found in Forestry Commission Bulletin 124 - An Ecological Site Classification for Forestry in Great Britain.

Renewables- Midhill Wind Farm

The Forestry Commission's commitment to tackling climate change and facilitating renewable energy has resulted in the development of a wind farm in the Glenfarquhar area of the design plan. This is scheduled in total to be a 25 turbine wind farm with 18 turbines plus other infrastructure going onto

Mearns Forest Design Plan 2015-24

Forestry Commission land. There is also a substation currently being built in Fetteresso. These developments are due to be completed by the end of 2014.



(Map above shows an indicative layout of Midhill wind farm)



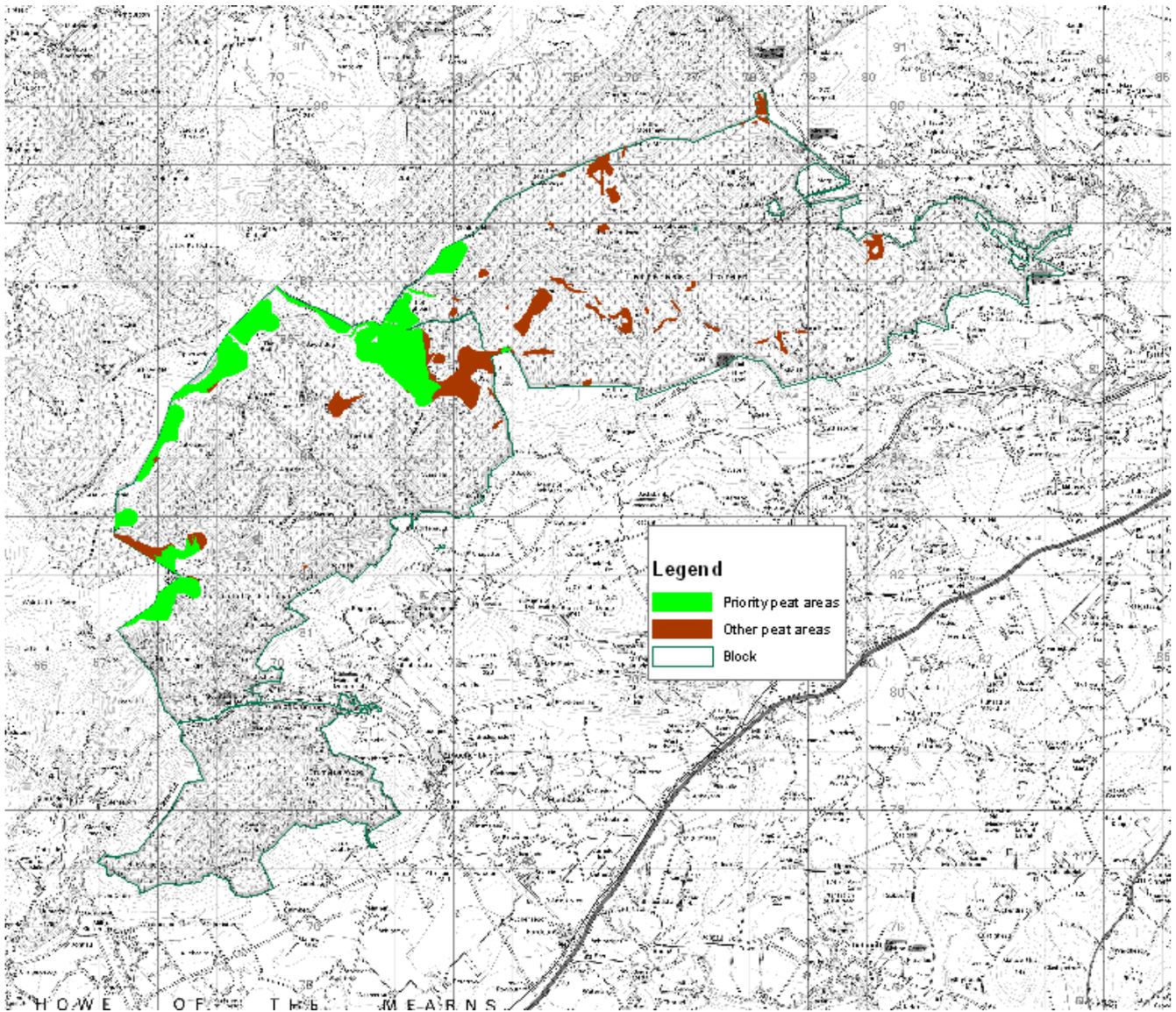
3.2 Biodiversity and environmental designations

There is one UKBAP species found within the forest- Red Squirrel whereas Black Grouse has been historically associated with the moorland to the north of the block. These two species are part of the six key species identified in the FCS Biodiversity Action Plan. Therefore good forest design and operational practice will be undertaken to benefit both.

Areas of planted ancient woodland sites are found within the forest at Mergie and Drumtochty glen. Such areas should be restored or enhanced according to priorities of the forest district's conservation team. There are a number of other conservation considerations such as Raptors, other birds and badgers; and in the past areas of crop have been retained in order to benefit these species. All laws applying to wildlife are complied with and ultimately picked up in the work plan process.

In line with the current FCS peat guidance there are priority areas of deep peat identified within the forest, however these are mainly associated with the existing open upland heath land areas. Elsewhere the peat areas are not priority sites, as they are fragmented making up <20% of sites and could grow Sitka Spruce at yield class 8 or greater. Therefore on non priority deep peat sites restocking will be undertaken to comply with the FCS Peatland guidance, UK Forestry Standard and the Scottish Governments policy on control of woodland removal.

Mearns Forest Design Plan 2015-24



“Areas of deep peat located within forest”

Mearns Forest Design Plan 2015-24

3.3 The existing forest

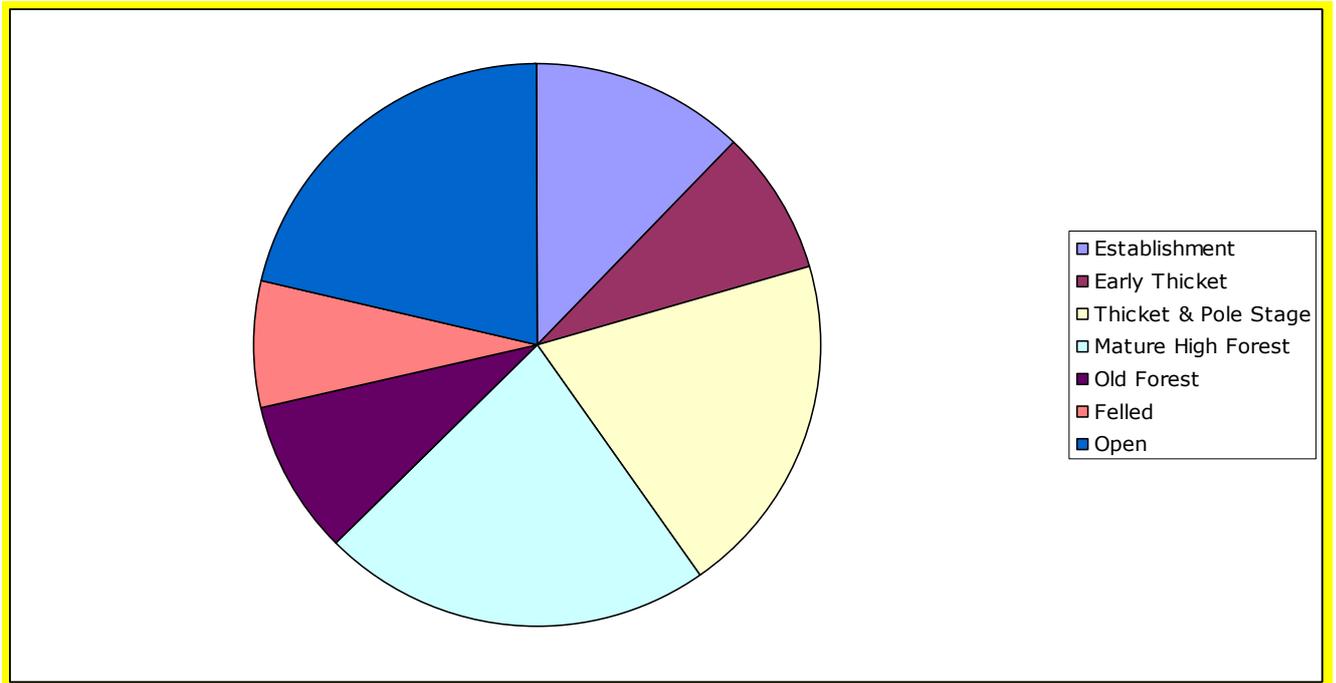
3.3.1 Age structure, species and yield class

Age Structure

As can be seen from the following table and pie chart the spread of age classes across the plan area is not even. Mature high forest and Thicket & Pole stage makes up the largest proportion, with more than 40% of the design plan area, while there is significantly less in the Early thicket and Old Forest. Due to the production/clearfell element of the forest 7.2% of the forest area is currently felled. However, restructuring is well on the way and this will ultimately improve the sustainability of the forest area. 21.5% of the forest is currently open with the majority of this located on the upland heath land.

Ages of Trees (years)	Successional Stage	Area/ha	%
0 -10	Establishment	816.59	12.23
11 - 20	Early Thicket	554.85	8.31
21 - 40	Thicket & Pole Stage	1318	19.74
41 - 60	Mature High Forest	1484.9	22.24
61+	Old Forest	513.46	8.78
Felled		406.62	7.2
Open		1575.7	21.5
Total		6677	100

Mearns Forest Design Plan 2015-24



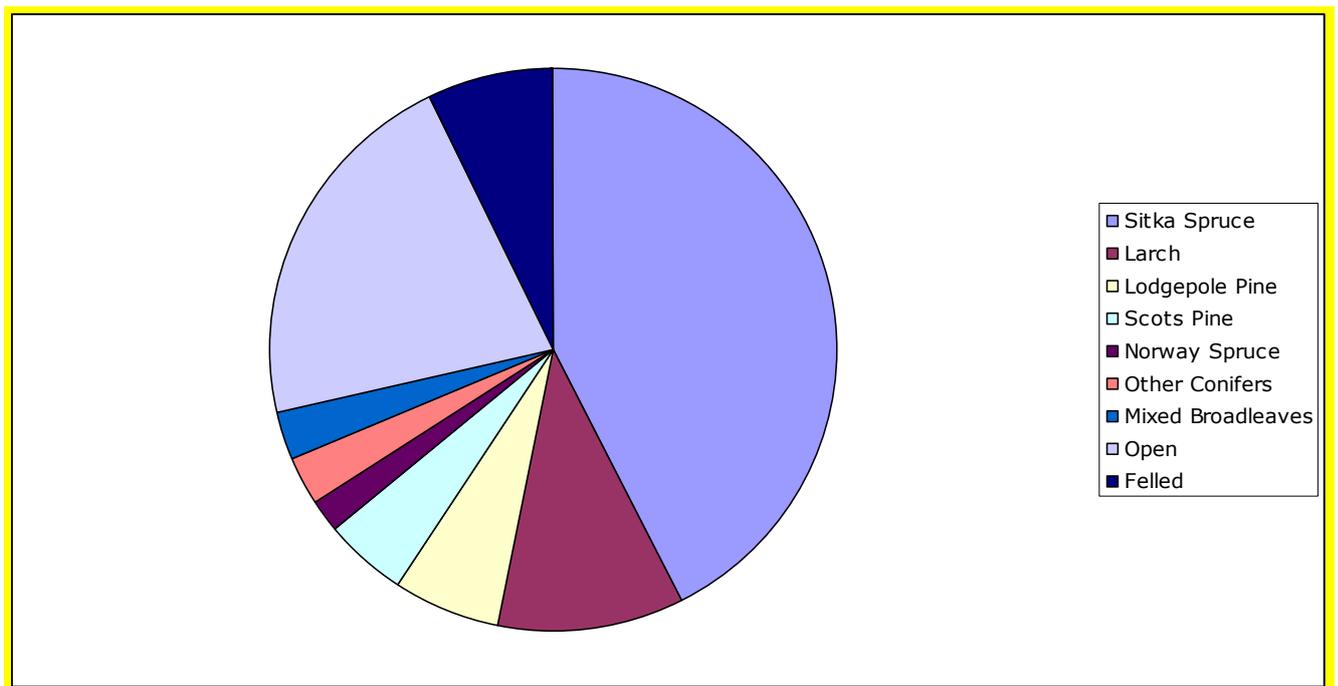
Species

The forest is mainly located in the uplands with Sitka Spruce making up 42.6% of the forest. Larch and in particular Japanese is well suited to this forest and makes up 10.5%. Lodgepole Pine was seen as a good alternative to Spruce and as a mixture species and is currently at 6.1%, however this will continue to decrease due to the Dophistroma disease. Scots Pine makes up 4.8% of the forest being concentrated mainly on the slopes and ridges above the watercourses. Other species make up about 7% of the plan and these are generally located on the better soils and in particular the lowlands. Currently broadleaves make up only 2.6% of the forest which is less that the required minimum of 5%.

Species	Area	%
Sitka Spruce	2844.4	42.6
Larch	701.1	10.5
Lodgepole Pine	407.3	6.1
Scots Pine	320.5	4.8
Norway Spruce	120.2	1.8
Other Conifers	193.6	2.9

Mearns Forest Design Plan 2015-24

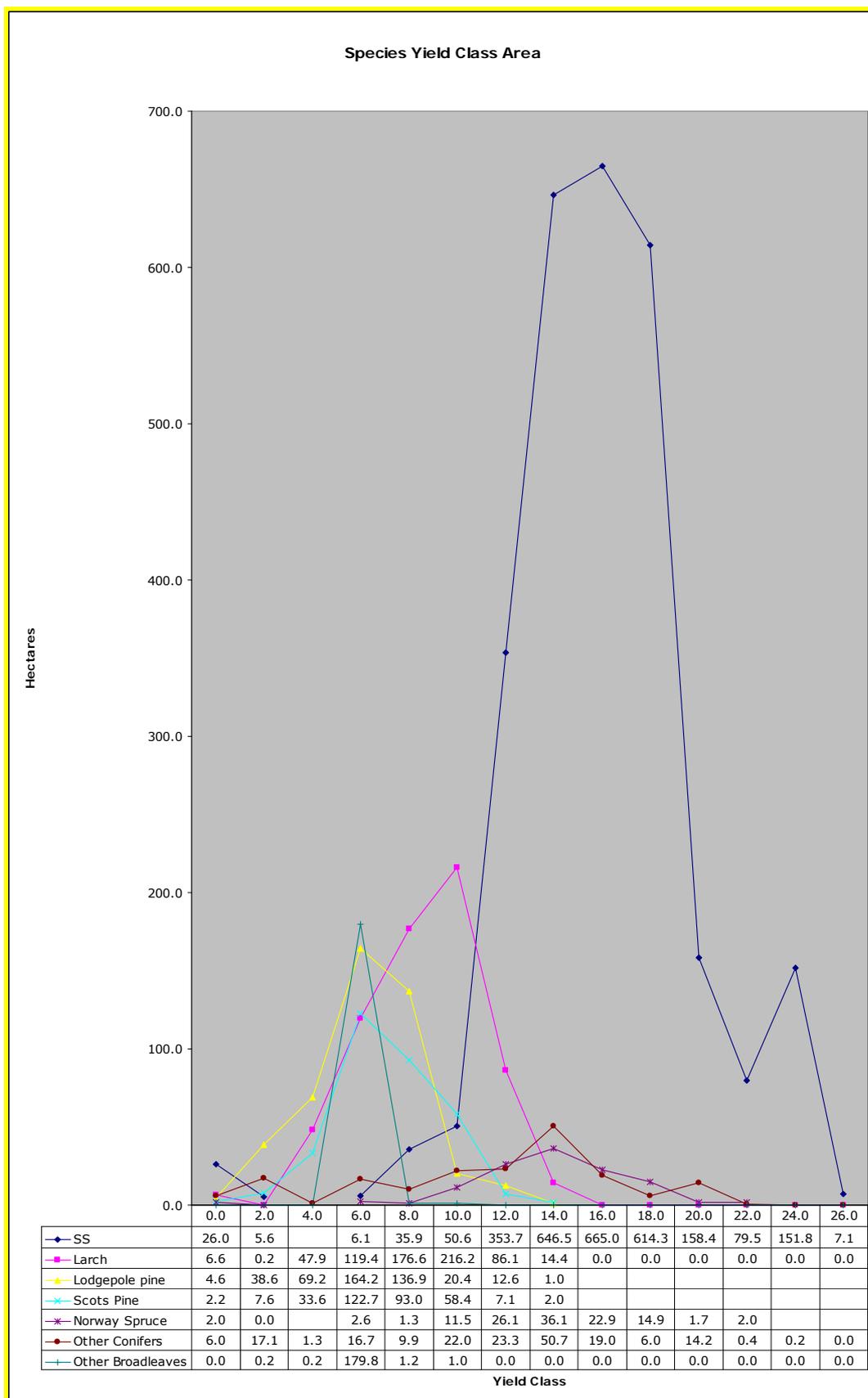
Mixed Broadleaves	173.6	2.6
Open	1435.6	21.5
Felled	480.7	7.2
Total	6677.0	100.0



Yield Class

In the uplands Sitka Spruce, the dominant species (2801ha), has an average yield class of 14-18, and this would be considered to be above average for this species. Otherwise Japanese Larch, Lodgepole and Scots Pine score 6-10 on average. Broadleaves score is scattered with it getting up to 6 on the better soils. On the lowlands with the increased nutrient availability yield classes are much higher for all species.

Mearns Forest Design Plan 2015-24



3.3.2 Access

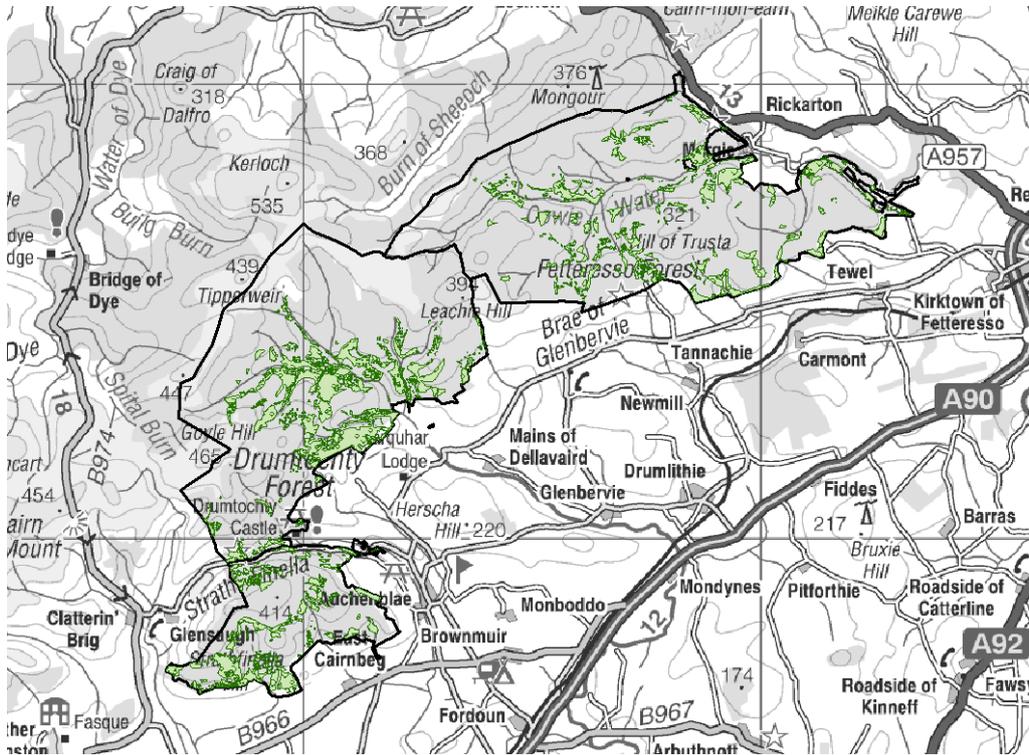
The A90 lies to the south of the forest area and there are connections with this via the A957 Slug road and the Drumlithie unclassified road. There are various accesses into the forest from slug road, Swanley, West Bogton Chapelton and Drumtochty Glen. Access both to and within the whole of this design plan area is good, although there are some areas that will represent a challenge for managing on the steep ground. Forest coupes road requirements will need reviewed in the next 10 years. The Midhill wind farm has upgraded the current access from slug road up to Midhill. There is scope to use the new roads at the Midhill Wind Farm site.

3.3.3 LISS potential

There are areas (753ha) of this design plan with potential for management under LISS, (Low impact silvicultural system). However due to limiting factors such as access, steep slopes, thinning and choosing appropriate species the actual area suitable for LISS needs to be reassessed with only those areas judged as being most suitable having LISS prescriptions. Areas unsuitable for LISS will need to revert to clearfell/thin. (See Appendix4 for current LISS prescriptions).

This management system is defined as: 'Use of silvicultural systems whereby the forest canopy is maintained at one or more levels without clear felling.'
Under LISS there are no clearfell areas larger than 2 ha.

Mearns Forest Design Plan 2015-24



“Areas and crops with potential for LISS management”

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%

All products are supplied to companies localised in the north east of Scotland and logs go to James Jones at Aboyne & Kirriemuir; Logs, fencing and pallet go to Cordiners; logs, fencing and pallet go to Rosehill Export and Pulp usually goes to Montrose. It is likely that in the future there will be an increase in material going into the local fuel wood market and the production of hardwood timber.

3.4 Landscape and land use

3.4.1 Landscape character and value

Mearns landscape character:

Forest is located on the lower slopes of the range of hills to the north west of the Kincardine plateau –an agricultural coastal strip stretching south from Stonehaven. The hills form a dominant ridge running northeast-south west, which loom over the flat farmland of Howe of Mearns. To the east, around Stonehaven, the foothills are less dramatic as they tumble down to the coast, with a more gradual transition to the farmland.

The hill slopes have a rolling relief with ridges of rounded hills of similar heights receding into the distance. To the north, above the forest, the smooth upland moorland plateau is dissected by shallow carved gullies. This is a large scale upland form which is similar in character over extensive areas, only changing slowly along the length of the upland ridge.

Top of the hills to the north west is extensive open moorland. Much of the lower southern slopes of the upland ridge are forested with even aged plantations including the forests making up the Mearns Forest Plan area. On the lower slopes are open fields of mixed agriculture, some field boundary trees, hedges and isolated small mature broadleaf woodlands. The moorland and forests are relatively uniform though species such as larch do increase visual diversity. In places shape and scale of species blocks conflict with that of the landform, interrupting the visual flow of the hillside.

To the east, where the distinction between the ridge and the lowland is less distinct, there is increased tree cover with more copses and hedgerows than around the Howe of Mearns.

Across the southern areas of the plan there is little integration between the forest and its surrounds. Forest is located upon the hill slopes with farmland extending across lowlands. This appears comfortable within the landscape where the forest extends to the break of slope before tying in with the pattern of enclosure. Where fields extend up slopes (as apparent in the east of the area) the forest appears more like a cap accentuated by the abrupt change of a solid forest boundary to open fields.

Mearns Forest Design Plan 2015-24

Farmland is open with large fields, rolling to the east, flatter to the south west. Settlement across much of the area comprises isolated scattered farmsteads. Many are located along the break of slope and across the lowland agricultural plain. There are a few small compact villages on the agricultural plain.

The area is crossed by small local road network, electricity power lines and isolated single wind turbines. Due to the openness of the landscape these are visible over some distances. A wind farm is present to the south of the forest area and a new one is currently under construction within the forest landholding area on the upper slopes to the north of the forest area. All compound the degree of visual clutter in the area.



View 1 is of South Drumtochty, View 2 shows west to east- South Drumtochty, North Drumtochty and Glenfarquhar



Small regular shaped coupes stand out as they do not reflect the scale and shape of the landform

Broad scale of the dark conifers forest reflects the landform of the hill.

Younger planting area, shaped to fit with the flow of the landform, is beginning to visually integrate with the rest of the block. It creates a strong visual anchor bringing the forest down slope to the break in slope.

Small geometric species blocks (larch) conflict with the shape and scale landform making them poorly integrated with the forest as a whole. Impact diminishes over summer months.

View 1: Strathfinella and Black Hill: From Howe of Mearns

Forest margin relates to field boundary. On this hill slope the landform relief is the dominant visual factor, so forest margin would be improved if it reflected this. Forest edge is high up slope-out for proportion with the scale of the hill.

Open farmland with straight edged fields dominates on the expansive lowland. Hill is a visible backdrop to the area. The contrast between light crop colours of fields and dark forest accentuates its presence.

Field system extends up hill, limiting the forest to a narrow strip along the hill top. Forest appears out of proportion with height of hill. Dark colour of forest and straight edge accentuates issue.

Internal forest margins (road lines, species edges, age differences and rides) need to reflect landform to appear appropriate. Where they do not they draw the eye.

Forest wraps over the upland and extends to the break of slope at its base responding well to the landform.

Felling coupe is large, reflecting the scale of the landform, extending over top of knoll.

From this vantage point, eye is drawn to a step, at the edge of a felling coupe, visible on skyline, breaking the flow of the hill top which draws the eye and breaks the flow of the hill top.

Small straight edged larch blocks form discordant shapes on the smooth hillsides. Framed by evergreen conifers, these accentuate the unnatural appearance of them.



View 2: From north of Auchenblae

Mixed woodland extends from the forested hills into the lower land integrating it into the farmland, increasing enclosure in this area.



Visibility:

The forest of Mearns covers an extensive area and so its visibility is broken up into sections.

From Howe of the Mearns (view1&2): Forest is a visible back drop across much of this extensive agricultural plain. It is seen over significant distances including from Laurencekirk, the A94 and the Aberdeen Dundee railway as there is little of significant size to screen it. With distance, detail reduces but items cutting the skyline, of contrasting colour and of significant scale remain visible for longer.

South Drumtochty- outskirts of Auchenblae



From Auchenblae: South Drumtochty forest is located to the north and west of the settlement. Although not visible from within Auchenblae, it is clearly seen from the outskirts. Forest covers hills to the north and west, to the horizon, enclosing the farmed landscape closer to the settlement. The policy woodlands of Drumtochty House extend along the river, Luther Water, integrating into the mixed farmland, creating enclosure and diversifying the view.

Cairn O Mount- View of Glenfarquhar forest



Cairn o Mount: Glenfarquhar forest is visible on distant hills in the hinterland of the view. The moorland to the fore and the far off views to the sea draw the eye more. Mid Hill wind farm, once completed, may alter this providing a new focus in the landscape. Fragmentation of the forest in this region will accentuate the visual impact of the wind farm and so should be avoided (Photo below is taken from Cairn O Mount looking towards wind farm).

Mearns Forest Design Plan 2015-24

Cairn O Mount- Looking down to Strathfinella hill



The open area surrounded by forest on Strathfinella Hill is visually intrusive from this vantage point as it stands out from the wooded hills it adjoins. The view would be improved if this area was planted with woodland.



View 3, 4 & 5- Views around Fetteresso

Hills are less distinct than further west as land rises gradually without a defined break of slope. Forest extends over summit to meet with field margins, providing a simple back drop to the area.

Area of open moorland extends to horizon contrasting with forest.

Small slither of trees on horizon is visible as trees have been planted to the forest boundary located 10-20m below the ridgeline. This step is disruptive to the flow of the horizon and so draws the eye. Its impact will increase as trees grow. Future planting should be set further back from the ridge to avoid this reoccurring.



Simple, open, gently dipping agricultural landscape with regular improved fields extends to the forest edge.

View 3: Near Mains of Inchbrek, looking west.

Small section of forest at top of hill is visually disruptive in the landscape. Forest edge butts up with field margins which extend towards the top of the ridge in this location. Abrupt straight edge, accentuated by larch band along skyline hangs above the smooth even slopes. A notch where ridge is located further breaks the skyline increasing the visual disruption. The impact of this has been accentuated by the felling of a coupe to its north leaving this narrow band along the edge. Recommend this area is felled early and forest margin moved away from ownership boundary in future to avoid repercussion.

The tops of trees planted along the ridge of the hill are beginning to show above the horizon breaking the flow of the rounded hill top.

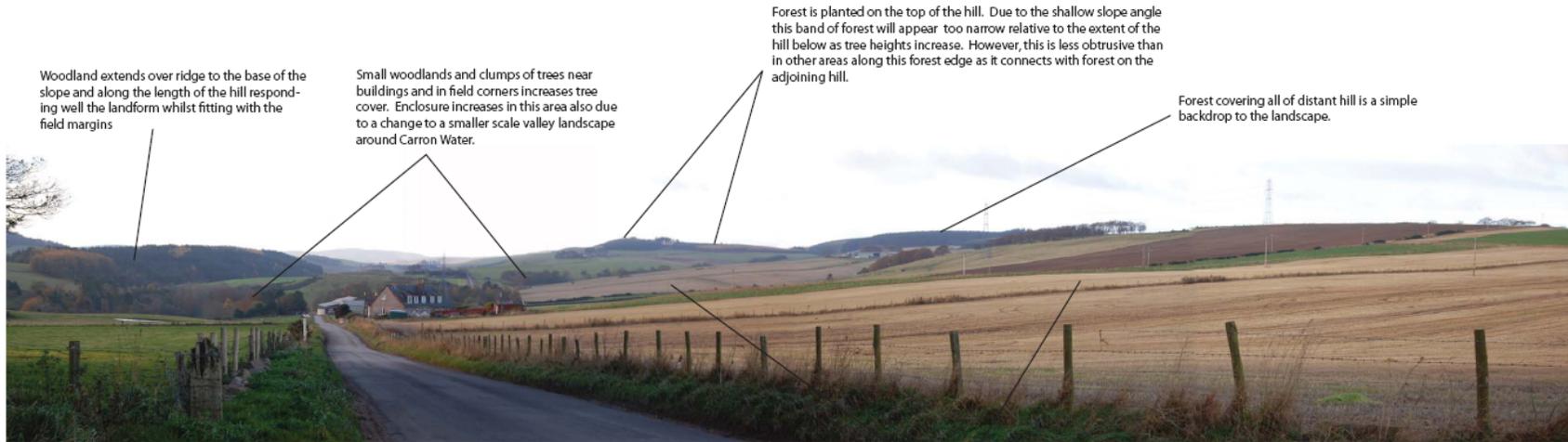


Forest runs along the horizon of a gently dipping hill in a simple line above field system. As a distant view this ties in with the surrounds.

Forest runs along the top of the ridge with minimal connection to clumps of trees in the surrounding area.

View 4: Near Mains of Inchbrek, looking north

Mearns Forest Design Plan 2015-24



View 4: Looking west from brow of hill at Tewel Belt

Open rectangular fields on even gently dipping slope present expansive views to the west. Sections of the southern edges of Fetteresso Forest and adjoining forests are visible along much of the skyline as one travels along the road.



View 5: From Bossholes overlooking Rickarton .
From raised vantage point extent of the forested landscape is appreciated.

Diverse landscape where farmland settlement and smaller scale woodland add to variety. Enclosure created by landform and woodland network.



Fetteresso (views 3,4 and 5)

Forest is visible from the local road network and scattered farms. Although the forest covers an expansive range of hills, it is only seen in small sections. Located beyond the field network the forest is often present in the distance, forming a simple edge to the fields, extending to the horizon. In places forest appears discordant where the balance with the landform is lost, the edge is too high above the immediate surrounding area, or it cuts across the flow of the horizon.

Hilly landform and extent of woodland cover around Cowie Water limits the extent of views of the forest in this area. Where seen it wraps over the top of hills such as Hill of the Three Stones and creates an extensive yet diverse forested view. The significant blocks of larch and bold coupes successfully reflect the shape and scale of the rounded hills to contribute to a pleasing, well balanced forest landscape. The balance attained between simplicity of shape with diversity of species needs to be perpetuated into the future, ensuring that future shapes assimilate with each other and the landform.

Forest design advice:

For the forest to tie in with the landscape character its shape, scale and diversity should relate to dominant characteristics of the landscape.

On the hill tops where landform is on a broad scale, coupes, species blocks and open space should also be large.

Where landform relief and shape is dominant then the shape of the forest should reflect the landform (sweeping smooth margins avoiding abrupt changes in direction).

Where landform is less dominant and field pattern is the key characteristic it is appropriate to use straight margins to reflect landscape character.

Forest design should seek to limit the fragmentation created by increased visual clutter along the horizon, compounded by the installation of wind farms and masts.

Mearns Forest Design Plan 2015-24

3.4.3 Neighbouring land use

There are a great number of private properties, estates and farms on the periphery of the Mearns forest design area. These include adjoining forestry blocks such as Glendye to the west, Durriss (Forestry Commission) to the north east and Mongour hill wood to the north. Arable and pastoral farms dominate the lower slopes surrounding the forest. Other neighbours include Fred Olsen's Midhill wind farm which is largely located in Glenfarquhar and South Drumtochty Castle which is located in Drumtochty glen. There is a grouse moor located to the west of the forest.

3.5 Social factors

3.5.1 Recreation

The recreation facilities within this forest have been deformed after an overall review across the forest district. The formal car parks at Quithel, Swanley, Hill of 3 stones and North Drumtochty are still present but do not get advertised and are not subject to as frequent checks. Under Scottish Outdoor Access Code (SOAC) people can make full use of the woods for walking, cycling and horse riding. There are a couple of public rights of way running through the forest (the old mounth hill routes).

There are usually a couple of cars in the car parks, and given their close proximity to Aberdeen, Banchory and Stonehaven this is to be expected. The woods have some use through forest district permissions; mostly long distance walks, horse riding, large mountain bike events and motorised access - training and the Granite City Rally. There are problems with mis-use of these woods by motorised access; and the police often get involved.

3.5.2 Community

The forest is close to Banchory, Stonehaven and Aberdeen and there are numerous settlements such as Auchenblae and Rickarton scattered around the forest area. Mearns Community Council and Stonehaven and district community council both have an interest in this forest.

3.5.3 Heritage

Fetteresso Forest contains two scheduled monuments (or parts of these scheduled monuments). A scheduled monument is an archaeological site that has been recognised as being of national importance and is designated as a scheduled monument under the Ancient Monuments and Archaeological Areas Act 1979. Both of the scheduled monuments described below are checked once a year by a member of FC staff and someone from Historic Scotland.

'SM 6437 Cowie Line, pill box and earthworks 900m SW of Stonehouse' is located in Fetteresso Forest close to the Cowie Water at its confluence with the Burn of Finglennie. The monument comprises the remains of a pillbox and anti-tank earthwork that formed part of the WW2 'Cowie Line' (a strategic stop-line to help prevent the movement of troops southwards in the event of an invasion). Part of the monument to the north of the Cowie Water lies in private ownership, but the remainder is on FCS land. Whilst largely open, there are a number of trees on part of the monument. A FCS Monument Management Plan exists for the monument and runs until March 2015. This document indicates that the main objective of management is to ensure the stable condition of the monument.

Prescription:-

All scrub vegetation and naturally regenerating conifers within the scheduled area will be cut off at ground level using appropriate hand or power tools and removed. Any conifer seedlings will be removed by pulling out by hand. Conifers growing on the slopes below and to the E of the pillbox will be felled, opening up the view onto the stop line. The section of stop line to the E of the modern forestry track will be cleared of major brash within the lifespan of this plan. Brash will be removed to form habitat piles at least 10m to the S of the embankment. Remaining elongated tree stumps will be cut down close to ground level (with all tree stumps being left to rot in situ).

'SM 4857 Clochanshiels, cairns, houses and field systems 500m ESE of' is located on the NE edge of Fetteresso Forest near to Whitehills and Clochanshiels Farms. It comprises a variety of prehistoric round houses and field systems preserved as low earthworks. The eastern part of the monument is in private ownership, but the western part is on FCS land. The ground cover is predominantly heather, and whins have been kept largely under control (although there is some regeneration).

Prescription:-

Mearns Forest Design Plan 2015-24

Management of this scheduled monument is as open ground, and clearance should occur at least once every five years and will be undertaken by FCS Forest District staff. All scrub vegetation and naturally regenerating trees within 20m of the identified feature will be cut off at ground level using appropriate hand or power tools and removed. Any seedlings will be removed by pulling out by hand. The forestry situated immediately to the W of the hut circle will not be restocked, leaving a buffer zone of 20m from the identified feature.

It is important to note that any works to a scheduled monument require the prior written permission of Scottish Ministers, a process known as scheduled monument consent (SMC) which is administered by Historic Scotland. Such works would include any felling or thinning within the scheduled areas (which may extend beyond the visible remains), or any extraction running through the scheduled areas.

Otherwise there are a number of other archaeology features within the Mearns forest design area and these will be managed during the district work plan process. In terms of management, the main principle is to adhere to the UKFS Forests and Historic Environment guidelines.

The forest lies beside a designed landscape associated with Drumtochty glen, and this area of the forest is commonly referred to as 'big tree country'.

3.6 Pathogens and diseases

Dothistroma needle blight (DNB)

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. 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, and, since the beginning of the new millennium, in Lodgepole 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. More recently the disease has also been reported in Scots pine. Although significant damage in this species is yet limited, Scots Pine (including

Mearns Forest Design Plan 2015-24

young plantations and regeneration) needs to be monitored intensively in order to manage the disease.

Reasons for the increase in 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. Current FC policy for dealing with the existing scale of *Dothistroma Needle Blight* is to fell infected stands within the shortest time frame possible, in order to minimize the risk of infection to the surrounded uninfected pine crop on both public and private land.

Phytophthora ramorum

Phytophthora ramorum is the oomycete plant pathogen known to cause the disease Sudden oak death. The disease kills oak and other species of tree and had devastating effects on the oak populations in California and Oregon as well as also being present in Europe. Symptoms include bleeding cankers on the tree's trunk and dieback of the foliage, in many cases eventually leading to the death of the tree. *P. Ramorum* also infects a great number of other plant species, significantly woody ornamentals such as Rhododendron, Viburnum and Pieris, causing foliar symptoms known as ramorum dieback or ramorum blight. Such plants can act as a source of inoculum for new infections, with the pathogen producing spores that can be transmitted by rainsplash and rainwater. *P. ramorum* was first reported in 1995, and the origins of the pathogen are still unclear but most evidence suggests it was repeatedly introduced as an exotic species. Very few control mechanisms exist for the disease, and they rely upon early detection and proper disposal of infected plan material.

Any infection of *Phytophthora ramorum* is of relevance to the continued management of the forest, but Larch infection is of particularly concern due to the wide scale outbreak in the Scotland. Protocols are in place if there was an outbreak for the removal of infected species and for alternatives for restocking. Any suspicions of outbreak need to be reported immediately:- treehealthscotland@forestry.gsi.gov.uk

Mearns Forest Design Plan 2015-24

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

Mearns Forest Design Plan 2015-24

- 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.

Key Theme/Priority previously/priority now	Subject	District Objective	Management Indicator/Analysis of previous plan	Priority Now	Analysis	Proposed Action
Climate Change (High/High)	Renewable energy	1.02 Support the further development of the wood fuel sector and continue to work with merchants to make suitable material available. This will include specifically marketing parcels suitable for wood fuel of a nature and scale that matches demand.	Wood fuel- Lower grade material is used for fuel wood. A significant source of this has been dophistroma infected pine. In general deadwood has been taken to roadside.	Yes	There are different categories of dophistroma infected crop within the forest.	Prioritise Dophistroma infected crop for removal in order to maximise value of timber and reduce inoculum levels.

Mearns Forest Design Plan 2015-24

	Adapting to climate change	<p>1.04 Adopt a policy of future proofing forests to make them more resilient to the potential impacts of climate change. This will include making sure that silvicultural systems and species choice incorporated in forest plans are selected carefully to suit the site characteristics, and take into account the envisaged change for generally warmer and drier summers, milder wetter winters and increasing frequent storm events.</p>	<p>Ecological site classification- Previous plan took into account the ecological site classification. However, it is vital that species selection is reviewed at every opportunity given most up to date data.</p>	Yes	<p>The forest is currently below the 5% level for broadleaves. Elsewhere there is acceptable species diversity which could be built upon.</p>	<p>Where there is opportunity utilise the ecological site classification to increase species diversity and specifically to meet the 5% broadleaf target.</p>
--	----------------------------	---	--	-----	---	--

Mearns Forest Design Plan 2015-24

		<p>1.06 Consider opportunities to restore areas to moorland where climate change favours habitat restoration in accordance with forest plans.</p>	<p>Moorland- A number of areas were identified for heath land restoration in the previous plan where the tree line was going to be lowered.</p>	<p>Yes</p>	<p>The main deep peat areas are associated with the open heath land on the higher ground. Elsewhere peat areas are not priority sites, as they are fragmented and more suitable to planting woodland.</p>	<p>On non-priority deep peat sites restock will be undertaken to comply with the FCS Peatland guidance, UK Forestry Standard and the Scottish Governments policy on control of woodland removal.</p>
--	--	--	--	------------	---	--

Mearns Forest Design Plan 2015-24

			<p>Habitat networks- The previous design plan rationalised the habitats to be improved, with resources being concentrated in the Cowie, Finglennie and the Bervie. LISS systems have offered substantial habitat network benefit. Stands such as mature Larch, Pine and Norway Spruce have been retained where possible. The Finglennie and Cowie have been targeted for Spruce removal and open space, broadleaves and species diversification has been encouraged. Levels of deadwood retention has also been encouraged in general and this includes areas of wind blow. The previous design has incorporated some artificial waterbodies in order to increase wetland habitat.</p>			
		<p>1.09 Incorporate forest habitat networks into forest plans, where appropriate. At a general level, forest habitat networks will make a positive contribution to biodiversity and will particularly assist the movement of fragile species affected by climate change.</p>		Yes	<p>The Cowie, Finglennie and Bervie are the main riparian veins of the forest, however the biodiversity value is low.</p>	<p>Restructuring and increased species diversity will improve the environmental value of the Finglennie, Cowie and Bervie.</p>

Mearns Forest Design Plan 2015-24

	Flood and catchment management	<p>1.10 Consider the relationship with river catchments in developing forest plans and seek to contribute positively to flood and catchment management planning. All operations will be undertaken with Forestry Commission Scotland forests and water guidelines.</p>	<p>Flood and catchment management- Some opportunities have been taken to improve riparian habitat networks and a number of riparian areas have been designated as LISS. See 1.09 “Forest habitat” networks above. Forestry & Water Guidelines are followed.</p>	Yes	<p>The forest is a major contributor to both the Bervie and Cowie water catchments.</p>	<p>Smaller coupes along the Cowie and Bervie watercourses will have a positive impact on water catchment and flooding.</p>
--	--------------------------------	---	--	-----	---	--

Mearns Forest Design Plan 2015-24

	Carbon sequestration	<p>1.13 Adopt alternative to clear fell or low impact silvicultural systems to assist carbon sequestration and limit carbon release associated with ground disruption where site conditions are suitable.</p>	<p>LISS/carbon sinks- CCF areas have been designated, however some areas were located in inappropriate locations. Conservation have designated minimum intervention & natural reserve areas. Long Term Retentions exist for landscape and biodiversity objectives.</p>	Yes	<p>The forest has a number of areas suitable for LISS. Other areas are unsuitable due to steep terrain, limited access, unthinned stands and limited natural regeneration.</p>	<p>Identify areas within the forest most suitable to low impact silviculture systems.</p>
--	----------------------	--	---	-----	--	---

Mearns Forest Design Plan 2015-24

Timber (High/High)	Timber Supply	<p>2.02 Work at a local and GB level to improve production forecasting and forest planning systems for thinning and continuous cover treatments. Allocate a significant proportion of timber to long-term contracts to help secure supplies and price to the regional sawmills. Timber will also continue to be sold under open-market conditions to maintain competitiveness and allow a wider range of merchants to buy local timber.</p>	<p>Production- Long term contracts are in place and the production forecast accurately predicts volumes for clear felling and thinning. However, it seems that demand is outstripping supply in this local area.</p>	Yes	There are a number of long term contracts for timber that need to be met.	<p>The production of timber from the forest will need to be optimised in order to meet demands. New roads will be constructed to facilitate harvesting programme</p>
--------------------	---------------	--	---	-----	---	--

Mearns Forest Design Plan 2015-24

Environmental Quality (Med/Med)	Landscape	<p>6.05 Take account of landscape issues in developing forest plans, in accordance with guidance and consultation from in-house advisors. The SNH landscape character assessment will provide a useful source of reference.</p>	<p>Landscape character- was considered in liaison with a landscape architect.</p>	Yes	<p>South Drumtochty is more visible and sensitive within the landscape. Other areas such as Fetteresso and Glenfarquhar are still seen from the roadside as forest edges. Powerlines/pipelines are located within the design plan but there is limited scope for improvement without loss of productive land.</p>	<p>For the forest to tie in with the landscape character its shape, scale and diversity should relate to dominant characteristics of the landscape.</p>
	Cultural Heritage	<p>6.09 Maintain all designated scheduled ancient monument sites in accordance with management plans agreed with Historic Scotland.</p>	<p>Scheduled Ancient Monument- The two scheduled areas are to be managed as open and this is being achieved. Both areas are inspected once a year. Otherwise archaeology has been protected as per Historic Scotland's guidelines.</p>	Yes	<p>The forest has two scheduled ancient monuments.</p>	<p>Maintain the scheduled monument areas as open as per agreed management plans.</p>

Mearns Forest Design Plan 2015-24

		<p>6.12 Continue to work with partners to safeguard and where possible enhance or interpret features of cultural or historic interest.</p>	<p>Culture- There are a number of unscheduled ancient monuments in the design area and these have been safeguarded as required. Consideration has been given to historic planting in Drumtochty glen associated with a designed landscape. Drumtochty Castle have been consulted on future plans.</p>	Yes	<p>There is a designed landscape lying in proximity to Drumtochty glen, and in association with this there are stands of big trees on the forest estate.</p>	<p>The big tree country in Drumtochty glen will be maintained where they do not infringe on other objectives.</p>
Biodiversity (Med/Med)	Species & habitat	<p>7.02 Take into account the needs of priority species by incorporating appropriate prescriptions from habitat action plans and species action plans into forest plans. Particular priorities include red squirrel, capercaillie, black grouse, juniper, twinflower and lepidoptera.</p>	<p>Priority Species- Red squirrel habitat has been encouraged over greys through species diversification in favour of red squirrels. Management of Black Grouse areas was also previously considered where forest edge habitat was reviewed.</p>	Yes	<p>Black Grouse can be found on adjacent land to the north west of the block. The forest is important to forming a restriction to grey squirrels moving north.</p>	<p>Opportunities should be taken for edge prescriptions for Black Grouse. The forest will favour species more suited towards red squirrels. However, it will still be possible to plant large seeded trees where there are no linkages created.</p>

Mearns Forest Design Plan 2015-24

	Designated Site	<p>7.10 Manage all plantations on ancient woodland sites in accordance with agreed management plans. Restoration will be progressed appropriately to maximise the ecological return.</p>	<p>Ancient woodland- Areas of PAWS have been identified in the previous plan and are being restored/enhanced as necessary.</p>	Yes	There are planted ancient woodland sites within the forest.	The planted ancient woodland sites will be enhanced/restored as appropriate to site.
--	-----------------	---	---	-----	---	--



5.0 Forest Design Plan Proposals

5.1 Management

Refer to Map 5: Management.

Thinning

See Map 6 – 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 Mearns as much of the area as possible will be thinned in order to improve the timber quality. In general the main limiting factor to the thinning of the crops in this block is the steep slopes in association with various gullies and hillsides. Where Lodgepole pine occurs in mixtures with other crops, and is infected with DNB, it will be targeted for removal during thinning operations. All thinning decisions will be guided by Operational guidance Booklet No 9 'Managing thinning' and the recent district Thinning Plan.

Low Impact Silviculture (LISS)- See Appendix 4, 5 & 6

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 although in Mearns the area managed under a LISS system will be decreased; due to the previous design plan identifying a number of inappropriate sites. This situation could be reversed in the future if appropriate thinning occurred early to stabilise the crop.

Clearfell

As stated above the main silvicultural system employed in British forestry is 'patch' clear-felling followed by planting or occasionally natural regeneration. In order that the timber in this plan area is harvested before the onset of windblow clearfell will remain the most appropriate silvicultural system.

Although clear-felling can appear to have a negative impact on landscape and habitat it 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 (4years) before restocking, or natural regeneration establishment, also creates transient open habitat that is exploited by several species such as voles, deer and raptors such Buzzard and Goshawks in this area.

Where possible the scale of clearfells will be in keeping with the scale and topography of the local landscape. Therefore in some instances large clearfells will be appropriate in terms of scale (See Map5, Management map).

5.2 Future Habitats and Species

Refer to Map 7: Future habitats and management.

Restocking

In common with the majority of FCS estate, most restocking in the FDP 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*. This species lays its eggs in deadwood/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.

Mearns Forest Design Plan 2015-24

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 sooner if monitoring, using the Forest Research *Hylobius* Management Support System, shows that it is safe to do so. Refer to the district fallow policy for details.

The species choice for restocking has been guided by the use of the ESC decision support system. This highlighted that for the majority of the upland area the most suitable restock species are Sitka Spruce and Larch due to the soil nutrient regime generally being "poor". Important to note that it is still acceptable to plant Larch however this may change depending on whether the current *Phytophthora ramorum* outbreak reaches the forest. In the past Lodgepole Pine had been a good option however due to the issue of DNB highlighted earlier, it is now economically unwise to plant.

Soil nutrient regime is generally better close to watercourses and glens, and there are a few areas associated with the lowlands that have better nutrient regimes. The larger areas have been mapped and species diversification has been planned, however the final decision on the appropriate planting species or mixture will be taken by the forester on the ground.

The impact of large or small scale landscapes will drive the restocking where larger landscapes will be more associated with Sitka Spruce with increased Larch for visual value. Smaller scale landscapes will be targeted for edge enhancement with Larches, Norway Spruce, Scots Pine, other conifers and broadleaves. The major watercourses within the design area namely the Cowie, Finglennie and Bervie will be enhanced through restructuring and increased species diversity. Broadleaves and in particular birch (downy/silver), which is very suitable over extended areas of the forest, will be planted to increase the broadleaf component to the required 5%, along with other broadleaves such as Alder, Aspen and Willow. Generally diversity will increase in association with natural reserves, planted ancient woodland sites and LISS areas. Ancient woodland will be restored and this will include planting oak, however this will be done in a manner that does not provide linkages for red squirrels. Edge habitat for Black grouse will be created on the border with heath land by planting at lower densities with elements of Larch. There is a designed landscape associated with Drumtochty castle and opportunities have been taken to maintain the big tree feel associated with this area.

Mearns Forest Design Plan 2015-24

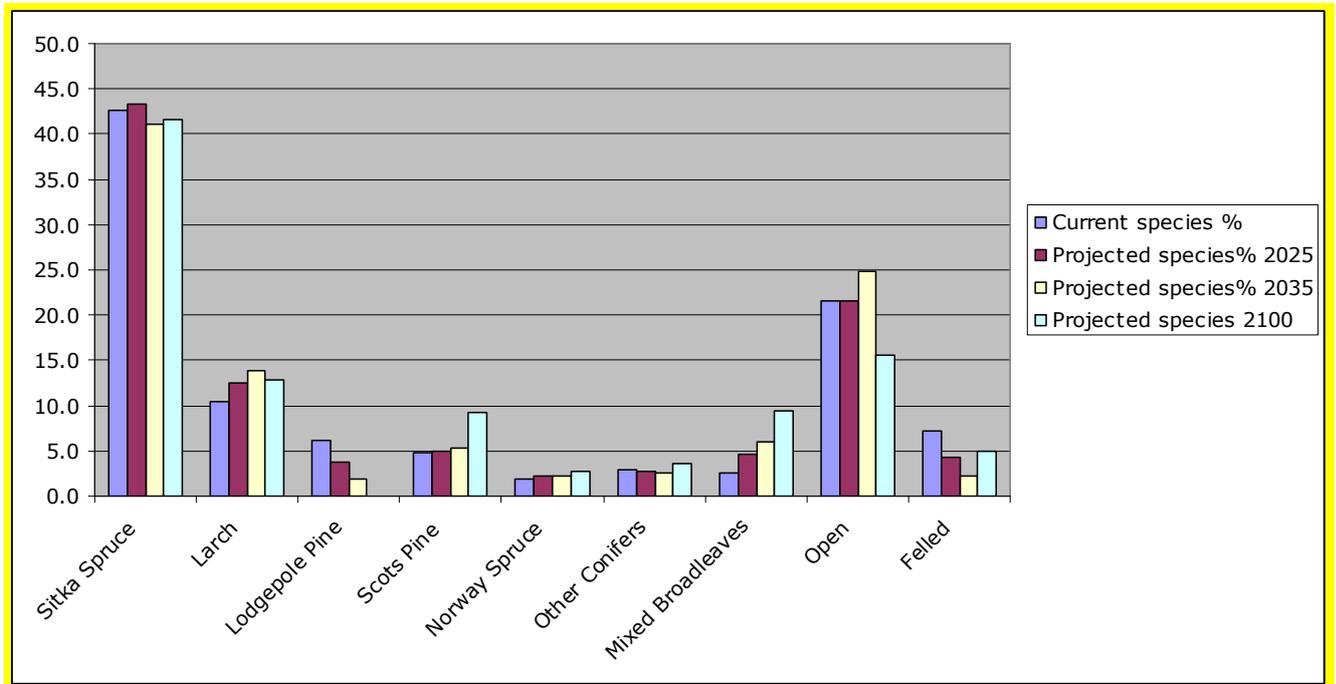
Sites that are currently recorded as felled but not yet restocked will be surveyed with plots using the FMM4 protocol. The results of this will inform the decision as to whether enhancement planting, with species appropriate to the site, is essential for successful establishment or if waiting for additional regeneration will produce a stocking adequate for timber production. The final decision and subsequent enhancement planting, if necessary, will be carried out within 8 years of the felling date.

Some of the areas highlighted for broadleaves with easy access will be planted at commercial spacing (2500 stems per ha minimum) and managed for fuelwood production. These sites will require ground preparation and possibly deer fencing. Thinning will also 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 FDP. In this plan natural regeneration areas are associated with LISS prescriptions outlined in appendix 4, 5 & 6.

5.3 Species tables

Species	Current species % 2015	Projected species% 2025	Projected species% 2035	Projected species 2100
Sitka Spruce	42.6	43.4	41.1	41.6
Larch	10.5	12.5	13.8	12.9
Lodgepole Pine	6.1	3.7	1.9	0.0
Scots Pine	4.8	5.0	5.3	9.2
Norway Spruce	1.8	2.2	2.2	2.7
Other Conifers	2.9	2.7	2.5	3.6
Mixed Broadleaves	2.6	4.6	6.0	9.5
Open	21.5	21.6	24.9	15.5
Felled	7.2	4.3	2.3	5.0
Total	100.0	100.0	100.0	100.0

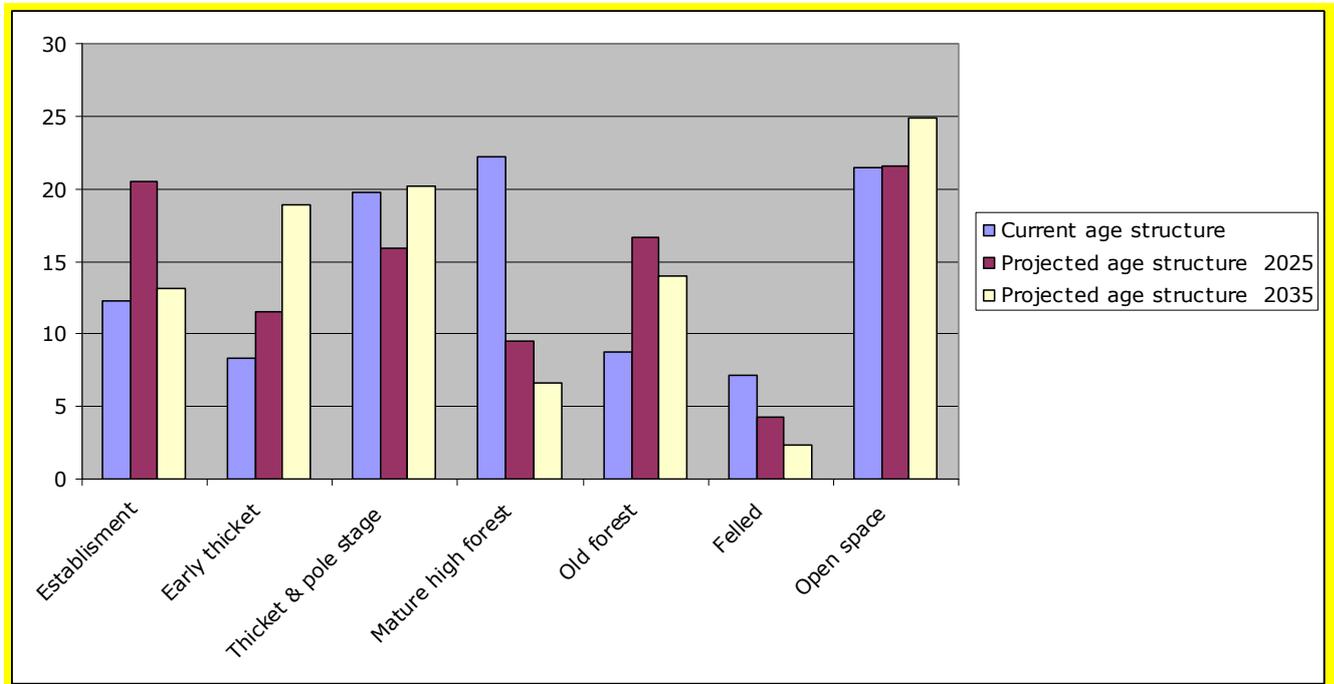
Mearns Forest Design Plan 2015-24



5.4 Age structure

Age of trees (years)	Successional stage	Current age structure	Projected age structure 2025	Projected age structure 2035
0 - 10	Establishment	12.23	20.49	13.09
11 - 20	Early thicket	8.31	11.5	18.9
21 - 40	Thicket & pole stage	19.74	15.91	20.15
41 - 60	Mature high forest	22.24	9.5	6.66
60+	Old forest	8.78	16.7	14
	Felled	7.2	4.3	2.3
	Open space	21.5	21.6	24.9
	Total	100	100	100

Mearns Forest Design Plan 2015-24



5.5 PAWS restoration

Areas of planted ancient woodland are found within the block and these are identified for full restoration or enhancement as per the forest district’s conservation team’s action plan. Natural regeneration of PAWS areas is standard, however where there is limited seed source such as in Drumtochty glen then planting will be undertaken.

5.6 Management of open land

Areas designated as permanent open space will be limited to the existing moorland on the high ground. Opportunities for enhancement of heathland habitat will be taken at restocking, where boundary forest could be planted at lower density along with elements of other species such as Larch. This along with a network of transitional open space between the felling and establishment operations will provide further open areas which could be useful for heath land species such as Black Grouse.

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.

Mearns Forest Design Plan 2015-24

5.8 Access

These are shown on Map 9 –Planned Roads.

5.9 Pathogens

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.

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.

Dothistroma Needle Blight 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:

Mearns Forest Design Plan 2015-24

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 lead to the following action plan for dealing with DNB 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 affect 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.

Phytophthora ramorum

Any infection of *Phytophthora ramorum* is of relevance to the continued management of the forest, but Larch infection is of particularly concern due to the wide scale outbreak in the Scotland. Protocols are in place if there was an outbreak for the removal of infected species and for alternatives for restocking. Any suspicions of outbreak need to be reported immediately:- treehealthscotland@forestry.gsi.gov.uk.

5.10 Critical Success Factors

- Undertake felling and restocking within sensible periods to allow for continued restructuring of the forest.
- Undertake the planned thinning programme in order to improve crop quality and carry out LISS prescriptions as detailed in Appendix 4.
- Construct the planned forest roads to allow the currently inaccessible coupes to be managed.
- Restore/enhance planted ancient woodland sites.

Mearns Forest Design Plan 2015-24

- Maintain scheduled ancient monument sites as open.

Appendix 1 – Consultation record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Statutory Consultees				
Scottish Natural Heritage	26/7/13	22/8/13	The operational plan should include information about the location of any sensitive habitats and species and how impacts to these will be avoided during any felling or thinning works. Plan should explore opportunities to us felling and re-structuring to improve habitat for Goshawk and Crossbill. It should also include the planning of operations to avoid damage or disturbance to nests during the breeding season. Plan should seek to restore native woodland and particularly PAWS restoration and deal with any non naïve exotic species. Consideration also needs to be given to habitat networks and riparian corridors. Fetteresso is identified as priority woodland in the Scottish Red Squirrel Action Plan. These woods are seen as ranking the highest with regards to habitat, size, age, squirrel presence and	Prior to operations the forestry conservation team will identify any sensitive habitats and species in order to minimise any impacts. Restructuring of the forest and designating some areas as long term retentions and natural reserves will aid bird species. All wildlife will be protected as per statutory requirements. Native woodland will be concentrated in the major watercourses (Finglennie, Cowie and Bervie) and also in any ancient woodland sites. Exotics will be removed as per the conservation team's strategic plan, where planted ancient woodland sites will be prioritised. Forest will be designed with species favouring red squirrel although some pockets of large seeded broadleaves will be acceptable in the ancient woodland area. Along the forest/moorland boundary edge prescriptions will be undertaken for Black Grouse. This will include

Mearns Forest Design Plan 2015-24

			<p>dependability. A key objective for the plan will be to identify and pursue management objectives that will contribute to conserving the Red Squirrel, in line with the objectives of the UKBAP. The plan should also seek opportunities to improve potential habitat for Black Grouse along the moorland forest edge. Plan should seek to identify the location of any sensitive habitats and species and steer any proposals to expand or increase recreational elements of forest use away from these areas with the aim of striking a balance between recreational use and wildlife value. The plan should comply with statutory requirements and key policies.</p>	<p>planting larch and also planting at lower densities. There are no identified issues in the forest where recreation needs to be managed around sensitive habitats and species. The plan will comply with statutory requirements and policies outlined in section 3.7.</p>
SEPA	26-Jul-13	21-Aug	<p>Detail any new felling and planting and utilise low impact silviculture where possible. Any area greater than 20% of any catchment to be felled within any 3 year period would need an assessment of the effects this may have on local water bodies. Also any new infrastructure such as roads would also need to be highlighted.</p> <p>Bervie and Luther water are at moderate ecological status and improvements would be beneficial. Any watercourse improvements should be highlighted. Any invasive species such as Japanese Knotweed, Giant Hogweed</p>	<p>New planting/felling/roads are outlined in Maps 5-9. No area greater than 20% of any catchment will be felled in any 3 year period. The main watercourses Bervie, Cowie and Finglennie will be prioritised for riparian enhancement. Luther catchment will also be diversified as part of diversification on the lower slopes of Drumtochty. Exotics will be removed during forestry operations and areas such as planted ancient woodland will be prioritised. On deep peat sites restocking after clearfelling will be standard, where this complies with the UK Forestry Standard and the Scottish Governments Policy on Control</p>

Mearns Forest Design Plan 2015-24

		<p>and Himalayan Balsam would need to be managed. Forest management should enhance the potential of forests to protect society and the environment from the various effects of climate change, where this is particularly relevant to peat land. Provision should be given to the potential of fire which can result in uncontrolled release of carbon from the entire forest ecosystem. The SEPA wetland inventory does not show any wetlands concerns within or adjacent to the boundary of the woodland, however, this does not mean that there are no wetlands present, only that they are not included in the wetland inventory. Therefore, if seepages, springs or flushes are found to be present then these areas should be protected. There is a requirement to conform to SEPA' guidance management of forestry waste. Scottish Natural Heritage need to be consulted if it is thought that the proposal will affect a protected site or protected species. We expect forest activities to be carried out following the best practice guidance outlined in the Forest Standard Guidelines and other relevant best practice management such as the forest and water guidelines.</p>	<p>of Woodland Removal. The forest district has an operational forest fire plan. Any wetland areas are identified they would be protected as per the Water Framework Directive. Any forest waste operations would be undertaken after consultation with SEPA. Scottish Natural Heritage have been consulted with in regards to this plan. All forest activities to be carried out as per Section 3.7 Statutory requirements and key external policies</p>
--	--	--	---

Mearns Forest Design Plan 2015-24

Local Authority (Planning)	29-Jul-13	No response	N/A	N/A
Local Authority (Archaeology)	26-Jul-13	06-Aug-13	There are a significant number of archaeological sites within the Forest Plan areas, ranging in date from prehistoric to World War II, although not all will raise significant management issues. In terms of management, the main principle is to adhere to the UKFS Forests and Historic Environment guidelines.	Archaeology will be protected as per UKFS Forests and Historic Environment guidelines.
Local Authority (Roads)	31-Oct-13	No response	N/A	N/A
Other				
RSPB	26-Jul-13	30-Sep-13	In terms of forest structure and composition, working towards a much higher pine and broadleaf component, together with expanded open ground habitats would be ideal. More extensive planting of larches would also be beneficial. Watercourses/wetlands should meet water quality objectives and increased broadleaves would improve these habitats. Adjacent to Midhill wind farm there is considerable potential for a mix of restocked trees and managed open space to create a habitat mosaic. Management of moorland could improve habitat for heath land species. Retention of over	Ecological site classification will be used to identify suitable sites for tree species diversification where there is emphasis on increased broadleaves. If any wetland areas are identified they would be protected/enhanced as per the Water Framework Directive. There will be an emphasis on improving the main riparian of the forest, namely the Bervie, Cowie and Finglennie. At least 10% of the forest design plan will be managed as open. Adjacent to Midhill wind farm the emphasis is on growing trees for commercial timber. On the forest/heath land edge lower density planting and larch

Mearns Forest Design Plan 2015-24

			mature trees in Drumtochty offers good habitat.	will allow for better forest/moorland integration. Low impact silviculture and natural reserves will be beneficial for habitat.
Scottish Wildlife Trust	12-Aug-13	13/9/14	As per Red Squirrel Officer comments.	As per Red Squirrel Officer comments.
Historic Scotland	26-Jul-13	13-Aug-13	'SM 6437 Cowie Line, pill box and earthworks 900m SW of Stonehouse' is located in Fetteresso Forest close to the Cowie Water at its confluence with the Burn of Finglennie. The monument comprises the remains of a pillbox and anti-tank earthwork that formed part of the WW2 'Cowie Line' (a strategic stop-line to help prevent the movement of troops southwards in the event of an invasion). 'SM 4857 Clochanshiels, cairns, houses and field systems 500m ESE of' is located on the NE edge of Fetteresso Forest near to Whitehills and Clochanshiels Farms. It comprises a variety of prehistoric round houses and field systems preserved as low earthworks. Elsewhere unscheduled monuments need to be protected as per UKFS Forests and Historic Environment guidelines.	Scheduled areas are to be managed as open. Some areas still under conifer cover but future felling will revert to open. For both areas annual inspections are carried out to remove unwanted regeneration. Any works would require a scheduled monument consent from Historic Scotland. Archaeology is protected as per UKFS Forests and Historic Environment guidelines.
Macaulay Institute	29-Jul-13	19-Aug-13	These are large areas of commercial woodland which grow Sitka spruce quite well. This should be the main activity in the future. Areas of diseased Pinus contorta should be replaced with spruce.- Small areas of pine/	Sensible species selection will be undertaken to fit species with site. This area is not a priority for recreation although the forest road system is widely used. Landscape has been approved by a landscape architect.

Mearns Forest Design Plan 2015-24

			<p>larch mixtures could be used for aesthetic purposes.- Our experience of trying to grow broadleaved species in this environment isn't encouraging. Therefore, we wouldn't suggest doing this (i.e. there should be a heavy conifer bias in the design).- The area is well used by mountain bikers and access should continue to be encouraged. Some reshaping of hilltop sites would be worthwhile from an aesthetic standpoint (Finella Hill and Goyle Hill, and may be some others).</p>	
Red Squirrel Officer	29-Jul-13	13-Sep	<p>The interesting thing about this wood, which is a massive area, is that it sits right alongside the southern edge of the current grey squirrel distribution in the northeast. Breeding range and the overall number of greys is dropping all the time so before I make any suggestions it should be borne in mind that within the timescale of this forest design we could quite feasibly clear the northeast of greys altogether. However, that could be a few years away and it might be worth taking reds and greys into account in the plan. Firstly I think they should try and avoid large areas of broadleaved woodland, especially along the southern edge. In the event of any grey(s) crossing the gap from the Angus population heading north then the South Drumtochty wood would be the first thing they would find. If</p>	<p>This conifer dominated forest will be favourable for red squirrels with its make up consisting of Norway Spruce, Pine and Larch along with Sitka Spruce. Broadleaves will be dominated by small seeded trees, however In some places such as Drumtochty glen which is an ancient woodland it will be acceptable to plant large seeded broadleaves in isolated pockets.</p>

Mearns Forest Design Plan 2015-24

			there was lots of oak, beech, and hazel in there then it could be just the foothold they need. Likewise if a lot of the eastern edge of the wood has broadleaved areas then it could pose a risk to movement of greys moving along the wood. Broadly speaking a mix of coniferous species would most benefit the red squirrels. Scot's pine, larch, and Norway spruce are good sources of food for red squirrels and would be recommended. Other than that good habitat connectivity will also benefit reds, especially in a working forest.	
<i>Stonehaven & District Community Trust</i>	06-Aug-14	No response	N/A	N/A
<i>Mearns Community Council</i>	26-Jul-13	No response	N/A	N/A
<i>Fountain Forestry</i>	26-Jul-13	No response	N/A	N/A
<i>Stonehaven & District Angling Association</i>	26-Jul-13	No response	N/A	N/A
<i>Fasque and Glendye estate</i>	31/10/2013	No response	N/A	N/A
<i>Drumtochty Castle</i>	31/10/2013	No response	N/A	N/A
<i>Esk Fisheries Trust/ River Dee Trust & Dee District Salmon Fishery Board</i>	10/12/13	11/12/13	The Carron, Cowie and Bervie watercourses are all important for salmon, where both the Esk and Dee fishery boards are keen for ecological improvements to be made where possible. Typically this involves restructuring conifer plantations, increasing species diversity, increasing the	The main watercourses within the design plan are being targeted for restructuring and increased tree species diversity which will include broadleaves, Scots Pine and Larch. Forest and water guidelines are being followed in regards to opening up open space around the watercourses.

Mearns Forest Design Plan 2015-24

			broadleaf element and opening up watercourses as per the forest & water guidelines. Interestingly fishery boards find it acceptable to leave trees in streams as they do not affect fish and act as mitigation to flooding.	
<i>Fred Olsen</i>	25/2/14	25/2/14	To be kept informed of design proposals.	Copy of plan provided to Fred Olsen.

Mearns Forest Design Plan 2015-24

Appendix 2 – Tolerance table

	Adjustment to felling period	Adjustment to Felling coupe boundaries	Timing of restocking	Change to species	Windthrow clearance	Designed open space	Changes to roadlines
FC Approval not normally required	Fell date can be moved within 5 year period where separation or other constraints are met.	1.0 ha or 5% of coupe area – whichever is less.	Up to 4 planting seasons after felling	Change within species group e.g. Evergreen conifers; broadleaves.	Up to 1.0 ha	Location of temporary open space, eg deer glades, if still within overall Open Space design Increase by 0.5ha or 5% of area – whichever is less	No greater area to be felled than originally proposed Departures of < 60m in either direction from centre of line of road
Approval by exchange of letters and map	Felling moved into previous or subsequent 5 year period	1.0 ha to 4.0 ha or 10% of coupe – whichever is less			1.0 ha to 4.0 ha – if mainly windblown trees in sensitive areas 1.0ha to 6.0	Increase of 0.5ha to 2ha or 10% - whichever is less Any reduction	Additional felling of trees not agreed in plan. Departures of > 60m in either

Mearns Forest Design Plan 2015-24

					ha – if mainly windblown trees in areas of low sensitivity	in open space	direction from centre of line of road in low sensitivity areas.
Approval by formal plan amendment	Advance felling of unapproved coupe into current 10 year plan	>4.0 ha or 10% of coupe.	Over 4 planting seasons after felling	Change from specified native species Change between species group	> 4.0 ha in sensitive areas. >6.0ha in low sensitivity areas.	More than 2ha or 10% Any reduction in open space in sensitive areas Colonisation of open areas agreed as critical	As above in high sensitivity areas.

Mearns Forest Design Plan 2015-24

Appendix 3 – FDP Brief

As part of the national forest estate this plan will contribute to the seven key national theme in the Scottish Forest Strategy as indicated in the table below:-

Key Theme/Priority previously/priority now	Subject	District Objective	Management Indicator/Analysis of previous plan	Priority Now	Analysis	Proposed Action
Climate Change (High/High)	Renewable energy	1.01 Work with renewable companies to identify potential sites	Midhill wind farm- There is planning permission for Midhill wind farm.	Yes	N/A	N/A
		1.02 Support the further development of the wood fuel sector and continue to work with merchants to make suitable material available. This will include specifically marketing parcels suitable for wood fuel of a nature and scale that matches demand.	Wood fuel- Lower grade material is used for fuel wood. A significant source of this has been dophistroma infected pine. In general deadwood has been taken to roadside.	Yes	There are different categories of dophistroma infected crop within the forest.	Prioritise Dophistroma infected crop for removal in order to maximise value of timber and reduce inoculum levels.

Mearns Forest Design Plan 2015-24

		<p>1.03 Recognise the potential of the area to contribute at a commercial scale to the delivery of bio energy forestry.</p>	<p>Bio energy- RWE Tullis Russel- 50% of contract comes from Mearns. It will be important to ensure that supply can meet demand, and that appropriate contacts are in place.</p>	Yes as of 2.02	As 2.02	As 2.02
	Adapting to climate change	<p>1.04 Adopt a policy of future proofing forests to make them more resilient to the potential impacts of climate change. This will include making sure that silvicultural systems and species choice incorporated in forest plans are selected carefully to suit the site characteristics, and take into account the envisaged change for generally warmer and drier summers, milder wetter winters and increasing frequent storm events.</p>	<p>Ecological site classification- Previous plan took into account the ecological site classification. However, it is vital that species selection is reviewed at every opportunity given most up to date data.</p>	Yes	<p>The forest is currently below the 5% level for broadleaves. Elsewhere there is acceptable species diversity which could be built upon.</p>	<p>Where there is opportunity utilise the ecological site classification to increase species diversity and specifically to meet the 5% broadleaf target.</p>

Mearns Forest Design Plan 2015-24

		<p>1.05 Continue to monitor the pests and diseases currently affecting crops in the district, and look to implement silvicultural practices to mitigate the known effects. It is possible that changing climate will result in changes to the range of pests and diseases. Impacts may be accelerated by warmer wetter conditions, or we may need to identify and address issues with which we are not currently familiar. It will become increasingly important to select tree species or provenances that are least susceptible to disease.</p>	<p>Disease- Areas of Dophistroma infection have been identified and incorporated into felling plan. Plan did not take into account Ash Dieback and Phytophora in Japanese Larch.</p>	<p>Yes as of 1.02</p>	<p>As 1.02</p>	<p>As 1.02</p>
		<p>1.06 Consider opportunities to restore areas to moorland where climate change favours habitat restoration in accordance with forest plans.</p>	<p>Moorland- A number of areas were identified for heath land restoration in the previous plan where the tree line was going to be lowered and several coupes were going to not be replanted in the future.</p>	<p>Yes</p>	<p>The main deep peat areas are associated with the open heath land on the higher ground. Elsewhere peat areas are not priority sites, as they are fragmented and more suitable to planting woodland.</p>	<p>On non-priority deep peat sites restock will be undertaken to comply with the FCS Peatland guidance, UK Forestry Standard and the Scottish Governments policy on control of woodland removal.</p>

Mearns Forest Design Plan 2015-24

		<p>1.09 Incorporate forest habitat networks into forest plans, where appropriate. At a general level, forest habitat networks will make a positive contribution to biodiversity and will particularly assist the movement of fragile species affected by climate change.</p>	<p>Habitat networks- The previous design plan rationalised the habitats to be improved, with resources being concentrated in the Cowie, Finglennie and the Bervie. LISS systems have offered substantial habitat network benefit. Stands such as mature Larch, Pine and Norway Spruce have been retained where possible. The Finglennie and Cowie have been targeted for Spruce removal and open space, broadleaves and species diversification has been encouraged. Levels of deadwood retention has also been encouraged in general and this includes areas of wind blow. The previous design has incorporated some artificial waterbodies in order to increase wetland habitat.</p>	Yes	<p>The Cowie, Finglennie and Bervie are the main riparian veins of the forest, however the biodiversity value is low.</p>	<p>Restructuring and increased species diversity will improve the environmental value of the Finglennie, Cowie and Bervie.</p>
	Flood and catchment management	<p>1.10 Consider the relationship with river catchments in developing forest plans and seek to contribute positively to flood and catchment management planning. All operations will be undertaken with Forestry Commission Scotland forests and water guidelines.</p>	<p>Flood and catchment management- Some opportunities have been taken to improve riparian habitat networks and a number of riparian areas have been designated as LISS. See 1.09 "Forest habitat" networks above. Forestry & Water Guidelines are followed.</p>	Yes	<p>The forest is a major contributor to both the Bervie and Cowie water catchments.</p>	<p>Smaller coupes along the Cowie and Bervie watercourses will have a positive impact on water catchment and flooding.</p>

Mearns Forest Design Plan 2015-24

		<p>1.11 Continue to look for opportunities to promote the case for new riparian woodland to mitigate the impacts of flooding. We recognise that the immediacy of flood alleviation measures, particularly in Moray, precludes development of soft engineering solutions.</p>	<p>Riparian woodland and flooding- See 1.09 “Forest habitat” networks and 1.10 Catchment management above.</p>	Yes	Yes as per 1.09 and 1.10.	As 1.09 and 1.10
	Carbon sequestration	<p>1.13 Adopt alternative to clear fell or low impact silvicultural systems to assist carbon sequestration and limit carbon release associated with ground disruption where site conditions are suitable.</p>	<p>LISS/carbon sinks- CCF areas have been designated, however some areas were located in inappropriate locations. Conservation team have designated minimum intervention & natural reserve areas. Long Term Retentions exist for landscape and biodiversity objectives.</p>	Yes	The forest has a number of areas suitable for LISS. Other areas are unsuitable due to steep terrain, limited access, unthinned stands and limited natural regeneration.	Identify areas within the forest most suitable to low impact silviculture systems.
Timber (High/High)	Timber supply	<p>2.01 Continue to maximise the area managed through thinning and utilise staff/contractor base to further develop professionalism and thinning expertise.</p>	<p>Thinning- A thinning program is in place for the forest which occurs on 5-7 year cycles, and this can be predicted fairly well in the production forecast. There is limited information on CCF prescriptions undertaken and a number of areas have not been thinned.</p>	Yes	The forest is divided into a number of areas that are thinned on a periodic year cycle. Steep areas should be worked as required.	As per 2.02

Mearns Forest Design Plan 2015-24

		<p>2.02 Work at a local and GB level to improve production forecasting and forest planning systems for thinning and continuous cover treatments. Allocate a significant proportion of timber to long-term contracts to help secure supplies and price to the regional sawmills. Timber will also continue to be sold under open-market conditions to maintain competitiveness and allow a wider range of merchants to buy local timber.</p>	<p>Production- Long term contracts are in place and the production forecast accurately predicts volumes for clear felling and thinning. However, it seems that demand is outstripping supply in this local area.</p>	Yes	There are a number of long term contracts for timber that need to be met.	<p>The production of timber from the forest will need to be optimised in order to meet demands. New roads will be constructed to facilitate harvesting programme</p>
	Timber quality	<p>2.03 Make sure that timber quality is maintained or improved over time through appropriate species choice, stocking/regeneration densities and thinning.</p>	<p>Timber quality- Restock has favoured commercially productive species although some diversification has occurred on the better soils. Thinning has improved crop quality and stocking density assessments are carried out.</p>	Yes as of 2.02	This forest block is vital for the production of timber within the district.	As 2.02

Mearns Forest Design Plan 2015-24

		<p>2.04 Use good silvicultural and appropriate species choice and use a low input approach where this can be achieved.</p>	<p>Low cost silviculture/species choice- Clearfell with Sitka Spruce is the main system employed, and this is cost effective. Where conditions allow LISS systems have been employed, however a number of these areas have not been thinned, are located on unsuitable ground.</p>	Yes	A number of LISS areas have been located on unsuitable ground.	As 1.13
Business Development (Low/Low)	Tourism	<p>3.08 Continue to consider the landscape value of woodlands to tourism during revision of forest plans.</p>	<p>Landscape- Current plan identified only South Drumtochty with a higher landscape value. Fetteresso and Glenfarquhar and North Drumtochty are less visible within the landscape. Design coupes fit the landform and the surrounding landscape. ATC and LISS have been adopted where feasible to reduce the landscape impacts associated with clearfell. Where possible species have been diversified on highly visible areas. There are wayleaves (powerlines/gas pipeline) visible in the landscape, but there is limited opportunity to improve visualisation without losing productive land.</p>	Yes	See 6.05	See 6.05

Mearns Forest Design Plan 2015-24

	Income Diversification	3.09 Respond positively to further approaches from woodfuel and hydro that equally help mitigate against climate change. Currently, the largest single non-timber income stream is progression of renewable energy proposals for Aultmore, Cushnie, Midhill and Clashindarroch.	Other income- Major income has been receive from both Fred Olsen and SSE in regards to the Midhill wind farm. There is an increasing demand for woodfuel and this market has developed significantly in the last 10 years.	Yes as 1.01 and 1.03	N/A	As 1.01
Community Development (Low/Low)	Community Engagement	4.02 Continue to engage communities in the forest design process and consultation on local issues.	Public Engagement- Consultation was undertaken in the previous design plan.	3	Appropriate consultation will be needed to ensure the success of the forest design plan.	N/A
Access and Health (low/low)	Recreation	5.03 Develop, review and maintain a recreation strategy that will guide policy implementation and investment.	Recreation- The forest is a low priority within the forest district however, the public still use the informal car parks and access the forest roads.	N/A	The forest block is not a priority for recreation within the forest district's strategy.	N/A
Environmental Quality (Med/Med)	Soil, water and air quality	6.01 Develop forest plans that take into account the Impact of woodland on soil, water and air quality. We will work with SEPA and other agencies to support achievement of good environmental quality for water.	Soil, Water, Air quality- Design plan took into account the potential impact on watercourses, forest soils, and air. Best management practices and guidelines have been followed in conjunction with SEPA and other environmental stakeholders.	Yes as 1.10 and 1.11	N/A	As 1.10 and 1.09

Mearns Forest Design Plan 2015-24

		<p>6.02 Undertake all forest operations in accordance with Forestry Commission Scotland water and soils guidelines. We will also adopt a fallow ground and a chemical reduction strategy.</p>	<p>Soil & Water Guidelines- Forest Commission water and soil guidelines followed. Fallow period is minimum of 4years.</p>	<p>Yes as 1.10 and 1.11</p>	<p>Forest and Water guidelines will be followed.</p>	<p>N/A</p>
		<p>6.03 Adopt alternatives to clearfell (ATC) or low impact silvicultural systems (LISS) where practicable to mitigate the effects of erosion or siltation.</p>	<p>ATC/LISS management- reduces impact on the environment. Currently 16% of the forest is managed by low impact silvicultural systems, however a number of these locations are unsuitable for LISS.</p>	<p>Yes as 1.13 and 2.04</p>	<p>N/A</p>	<p>As 1.13</p>
	Landscape	<p>6.05 Take account of landscape issues in developing forest plans, in accordance with guidance and consultation from in-house advisors. The SNH landscape character assessment will provide a useful source of reference.</p>	<p>Landscape character- was considered in liaison with a landscape architect.</p>	<p>Yes</p>	<p>South Drumtochty is more visible and sensitive within the landscape. Other areas such as Fetteresso and Glenfarquhar are still seen from the roadside as forest edges. Powerlines/pipelines are located within the design plan but there is limited scope for improvement without loss of productive land.</p>	<p>For the forest to tie in with the landscape character its shape, scale and diversity should relate to dominant characteristics of the landscape.</p>

Mearns Forest Design Plan 2015-24

		6.06 Adopt ATC and LISS where feasible to reduce the landscape impacts associated with clearfell and restock., particularly in areas of high landscape value.	LISS & landscape- Areas were identified in the previous plan however not all locations are suitable and thinning has not occurred.	Yes as 1.13 and 2.04	N/A	As 1.13 and 2.04
		6.07 Progress naturalisation of woodlands where possible taking into account site, species and silvicultural context.	Naturalisation- PAWS areas are in process of being enhanced restored. Major watercourses have been concentrated on in regards to establishing broadleaves. Areas of moorland were identified for restoration.	Yes as 1.06, 1.09 & 7.10	N/A	As 1.06 and 1.09
	Cultural Heritage	6.09 Maintain all designated scheduled ancient monument sites in accordance with management plans agreed with Historic Scotland.	Scheduled Ancient Monument- The two scheduled areas are to be managed as open ground and this is being achieved. Both areas are inspected once a year. Otherwise archaeology has been protected as per Historic Scotland's guidelines.	Yes	The forest has two scheduled ancient monuments.	Maintain the scheduled monument areas as open as per agreed management plans.
		6.12 Continue to work with partners to safeguard and where possible enhance or interpret features of cultural or historic interest.	Culture- There are a number of unscheduled ancient monuments in the design area and these have been safeguarded as required. Consideration has been given to historic planting in Drumtochty glen associated with a designed landscape. Drumtochty Castle have been consulted on future plans.	Yes	There is a designed landscape lying in proximity to Drumtochty glen, and in association with this there are stands of big trees on the forest estate.	The big tree country in Drumtochty glen will be maintained where they do not infringe on other objectives.

Mearns Forest Design Plan 2015-24

Biodiversity (Med/Med)	Species & habitat	7.01 Incorporate provision for forest habitat networks into forest plans to improve biodiversity and assist species movement.	Habitat networks for Biodiversity- See 1.09 Forest habitat networks	Yes as 1.09	N/A	As 1.09
		7.02 Take into account the needs of priority species by incorporating appropriate prescriptions from habitat action plans and species action plans into forest plans. Particular priorities include red squirrel, capercaillie, black grouse, juniper, twinflower and lepidoptera.	Priority Species- Red squirrel habitat has been encouraged over greys through species diversification in favour of red squirrels. Management of Black Grouse areas was also previously considered where forest edge habitat was reviewed.	Yes	Black Grouse can be found on adjacent land to the north west of the block. The forest is important to forming a restriction to grey squirrels moving north.	Opportunities should be taken for edge prescriptions for Black Grouse. The forest will favour species more suited towards red squirrels. However, it will still be possible to plant large seeded trees where there are no linkages created.
	Invasive species	7.04 Undertake to survey and where possible restrict or eradicate invasive species, mapping and controlling hemlock and rhododendron.	Invasive species- There has been Hemlock removal in PAWS areas and rhododendron removal is ongoing.	Yes	There are areas of invasive species in proximity to sensitive areas such as PAWS.	As per 7.10
	Ecosystems	7.07 Take into account the requirements of species and habitat action plans in developing forest plans. We will work with other partners to seek to deliver species or habitat specific management actions.	Habitat action plans- Areas of heath land have been identified for restoration in the previous design. Planted ancient woodland areas have been identified for restoration.	Yes as 1.06, 1.09 & 7.10	N/A	As 1.06 and 7.10

Mearns Forest Design Plan 2015-24

	Designated Site	7.09 Manage all designated sites in accordance with agreed management plans, with the objective of securing favourable condition wherever possible.	Designated site- Parts of Northern Fetteresso drains to the Sheeoch Linn which ultimately feeds to the Dee which is a special area of conservation. This has been considered through the Forest and Water Guidelines.	Yes as 1.10 and 1.11	N/A	As 1.10 and 1.11
		7.10 Manage all plantations on ancient woodland sites in accordance with agreed management plans. Restoration will be progressed appropriately to maximise the ecological return.	Ancient woodland- Areas of PAWS have been identified in the previous plan and are being restored/enhanced as necessary.	Yes	There are planted ancient woodland sites within the forest.	The planted ancient woodland sites will be enhanced/restored as appropriate to site.

Mearns Forest Design Plan 2015-24

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
Various LTR coupes	Biodiversity, landscaping and production.	Simple Mix of both conifers and broadleaves.	30-100 None None	Various	Windblow	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.
Various Nature reserve/minimum intervention coupes	Biodiversity and landscape.	Complex No specific desirable species as NR.	>30 years N/A N/A	Various	Deer browsing & weed competition.	No intervention or minimal.	Site visit	These are agreed with the local conservation team.
38524	Biodiversity and production.	Simple 70% Japanese Larch and 30% SS.	63 100 10	Limited regeneration of larch under mature crop. Grass.	Sitka Spruce regeneration.	Identify frame trees and Crown thin.	Thinning control.	N/A
40592	PAWS enhancement	Complex Brdlvs 100%	30-154 200 10	Regeneration unlikely to be broadleaves and planting will be required. Moss/Grass.	Lack of seed source. Deer browsing.	Halo thinning to favour broadleaves with broadleaf planting.	Thinning control.	This is a planted ancient woodland site.
40092 (F as per appendix)	Maintain big tree element of forest/production	Complex DF 25% WH 25% EL 25% NS% 25%	66-83 150 10	There is regeneration of DF. Various vegetation including grass.	Finding niche markets for big trees.	Single tree selection.	Thinning control.	See appendix6-Drumtochty AWS & LISS recommendations.
40051 (B as per	PAWS enhancement	Complex	32-72	Regeneration	If Oak and Ash	Remove	Thinning	See appendix6-

Mearns Forest Design Plan 2015-24

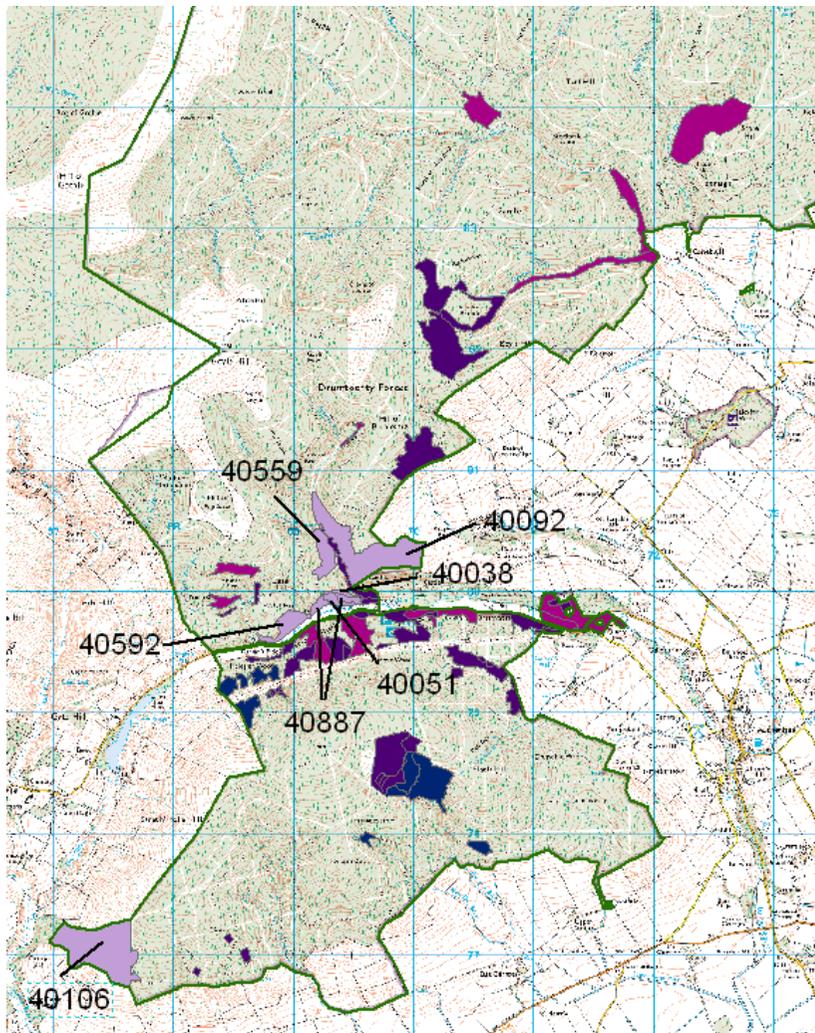
appendix)		Brdlvs 100%	200 10	unlikely to be broadleaves and planting will be required. Grass/other vegetation.	desired species would need to plant.	groups of Beech and retain oak.	control.	Drumtochty AWS & LISS recommendations.
40887 (C as per appendix)	PAWS enhancement	Complex Brdlvs 100%	81 200 10	Oak only needs lightly thinned. Various vegetation including grass.	Deer browsing. Limited seed source.	Lightly thin the oak.	Thinning control.	See appendix6-Drumtochty AWS & LISS recommendations.
40559 ((D as per appendix)	PAWS enhancement	Complex Brdlvs 100%	60-118 150 10	NS/SS understory. Various vegetation including grass	Regeneration of Spruce and deer browsing.	Completely fell the understory and plant broadleaves.	Thinning control.	See appendix6-Drumtochty AWS & LISS recommendations.
40038 (G as per appendix)	PAWS enhancement	Complex Brdlvs 100%	70 150 10	Limited broadleaf seed source. Various vegetation including grass	Lack of seed source and deer browsing.	Thin out non native conifers and broadleaves and enrich with planting native species.	Thinning control.	See appendix6-Drumtochty AWS & LISS recommendations.
40106	Landscape/production/biodiversity	Simple HL 60%, Mixed conifers (SS, JL, DF, SP) 40%	70 120 10	No regeneration and grass.	Major disturbance of vegetation required for regeneration. Regeneration more likely as surrounding conifer crop matures.	Crown thin.	Thinning control.	Scope to add in adjacent younger areas in the future. There is an area of mature Spruce which may need cleared if wind blow.

* 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.

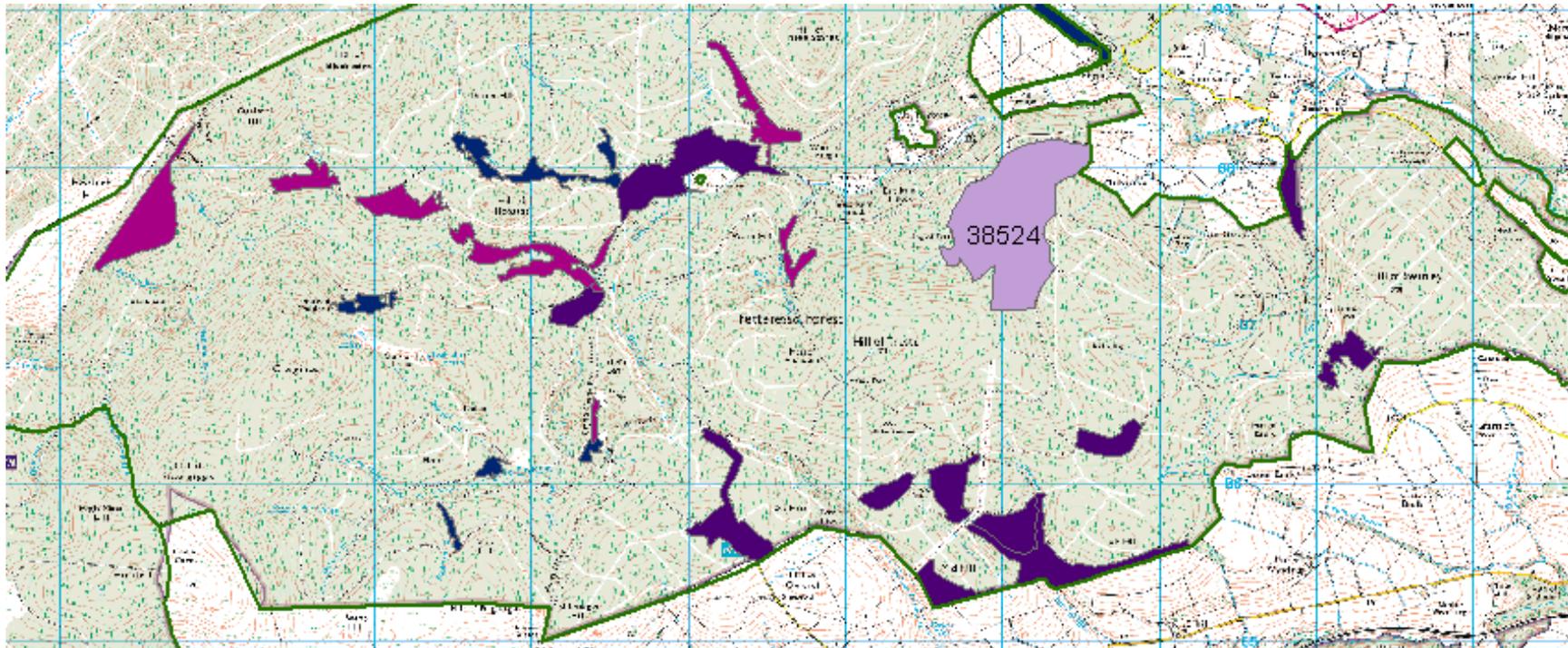
Mearns Forest Design Plan 2015-24

Map1A



Mearns Forest Design Plan 2015-24

Map1B





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.

Mearns Forest Design Plan 2015-24

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

Mearns Forest Design Plan 2015-24

Table 2. Basal area guidance for natural regeneration

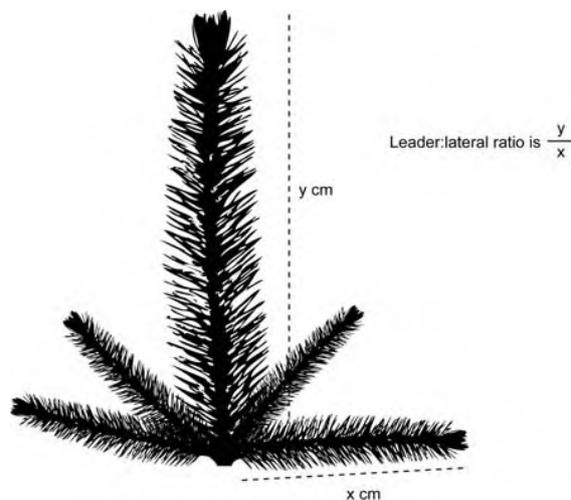
Species/ group	Shade tolerance of seedlings	BA (m ² ha ⁻¹) Establishment*	BA (m ² ha ⁻¹) Seedling growth**
Larches	Intolerant	20-25***	15-20
Pines	Intolerant	25-30***	20-25
Sitka spruce	Intermediate	30-35	25-30
Douglas fir	Intermediate	35-40	30-35
Norway spruce	Tolerant	40-45	35-40
Western hemlock	Tolerant	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:

Mearns Forest Design Plan 2015-24

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.

Appendix 6 – Drumtochty AWS & LISS recommendations.

Drumtochty AWS & LISS – Site Visit Recommendations & Notes

Present: Philippa Murphy, John Mackie, Graham Morrison, Jim Seaton, Mark Reeve, Dave Braiden

Coupe A

Gully: this gully is unthinned with steep slopes to the burn. Components are Grand Fir, Western Hemlock and Sitka Spruce. Currently designated as LISS, the crops are passed their thinning window and there are accessibility issues. As this is PAWS, the GF and WH are undesirable and thinning them would result in prolific regeneration. Beech should also be felled from the coupe at the same time. There is occasional Ash and Hazel and these would be the desirable restock species, along with Alder, Bird Cherry and Hawthorn.

It would be beneficial to fell this coupe at the same time as the thinning in 2011/12. An amendment should be drawn up for this.

Coupe B

Mature Oak with groups of Beech (PYr 1982): the Beech is unthinned and of poor form. This should be clearfelled for the firewood market. Retain all mature Oak. These areas could then be planted with Oak and Ash at productive densities.

Coupe C

Oak 1933: this area is categorised as Planted Site Native Woodland. The Oak should be lightly thinned.

Coupe D

1896 Larch with NS/SS understorey: the understorey should be felled completely at the next thinning. Hazel should then be planted to encourage a native woodland understorey.

Coupe E

LTR – steep gully sides of the Dhulin Burn and pond: the steep slopes are predominately stocked with non-native broadleaves and conifers but there are

occasional Ash, Hazel and many flushes of W7 vegetation. The aim for this area should be long-term, gradual restoration of the network of watercourses to native woodland (>90% native species). The working of this coupe will require further visits and planning of which trees to remove at each intervention. The tree casting the most shade should be targeted first and as the firewood market is buoyant this should be progressed quickly.

Coupe F

Big Tree Country!: This coupe should remain as LISS based around single-tree selection with occasional groups. There is regeneration particularly amongst the DF. There is definitely niche marketing opportunities on this site for over-sized trees and special requests and perhaps needs to be a thinning coupe in its own right. Should this remain a part of the thinning coupe due next year or do we wait till someone approaches us? Any flushes and native trees should be opened up during any thinning intervention.

Coupe G

All non-native conifers and broadleaves should be felled from this coupe and the remaining native component enriched through planting of Oak and Ash.

Coupe H

This area should be changed from LISS to clearfell as the fir component is undesirable on a PAWS site. This should be reviewed as a part of the forest plan review in 2012/13. The area should be restocked with Oak, Downy Birch, Silver Birch, Rowan and Hazel. This could be at productive densities but ground preparation should be scarification, if possible, to minimise disturbance.

Mearns Forest Design Plan 2015-24

